THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

Intermediate Examinations   Spring 2006

March 13, 2006

INFORMATION TECHNOLOGY

Module D

(MARKS 100) (3 hours)

Q.1 Rettalic is a healthcare organization having subsidiaries in seven countries. All seven subsidiaries have their own computerized systems. The management is now considering the possibility of integrating the inventory and personnel functions of all the seven subsidiaries in a single computerized system.

Required:

Describe briefly the key features of an 'Inventory Management System' and 'Personnel System'.

(12)

Q.2 Management of Mind Care, a private hospital, is considering ways to enhance the use of Information Technology in order to maintain its competitive advantage. A consultant who has been hired recently has advised to introduce an expert system.

Required:

What do you understand by an expert system? Give two suitable examples.

(05)

Q.3 The Systems Development Life Cycle (SDLC) is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study to maintenance of the completed application.

Required:

What is a feasibility study? Briefly explain any three key areas in which an IT solution has to be feasible in order to be selected?

(08)

Q.4 Tijarat Limited (TL) is a trading company using an IT based application to process daily operational activities. Recently, the company has been facing problems with the software. The management has considered several options to solve the issue and is inclined to develop a new application. However CEO of the company desires that a cost benefit analysis should be conducted prior to making any decision.

Required:

(a) Briefly describe the different costs of a new system.

(b) Briefly explain any three commonly used methods of cost benefit analysis which may be used by the management of TL.
Q.5 Riwayat Company (RC) has more than 100 standalone computers and each computer has its own data files. The management is planning to introduce the concept of networking to get the benefit of data sharing and avoid duplication of data. Moreover, this would help improve data processing and decision making. You have been recently hired as an IT Manager by RC and have been given the task to evaluate the suitability of a particular LAN system configuration. However, the management wants you to give them a presentation regarding various network topologies before finalizing any solution.

**Required:**

Apprise the management about the term ‘Network Topology’ and its various types with suitable examples.

(10)

Q.6 The performance of a network is dependent on the bandwidth and the media used for data transmission.

**Required:**

You are required to list and describe the main features of any four types of data transmission media.

(08)

Q.7 (a) Microsoft Excel provides features that help in tracking down problems on worksheets. Most of these are available either as menu commands or on the Auditing toolbar. Briefly explain the function of the following options available in the Auditing toolbar:

(i) Trace Precedents
(ii) Trace Dependents
(iii) Circle Invalid Data

(03)

(b) Reviewing toolbar is an excellent feature of Microsoft Word. Briefly explain the function of the following options available in the Reviewing toolbar:

(i) Track Changes
(ii) Accept Change

(02)

(c) One of the most popular features of Microsoft office family members is the ability to copy and move information from one application to another. Briefly explain the following in Microsoft Windows environment:

(i) Clipboard
(ii) Difference between ‘copy’ and ‘cut’ operation

(03)

(02)

Q.8 Cancer Cure Centre (CCC) is a large hospital for diagnosis and treatment of cancer. Patients’ bills are processed and approved by the computer. A discount is given to patients who cannot afford to pay the hospital bill. Management has laid down the following rules:

(i) For patient bill above Rs. 100,000, a discount of Rs. 15,000 plus 50% of the amount exceeding Rs. 100,000 is given, provided the patient does not have any outstanding dues.
(3)

(ii) For patient bill above Rs. 50,000 and upto Rs. 100,000, a 30% discount is given on amount exceeding Rs. 50,000, provided the patient does not have any outstanding dues.

(iii) For patient bill less than Rs. 50,000 no discount is given.

(iv) If the patient has any outstanding dues, the case is referred to the Financial Counselor.

(v) Details of payments are printed out after each record has been processed.

**Required:**

Construct a flowchart for CCC’s payment operations. 

**Q.9** Point Consulting has approached Mr. Rahman a senior member of the company to conduct a workshop on audit of computer based systems which would help the staff conduct the IT audits more effectively and efficiently. The CEO of Point Consulting has specially requested Mr. Rahman to focus on ‘General Controls’ in his presentation.

**Required:**

Prepare notes for Mr. Rahman’s presentation on General Controls – its meaning and examples in the following areas:

(i) Environment
(ii) Development
(iii) Maintenance and operation

**Q.10** Computer Aided Software Engineering (CASE) techniques aim to automate the document production process. Briefly describe two types of CASE tools.

**Q.11** In view of rapid change in the Information Technology environment, the vulnerability of the information systems has increased. To address this issue, management should identify threats to its information systems and develop a risk based approach.

**Required:**

Explain the stages involved in managing the risk in the information systems.

*(THE END)*
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

Intermediate Examinations  Autumn 2006

September 11, 2006

INFORMATION TECHNOLOGY

(QMARKS 100) (3 hours)

Module D

Q.1 Aljadeed Engineering (AE) is a large company involved in manufacturing and export of auto parts. The management of AE is considering to computerise its records. In the board meeting held in this regard, Mr. Alif proposed to develop the project using System Development Lifecycle (SDLC) approach. Some of the board members have no idea of SDLC approach. You are required to make a presentation giving brief explanation of various stages of SDLC.

(09)

Q.2 You have recently joined as Manager IT of Ever New Garments (ENG) which is a medium sized manufacturer of ready-made clothes. During your orientation visit you observed that there were sixty computers on ENG’s local area network following peer-to-peer networking model. The management of ENG is unaware of the demerits of peer-to-peer networking and the existence of any other networking model. All they know is that the data should be available to all users on timely basis. As this is not a sensible approach, you suggested to the Executive Director of ENG to switch over to file-server model.

The Executive Director has requested you to compare the file server model with peer-to-peer model to highlight the advantages of file server model.

(08)

Q.3 Management of ABC Limited, a fast moving consumer goods company, is considering changing its secondary sales data capture and analyses software. The management is confused whether to purchase an off-the-shelf packaged software or instead, develop a customised software.

You are required to apprise the management about the advantages and drawbacks of using off-the-shelf software.

(10)

Q.4 Prototyping is one of the techniques used for developing customised software. You are required to explain:

(a) the technique of prototyping with an example.

(b) how prototyping is beneficial to users and developers? What are its main disadvantages?

(03)  (06)

Q.5 The employees in the accounts department of Turab and Company are well versed in the use of spreadsheets. You have recently joined the company and wish to introduce a database management system (DBMS). However, your staff feels that DBMS is difficult to learn and are unable to find anything special in it.

To convince the staff you are required to:

(a) briefly explain the merits of a DBMS.

(b) identify and describe the key differences between a system based on spreadsheets and a DBMS as regards security and integrity of data.

(05)  (03)
Q.6 The World Wide Web (WWW) was designed in 1989 to provide a group of physicists with a mechanism to collaborate on-line in their research. It is technically similar to client/server model. Briefly explain the basic components of WWW.

Q.7 (a) Briefly explain the benefits of high level languages (HLL).
(b) Name any five types of HLL and specify their areas of application.

Q.8 You have recently joined as Manager IT of Shifa Pharma, a small sized pharmaceutical company. Just after joining, you asked your staff to guide you about various IT systems which have been developed in-house. During the discussion you noted that they have not adequately documented the flow of data in the systems and consequently a number of confusions arise. All the details regarding the system have been noted in the form of bullet points but such documentation is not meeting the standard. You are of the view that they should prepare adequate flow charts or should use some other appropriate form of system designing and documentation.

You are required to:
(a) briefly inform them about dataflow diagrams, decision tables and decision trees which are some of the common techniques of system documentation.
(b) advise them about the benefits and advantages of using flow charts.

Q.9 With the increased use of information technology in business environment, the success and failure of businesses are becoming more and more dependent on efficient performance of their information systems. The organizations must prepare themselves to face the risks and threats posed to their information systems and must have a documented and tested disaster recovery plan.

In view of the above perspective, you are required to:
(a) explain the meaning of the term disaster in an IT environment.
(b) briefly describe three broad categories of activities that are addressed by a disaster recovery plan?
(c) list the fundamental rules that should be applied while formulating a disaster recovery plan.

Q.10 Finance and Investment Bank Limited (FBIL) is developing a new integrated system which will work in a real-time, distributed environment covering thirty branches. Management recognises the need for strong controls but there is a concern that business processes may be over-burdened with checks and controls.

You are required to advise the management about the:
(a) key characteristics which should be considered while assessing the appropriateness of controls.
(b) risks that need to be addressed as FBIL is moving to a real-time, distributed environment.

Q.11 The following data represents the share price of XYZ company for a week:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date</td>
<td>Lowest</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>21/08/2006</td>
<td>96</td>
</tr>
<tr>
<td>4</td>
<td>22/08/2006</td>
<td>99</td>
</tr>
<tr>
<td>5</td>
<td>23/08/2006</td>
<td>101</td>
</tr>
<tr>
<td>6</td>
<td>24/08/2006</td>
<td>102</td>
</tr>
<tr>
<td>7</td>
<td>25/08/2006</td>
<td>98</td>
</tr>
</tbody>
</table>
(3)

(a) You are required to calculate the following:
   (i) highest price during the week.
   (ii) lowest price during the week.
   (iii) number of days when the price dipped below Rs. 100.
   (iv) number of days when the price rose above Rs. 100.
   (v) average of the highest price.
   (vi) difference between the highest price and lowest price during the week. (03)

(b) Write the Microsoft Excel formulas to calculate the above. (06)

(THE END)
Q.1 You have recently joined Shifa Pharmaceutical (SP) as IT Manager of its newly formed IT department. Previously IT support and services were outsourced. While reviewing the business and operations you observed that each department of SP had different local area network (LAN) topology and worked in isolation. For example, in Finance department every computer is connected to every other computer of the department whereas in Sales department all computers were connected via a single cable. When you pointed out this inconsistency to the SP’s Chief Executive and suggested to implement the same topology throughout the organization, he asked you to brief him about various network topologies before implementing your suggestion.

You are required to apprise the Chief Executive on basic types of Local Area Network (LAN) system configurations. (10)

Q.2 With increased automation of today’s businesses, the senior management of a company is often overloaded with various types of data. The ability to efficiently use such data for decision making purposes is quite often what distinguishes successful companies from others. Executive Information System (EIS) is a decision support system which is commonly used in many good organizations. You are required to:

(a) briefly explain EIS; and (03)
(b) list key advantages of an EIS. (03)

Q.3 All organizations are at risk of attack from computer viruses, worms and trojan horses when they are connected to the Internet and while using removable media (e.g. floppy disks and CD-ROMs) or shareware/freeware software. The impact of a virus, worm or a trojan horse can be as harmless as a pop-up message on a computer screen or as destructive as deleting all the files on a hard drive. To counter such threats antivirus programs are installed either on the network infrastructure (i.e. mail server or firewall) or on the end user machines.

You are required to describe the respective advantages and disadvantages of antivirus programs installed at the network infrastructure and on the end user machines. (06)

Q.4 You are a software consultant and have been approached by a Right Angle Business School (RABS) to give a lecture on Computer Aided Software Engineering (CASE) tools to their students, highlighting their types, need and utility.

In the light of RABS’s request, you are required to prepare a lecture on CASE tools explaining the following points:

(a) Types of CASE tools (03)
(b) Advantages of using CASE tools in system analysis and development process (03)
Q.5 ABC Bank has recently implemented a custom-built software to automate its consumer lending operations. With an interface to the Bank’s customer credit history database, the system is expected to allow faster processing of loan applications and ensure better credit-quality decisions. On completion of first processing cycle by the new system, the IT Manager has recommended to conduct its post implementation review (PIR). The management is not sure about the necessity of carrying out such a review and therefore has asked you to apprise them about PIR in detail before any decision can be taken.

You are required to submit a report on PIR covering the following:

(a) purposes of conducting a PIR; and  
(b) when should ABC Bank conduct the PIR of the new system?

Q.6 Hakim Hospital (HH) is a medium size hospital equipped with state of the art medical facilities. Though the records of HH are computerized, they are not integrated. The management is planning to get an integrated software developed from a software house. However, security over patients’ history is their major concern.

You are required to list any six logical access controls that should be incorporated in the HH’s integrated software to ensure the security of data.

Q.7 Galaxy Services (GS) is a newly established brokerage house which functions 24 X 7 hours a week due to its dealings in international markets. Since continuity of operations is a prime concern for GS, it is looking for alternative processing facility arrangements. In this regard, the management of GS has asked you, being their IT Manager to explore this issue in detail and submit a report.

You are required to write a report on alternative processing arrangements covering the following:

(a) possible alternative arrangements with their distinguishing features; and  
(b) which alternative processing facility(ies) would you recommend for GS and why?

Q.8 The Valley Bank (VB) has two types of credit card members viz. Gold card members and Silver card members. You are required to construct the flowchart of a program that will generate a list of each type of members showing the credit limits utilized by each member and the total of each list.

THE END
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

Intermediate Examinations  Autumn 2007

September 10, 2007

INFORMATION TECHNOLOGY

Module D

(Marks 60)

(1 hour 45 minutes)

Q.1 E-commerce has experienced tremendous growth over the past decade. Many retail
businesses now offer some form of e-commerce services as no one wants to be left behind
in the global race for business in the information age. However, not all companies have
proved successful in their e-commerce ventures. Indeed, bursting of dot com bubble at the
turn of last century proves that merely establishing a presence as an e-commerce company
does not guarantee success.

You are required to explain the success factors which an aspiring e-commerce company
should adopt to succeed in its e-commerce initiative. (06)

Q.2 Resource Enterprises (RE) is a reputed recruiting agency. One of their clients has
embarked on an ambitious program to induct entry-level fresh graduates at its various
locations. The client has requested them to assist in short-listing the right candidates from
the job applications which they might receive. RE decided to develop a computer
application to significantly automate the process of analyzing and short-listing job
applications. They plan to have a comprehensive program which could be used for other
clients as well.

You are required to list down at least eight system functionalities which the above
mentioned system should have, to meet the objectives of RE. (10)

Q.3 (a) Local area networks (LANs) using wireless media is gaining immense popularity
now-a-days. Briefly describe Wireless LAN and list three key advantages and
disadvantages of wireless LAN. (08)

(b) Briefly explain distributed processing. (02)

Q.4 (a) A relationship is a natural business association that exists between one or more
entities. Sometimes, relationships are also referred to as data associations. Give an
example of each of the following types of relationships:

• One to One
• One to Many
• Many to Many (03)

(b) List four types of storage media which can be used for taking back-up. (02)

Q.5 Explain each of the following types of controls. Also give two suitable examples in each
case.

(a) Preventive Controls (03)
(b) Detective Controls (03)
(c) Corrective Controls (03)
Q.6  (a) A global Web of computers i.e. the Internet allows individuals to communicate with each other. It provides a quick and easy exchange of information and is recognized as the central tool in the present era.

You are required to explain the following terms related to Internet:

- Web Page  
- Home Page  
- URL  

(b) Explain the security risks associated with the use of instant messenger in a corporate environment.  

Q.7  Vibrant Traders is a medium sized trading company. The company is in the process of documenting its payment procedures. The management has formulated the following rules for signing of cheques:

- All cheques should be signed by two signatories not below the rank of managers.
- Cheques upto Rs. 100,000 may be signed by two managers.
- Cheques upto Rs. 1.0 million should be signed by at least one director.
- Cheques of more than Rs. 1.0 million shall be signed by two directors.

Prepare a decision table to assist in the verification of cheques.  

(THE END)
INFORMATION TECHNOLOGY
(Marks 60)
Module D
(1 hour 45 minutes)

Q.1 Soft Revolution (SR) is a large IT solution provider. Recently it has purchased an old building in a coastal city for their branch office. Since SR’s business is dependent on information technology function, the effects of physical environment require careful consideration. The management has identified three major types of physical threats to its operation i.e. fire, flooding and unauthorized physical access.

You are required to advise the management about the following:
(a) At least three types of controls applicable in each of the above situation. (04)
(b) What measures the company should take to mitigate the losses from the above threats? (03)

Q.2 Classify the following controls as preventive, detective, or corrective controls. Give very brief reasons to justify your answers.

(i) Strong passwords
(ii) Exception reports
(iii) Digital signatures
(iv) Segregation of duties
(v) Backups
(vi) Review of system activity logs (06)

Q.3 E-mail, Instant Messaging (IM) and other chatting programs are very popular among home Internet users. Few years back, these were equally popular in corporate environment where users did have one or other messenger for sharing information with friends and colleagues. However, with increasing risks and threats, the use of IM and chatting programs is generally prohibited in the corporate environment but e-mail is still widely used.

(a) Explain the difference between an e-mail and an instant message. (02)
(b) List the factors which prompted the corporate world to prohibit the use of IM and chatting programs. (04)

Q.4 Internet is an important source of gathering information on different topics.

(a) List any six search engines which are popular among Internet users. (03)
(b) Explain with the help of an example, how a search engine will respond if the information to be searched is entered:
(i) within inverted commas;
(ii) without inverted commas. (03)

Q.5 (a) Networks have played an important role in the significant growth of computer applications and office automation. Large as well as small businesses are using networking. You are required to briefly explain the benefits of networking, in corporate environment. (04)
(b) Data is transmitted over a channel in three different modes, i.e. simplex, half duplex and full duplex.
   (i) Explain the difference between each of the above modes. (03)
   (ii) Give two examples of data transmission under each mode. (03)

Q.6  (a) An operating system controls the running of programs in a computer. You are required to explain how the operating system controls and facilitates application programs. Also list the services which an operating system provides to the users. (04)

(b) System Software comprises of various system and utility programs. These programs are used in the design, processing and control of all computer applications. Operating System is an example of System Software. You are required to list six other types of system/utility programs. (03)

Q.7  The management of Beta Textiles is not satisfied with the performance of its information processing system. The processing is carried out through a comprehensive software which was developed in-house about two years back. However, soon after its implementation, users started complaining that the software is not user friendly. They also complained that there are frequent hang-ups and the processing is slow. The recently appointed IT Manager is of the view that main causes of these problems are lack of software maintenance and ineffective post implementation review (PIR). The PIR team had recorded users’ concerns and various system irregularities during their review but their findings were not formalised and no action was taken to address users’ concerns.

You are required to:
(a) List down the matters that should be contained in a formal PIR report. (04)
(b) Explain the importance of software maintenance. (04)

Q.8  International Consumers Products Limited (ICPL) is a large FMCG company with country-wide presence. In a meeting of the executives of the company the Marketing Manager proposed the development of an Expert System (ES) for analyzing the customer trends, their preferences and anticipating the future demands. However, the IT Manager was of the opinion that ES is not suitable in their case. Since the CEO does not have adequate knowledge about application of ES, he asked the IT Manager to prepare a note, for discussion in the next board meeting.

On behalf of the IT Manager, you are required to:
(a) Identify three major components of an ES and the specific contribution which each of them makes in the working of the system. (05)
(b) Explain why the IT Manager feels that ES is not suitable for ICPL. (05)

(THE END)
Q.1 New Era Textiles Limited is in the process of laying Local Area Network (LAN) in their factory for the first time. The management has hired you to supervise this task. Since the management has no previous experience of working in a LAN environment, it has requested you for a discussion on the subject.

You are required to apprise the management about:
(a) Four major types of network topologies and their salient features.  
(b) Duties related to administration and control of LAN.

Q.2 Tameer Constructions Limited (TCL) is a growing company and is handling various projects simultaneously. During the management meeting, the Project Managers highlighted the problems in the existing software, which was developed five years ago. They emphasized the need for a better software according to the present requirements. The senior management has decided to carry out a feasibility study before making a final decision.

Briefly explain the areas which should be addressed in the feasibility study.

Q.3 Most of the advanced and sensitive systems place significant reliance on automated controls. Audit trail is one such automated control.

(a) Explain the concept of audit trail in a computerized environment. 
(b) List the major benefits which can be derived from the use of audit trails

Q.4 Identify the advantages which can be derived by the use of Computer Aided Software Engineering (CASE) tools, in the system development process.

Q.5 (a) Briefly explain the terms “system flowchart” and “program flowchart”. Also, identify the disadvantages associated with the use of a flowchart.

(b) One Place Departmental Store is offering 10% discount to all its customers who make purchases of more than Rs. 10,000 during a single visit. On each counter, the item code and the quantity is fed into a computer for generating the cash memo. You are required to prepare a program flowchart showing the above steps.

Q.6 The Finance Manager of Nafees Traders (NT) wants to buy a customized Decision Support System for assistance in various financial projections and decision making. However, the management is not convinced with its utility because it is of the view that such programs cannot replace human intelligence, which is vital for business decisions.

On behalf of the Finance Manager, apprise the management about the uses and benefits of a Decision Support System.
Q.7 As the need for updated information is increasing, online processing is gaining popularity. However, batch processing is still a preferred choice for certain business applications.

(a) Explain how batch processing is different from online processing, in terms of processing of transactions, file updation and response time.

(b) Briefly explain two situations in which batch processing will usually be preferred over online processing.

(c) Briefly describe the three major types of data files used in batch processing environment.

Q.8 The management of Explicit Technologies Limited (ETL) has decided to develop a risk management manual for their IT operations. You are required to explain the main stages in the risk management process.

(THE END)
Q.1  Emerald Distributors Limited (EDL) is the authorized distributor of various fast moving consumer goods. There are three Local Area Networks (LANs) within EDL’s head office and a number of small LANs at its branches. However, they are not interconnected. To enhance the business efficiency, the management has decided to connect its information systems with its business partners. As the IT manager of the company you have requested the finance department to allocate required funds for establishing intranet and extranet. However, the finance manager is of the view that the management’s objective can be achieved easily through the use of Internet.

Explain intranet and extranet and comment on the views of the finance manager.  (07)

Q.2  In present era of networking, sending and receiving data to far off places has become efficient and economical. Whether we connect to the Internet using a dial up connection, create a small local area network or create a wide area network, some typical network hardware is essentially required. These include repeaters, hub, bridge, router etc.

Explain the basic functions of each of the above mentioned hardware.  (08)

Q.3  Phi Limited Company (PLC) has recently implemented a sales and inventory management system at its warehouse. PLC supplies goods on cash as well as on credit. Credit is only allowed to those customers who have made at least one cash transaction with the company. The credit limit for A and B category customers is Rs. 1.0 million and Rs. 0.5 million respectively. It allows a discount of 5% on all orders exceeding Rs. 0.25 million.

You are required to list the following:
(a) data to be input at the time of booking/recording customers’ orders.
(b) types of processing which may be carried out by the system.
(c) output that may be produced by the system.  (08)

Q.4  The management of your company wants to create general awareness about computer viruses among the employees. You are required to briefly explain:
(a) Virus, Worm and Trojan horse.  (04)
(b) any six preventive controls which may be placed to mitigate the risk of such threats.  (03)

Q.5  A mobile phone operator is running a promotional campaign. According to the scheme a customer who makes calls worth Rs. 1,000 in any calendar month, is allowed 50% discount on all subsequent calls made to its own network, during that month.

Construct a decision table depicting the functioning of such a program.  (08)
Q.6 Explain six main stages of System Development Life Cycle (SDLC). (09)

Q.7 You are required to gather information on financial meltdown from the web. Briefly explain what results would you get when you enter the following on the Internet search engine:
(a) Financial Meltdown
(b) “Financial Meltdown”
(c) Financial AND Meltdown
(d) Financial OR Meltdown
(e) Financial NOT Meltdown (05)

Q.8 Mehak Enterprises (ME) has outsourced the development of its inventory management software. Users with different profile and access rights would use this software. Most of the users would only have the rights for entering the data related to receipts and issuance of goods. Only three persons would be nominated to authorize the transactions. Being ME’s internal auditor, you are conducting a pre-implementation review of its logical access controls.

Identify at least four controls which you would look for, to assess the adequacy of the logical access controls. Specify the risk associated in case the specified control is not implemented. (08)

(THE END)
Q.1 Modern Pharmaceuticals Limited (MPL) is a large organization with country wide presence. It is considering to replace its centralized system with distributed processing system. In order to create awareness among the senior executives of the company about distributed processing system, you have been asked by the management to give a presentation on:

(a) Distributed Processing System and its important characteristics.  
(b) Risks and challenges in adopting distributed processing approach.  

Q.2 Your company is planning to launch an interactive website. In the initial stages, various options have been discussed. The final proposal is now being drafted and you are required to write a note for inclusion therein, consisting of the following:

(a) Explanation of website hosting and types of services usually provided by web hosting companies.  
(b) Brief explanation of the following types of web hosting:
   (i) Shared Web Hosting
   (ii) Virtual Dedicated Server
   (iii) Dedicated Hosting
   (iv) Co-location Web Hosting

Q.3 Unique Enterprises is a large scale manufacturer of mobile parts and accessories. It has acquired a new ERP to integrate different departments. It is also planning to connect with its customers and suppliers through extranet. Consequently the management is reassessing its alternative processing facilities.

(a) Compare the respective merits and demerits of having own alternative processing site or engaging a third party service provider.  
(b) Differentiate between a hot site, cold site and a warm site. Which type of facility would you prefer in the above situation and why?  

Q.4 World Technologies is in the process of implementing electronic physical access controls. The IT department has identified the following options:
   - Password
   - Access cards / tokens
   - Bio-metric system

You are required to write a note giving brief comparison of the above with respect to ease of use and level of security.
Q.5 In view of certain threats identified during the information systems audit of Customers Bank Limited (CBL), the auditors have recommended the use of Public Key Infrastructure (PKI).

You are required to write a note to the management explaining the functioning of PKI. (05)

Q.6 Sirzameen Bank Limited (SML) has launched a promotion for its credit card customers. According to the promotion, the customers will receive a gift voucher worth Rs. 500 with their monthly bill if they spend Rs. 15,000 more than their last month spending and their last month bill is not less than Rs. 10,000.

Draw a flow chart showing the above process. (05)

Q.7 (a) In a networking environment, what do you understand by “Protocol” and “Communication Protocol”? (02)

(b) Write brief notes describing the salient features of each of the following:
   (i) Transmission Control Protocol / Internet Protocol (TCP/IP) (03)
   (ii) Open Systems Interconnection Protocol (OSI) (03)
   (iii) Wireless Application Protocol (WAP) (03)

(THE END)
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examinations – Autumn 2009

Ans.1 (a) Distributed system is defined as a system in which there are several autonomous but interacting processors and/or data stores at different geographical locations linked over communication networks.

Some of the important characteristics of distributed processing system are as follows:
(i) A computer can access files from other computers in the system.
(ii) The computers within the system are able to process data jointly or interactively.
(iii) Files are stored centrally or at local sites (redundancy).
(iv) Processing can be carried out centrally as well as locally.
(v) Authority is decentralized as processing can be performed autonomously by local computers.
(vi) End-users of computing facilities are given responsibility for, and control over their own data.

(b) Risks and challenges in adopting distributed processing approach are as follows:
(i) Security risks arise because processed data is also required to be transmitted.
(ii) As there is reliance on remote systems for processing so failure of remote system and/or communication link can affect local processing also.
(iii) It is hard to administer and manage a distributed system rather than centralized system.
(iv) Cost of maintaining the system increases as more sophisticated equipment and trained staff is required at more than one location.
(v) Data accuracy issues may arise.

Ans.2 (a) A website hosting service is a type of Internet hosting service that allows individuals and organizations to host their own website, and users with online systems for storing information, images, video or other contents accessible via the World Wide Web.

Following services are usually offered by web hosting companies:
(i) Web Interface / Control Panel to manage the website.
(ii) Storage space.
(iii) Database service.
(iv) Application platforms to run various applications.
(v) Security services.
(vi) E-mail accounts.
(vii) Mailing lists.
(viii) Monitoring and statistics.
(ix) Bandwidth for accessing websites.

(b) (i) Shared Web Hosting
One’s website is placed on the same server as many other sites, ranging from a few to hundreds or thousands. All domains may share a common pool of server resources, such as RAM and the CPU. It is the most economical web hosting solution which offers slowest speed as compared to other solutions.

(ii) Virtual Dedicated Server
It involves slicing up a server into virtual servers. Each user feels like they are on their own dedicated server but they are actually sharing a server with many other users. It is a faster but expensive solution than shared web hosting solution.

(iii) Dedicated Hosting
The user gets his own web server and gains full administrative control over it. However, the user typically does not own the server. It is the fastest but costly than shared and virtual dedicated web hosting solutions.

(iv) Co-location Web Hosting Service
The user has his/her own web server and has full administrative control over it. The hosting company provides physical space that the server takes up and takes care of the server. In most cases, the co-location provider may provide little to no support directly for their client’s machine. It provides only the electrical, internet access and storage facilities for the server. It is the fastest but most expensive web hosting solution.
Ans. 3 (a) Comparative merits of having own alternative processing site than engaging third party service providers

(i) It will comprise of one time fixed cost rather than monthly variable cost over a long duration.
(ii) Own alternative processing site can be made at a convenient location for the company rather than having to adjust when and where basis of third service provider.
(iii) No dependency on any organization. Unique Enterprises can test its alternative processing arrangement when it suits.
(iv) Standardizations can be managed. Own alternative processing site can have same level of controls as primary site.
(v) All hardware, software and other resources are readily available.
(vi) Same level of security that of the original site may easily be observed at own alternative processing site. In case of engaging third party for alternative processing arrangements, risk to confidentiality of data increases.

Comparative demerits

(i) Own alternative processing site will be very costly to manage.
(ii) As one is never sure when an alternative processing site might be required so a situation can arise when Unique Enterprise might not require its alternative processing site for years.
(iii) Own alternative processing site will be hard to manage and maintain, in terms of operations, human resource and hardware.
(iv) In case of own alternative processing site, all resources required might not be available and require sometime for implementation based on SLA signed with third party service provider.
(v) Third parties offering alternative processing arrangements have experts for handling disastrous situations and managing recovery/alternative processing sites. There is high risk that company’s may not be able to manage the alternative processing site like third party experts due to their little or no exposure in this field.

(b) A hot site usually has a full computer systems as well as near-complete backups of user data. It takes few minutes to few hours to attain full working condition.

A warn site has hardware and connectivity already established, though on a smaller scale than the original production site. It has backups on hand; therefore, it requires few days to be put at full condition.

A cold sites has only basic environment i.e. electrical wiring, air conditioning, flooring etc.. This site is ready to receive equipments but does not offer any components at the site in advance of the need. So to upgrade this site to full working condition may require several weeks.

Recommendation for alternative processing site

Discontinuation of operations for more than a few hours may prove very costly to UE. Unavailability of the system means the:

- departmental working will be stopped as all the departments will be working on the same data under the new ERP.
- company will not be able to meet the demands of its customers and place timely orders to its suppliers who will be connected to the company’s system via extranet.

Since a hot site takes minimum time to resume the operations, hence it would be most suitable choice for the UE.
Ans.4 Password

Password is an authentication control in which entry into any physical environment is based on something you know. Generally a keypad entry system is used for entering password which is verified by a suitable program to allow physical access to a facility.

Passwords are easy to use but need to be memorized. In comparison to other electronic controls it is weak as it can be guessed and/or stolen.

Access Cards/Tokens

This is an authentication control in which entry into any physical environment is based on something you have. Generally a swap card terminal or show card terminal is used for authenticating access cards and gaining physical access to a facility.

It is easier to use than password as one does need to memorize it. However, it has to be kept in custody at all times. It is a weak control as compared to a biometric control and can be compromised if stolen.

Bio-metric System

This is an authentication control in which entry into any physical environment is based on something you are. Generally finger print, hand and retina scanners are used for authenticating users and gaining physical access to a facility.

It is easier to use than other electronic controls as one does not need to memorize or to keep as an article all the time. It is strongest control than other electronic controls. Authentication by this control guarantees user’s identity as a user cannot share this control like a password or access card.

Ans.5 Public Key Infrastructure (PKI)

PKI is a mechanism of encryption and decryption of data using double keys (codes) issued by an independent trusted third party, known as Certificate Authority (CA).

To understand PKI mechanism, consider two users A and B, both having their private and public keys issued by same or different CA.

A can send data to B encrypted by:
(i) his own private key; or
(ii) B’s public key; or
(iii) B’s public key and his own private key.

On receipt of the data, B can decrypt it using:
(i) A’s public key if it is encrypted by A’s private key.
(ii) his own private key if it is encrypted by his own public key.
(iii) his own private key and A’s public key if its encrypted by his own public key and A’s private key.
Ans. 6

Start

Open Files

If EOF

Yes

No

Read a record
Current Month Spending = CMS
Last Month Spending = LMS

IF LMS >= 10,000

No

Yes

IF CMS >= LMS + 15,000

No

Print Bill

Yes

Print Bill and Gift Voucher

Next Record

Close Files

End

Ans. 7 (a) **Protocol**
An agreed set of operational procedures governing the format of data being transferred and the signals initiating, controlling and terminating the transfer is known as Protocol.

**Communication Protocol**
A Communication Protocol is the set of standard rules for data representation, signaling, authentication and error detection required to send information over a communication channel.

(b) **TCP/IP**
It is the wide area network protocol that provides communication across diverse interconnected networks.
The IP component provides routing from the department to the enterprise network, then to regional networks and finally to the global Internet.

TCP is responsible for verifying the correct delivery of data from client to server. Data can be lost in the intermediate network. TCP adds support to detect errors or find lost data and to trigger retransmission until the data is correctly and completely received.

(c) OSI
This protocol is divided into seven functions in a seven layer reference model.

The seven layers of OSI model are as follows:
1. Physical layer
2. Data link layer
3. Network layer
4. Transport layer
5. Session layer
6. Presentation layer
7. Application layer

Layers 1 to 4 handle the movement of data from one place to another. Layers 5 to 7 deal with the exchange of data between applications.

(d) WAP
It allows users to access information instantly via handheld wireless devices such as mobile phones, pagers, two-way radios and communicators.

It supports most wireless networks. These include GSM, CDMA, TDMA, CPDP and Mobitex etc.

It is supported by all operating systems. Windows CE, OS/9, PalmOS, EPOC and JavaOS are some of the operating systems that are specifically engineered for handheld device.

WAPs that use displays and access the Internet runs micro browsers. Such browsers have small file size that can accommodate the low memory constraints of handheld device and the low bandwidth of a wireless handheld network.

WAP supports HTML and XML, however, WML language is specifically devised for small screens and one-hand navigation without a keyboard.

(THE END)
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

Intermediate Examinations Spring 2010

March 8, 2010

INFORMATION TECHNOLOGY

Module D

(MARKS 60)

(1 hour 45 minutes)

Q. 1 National University of Business Education (NUBE) is considering to connect the networks installed in its campuses which are three kilometers apart. While reviewing the IT department’s proposal in this regard, the head of procurement has observed that IT department has recommended the use of a particular type of cable as data transmission medium without giving any justification for its selection.

Required:
As IT Manager of the university, write a note to the head of procurement describing the key characteristics of four types of data transmission media that are commonly used for connecting networks. Give justification to support your recommendation. (10)

Q. 2 The management of Proficient Consultants (PC) is considering to install an Expert System as it is concerned about losing the expertise of some of its key employees. However, the CEO is concerned that huge cost would have to be incurred which would far outweigh the benefits.

Required:
(a) To what extent an Expert System can substitute the expertise of a key employee? (02)
(b) What other benefits can be secured by deploying an Expert System? (04)
(c) Limitations and constraints which the company must consider before acquiring the expert system. (03)

Q. 3 Perpendicular Limited’s network is down due to a virus attack. Management has asked the IT manager to explain why the viruses were able to penetrate the system, in the presence of disk scanner antivirus software.

Required:
As IT Manager of the company explain:
(a) two more kinds of antivirus software, besides conventional disk scanners: (04)
(b) how the controls against viruses be strengthened further? Also discuss the possible justification for your failure to install the appropriate software. (04)

Q. 4 Vertical Heights Limited (VHL) makes a variety of children products and sells them directly in local market through its own stores. To counter the impact of the recent recession, VHL wants to promote the use of e-commerce technology to promote its business interests.

Required:
(a) Identify any six common uses of e-commerce technology. (03)
(b) Discuss what benefits can VHL obtain by use of e-commerce. (04)
Q.5 Many organizations prefer in-house development of computer applications in order to achieve cost effectiveness and ensure that deadlines are met.

**Required:**
Explain the following, assuming you are the Project Manager responsible for in-house development of an application and you are using SDLC approach:
(a) the key strategies that would help in achieving the objectives of cost efficiency and timely completion of assignment;  
(b) responsibilities of the users in successful completion of the project;  
(c) the possible uses of Computer Aided Software Engineering (CASE) tools for achieving cost effectiveness and time saving.  

Q.6 Horizontal Ltd has realized the importance of data recovery after a recent disaster where they lost some very important data. On the advise of a director the management is inclined to implement the **Grandfather, Father and Son** methodology for data backup.

**Required:**
(a) Briefly discuss the above methodology.  
(b) Explain the risk which would persist even after implementing the above system and suggest measures to minimize that risk further.  

Q.7 Briefly explain the following features of a Database Management System with a suitable example in each case:
(a) Data sharing  
(b) Query ability  
(c) Rule enforcement  
(d) Change and access logging  

**THE END**
A.1 **Copper wire**

This is a twisted pair of cables. It is widely available and inexpensive. However, it has low transmission rate and relatively high error rate because there is only minimal anti-interference screening. It allows straightforward addition of extra nodes. Telephone line is an example of copper wire.

**Coaxial cable**

Coaxial cable is similar to domestic television aerial cable. It gives significantly better performance than twisted pair cable, as there is less risk of distortion of data at higher rates of transmission. Anti interference screening is also better than twisted pair cable. Heavier grades of cables allow broadband transmission, increasing the number of signals which can be carried simultaneously. It allows straightforward addition of extra nodes.

**Fibre optic cable**

These are virtually interference free and have extremely high data transmission rates up to one billion bits per second. It is popular in WAN, but less widely used in LANs for two reasons, first it is relatively high cost option, secondly it does not support the addition of nodes, which makes it unsuitable for ring type LANs, and transmission is essentially in one direction, which makes it unsuitable for bus type LANs.

**Microwave**

These are ultra high frequencies (UHF) radio signals; they can be transmitted between radio transmitters and receivers which are in the site of each other. Each of these relay stations are known as repeaters. Repeaters are cited a network along which signals can be sent. The ultra high frequency nature of microwave minimizes distortion. One particular characteristic of the microwave system is that it cannot bend around corners; therefore microwave antennas must be in "line of sight" of each other - that is, unobstructed.

In the given scenario it is suggested to go with fibre optic technology due to following reasons:

(i) No interference from external factors.
(ii) No problem in terms of line of sight.
(iii) No problem with multipath distortion.
(iv) Unlimited bandwidth.
(v) High Reliability.
(vi) Low cross talk, interference between adjacent cable.
(vii) Though satellite is also a better option, it is much expensive than fibre optic and does not suit to NUBE.

A.2 (a) **Expert system can be used to acquire knowledge base from existing employees based on their past experience.**

The Expert system can substitute the expertise of key employees in a complex situation/decision provided:
- The key employee whose expertise is needed had faced such situation or similar situation in the past.
- The key employee has stored his strategy to deal with situation or decision taken in such situation, in the knowledge base of the expert system.

(b) **Other Benefits of Expert System**

(i) It can reduce the number of people or it can reduce the coordination and consultancy cost between employees when a complex decision is to be made.
(ii) The decisions made by using its knowledge database would be consistent while human decisions may sometimes be inconsistent and affected by other factors.
(iii) The decisions and knowledge is documented, hence any decision can subsequently be justified.
(iv) Decisions can be made quickly.
(v) This knowledge base containing key employees expertise, remain with the company while employees can leave any time.
(vi) Expert system will carry out a detailed analysis while a human may forget to consider many things.
(vii) It can work continuously, while a human being has his/her limitations.

(c) Limitations and Constraints of Expert System
(i) Expert systems are expensive, as they require initial cost and cost of maintenance.
(ii) Humans are naturally more creative as compared to computers.
(iii) If relevant information is not present in its knowledge base, the system is unable to make a decision. In such a situation, further input of data/information is required.
(iv) In expert system, domain experts are not available to explain the logic and reasoning.
(v) Wrong decisions might be taken on account of errors in the knowledge base.

A.3 (a) Besides conventional disk scanners, following types of virus scanners are usually used:
(i) **Active Monitors / Behavior-Based Detection**: This kind of software will sit in memory and look for so-called "virus-like behavior" or "suspicious activities". In essence, these programs are looking for the types of actions taken on files or boot sectors that are usually performed by a virus when it tries to spread. Active monitors can be annoying because they cannot distinguish between a user request and a program request. As a result, users are asked to confirm actions like formatting a disk or deleting a file.

(ii) **Integrity Checkers**: They compute a binary number on a known virus-free program that is then stored in a database file. The number is called a Cyclic Redundancy Check (CRC). When that program is called to execute, the checker computes the CRC on the program that is to be executed and compares it with the number in the database. A match means no infection; a mismatch means that a change in the program has occurred i.e., a virus could be present.

(b) **Measures to strengthen controls against viruses**
(i) The controls against viruses are strengthened by installing a combination of different types of antivirus software, because disk scanners carry certain limitations such as inability to detect viruses like actions and inability to perform cyclic redundancy check.
(ii) Designing and implementing sound antivirus policies.
(iii) Educating users about potential virus sources and their controls.
(iv) Restricted use of removable storage media.
(v) Installation of properly configured firewall. Periodic review and update of the firewall policy.

**Reasons of failure**
At the time of previous capital budget approval, it was pointed out to the management that merely installing conventional disk scanner antivirus software is not enough to prevent viruses from penetrating. Besides disk scanners, active monitors and integrity checkers were also requested in the budget. Consequently, various other measures were suggested/required which involved purchase of hardware as well as software. However, our request was turned down and consequently we were unable to carry out the desired steps.

A.4 (a) **Common uses of E-commerce**
- E-Marketing
- Business Services
- Online trading
- Communication Services
- Online banking
- Information Services

(b) **VHL can obtain following benefits by using e-commerce:**
(i) More business partners can be reached and hence more sales can be made.
(ii) More geographically dispersed customers can be contacted.
(iii) Decisions regarding inventory controls and management can be made.
(iv) Customer services can be improved.
(v) Cost savings especially in areas such as procurement and marketing can be achieved.
(vi) Less administrative hassle as less staff would be needed.
(vii) Extended trading hours allows business always free to open on the Internet without overtime and extra cost.

A.5 (a) **Key strategies to achieve the objectives of cost efficiency and timely completion of assignment**

(i) **Monitor the project plan** – continuously monitoring and managing the project plan helps in ensuring that the project remains on track and all major project milestones are met.

(ii) **Find errors early** – the sooner errors are found, the less costly it is to correct them.

(iii) **Determine future requirements** – establishing requirements for current as well as future needs will help ensure that system will not outgrow.

(iv) **Take advantage of changing technology** – technology changes quickly and one must take advantage of any new technologies to make the project successful.

(v) **Complete the testing phase** – it is critical to perform all phases in the SDLC. Try not to sacrifice testing time as it may be disastrous in the long term.

(vi) **Choose the right implementation method** – that best suits the organization, project and employees.

(vii) **Work together** – it is important to have co-ordination between the users and IT specialists. Without such co-ordination, it would not be possible to achieve the desired results.

(b) **Responsibilities of Users**

(i) Defining the system to be developed.

(ii) Helping project manager in defining the activities of each phase of the SDLC.

(iii) Performing a detailed review of each business requirement and approving the analysis by signing off on the business requirements.

(iv) Analyzing solution developed by IT specialists and making recommendations.

(v) Reviewing the test conditions and ensuring that all aspects of the system functionality are tested, as far as possible, under live environment.

(vi) Attend training session and try to make best utilization of the available training facility.

(vii) Timely availability of required data.

(c) **Possible uses of CASE tools for achieving cost effectiveness and time saving are as follows:**

(i) Quickly generating project schedules in various formats.

(ii) Producing diagrams e.g., flowcharts, DFDs etc.

(iii) Producing system model diagrams.

(iv) Defining data structures.

(v) Automating Screen Report designing.

(vi) Producing Installation Schedule.

(vii) Generating Program codes.

(viii) Version controlling.

(ix) Change specification and change tracking.

(x) Test data generators.

A.6 (a) A grandfather, father and Son is a rotation schemes for tapes that provide an appropriate data history. It uses twelve tapes or other portable media, allowing recovery of three months data.

<table>
<thead>
<tr>
<th>Tape No</th>
<th>Tape Name</th>
<th>When Written To</th>
<th>Over Written</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Son 1</td>
<td>Every Monday</td>
<td>Weekly</td>
</tr>
<tr>
<td>2.</td>
<td>Son 2</td>
<td>Every Tuesday</td>
<td>Weekly</td>
</tr>
<tr>
<td>3.</td>
<td>Son 3</td>
<td>Every Wednesday</td>
<td>Weekly</td>
</tr>
<tr>
<td>4.</td>
<td>Son 4</td>
<td>Every Thursday</td>
<td>Weekly</td>
</tr>
<tr>
<td>5.</td>
<td>Father Week 1</td>
<td>First Friday</td>
<td>Monthly</td>
</tr>
<tr>
<td>6.</td>
<td>Father Week 2</td>
<td>Second Friday</td>
<td>Monthly</td>
</tr>
<tr>
<td>7.</td>
<td>Father Week 3</td>
<td>Third Friday</td>
<td>Monthly</td>
</tr>
<tr>
<td>8.</td>
<td>Father Week 4</td>
<td>Fourth Friday</td>
<td>Monthly</td>
</tr>
<tr>
<td>9.</td>
<td>Father Week 5</td>
<td>Fifth Friday</td>
<td>Monthly</td>
</tr>
<tr>
<td>10.</td>
<td>Grandfather 1</td>
<td>Last Business Day</td>
<td>Quarterly</td>
</tr>
</tbody>
</table>

19-May-10 4:42:44 PM
(b) Even if the above strategy is well planned and implemented, there is still a risk that data loss of up to eight hours may occur. Moreover, the backup may also be destroyed in case of a disaster.

We may take the following measures to minimize the above risks:
(i) Record the backup simultaneously.
(ii) Select such a place for backup storage that does not have same threats as that of the original site.
    i.e., which may be far away from the original site.

A.7 (a) **Data Sharing**
The data sharing feature enables multiple applications and users to read (pull and use) from and write to the same database concurrently.

**Example**
An airline database of passengers’ booking is shared between its booking offices and airport check-in counter.

(b) **Query Ability**
A database query language allows users to interactively interrogate the database i.e., obtain and update the data/information, according to the privileges allowed.

**Example**
Retrieving customers’ records whose average monthly balance is greater than Rs. 500,000 and adding 4% profit in their balances.

(c) **Rule Enforcement**
Generally, a DBMS has the capability to enforce rules related to the following:
(i) viewing data.
(ii) inserting, updating/editing and validating data.
(iii) data deletion.

**Example**
Allow data entry operators to enter new records, but restrict them from editing existing records.

(d) **Change and Access Logging**
The database access logging service allows to keep a record of the following:
(i) who accessed the data?
(ii) when was it accessed?
(iii) what changes were made?

**Example**
List of changes made between May 1, 2009 and May 7, 2009 by a particular user can be printed using ‘change and access log’.

**(THE END)**
Q.1 Patoki Limited is a small but growing organization. Presently it is using standalone computers only. However, in view of ever increasing need, it has hired you to connect its computers using a suitable network topology.

**Required:**
Write a report to the management explaining the architecture of Bus, Star and Ring topologies and how they differ in respect of the following.

(i) Single point of failure
(ii) Network expansion
(iii) Centralized control system
(iv) Security
(v) Cost

(12 marks)

Q.2 A recent report from an international body has highlighted the rise in undocumented economy in Pakistan and its serious repercussions. In a recent seminar a senior government official has pointed out that the situation can be improved by promoting the use of e-commerce. He has requested the IT professionals to come forward and give their input on this issue.

**Required:**
Give recommendations (any eight) to the government which in your opinion would facilitate the growth of e-commerce in the country.

(08 marks)

Q.3 Source data automation has gained significant popularity during the last decade and it is being used by a large number of organizations.

**Required:**
What do you understand by source data automation? Give two advantages of the use of source data automation and identify any two types of businesses where it is more commonly used.

(04 marks)

Q.4 Forward Bank Limited is considering the use of smart cards which would replace the currently used magnetic stripe cards. The idea has been questioned by some of the board members as the initial costs are considerably high.

**Required:**
Identify any seven advantages of smart cards over magnetic stripe cards.

(07 marks)

Q.5 The System Development Life Cycle (SDLC) approach has helped standardize the process of system development by devising a set of activities which could be applied to the development of almost all types of systems. SDLC approach has been used successfully over a long period of time, however, it has its own limitations and drawbacks.

**Required:**
Briefly describe the drawbacks (any seven) of SDLC.

(07 marks)
Q.6 Kotri Enterprises (KE) is a supplier of computer and electronic hardware. Its management has recently decided to use e-commerce to boost its sales. In this regard, the CEO of the company held a meeting with the heads of IT and Finance in which he emphasized upon the following:

(i) Continuous availability of the website
(ii) Confidentiality of the customers' information
(iii) Controls over e-payment transactions

Required:
List the important measures that should be taken to address the above issues.  

(05 marks)

Q.7 Sualkeh Enterprises is engaged in a variety of businesses. It relies heavily on its IT systems for conducting its operations. An investigation report on a recent incident of information security breach has highlighted strong deficiencies in preventive and detective controls over the company's IT systems. An emergency meeting has been called to discuss the issue. The head of IT believes that some of the controls could not be implemented due to constraints related to high costs and availability of human resources.

Required:
For the purpose of presentation in the meeting, briefly describe the purpose of preventive and detective controls. Identify any three preventive and three detective controls which could not be implemented due to the constraints specified by the head of IT.  

(06 marks)

Q.8 Password is an effective tool in avoiding unauthorized access. However, it may provide a false sense of security and could be easily bypassed if not managed properly.

Required:
List the best practices (any six) that should be part of an effective password policy.  

(06 marks)

Q.9 Snawal Limited is engaged in the production and sale of consumer products. Its products are marketed through wholesalers located in all the major cities of Pakistan. During an annual get together of major stakeholders, a large number of wholesalers have identified the following issues:

(i) Frequent stock-out of popular products.
(ii) Delays in processing of their orders.
(iii) Improper response from customer services on their queries and complaints.

Required:
Explain what role can be played by the company's IT department in addressing the above complaints.  

(05 marks)

(THE END)
A.1 Bus Topology:
A linear bus topology consists of a single cable with a terminator at each end. All nodes (file server, workstations, and peripherals) are connected to the linear cable.

(i) **Single point of failure:** Bus/cable is single point of failure.
(ii) **Network Expansion:** It is very easy to add further computers i.e. by using a new T- connector the cable can be extended to add another computer. However, the network may be disrupted while a computer is added.
(iii) **Centralized Control System:** There is no centralized control system and the data is transferred on cable.
(iv) **Security:** Security is weak because data traverses on entire cable before terminating on addressee’s station so practically everyone can see each other’s data.
(v) **Cost:** Least expensive of all topologies as no central hub or switch is required and required less amount of cable.

Star Topology:
A star topology is designed with each node (file server, workstations, and peripherals) connected directly to a central network hub, switch, or concentrator.

(i) **Single point of failure:** Central network hub/switch is single point of failure.
(ii) **Network Expansion:** Network expansion depends on available ports on central hub/switch. However, in case the port is available, the peripheral device can be added without disrupting the network.
(iii) **Centralized Control System:** All addresses, destinations and data flow is managed by central hub/switch.
(iv) **Security:** Due to availability of central system different kinds of security measures can be implemented ranging from port level security to MAC (Media Access Control) address authentication.
   Due to central controls system and intelligent switching data is only forwarded to required address instead of continuous broadcasting
(v) **Cost:** Expensive than all other topologies as it requires a central hub/switch and more cable is required to connect all workstations to the hub/switch.

Ring Topology:
In this topology all machines are connected to form a loop. A single channel connects all computers.

(i) **Single point of failure:** Due to single loop, every point on the cable is a single point of failure. However, due to looping characteristics machines can still use the available path in clockwise or anticlockwise direction.
(ii) **Network Expansion:** It is relatively easy to connect new devices in this topology. However, the network may be disrupted while a computer is added.
(iii) **Centralized Control System:** There is no centralized control system and like bus topology, data is transferred on the cable.
(iv) **Security:** In ring network tokens are assigned to computers for data transfer, still the data has to traverse the whole cable before reaching the destined computer. Like bus topology, data is practically accessible to all other nodes.
(v) **Cost:** It is expensive than Bus but less expensive than Star Topology.

A.2 Recommendations:
(a) Availability of improved and robust Internet connectivity in all areas.
(b) Cost effective Internet connection should be provided.
(c) The availability and use of credit/debit cards should be promoted.
(d) Training and mass awareness schemes should be launched by the government to educate the masses about online businesses.
(e) Issues with network security should be given special attention. Both service providers and merchants should be given appropriate instructions in this regard.

(f) Suitable laws should be introduced in line with requirements of online businesses. These should be effective and implementable.

(g) Special attention should be given to resolve issues related to cross-border data transfer and the applicable laws.

(h) Government should assist companies in making their websites by providing technical know-how and financing facilities.

(i) Special customer services areas should be managed by government to give quick support to businesses.

A.3 The use of automated methods of data entry is known as source data automation. Process of collecting data at their point of origin in digital form.

Advantages of using source data automation are:

(a) It minimizes the time needed to record data input.

(b) It minimizes data entry errors.

It is commonly used in following businesses:

(a) Banks

(b) Departmental stores

(c) Airport check-in counters

A.4 (a) Smart cards are more secure than magnetic cards.

(b) Smart cards can store more data than magnetic cards.

(c) Smart cards are more durable than magnetic card i.e., have a long life, etc.

(d) They are microprocessor-based cards so lot more processing can be done in it, rather than passive feature of magnetic cards.

(e) Smart cards don’t need availability of other end network for basic authentication as much of the data is available on the card itself whereas magnetic stripe card requires dedicated dialup connection availability for all kind of transactions.

(f) Smart cards are not affected by magnetic interferences or other electrical interferences, while magnetic cards can lose data on account of high magnetic interference area.

(g) Smart cards can manage the mechanisms of authentication and non-repudiation in a better way due to more storage capacity.

(h) Smart cards can be used for multiple purposes rather than a single dedicated purpose, as a single card can be used for driver license, health information, immigration details and credit card.

A.5 **Drawbacks of System Development Life Cycle (SDLC) Approach**

(a) **High cost of correcting errors**

Due to sequential nature of SDLC, high cost is associated with incorporating changes related to previous stages.

(b) **Late detection of errors**

Misunderstandings/omissions may not come to light until user acceptance test stage and by that time it may be too late to make significant changes. As a result, changes may be needed even after sign off by user.

(c) **Change in users’ requirement**

Quite often the users’ requirements change while the system is being developed and it leads to high
cost and time over run and therefore sometimes the system becomes inflexible and users have to accept it.

(d) **Strategic/tactical management level issues**

Systems developed with this approach are mainly operational processing systems such as payroll and invoicing etc i.e., which deal with low level operational tasks. Quite often the information needs of the tactical and top management are not given due importance in the development stage which leads to serious problems later.

(e) **Increased Development Time**

SDLC approach has many phases with sub phases. It may take many weeks to complete a phase, thus the overall development time of a single project may be quite high.

(f) **Problems with documentation**

Under this approach, most of the system documentation is written for programmers and is highly technical which is not easy for the users to understand.

A.6 Following measures should be taken to address the issues highlighted by the CEO:

(i) **Continuous availability of website**

   (a) Incorporation of appropriate detective controls to be aware of a security breach as soon as it happens.

   (b) Incorporation of preventive controls such as Intrusion prevention system (IPS) to stop any attack.

   (c) Appropriate disaster recovery plan to ensure availability of website.

(ii) **Confidentiality of the customers’ information**

   (a) Encryption of customers’ data.

   (b) Use of SSL, for protection of information on browser based transactions.

   (c) As a rule, storing the most necessary information only and avoidance of storage of critical information such as credit card numbers, PIN etc.

(iii) **Controls over e-payment transactions**

   (a) Incorporation of atomicity of transactions so that either the whole transaction is processed or rolled back in case of failure.

   (b) Regular auditing and monitoring of controls.

A.7 **Preventive Controls:** They are intended to deter problems before it arises.

   (a) Engaging qualified professionals, requires high cost.

   (b) Segregation of duties, requires additional human resources and cost as well.

   (c) Installation of Intrusion Prevention System, requires cost.

   (d) Disaster recovery measures, requires cost to implement.

**Detective Controls:** These are meant to discover control problems as soon as they arise

   (a) Duplicate checking of invoices or other documents, requires additional human resources.

   (b) Installation of network monitoring systems / Intrusion detection system, requires additional cost.

   (c) CCTV cameras requires additional cost and the review of recording also requires a lot of man hours.

   (d) Proper review of system log requires additional time of senior management personnel.

A.8

(a) The minimum password length should be specified.

(b) Characters should contain alpha, numeric as well as special characters.

(c) Password should be changed periodically.

(d) Passwords should not be based on or include dictionary words.

(e) Passwords should not be written down anywhere.

(f) Password should not be revealed to anyone.
(g) Passwords should not be based on characters which can be guessed, like names in family, initial characters of names in family, date of birth etc.
(h) Remember password option should not be used in browsers and applications.

A.9 Information Technology (IT) department can help in the following way to alleviate the customers complaints:

(a) It can develop an integrated system that would link inventory, order processing, sales and marketing and other important business systems. It would help to make available updated information at all times and would therefore allow management to plan their purchasing, production and stock quantities.
(b) An updated position of orders in the queue could be made available for the concerned personnel both at the operational as well as top management level.
(c) IT department can develop a system through which customers can register their complaints online. It will reduce the cost and time involved in lodging the claim and would also allow the top management to review the status of unresolved complaints.
(d) The IT department can devise an online tracking system which would allow the whole sellers to monitor the progress of their orders, queries and complaints.

(THE END)
Q.1 Faisal (Private) Limited (FPL) is a large company with global presence and deals in a variety of businesses. It has recently acquired an ERP solution and is planning to implement it globally.

**Required:**
As a representative of the ERP solution provider:
(a) Identify four generally used system changeover methodologies.
(b) Briefly discuss the suitability of each methodology in the case of FPL. **(10 marks)**

Q.2 Huma Traders (HT) is a family owned company. It has experienced significant growth during the past few years. The company is running various applications on standalone computers. It is being suggested that all computers should be connected through Local Area Network in order to install an efficient management reporting system. However, some members of the family management do not agree as they have serious concerns as regards confidentiality and security of data in networking environment.

**Required:**
(a) List five benefits of networking over standalone systems. **(05 marks)**
(b) Identify any four controls over the network, to minimise the risk to confidentiality and security of data. **(04 marks)**

Q.3 Ekram Super Store (ESS) is a medium sized departmental store with a very high turnover. It has a Management Information System (MIS) system in place which produces a variety of reports. Mr. Taifazul, who has recently been appointed as the manager is not satisfied with the effectiveness of the reporting system for decision making purposes. He believes that MIS is of limited use unless it is integrated with a Transaction Processing System (TPS).

**Required:**
(a) Describe MIS and TPS and give a suitable example of each. **(04 marks)**
(b) Briefly describe how the integration of MIS with TPS would improve the process of decision making at ESS. **(04 marks)**

Q.4 (a) List any six good practices which should be followed by the programmers while writing an application program and later on, making changes as a part of program maintenance or modification. **(06 marks)**
(b) Explain how CASE tools could be helpful to the programmers in effective and efficient programming. **(04 marks)**

Q.5 Salsa Software Solutions Limited (SSSL) witnessed quite a few setbacks in some of the major projects which it undertook during the last year. Your study has revealed that the company has suffered on a number of fronts but the primary failure has been at the project selection level.

**Required:**
Write a memo to the management of SSSL explaining about the areas in which a project must be feasible if it is to be undertaken. **(10 marks)**
Q.6 The management of Opal Bank Limited (OBL) is planning to implement biometric access system for the customers using the bank’s lockers. A number of biometric solutions are available in the market. The management has asked you to assist in the process of selecting the most appropriate solution.

Required:
Briefly explain what aspects the management of OBL should consider while finalising the selection of biometric solution.

(06 marks)

Q.7 Care Laboratories (CL) allows its customers to access their blood test reports through Internet. At the time of payment the system creates a unique user ID and password which is printed on the payment receipt. The customer is allowed to log on to CL’s website on or after the specified date, to access the report. After logging on to the website the customer is required to input his email address after which the system automatically sends the test report to that email address. After sending the email, the system automatically signs off the customer and displays the message: “Your report has been sent to your email address.”

If the customer tries to log on before the report receiving date, the system displays the message: “Your report would be available on the date specified on your payment receipt.”

The user ID and password is valid only for fifteen days after the date on which the report becomes available.

Required:
Draw a program flowchart to depict the above process from customer sign in to automatic sign off.

(07 marks)

(THE END)
A.1 (a) Generally following four system changeover methodologies are used:

(i) **Direct Changeover:**
In this methodology the old system is completely replaced by new system in one move.

(ii) **Parallel Running:**
In this method new and old system run in parallel for some time enabling cross checking of results.

(iii) **Pilot Operations:**
There are two types of Pilot Operations:
   (a) **Retrospective parallel running:** In this method the new system runs on data that has already been processed by the old system. Existing results are available for cross checking.
   (b) **Restricted data running:** In this method a complete logical part of the whole system file being chosen and run as a unit on the new system. If that is shown to be working well the remaining parts are then transferred in piece meal fashion.

(iv) **Phased Implementation:**
This is best solution when there is a large system or when the system parts are distinctly and geographically placed. New system is introduced in stages either by functions or by organizational units.

   This method resembles the parallel run with a difference that rather than whole system a part of new system is run in parallel. This method also resembles with direct changeover with a difference that rather than whole system changeover a part / module is changed.

(b) (i) **Direct Changeover:**
In the case of FPL it would not be advisable as it would involve high risk of failure on account of the complex environment.

(ii) **Parallel Running:**
This is a safe method but involves a high cost as the related efforts have to be duplicated.

(iii) **Pilot Operations:**
System can be tested without problems of staffing and disruption caused by parallel running. This method can be used as it contains the advantages of safe parallel run but at the same time avoiding high costs of duplicating all processes.

(iv) **Phased Implementation:**
As different phases may be used in different locations, this seems to be a good option in the case of FPL because the experience gained in initial phases can be used to avoid risk and costs in the subsequent phases.

A.2 (a) Benefits of networking over standalone systems are as follows:

(i) Networking offers centralized management and security.
(ii) It results in flexible working environment. Work can be done from anywhere.
(iii) Networking offers resource sharing. Data and equipment can be shared regardless of physical location.
(iv) Networking offers load sharing and balancing. Load can be shared from busy servers to idle machines.
(v) Networking can also offer facility of reliability and backup. If primary machines shuts down backup machine can start working immediately.
(vi) Networking facilitates instant availability of information.
(b) HT may take the following measures to minimize the risks to confidentiality of data:

(i) Define user authorization matrix and ensure that users’ rights are managed strictly according to that.
(ii) Enable audit trails.
(iii) Disable USB ports and other portable storage devices. Only authorized users with ‘need to have basis’ permissions should be allowed to use such devices.
(iv) Implement email/Internet scanning and monitoring system.
(v) Disable the use of Internet through dial up or mobile devices.

A.3 (a) Management Information System (MIS)
It is a system which converts data into information and communicates that information in an appropriate form, to managers at all levels and in all functions to enable them to make timely and effective decisions.

Examples of MIS
Budget forecasting and analysis, financial reporting (e.g., balance sheets, income statements, cash flow reports), inventory reporting, salary analysis and sales forecasting etc.

Transaction Processing System (TPS)
It is system that captures and processes data generated during an organization’s day-to-day transactions. It serves the organization at operational level.

Examples of TPS
Airline reservations, bank deposits and withdrawals, course registration, hotel check-in/check-out, inventory procurement and payroll etc.

(b) Integration of MIS with TPS reduces re-input of data in the MIS which in turn minimizes human involvement, reduces chances of errors and saves time. Consequently, it gives the confidence that most updated and correct information is available for decision making.

If the TPS is a real time system then the integration of MIS with TPS would allow the management to have vital information such as stock position, orders outstanding etc; at any given point in time.

A.4 (a) Some of the good practices that may be followed while writing a new program or making changes in an existing program are as under:

(i) The program requirements must be specified in full and in writing.
(ii) A program should be logically well structured and should follow the international standardization requirements in terms of security, monitoring and evaluation.
(iii) Each version of the program should be identified separately to avoid mix up.
(iv) Appropriate working papers should be maintained to keep track of important events and what decisions were taken in each case.
(v) Detailed training and awareness sessions shall be arranged for programming team so that all team members are on same footing.
(vi) The programs should always be tested whenever they have been written.
(vii) Records shall be kept as regards all errors that were found during live processing of data and the correction that are made to the program.
(viii) Unrealistic deadlines for deliverables should not be agreed upon.
(b) CASE tools could be helpful in effective and efficient programming as:

(i) Prototyping becomes easier as re-design can be made very quickly.
(ii) Diagrams could be prepared and amended efficiently.
(iii) Blocks of codes could be reused with appropriate modification in similar functions or processes.
(iv) Consistency of terminology and maintenance of documentation standards is ensured.
(v) Debugging tools are available for detecting and correcting errors.

A.5 A project, if it is to be undertaken, must be feasible in the areas described below:

Technically Feasible:
The requirements as defined in feasibility study must be technically achievable. Solution must be implementable with available hardware, software and other equipment. For evaluation matters such as volume of transactions, response time required number of users etc must be considered.

Operationally Feasible:
The chosen solution must not conflict with the way an organization works or does business. Further, it should be analyzed that to what degree the proposed solution is expected fulfill users’ requirements? Will it change the users’ work environment? Any project which conflicts or tries to change management responsibilities, or chains of command or regional reporting structures must not be undertaken.

Socially Feasible:
Before undertaking a major project the management must assess its impact, if any, on the following:

- Adherence to Personnel Policies
- Redrawing of job specifications
- Threats to industrial relations
- Ethical requirements
- Expected skills requirements
- Impact on Motivation of the employees

Economically Feasible:
A project must be economically feasible; it must be a good investment. It must have a clear return on investment. For this purpose all the resources required and cost of their deployment should be assessed carefully. There should always be sufficient flexibility in budgeting the costs and a cushion for reasonable cost over-runs should be incorporated.

A.6 While finalising selection of biometric solution, the management of OBL should consider the following aspects:

(i) Universality - how commonly a biometric is found in each individual. People who are mute or without a fingerprint will need to be accommodated in some way.
(ii) Uniqueness - how well the biometric separates one individual from another.
(iii) Permanence - how well a biometric resists affects of aging of an individual
(iv) Collectability - how easy it is to acquire a biometric data for measurement.
(v) Performance - the accuracy, speed and robustness of the system capturing the biometric.
(vi) Acceptability - the degree of approval of a technology by the public in everyday life.
(vii) Circumvention - how easy it is to fool the authentication system
(viii) Costs - how much cost is involved in purchasing the system.
(ix) Storage and retrieval of data - how data is stored and retrieved from the system.

How the data could be analysed for MIS purposes.
Ans. 7

Start

Open Files

Input User ID and Password

Check User ID and Password

N

Invalid User ID

Y

Check if report date has reached

N

Display: Your report would be available on the date specified on your payment receipt

Y

Input Email ID

Send Email

Auto sign off

Display: Report has been sent to your email address

Close Files

End

(THE END)
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

EXAMINERS' COMMENTS

SUBJECT                        SESSION
Information Technology          Intermediate Examination - Spring 2011

General:

The overall performance in the paper was average. A common reason among those who could not perform well was their inability to understand the exact requirement of the question. Many such candidates wrote lengthy irrelevant details. Some candidates adopted the policy of writing everything they knew about a topic irrespective of what was required. They must realize that such a practice cannot succeed in professional examinations.

Question-wise comments are as follows:

Q.1 This question pertained to methodologies used for implementation of ERPs and their relevance for a large sized global company. Most of the students correctly described generally used changeover techniques including direct, parallel, phased and pilot changeover. Some students described variations of some of the above methodologies. However the 2nd part pertaining to suitability of these techniques for the mentioned company was not as well attempted as many students tried to justify each technique for the same company which was not correct. Students should note that for a global, large sized company, phased approach works best. Other approaches are either too risky as in the case of Direct or Big bang approach or too expensive/time consuming as in the case of parallel or pilot approach.

Q.2 The question pertained to comparison of local area network (LAN) with standalone systems in terms of benefits of the former. While most of the students correctly mentioned benefits of LAN such as resource sharing, data sharing, quick decision making etc, some students mentioned benefits of standalone systems in effect, which was surprising. 2nd part of the question was about controls to be put in place over LAN. Students should note that these controls include user authorization, audit trails, disabling of usb ports, usage of firewall/anti-virus etc.

Q.3 First part of the question required students to define Transaction Processing System (TPS) and Management Information System (MIS). The area was not handled well as many students defined MIS as if it were a transaction processing system. MIS is a systems which feeds on TPS and converts data into information for use of managers. Moreover, examples quoted by students were mostly irrelevant. It should be noted that examples of MIS include budget forecasting, financial reporting, sales forecasting etc. TPS can be an airline reservation system, banking application system etc.

2nd part of the question regarding integration of TPS and MIS was not uniformly attempted either. Students should know that integration of TPS and MIS reduces duplication in data input, saves time and reduces errors.
Q.4 First part of the question required listing of six good practices to be adopted during application development and subsequent change management. The question was generally well attempted and students listed practices such as formally documented program requirements, version controlling, working paper organization, training and awareness for programming team, debugging, technical documentation etc. 2nd part was about benefits of CASE tools in this area. Most of the students correctly mentioned benefits such as prototyping, reuse of code, better documentation, debugging etc.

Q.5 The question was about areas in which a project must be feasible to be chosen for implementation. The quality of responses to this remained mixed. However a significant number of students correctly elaborated various areas establishing that a project should be technically, legally, operationally, socially and economically feasible in order to be undertaken. However, some candidates got confused with the word “Feasibility” and wrote the complete System Development Life Cycle.

Q.6 The question was about factors which should be considered while selecting biometric solution. The response to the question was mostly disappointing as many students listed the types of biometric solutions available, which was not needed. In fact, factors which should be considered include universality, uniqueness, resistance to ageing, performance, acceptability, vulnerability to fraud, cost and data storage etc.

Q.7 The question required preparation of flowchart for a process involving on-line collection of blood test report. The performance of students in the same was mostly below standard. Poor knowledge of flow charting symbols and process logic was exhibited. The students need to improve a lot in this area and it would need a lot of practice, under proper supervision.

THE END
Information Technology

Intermediate Examination
Autumn 2011
Module D

Instructions to Candidates:
(i) All the Questions from Section – A are compulsory.
(ii) Attempt any TWO out of THREE Questions from Section – B.

Section A

Q.1 After a recent mishap in Kamal Electrical Company Limited, one of its directors has suggested that the use of external storage devices should be prohibited altogether. However, the IT manager is of the view that this suggestion is not practical.

Required:
(a) Explain how you would justify the IT Manager’s contention.
(b) Identify the threats involved in the use of external storage devices and suggest steps to minimize them.

Q.2 The management of Jamal Airways (JA) is revisiting its information processing and reporting systems. After carrying out a need analysis and evaluating the capabilities of existing systems, the management is inclined to develop a customized Executive Support System (ESS). However, many directors are not convinced as some of them have poor experience of such systems.

Required:
Being one of the board members of JA and an active supporter of ESS, identify the:
(a) key features of an ESS.
(b) factors that may have been responsible for the problems experienced by some of the directors.

Q.3 Nihal Industries Limited is considering to replace its present information processing and reporting system with a real time system. In this regard, a team has been appointed to carry out a feasibility study.

Required:
(a) Specify any ten points which in your opinion, may form part of the terms of reference of the above team.
(b) Identify the factors on account of which security of real time systems is more difficult as compared to batch processing systems.

Q.4 Explain the key characteristics of three commonly used wired telecommunication media.

Q.5 Briefly explain the key contents of a disaster recovery plan.
Section B

Q.6 The flowchart is a mean of visually presenting the flow of data through an information processing system, the operations performed within the system and the sequence in which they are performed.

**Required:**
(a) Draw and briefly explain five symbols commonly used in a flowchart.  
(b) Identify the advantages of using flowcharts.

Q.7 Smart Products Limited (SPL) is engaged in the marketing of hand bags and similar products throughout Pakistan. It is planning to launch an e-business enabled website primarily for the purpose of online sales of its products. The management of SPL has hired you as a Consultant to assist them in this venture.

**Required:**
(a) What features would you consider necessary in such a website? 
(b) Identify any four ways that may be used to market the website through Internet.
(c) Identify the limitations associated with the use of such a website.

Q.8 Vital Bank Limited (VBL) is a medium sized bank. To achieve quick growth VBL has been focusing on extending its online banking services. As part of this strategy, it intends to introduce mobile banking services.

**Required:**
(a) Identify the benefits which VBL could gain by initiating mobile banking services.
(b) Identify six types of services that can be offered through mobile banking.
(c) Briefly describe the challenges that VBL might have to face while developing the application of mobile banking.

*(THE END)*
A.1 (a) The IT Manager’s contention is justified as for various tasks use of external storage devices is inevitable. Some of the tasks which either necessarily require use of external storage devices or could be performed in most efficient and economical manner through the use of such devices are as follows:

(i) Portability being a separate device from PCs
(ii) Computer application carriers.
(iii) Recording backup.
(iv) Updating security and antivirus definitions in systems which are not connected to the Internet.
(v) Transporting huge amount of data.

(b) The threats involved in the use of external storage devices are as follows:
(i) Increased chances of data theft.
(ii) Increased chances of Virus attacks.

Mitigating Measures:
- Restrict the use where extremely necessary.
- Maintain system generated log and review it periodically.
- Prohibit use of personal devices.
- Use antivirus scanning.

A.2 (a) Key features of an Executive Support System (ESS) are as follows:

(i) It is capable of capturing data from organisation’s main system and of presenting it in summarised form.
(ii) It allows to drill-down from higher levels of information to lower.
(iii) It facilitates the comparison of current year data with previous years and also helps in trend analysis.
(iv) It is capable of presenting the data in graphic form which is easier to understand.
(v) It allows creating template for particular type of data. For example, sales figures would be presented in a particular format irrespective of changes in the volume of information required.

(b) Some of the directors of Jamal Airways might have experienced failure of an ESS on account of the following:

(i) Lack of commitment on the part of executive(s) responsible to sponsor the ESS.
(ii) Management’s lack of awareness about the features and benefits of the ESS.
(iii) Failure to clearly define the ESS’s link to business objectives.
(iv) Use of inappropriate technology for the development and execution of ESS.
(v) Failure to properly manage the spread and evolution of the system.

A.3 (a) The terms of reference of the team carrying out the feasibility study of Nihal Industries Limited (NIL) may consist of the following points:

(i) To investigate and report on the existing system of NIL, its procedures and costs.
(ii) To define the systems requirements.
(iii) To establish whether the newly defined requirements are being met by the existing system.
(iv) To establish whether the newly defined requirements could be met by an alternative system (other than the proposed system).
(v) To specify performance criteria for the new system.
(vi) To recommend the most suitable system to meet the system’s objectives.
(vii) To prepare a detailed cost budget, within a specified budget limit.
(viii) To compare the detailed budget with the costs of the current system.
(ix) To prepare a draft plan for implementation within a specified timescale.
(x) To set the date by which the feasibility study team must report back.

(b) The security of real-time systems is more difficult as compared to batch processing systems
due to the following factors:

(i) Problems may arise in identifying legitimate users at remote terminals.
(ii) Enforcing security standards at a large number of remote sites may prove complicated.
(iii) It is possible to eavesdrop on communication lines.
(iv) Audit trails might be weak.

A.4 Key characteristics of commonly used wired telecommunication media are as follows:

Copper wire
(a) This is a twisted pair of cables.
(b) It is inexpensive.
(c) It has low transmission rate and relatively high error rate because there is only minimal
anti-interference screening.
(d) It allows straightforward addition of extra nodes.

Coaxial cable
(a) Coaxial cable is similar to domestic television aerial cable.
(b) It gives significantly better performance than twisted pair cable, as there is less risk of
distortion of data at higher rates of transmission.
(c) Anti-interference screening is also better than twisted pair cable. Heavier grades of cables
allow broadband transmission, increasing the number of signals which can be carried
simultaneously.
(d) It allows straightforward addition of extra nodes.

Fiber optic cable
(a) The center conductor of a fiber optic cable is a fiber that consists of highly refined glass or
plastic designed to transmit light signals.
(b) It is virtually interference free and has extremely high data transmission rates.
(c) It does not support the addition of nodes.
(d) Transmission is essentially in one direction.

A.5 Key contents of a disaster recovery plan are as follows:

(a) Definition of responsibilities
   Responsibilities of key individuals who would take control and lead in the crisis are
clearly defined.

(b) Priorities
   Important and vital tasks and areas are clearly mentioned in the order of priority.

(c) Backup and standby arrangements
   Location of latest backups is clearly mentioned. Agreement briefs and identification of
   standby arrangements with third parties or other similar arrangements is specified.

(d) Communication with staff
   Contact details of key staff members are mentioned. Appropriate means to
   communicate the disaster to the staff may be specified.

(e) Public relations
   Name of officer appointed for dealing with media and public.
A.6 (a) Symbols commonly used in flowcharts along with their description are as follows:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>Start or end symbol. A flow chart has one start and one end symbol.</td>
</tr>
<tr>
<td>□</td>
<td>Process/operation symbol, for example, arithmetic calculations, read, print etc.</td>
</tr>
<tr>
<td>□</td>
<td>A routine or sub routine of several program instructions (not just one), for example, instructions to open or close files. / Predefined process.</td>
</tr>
<tr>
<td>□</td>
<td>Decision or condition symbol. This must have two or occasionally three flow lines coming out of it.</td>
</tr>
<tr>
<td>○</td>
<td>Connector symbol. This symbol is used to show connection between the two parts of a flowchart without drawing a connection line.</td>
</tr>
</tbody>
</table>

(b) Advantages of using flowcharts are as follows:

(i) **Communication**: Flowcharts facilitate in communicating the logic of a system to all concerned.

(ii) **Proper documentation**: Program flowcharts serve as a good program documentation, which is needed for various purposes.

(iii) **Efficient Coding**: The flowcharts act as a guide or blueprint during the systems analysis and program development phase.

(iv) **Proper Debugging**: The flowchart helps in debugging process.

(v) **Efficient Program Maintenance**: The maintenance of operating program becomes easy with the help of flowchart, thereby enhancing the programmer’s efficiency.

A.7 (a) An e-business enabled website to be developed by Smart Products Limited should have the following features:

(i) It should have an eye-catching look.
(ii) The information should be arranged in such a way as to allow easy and quick access.
(iii) It should have the capacity to accommodate adequate number of users/customers.
(iv) The information on the website should be readily updated.
(v) It should be resilient enough to counter virus and hackers attacks and remain available.
(vi) It should have an easy to remember and relevant domain name.

(b) The website could be marketed through Internet by:

(i) Getting it registered with leading search engines like Google and Yahoo etc.
(ii) Placing banner ads on popular commercial websites like Geo and Yahoo.
(iii) Sending advertisement of the website through email marketing vendors.
(iv) Creating customers’ relation pages on social networking sites like facebook.
(c) Following limitations are associated with the use of such a website:

(i) The inability of shoppers to actually see and assess the product's quality at the time of placement of order may give way to dissatisfaction when the buyer actually receives the goods.
(ii) Fear of insecure financial transaction may keep the buyers away from online shopping.

A.8

(a) VBL could gain following benefits by initiating mobile banking services:

(i) Ability to carry out transactions quickly.
(ii) Ability to keep all customers updated in a short period of time.
(iii) Ability to expand the business to customers in far off areas.
(iv) Increasing or maintaining customer loyalty.
(v) Reducing workload on branch employees.

(b) Following services could be offered through mobile banking:

(i) Mini-statements and checking of account history.
(ii) Alerts on account activity or passing of set thresholds.
(iii) Status of cheques deposited / stop payment.
(iv) Ordering cheque books.
(v) Fund transfers.
(vi) Payment of utility bills.

(c) VBL may face the following challenges while developing the application of mobile banking:

(i) Security: Security of financial transactions being executed from remote locations and transmission of financial information over the air, are the most complicated challenges that need to be addressed.

(ii) Scalability & Reliability: Selection/development of mobile banking services application which meets the future growing expectations of the bank’s customers is a challenge. As customers will find mobile banking more and more useful, their expectations from the application increase. Banks unable to meet the performance and reliability expectations may lose customer confidence.

(The End)
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

EXAMINERS’ COMMENTS

SUBJECT
Information Technology
SESSION
Intermediate Examination - Autumn 2011

General:
After a series of average performances in the past many attempts, a truly good performance was witnessed in this attempt. Most of the students seemed well prepared and produced good answers.

Q.1  (a) Students could mostly identify the benefits and necessity of using external storage devices. Surprisingly, some of the students were not conversant with the term and got confused.

(b) Most of the students emphasised on the issue of unauthorized access and data theft only. Threat of virus attacks was less frequently mentioned.

Q.2  (a) Executive Support System is a frequently repeated topic and majority of the students were well prepared to list its key features.

(b) This part of the question proved difficult as the answer required in-depth understanding of the issue as well as some sort of creativity. Most of the candidates referred to common issues like costs, delays and program errors. Factors like lack of management’s commitment, users’ resistance and lack of training etc. were less frequently mentioned.

Q.3  (a) Majority of the students did not have a clear understanding of the meaning of ‘terms of reference’. Most others discussed financial aspects only and laid very little emphasis on the technical issues. Some of the students described the contents of a feasibility report which was entirely irrelevant.

(b) This part of the question was quite simple and based on a very elementary topic and an average student could have produced a reasonable response even on the basis of his general understanding. However, the response was quite poor. Many students did not attempt it altogether whereas only few students managed to list more than one or two points. A lot of repetition was also witnessed.

Q.4  This was a high scoring question requiring listing of characteristics of wired telecommunication media. Majority of the students secured high marks. However, many students tried to write all they knew without realizing that it was only a six marks question. Some students seemed confused also and wrote about TV channels, LAN, WAN, Fax and DSL etc.
Examiners’ Comments on Information Technology – Autumn 2011

Q.5 This question required listing and narrating of key contents of Disaster Recovery Plan. A significant number of students were able to secure full marks. However, many students tried to explain the entire DRP in detail instead of restricting themselves to brief explanation of the key contents. Surprisingly, some students could not understand this clearly worded question and went on to describe points such as risk assessment, risk management, risk avoidance etc.

Q.6 (a) This was a very simple question requiring any five of the flowchart symbols along with their description. Almost all the students secured high marks.

(b) In this part also most of the candidates were able to secure high marks. However, some candidates went into unnecessary detail and started comparing flow charts with decision trees etc. which was not required.

Q.7 (a) This question required the candidates to describe important and necessary features of e-business enabled website. Majority had clear concepts and described points like eye-catching look, easy access to information, security etc.

(b) The performance in this question was quite poor as most students had no idea of how a website may be marketed through Internet. Many students discussed normal advertisement techniques such as advertisement in print media, banners etc. instead of restricting themselves to advertising through Internet.

(c) The performance was reasonable as most of the candidates seemed well prepared whereas many other were able to use their general understanding and intelligence, to produce the required answers.

Q.8 (a) The advantages of mobile banking were well understood probably because mobile phone is a commonly used device. However, some students wrote the benefits from the customers’ and not the bank’s point of view.

(b) This was a very easy question and most of the students were able to secure full marks.

(c) This part of the question was attempted poorly as most students tried to describe the difficulties faced in the use of mobile banking application instead of the challenges to be faced in its development.

THE END
The Institute of Chartered Accountants of Pakistan

Information Technology

Intermediate Examination
Spring 2012
Module D

12 March 2012
60 marks - 1¾ hours
Additional reading time - 15 minutes

Instructions to Candidates:
(i) All the Questions from Section A are compulsory.
(ii) Attempt any TWO out of THREE Questions from Section B.

Section A

Q.1 Progressive Explorer (PE) is a small travel agency. Due to recent growth in PE’s business, the management is planning to expand its staff and facilities. Presently, there are only two computers which are connected with each other through direct cable while the only printer is attached with one of the computers through local port. The new setup is likely to have ten computers and two printers which would be connected with each other through an appropriate network topology. One of the partners of PE, who has some experience of IT matters, has recommended the use of Mesh Topology.

Required:
(a) Identify two advantages and two disadvantages of using Mesh Topology in the above situation. (04 marks)
(b) Suggest one other network topology which in your opinion is best suited for PE. Give reasons to justify your suggestion. (04 marks)

Q.2 Greek Laboratories Limited (GLL) is a drug manufacturer and has a Management Information System to control the decision making process.

Required:
(a) Differentiate between a closed loop control system and an open loop control system. (04 marks)
(b) Give any three examples of decisions that may be taken by GLL using each of the above types of control systems. (06 marks)

Q.3 Usage of technology is dramatically altering the way business world operates. In an era of financial austerity and rising travel expenses, usage of video conferencing is one such technological development which is altering traditional modes of meeting people in other locations.

Required:
Specify any five issues which limit the use of video conferencing. (05 marks)

Q.4 (a) Briefly explain three types of Decision Tables. (05 marks)

(b) State two advantages and two limitations of Decision Tables. (04 marks)
Q.5 You are the Business Development Manager of Web Potent which deals in development, administration, maintenance/support and hosting of websites. Your clients differ on account of their size, nature of operations and administrative set-up.

Required:
Prepare a brief summary of any four web hosting solutions and their key characteristics for uploading on your website, for the benefit and guidance of your clients. 

(08 marks)

Section B

Q.6 The internal auditor of Crest Securities Limited has highlighted the following issues in his report:
(i) Most of the users have weak passwords.
(ii) There is no password expiry policy.
(iii) Locked user accounts are unlocked automatically after 24 hours.
(iv) Users are allowed to use their smart phones, tablets and laptops for sending and receiving official emails/documents.
(v) Firewall is installed with its default policy.

Required:
Suggest appropriate controls to address the above issues. 

(10 marks)

Q.7 A well developed system may fail to achieve its desired objectives if appropriate system changeover approach is not adopted. Sometimes a hybrid changeover approach is to be adopted depending upon the nature, resources and constraints of the organisation.

Required:
(a) Discuss the comparative advantages of Direct changeover approach and Parallel changeover approach. 

(04 marks)

(b) Identify and briefly explain two other changeover approaches. 

(04 marks)

(c) Which changeover approach would you prefer to follow in the following cases? Give brief reason to support your point of view.
   (i) Replacing manual attendance system of a local FM radio station with an automated biometric based solution.
   (ii) Online ticket reservation system for domestic railway service. 

(02 marks)

Q.8 Post Implementation Review (PIR) is an important step in the long run success of any system. It is necessary to conduct the PIR at an appropriate time to get the desired results.

Required:
List down the important steps that should be performed during a PIR. 

(10 marks)

(THE END)
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examination - Spring 2012

A.1 (a) Advantages of Mesh Topology are as follows:

(i) A fully connected mesh network does not have a single point of failure i.e., if the connection between any two nodes fails, the remaining connections would continue to work.

(ii) Security and data transmission rate is relatively high as each dedicated link carries traffic only between the two nodes it connects.

Disadvantages of Mesh Topology are as follows:

(i) It is relatively difficult to add further computers/devices, because each new computer/device is required to be connected with all the existing computers/devices.

(ii) Setting up a Mesh Topology is expensive than any other network topology. To link ‘n’ devices mesh network requires n(n-1)/2 physical channels. This would require significantly higher quantity of cable as compared to any other topology.

(b) Star Topology seems to be most appropriate for PE because of the following reasons:

(i) Network expansion is relatively easy. As PE would grow, additional computers or any other peripheral device may be added without disrupting the network.

(ii) It is economical than Mesh, as less cable is required to connect all workstations to the central hub/switch.

(iii) Due to availability of central system different kinds of security measures can be implemented ranging from port level security to MAC address authentication.

(iv) Although two other topologies i.e., Bus and Ring could also be used, Star topology is much better than these two topologies in respect of security, network availability, expansion and administration.

A.2 (a) |
| **Closed Loop Control System** | **Open Loop Control System** |
| A closed loop system is self contained and does not interact nor does it make exchanges across its boundaries with its environment. | An open loop system interacts and makes exchanges with its environment. Such exchanges affect the system and its performance. |
| Part of the output is fed back so that the output can initiate control action to change either the activities of the system or the system’s input. | Control is exercised regardless of the output produced by the system. Since information from within the organisation is not used for control purposes, control must be exercised by external intervention. |

(b) GLL may take the following decisions using closed loop control system:

(i) Monitor the profitability of product lines and reduce, stop or increase production of certain lines.

(ii) Monitor the results with budget in order to identify the deviations from plan and to take appropriate actions.

(iii) Monitor the punctuality of staff and record their punctuality status in their personal files.

GLL may take the following decisions using open loop control system:

(i) Stop the production of a profitable business line on receiving the results of a new medical research.

(ii) Revise the prices of a drug on account of competitor’s prices.

(iii) Adjust staff salaries as a result of government’s directives.
A.3 Following issues with video conferencing may affect its adoption:

(i) Connectivity issues are quite common, especially in developing countries.
(ii) Trained staff is required to support the video conferencing session.
(iii) During conduct of video conferencing sessions need of operational/technical level staff is inevitable. However, presence of such staff during strategic management meetings could compromise the confidentiality of certain high level decisions.
(iv) Setting up a video conferencing facility requires high initial cost.
(v) Eye contact plays a large role in conversational turn-taking, perceived attention and intent, and other aspects of group communication. In fact, videoconferencing systems provide a false impression that the remote interlocutor is avoiding eye contact.

A.4 (a) Types of decision tables are as follows:

(i) **Limited Entry**
In this type of decision table, the condition and action statements are complete. The condition and action entries define whether or not a condition exists (i.e., Yes or No) or whether an action should be taken. Besides it refers to a situation where the condition does not apply, or it makes no difference whether the condition exists or not.

(ii) **Extended Entry**
In this type, the statements in the table are more open-ended. The question does not suggest the answer with limited options, but expects further information from a variety of possible options. The expression of conditions is partly given in the quadrants and the rest is expressed in the entries quadrants in the form of answers.

(iii) **Mixed Entry**
It combines both the limited and extended entry forms. While the limited and extended entry forms can be mixed within a table, only one form may be used within a condition statement or an action statement.

(b) Advantages of decision tables are as follows:

(i) It is possible to check that all combinations have been considered.
(ii) It is easy to trace from actions to conditions.

Limitations of decision tables are as follows:

(i) They are not good at expressing sequence or procedure.
(ii) Multiple decision environments can quickly produce very large decision tables. These can be split into a number of smaller tables but inter-relating these tables can be difficult.

A.5 Four types of web hosting options are as follows:

(i) **Shared Web Hosting**
The website is placed on the same server as many other sites, ranging from a few to hundreds or thousands. All domains may share a common pool of server resources, such as RAM and the CPU. It is the most economical web hosting solution but offers the slowest speed as compared to other solutions.

(ii) **Virtual Dedicated Server**
It involves slicing up a server into virtual servers. Each user is given the rights similar to those given in case of dedicated server but they are actually sharing a server with many other users. It is a faster but relatively more expensive solution than shared web hosting solution.
(iii) **Dedicated Hosting**
The user gets his own web server and gains full administrative control over it. However, the user may or may not own the server. It is the fastest but more expensive as compared to shared and virtual dedicated web hosting solutions.

(iv) **Co-location Web Hosting Service**
The user has his/her own web server and has full administrative control over it. The hosting company provides the power supply, air conditioning, Internet access and storage facilities for the server. In most cases, the co-location provider may provide little or no support directly for their client’s machine. It is the fastest but most expensive web hosting solution.

A.6
(i) A minimum length of passwords should be specified. The longer the password, the greater would be the security.
(ii) It should contain alpha-numeric as well as special characters.

(ii) Periodic password change policy should be implemented. For example, the system should enforce the users to change their passwords after ninety days.

There should be a minimum password life. For example, users should not be allowed to change their password before five days.

(iii) Locked users’ should only be unlocked by administrator on written request from concerned user. Reason for account lockout should be investigated and documented.

(iv) Users should not be allowed to use their personal electronic gadgets for official work.
Use of smart phones should be prohibited in the sensitive data storage premises.

(v) Default policy of firewall should be replaced with company’s approved policy.
The firewall policy should be reviewed and updated periodically.

A.7
(a) Direct Changeover

<table>
<thead>
<tr>
<th>It is risky as the old system is completely replaced by new system in one move.</th>
<th>It is a safe method as new and old system run in parallel for some time enabling cross checking of results.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is less costly than parallel as additional resources are not needed.</td>
<td>It involves higher cost as the related efforts have to be duplicated which requires additional manpower, facilities and hardware resources.</td>
</tr>
<tr>
<td>It is the most time efficient approach, since at a pre decided time, the old system is discontinued and new system starts working immediately.</td>
<td>It is a time consuming approach and takes at least one system cycle time to implement.</td>
</tr>
</tbody>
</table>

(b) Two other changeover approaches are explained as follows:

**Pilot Operations:**
There are two types of pilot operations:

(i) **Retrospective parallel running:** In this method the new system runs on data that has already been processed by the old system. Existing results are available for cross checking and system can be tested without problems of staffing and disruption caused by parallel running.

(ii) **Restricted data running:** In this method a complete logical part of the whole system file being chosen and run as a unit on the new system. If that is shown to be working well the remaining parts are then transferred one by one.

This method contains the advantages of safe parallel run but at the same time avoiding high costs of duplicating all processes.
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examination - Spring 2012

Phased/Staged Implementation:
This is the best solution when there is a large system or when distinct parts of the system are geographically dispersed.

This method resembles the parallel run with a difference that rather than whole system a part of new system is run in parallel. This method also resembles the direct changeover with a difference that rather than whole system changeover a part / module is changed.

The different phases may be used in different locations. Experience gained in initial phases can be used to avoid risk and costs in the subsequent phases.

(c) (i) Replacing manual attendance system of a local FM radio station with an automated biometric based solution
In this case Parallel changeover approach is recommended because manual attendance system could easily be continued with the automated attendance system. After cross checking the results for a few months, say for three months, old system may be discontinued. Other changeover approaches may prove either risky or costly or time consuming in this case.

(ii) Online ticket reservation system of domestic railway service
In this case Pilot changeover approach using Retrospective parallel running is recommended because in case of Direct approach the risk of error and system failure would be very high whereas in case of simple Parallel approach extensive resources would be needed. Even in Phased changeover approach the risk is relatively high.

A.8 Key steps that should be performed during a PIR are as follows:

(i) Determine whether the system’s objectives and requirements were achieved.
(ii) Determine whether the procedures were properly documented, published and communicated to the concerned users.
(iii) Assess if the system is able to process transactions at an adequate speed.
(iv) Assess whether the system has the capacity to deal with actual peak loadings as are encountered or foreseen.
(v) Determine if the cost and benefits identified in the feasibility study are being measured, analyzed and accurately reported to management.
(vi) Review program change requests as these may indicate problems in the design, programming or interpretation of user requirements.
(vii) Determine whether the identified faults had been handled at an acceptable speed and with satisfactory results.
(viii) Review whether the controls built into the system are operating according to design.
(x) Determine whether users received adequate training and coaching to take advantage of the new system.
(xii) Assess whether third parties such as customers and suppliers are satisfied.

(The End)
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

EXAMINERS' COMMENTS

SUBJECT
Information Technology

SESSION
Intermediate Examination - Spring 2012

General:

This time also, the overall performance was quite satisfactory. Most of the students were well prepared so far as the routine topics are concerned. A little bit of extra efforts to cover the less frequently tested areas could have improved the result further.

Question-wise comments are as follows:

Q.1 In first part of the question, most students correctly described advantages of mesh topology such as lack of single point of failure and high security and also the disadvantages such as difficulty in adding more devices and high cost.

In the second part students were not very sure. Only about one-third correctly suggested the star topology. Many students did not give any reason to justify their choice.

Q.2 It seemed as if the majority of students had not studied this area. The students mostly produced vague answers based on the general meaning of the two terms.

Since most students did not possess the desired level of knowledge, very few were able to give appropriate examples of the two types of systems, in response to part (b) of the question.

Q.3 The question required listing of issues which limit the use of video conferencing. The answer was easy to guess and most students secured high marks.

Q.4 Most students were able to identify three types of decision tables i.e. Limited Entry, Extended Entry and Mixed Entry. However, most of them could only explain the Limited Entry and were confused as regards the other two types of decision tables.

In part (b), the advantages and limitations of decision tables were correctly identified by most of the students.

Q.5 Most of the students knew about different kinds of web hosting options though many could not produce the exact names or were confused while giving the descriptions. Some candidates mentioned more than four options which was a waste of time.
Examiners’ Comments on Information Technology – Spring 2012

Q.6 This was an easy question and attended by most of the students. The strong password controls and password expiry controls were well understood. However, only few had any idea about the automatic unlocking of the locked accounts. Most of them were of the view that the user should be able to unlock the account using his/her own password. They did not recognize the importance of an administrator doing this job after proper investigation. Similarly, the importance of having a firewall configured to organization’s needs and its constant update was seldom mentioned. Some students were confused between a firewall and an anti virus policy.

Q.7 Part (a) requiring advantages and disadvantages of parallel and direct changeover approaches was attempted well.

In part (b) most students identified the pilot approach and the phased approach. However, they were not very confident in explaining them and seemed to produce the same explanations in either case.

Most students were confused in part (c). All possible permutations were mentioned with almost equal frequency and without any logical reasoning.

Q.8 This was a poorly attempted question. Most candidates were unable to specify the steps that form part of a Post Implementation Review (PIR). Most of them wrote about bug fixes and user trainings which are part of implementation and not PIR. The only point that most of them got right was the cost/benefit analysis.

THE END
The Institute of Chartered Accountants of Pakistan

Information Technology

Intermediate Examination
Autumn 2012
Module D

10 September 2012
60 marks – 1¾ hours
Additional reading time – 15 minutes

Instructions to Candidates:
(i) All the Questions from Section-A are compulsory.
(ii) Attempt any TWO out of THREE Questions from Section-B.

Section A

Q.1 Classify the following controls into Input, Processing and Output Controls.

(i) Limit checks on calculated amounts.
(ii) Signature on source documents.
(iii) Use of bar codes.
(iv) Marking a file as read only.
(v) Audit trial.
(vi) Run-to-run totals.
(vii) Exception report showing data that does not conform to specified criteria.
(viii) Initial data should be within a predetermined range of values.
(ix) Checkpoint and recovery procedures.
(x) Unique login and password.
(xii) Restriction on printing of confidential reports.
(xii) Sequential checks.

(06 marks)

Q.2 (a) Briefly describe “Transaction files” and “Master files” with the help of two examples in each case.

(b) The sales day book of Paw Limited contains the following fields:

- Date
- Customer ID
- Customer Name
- Email Address
- Address
- Phone Number
- Invoice Number
- Amount

Required:
(i) Which of the above fields could be set as primary key? Give brief justification to support your opinion.

(02 marks)

(ii) Identify the fields that must be used by a program for generating customer-wise daily sales report.

(02 marks)

Q.3 During the last two decades IT industry has seen enormous growth. Various technologies are now available for capturing of data.

Required:
Briefly explain each of the following:
(a) Bar Code Readers
(b) OCR software
(c) MICR technology
(d) OMR process

(10 marks)
Q.4 Through the use of Artificial Intelligence (AI), Expert Systems can imitate human thinking and behaviour for the purpose of reasoning and reaching conclusions.

Required:
(a) Briefly describe key components of an Expert System. (05 marks)
(b) List four key benefits of AI over human intelligence. (04 marks)
(c) Describe by way of an example as to how an expert system could be used in each of the following areas:
   - Healthcare
   - Production
   - Prediction
   - Accounting
   - Human resource management (05 marks)

---

Section B

Q.5 (a) List ten tasks that are typically performed by an operating system. (05 marks)
(b) Briefly describe the following types of anti-virus software:
   (i) Scanners (05 marks)
   (ii) Integrity Checkers

Q.6 You have recently joined as System Development Manager of Search Industries Limited which is a new company and is actively involved in automation of all of its major activities. You observed that your team consists of young and energetic programmers but most of them have learnt their programming skills on their jobs with little formal training. As a result, they are weak in documentation and waste a lot of time in making amendments before a program is finalised. They also lack the ability to use programming tools effectively.

Required:
(a) State five good programming practices which you would like your team to follow. (05 marks)
(b) Identify any five types of Computer Aided Software Engineering (CASE) tools and specify how each of the identified tool helps in system development process. (05 marks)

Q.7 The ATM machines of Creative Bank Limited (CBL) contain biometric security features besides conventional PIN control. The customers of CBL have a choice either to use Card + PIN or Card + Biometric option. Customers of other banks can also withdraw cash from CBL’s ATM; however, they can only use Card + PIN option. A customer’s card is captured by the machine after three consecutive unsuccessful attempts.

Required:
Prepare a program flowchart showing the process of cash withdrawal from CBL’s ATM.
Assume that transactions other than cash withdrawals are not allowed. (10 marks)

THE END
A.1 | Input Control | Processing Control | Output Control |
---|---|---|---
ii, iii, viii, x, xii | i, iv, vi, ix | v, vii, xi |

A.2 (a) TRANSACTION FILES
A transaction file is a file containing records of individual transactions that occur from day to day, just like all sales transactions are recorded in a sales day book.

Examples:
(i) The sales day book entries are examples of transaction records in a transactions file.
(ii) All receipts and payments of cash are recorded in the cash book, and so the cash book is a sort of a transaction file if maintained in a computer.

MASTER FILES
A master file contains relatively permanent (reference) data i.e., it is not required to be changed frequently.

Examples:
(i) A master file of suppliers may include their name, address, reference number and agreed terms etc.
(ii) A customers’ master file contains name, address, reference number, credit limit, type of organisation, date of first transaction etc.

(b) (i) Invoice number in a sales day book is a primary key because duplicate values are possible in all the given fields except the Invoice Number.

(ii) To calculate the daily sales to each customer following combination of fields must be selected: Date, Customer ID, Customer Name and Amount.

A.3 (a) Bar Code Readers
It is a computer peripheral which reads barcodes printed on various surfaces. The bar codes are generally used for tagging prices in retail sector and tagging book reference numbers in international publications.

It generally consists of a light source, a lens and a photo conductor translating optical impulses into electrical ones. Almost all barcode readers currently produced contain decoder circuitry analysing the barcode’s image data provided by the photo conductor and sending the barcode’s content to the scanner’s port.

(b) OCR software
Optical character recognition, usually abbreviated to OCR, is a computer software program designed to translate images of handwritten or typewritten text, usually captured by a scanner, into machine-editable text, or to translate pictures of characters into a standard encoding scheme.

(c) MICR technology
Magnetic Ink Character Recognition is a special kind of technology that is used by the banking industry to facilitate the processing of cheques. MICR characters are printed at the bottom of the cheque in a specified font using ink with a magnetic signature. The letters are read with a device similar in nature to the head of an audio tape recorder.
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examinations – Autumn 2012

(d) OMR process
Optical Mark Recognition is the process of capturing data by contrasting reflectivity at predetermined position on a page. By shining a beam of light onto the document the scanner is able to detect a marked area because it is more reflective than an unmarked surface. This technology is widely used in MCQs based examinations.

A.4 (a) Key components of an expert system are as follow:

(i) Knowledge base
It contains rules and facts from past experience. The knowledge base interfaces with a database in obtaining data to analyse a particular problem in deriving an expert conclusion.

(ii) Knowledge Acquisition Program
It includes: Knowledge Interface and Data Interface.
Knowledge Interface: It allows the expert to enter knowledge into the system without the traditional mediation of a software engineer.
Data Interface: It enables the expert system to collect data from non-human resources, such as measurement instruments in a power plant.

(iii) User Interface
It enables users to interact with the system. Through the user interface, the Expert System, puts questions to the users and they reply by providing the required information.

(iv) Inference Engine
It executes the reasoning to decide which rules apply and allocates priorities.

(v) Explanation Engine
It explains how a particular fact was inferred.

(b) Key benefits of using Artificial Intelligence (AI) over human intelligence are as follows:
(i) AI and its expertise are permanent, whereas human experts may leave the business.
(ii) AI can be easily copied.
(iii) AI is consistent whereas human experts and decision makers may not be so consistent.
(iv) AI can be documented electronically.

(c) Healthcare
Recognising diseases or other conditions based on displayed signs and symptoms and suggesting possible cure.

Prediction
Inferential systems like weather forecasting.

Human resource management
HR manager may determine whether the company is in compliance with an array of government employment laws.

Production
A machine may be programmed to suggest possible reasons for a malfunction.

Accounting
By processing the available data, decisions such as budgeting, tax planning, project management etc can be carried out.
A.5 (a) An operating system typically performs the following tasks:

(i) Checking that the hardware (including peripheral devices) is functioning properly.
(ii) Calling programme files and data files from external storage into memory.
(iii) Opening and closing of files, checking of file labels etc.
(iv) Assigning programme and data files from memory to peripheral devices.
(v) Maintenance of directories in external storage.
(vi) Controlling input and output devices including the interaction with the users.
(vii) Controlling system security.
(viii) Handling of interruptions and communicating with the user.
(ix) Running checkpoint programmes and procedures.
(x) Managing multitasking and multiprogramming.

(b) (i) SCANNERS
Scanners look for sequences of bits called signatures that are typical of virus programs. They identify different types of viruses by examining memory, disk boot sectors, executables and command files for bit patterns that match a known virus. It then takes appropriate steps like clearing the virus, informing the user etc.

(ii) INTEGRITY CHECKERS
It computes a binary number on a known virus-free program that is then stored in a database file. The number is called a cyclical redundancy check or CRC. When that program is called to execute, the checker computes the CRC on the program about to be executed and compares it to the number in the database. A match means no infection; a mismatch means that a change in program has occurred. A change in program could mean a virus within it.

A.6 (a) I would like to suggest the following good programming practices to the Search Industries Limited's team:

(i) Specify all the program requirements and record them in writing.
(ii) Always keep the working papers which are made during program development.
(iii) When writing a program, try to keep it as short as possible and logically well-structured.
(iv) Test every new/amended program according to the specification given by system analyst.
(v) Keep record of all programming errors and subsequent corrections to the programs, which are found during live processing.

(b) Key types of CASE tools and their usefulness in system development process are as follows:

(i) **Diagramming tools**: Such tools automate the production of diagrams and hence SRL's team could use these tools to draw the system models.

(ii) **Analysis tools**: They are used to check the logic, consistency and completeness of system diagrams, forms and reports.

(iii) **CASE repository**: It is a specialized database that can store system models, detailed descriptions and specifications, and other products of system development which can be shared by all developers.

(iv) **Screen and layout generators**: These tools allow prototyping of the user-interface to be produced and amended quickly.

(v) **Document generators**: They are used to assemble, organize and report on system models, descriptions, specifications and prototypes that can be reviewed by system owners, users, designers and developers.

(vi) **Code generators**: They automate the production of code based on the processing logic input to the generator.

*Note: Students were required to identify and explain only five types of CASE tools.*
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examinations – Autumn 2012

A.7

Start

Read Card

Attempt = A = 0

CBL Customer

Yes

No

Option PIN or NDI

PIN

BIO

Scan Finger

Finger verified

No

Yes

PIN verified

No

Yes

A = A + 1

Read Amount

Authentication Failed

No

If A ≥ 3

Yes

Capture Card

Display Message: Your Card has been Captured

Cancel

Eject card

End

Display Message: Sorry Low Balance

Serve cash

No

Yes

Check Balance Amount

(The End)
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

EXAMINERS’ COMMENTS

SUBJECT
Information Technology

SESSION
Intermediate Examination - Autumn 2012

General:
The students’ performance in the theoretical part of the paper was not satisfactory. It seemed that many students came unprepared. Many of them were not aware of the very basic terms such as Master File and Transaction File. However, many students were able to neutralize this deficiency by considerably better performance in the Computer Practical Examination.

Question-wise comments are as follows:

Q.1 The first question was about classification of various controls into input, processing and output controls. The question was easy but the overall response was just average. Use of bar codes and sequential check were often categorized as processing controls instead of input controls. Read only file is a processing control; it was often categorized as input control.

Q.2 (a) The performance in this easy question was just about average. Many students thought that the only difference between transaction file and master file is that of detail and time frame. Most students wrote that the data in transaction file is summarized in master file. Some students described master file as a collection of daily transaction files.

(b) Only about 25% of the students could identify correctly that Invoice Number shall be the primary key. The majority was of the view that Customer ID should be the primary key which clearly showed that they were unaware of the concept of primary key or the type of records in sales day book. Many students mentioned two or more fields as the primary key which was obviously incorrect and indicative of serious weakness in conceptual understanding of the students. In sub part (ii), a list of eight fields was given and the students were required to identify the fields that must be used for generating customer-wise daily sales report. Here the performance was even worse. Some students listed seven or even all the eight fields, whereas only four fields were essentially required for generating such a report.

Q.3 The students were required to describe four types of technologies that are used for capturing data. Most of the students only described the barcode reader and here too their answers were mostly restricted to what they have seen in real life. Very few students knew the difference between OMR and OCR. Some knew that OMR can be used in examinations but how it works was not clear to them. The above performance is clearly indicative of selective studies.
Q.4 A mixed performance was witnessed in this question on the topic of Expert System and Artificial Intelligence. Performance in each of the three parts of the question is discussed below:

(a) Key components of an expert system were required to be described. Most students correctly mentioned components such as inference engine, knowledge base, knowledge acquisition program, working memory etc. However, very few wrote about explanation engine. Many students mentioned just two components i.e. knowledge base and inference engine.

(b) It required listing of key benefits of Artificial Intelligence over human intelligence. This was well attempted and benefits such as permanence, consistency, portability and low overall cost were mentioned.

(c) One example each of the use of Artificial Intelligence in five different areas i.e. Healthcare, Prediction, Human resource management, Production and Accounting was required to be given. Most of the students could not give correct examples except in respect of prediction where most of them mentioned weather forecasting. In other areas, most students mentioned routine tasks which were not required.

Q.5 (a) This was an easy question which required the students to list the tasks performed by operating system. This part was well attempted and majority of the students secured high marks.

(b) In this part of the question, the candidates were required to describe two types of antivirus software namely scanners and integrity checkers. This proved quite difficult. Only about 20% of the students could describe scanners whereas very few students had any idea about integrity checkers.

Q.6 (a) The candidates were required to list five good programming practices. The performance was about average as somehow a large number of students wrote various phases of SDLC which were totally irrelevant. Majority of the others could mention 2 or 3 points only.

(b) This was a very straightforward question for those students who had studied this topic and many among them were able to secure full marks. However, about half of the students were totally ignorant which was definitely on account of selective studies.

Q.7 The requirement was to prepare flow chart for ATM based cash withdrawal transaction. Nobody was able to prepare a completely correct and logical flow chart although it was a real life example and it was expected that students would do well. Logical flow of the transaction process was missing. Flow charting symbols were often used incorrectly. A large majority of the candidates included the step “Open file/close file” which was not required here. This was an indication of the fact that such students had resorted to rote learning instead of understanding the concepts.

THE END

Page 2 of 2
The Institute of Chartered Accountants of Pakistan

Information Technology

Intermediate Examination
Spring 2013
Module D
11 March 2013
60 marks – 1¾ hours
Additional reading time - 15 minutes

Instructions to Candidates:
(i) All the Questions from Section-A are compulsory.
(ii) Attempt any TWO out of THREE Questions from Section-B.

Section-A

Q.1 Connect Communications Limited (CCL) is a telecommunication service provider. On the instructions of the management its IT Manager has recently carried out a review of its invoicing operation, which is presently outsourced to OSC. The IT Manager has recommended that CCL should introduce e-billing. He also believes that the outsourcing arrangement should be terminated immediately and the invoicing function should be carried out in-house.

Presently CCL has 0.3 million post-paid customers. Details of the outsourcing arrangement with OSC are as follows:
- OSC charges Rs. 40 per invoice, subject to a minimum of Rs. 6.0 million per month. The charges include cost of stationery (papers and envelopes), printing, packing (inserting invoices and sealing the envelopes) and delivery of invoices to the customers.
- OSC is required to complete the assignment within ten days of the receipt of data.
- Proof of delivery of individual invoices is also provided to CCL.

However, CCL’s CFO is of the view that it should introduce e-billing but should not discontinue the outsourcing arrangement immediately.

(a) Briefly describe various types of costs that may be incurred if CCL decides to carry out the invoicing operation in-house. (04)
(b) Suggest whether CCL should implement the IT Manager’s advice. Substantiate your suggestion with appropriate arguments. (04)

Q.2 (a) Identify and briefly explain any four types of reports that may be generated from a data processing system. Give one example of each type of report. (08)

(b) Identify the types of data processing that is being performed in the following situations. Give appropriate reason(s) to support your answer.
(i) Employees’ attendance is marked in an ERP system through a biometric interface. The system updates the employees’ attendance record, on a daily basis at midnight.
(ii) Sohail inserted his debit card in the ATM machine. After entering the current password he:
   - cancelled the transaction
   - withdrew Rs. 20,000

Q.3 (a) Kamil Super Store (KSS) is considering to replace its existing cash registers with electronic point-of-sales (EPOS) system.
(i) Identify any three issues that KSS should consider before making a final decision. (03)
(ii) List any six benefits that KSS may obtain by implementing EPOS system. (03)

Continued on next page....
(b) Effective risk management plays an important role in the success of any information system project. Identify the key tasks that are generally performed in the following stages of risk management:
   - Risk Assessment
   - Risk Minimisation
   - Risk Transfer

Q.4 (a) You have been appointed as head of operations of a company which is about to set up a call centre. The company is in the process of purchasing a PABX system for the call centre.

Specify the features of a PABX system which may be particularly useful in the above situation.

(b) Identify any six activities that are required to be performed by a Network Administrator.

Section-B

Q.5 The last few years have witnessed significant growth in the use of Internet for downloading information and software which poses many risks.

(a) Specify any five precautions which one should take while downloading software from the Internet.

(b) List any two utility programs which may safeguard the data stored on computers from risks associated with downloading software. Briefly describe how these programs perform their tasks.

Q.6 While reviewing the system documentation of EWC Limited you have noticed that:
   - The programmers seem to be ignorant with the use of sub-routines.
   - Appropriate program maintenance controls do not exist.

Prepare a note for the guidance of the information systems development team, covering the following:
(a) the usefulness of sub-routines in writing efficient programs; and
(b) the importance of controlling the changes to the programs. Also list any six controls that should be implemented in this regard.

Q.7 The Government of Toyland is planning to replace the National Identity Cards of its citizens with a computerised National Identity Card. In this respect, it is considering either to use Magnetic Stripe Card or Smart Card.

(a) Which option would you prefer? Give any six advantages to support your answer.

(b) Identify the main purposes for which your preferred choice could be used.

(THE END)
Section-A

Ans.1  (a)  CCL should consider following types of costs if it opts to pursue the consultant’s recommendation:

(i) Cost of equipment such as computers, printers and special automated packing devices and air-conditioning equipment etc.
(ii) Cost of installation which may also include extension in premises or arranging new premises for printing arrangement along with the electric wiring and network cabling.
(iii) Cost of developing billing system and integrating it with the existing system.
(iv) Personnel costs, for example costs of recruitment/relocation and training of staff and other overheads etc.
(v) Operating costs or ongoing running costs, for example, cost of consumable materials such as stationery, paper and toners etc, costs of maintenance of equipment and facilities, fuel and power, insurance and standby arrangements etc.

(b) In my opinion, CCL should not implement the IT Manager’s advise because:

(i) Usually it is not advisable to bring about such a change without analyzing the situation carefully and or before a feasibility study.
(ii) In case CCL adopts the IT Manager’s recommendation and immediately engages the necessary resources, some of these may become redundant even if a small portion (say 25%) of the customers opt for e-billing option or if due to any reason, CCL decides to move back to the old arrangement.

However, CCL should introduce e-billing and those customers who do not opt for the e-billing option may continue to be invoiced through the outsourced arrangement, till a detailed review and feasibility study has been carried out.

Ans.2  (a)  Following types of reports are generally generated from a data processing system:

Routine / Periodic Reports: These types of reports provide information to the managers on a routine and regular basis in a pre-specified format.

Example: Daily or weekly sales analysis reports, monthly financial statements, etc.

Exception Reports: An exception report is generated as part of the output of a system where a situation arises which is acceptable to the system but needs to be notified to the user in order that some further necessary action can be taken.

Example: The credit card transaction execution system of a bank is programmed to generate an exception report whenever a customer spends ten times more than his average transaction spending.

Predictive/Forecasting/Planning Reports: They are used for forecasting and making projections. They are extensively used in planning and decision making process.

Example: Budgets, sales projections etc.

On-demand Reports: These reports are generated in response to an immediate request. They do not have any type of routine nature

Example: Number of employees present in the office at 10:30 pm on a particular date.
Cases (i) 
Since data is collected and master file is updated in two separate stages, hence it is an example of batch processing.

Cases (ii) first part 
In this case, for every data entry action of the user, the data is processed immediately by the machine and then some output, in the form of information, is produced by the machine. Hence, it is an example of interactive on-line processing.

Cases (ii) second part 
In addition to the activities described in first part above, the system also serves cash to Sohail and updates his balance simultaneously. Hence, it is an example of real-time online processing.

Ans.3 (a) 
(i) KSS should consider the following issues before making a final decision:

- Cost of the system and related hardware.
- Whether the EPOS is user-friendly i.e., it must be easy to learn and operate.
- Whether the EPOS has a reliable security system in place.
- Whether the EPOS system supplier provides complete training, installation, support and after sales services.

(ii) Key benefits of electronic point-of-sales (EPOS) system are as follows:

- Billing and payment process would become more efficient and quick.
- Billing accuracy will improve.
- Customers would get more details about items purchased and it would be easier to reconcile the bill, if required.
- Existence of ‘Manager only’ functions in the EPOS, for certain types of transactions/adjustments, may prevent misuse.
- Faster stock taking can be achieved by using hand held stocktaking devices
- Detailed reports may be obtained such as product-wise sales report, suppliers-wise sales report and list of slow moving items etc.

(b) Following key tasks are performed during risk assessment stage:

- Identification of risks.
- Quantification of risks.
- Placing risks in the order of potential loss. / Categorization of risks as high, low and moderate.

Risk minimization stage involves the following tasks:

- Identification of counter-measures.
- Costing of counter-measures.
- Selection of counter-measures. Insignificant risks may not justify the cost of setting up and operating controls.
- Implementation of counter-measures.
- Drawing up of contingency plans in case counter-measures fail.
- Introducing appropriate aversion clauses in the agreements involving such risks.

Risk transfer stage involves getting insurance cover for those risks that cannot be covered by security measures.
Ans. 4 (a) Following features of a PABX system may be particularly useful for the company in the given situation:

(i) Call logging for both incoming and outgoing calls.
(ii) Call recording function for quality assurance. However, this must be disclosed to the callers and the employees.
(iii) Line jump facility i.e. if a phone is not attended by intended recipient then after few rings, say five, the incoming call is automatically transferred to another nearby extension.
(iv) Caller Line Identification so that the call centre officer may readily access the existing customers’ details and facilitate them in a personalized manner.

(b) Following activities may be performed by a network administrator:

(i) Monitoring the network’s capacity to ensure that all transmission requirements can be met.
(ii) Adding capacity to the network by increasing bandwidth, interconnecting additional nodes, or creating and interconnecting additional networks.
(iii) Training people to use the network effectively.
(iv) Assisting IT professionals in writing applications that will make good use of the network’s capabilities.
(v) Backing up the network software and data regularly.
(vi) Putting security procedures in place and ensuring that all security procedures are followed.
(vii) Making sure that network personnel can respond quickly and effectively in the event of a network operational or security failure.
(viii) Diagnosing and troubleshooting problems on the network and determining the best course of action to take to solve them.

Section-B

Ans. 5 (a) Following are some precautions that should be taken while downloading software from Internet:

(i) Always download the software which you trust.
(ii) Download from the official website of the software provider.
(iii) Be cautious of a website which tries to auto download a software.
(iv) Use antivirus and anti spyware to protect your computer.
(v) Use security features of the browser so that it can check safety while downloading.
(vi) Keep the firewall of local machine in the enabled mode.

(b) Following utility programs may be used for safeguard of data stored on devices like laptops and smart phones etc.

(i) Anti-virus: It scans computers for viruses. These programs detect and try to remove/delete the virus and repair the infected files. If they fail to do so then depending upon the settings selected by the user, either they delete the detected threats permanently or quarantine suspicious items for further actions of the user.

(ii) Backup: This software can make a copy of selected or all information stored on a computer disk on the same disk or on some other device/online location. The backed up data can be restored in full or partly on the same device or on some other device/location. Backup program may be scheduled to run automatically or may run by the user at any time.
Ans. 6 (a) A sub-routine is a group of programming instructions which perform a task, that is required to be performed many times in the same program.

The use of sub-routines can be helpful because:

(i) Programming time is reduced when using a sub-routine which has already been tested and proved in another application.
(ii) They can be written by a programmer not involved in writing the main program.
(iii) It is easier to locate faults in programs that are constructed on a modular basis and/or include sub-routines.

(b) Controlling changes to programs are important because uncontrolled changes to already operational programs may lead to:

(i) New errors in the program
(ii) Introducing an element of fraud

In the given situation, implementation of following controls is useful:

(i) Change requests to the program must be in writing.
(ii) Change requests to the program must be approved at an appropriate level.
(iii) Change requests must be assessed by a system analyst before approval.
(iv) Changes incorporated in the program must be documented.
(v) All changes must be tested before implementation.
(vi) Documented procedure for transfer of source code from production to test environment and vice versa.

Ans. 7 (a) Smart cards are a better choice than Magnetic Strip Cards because:

(i) Smart cards are more secure than magnetic cards. (There are multiple devices in the market which can decode data on magnetic card easily, but as smart cards use different encryption mechanisms so it is hard to decode information on them.)
(ii) They can store more data than magnetic cards.
(iii) They are more durable than magnetic card i.e. have a long life, etc.
(iv) They are microprocessor based and hence a lot more processing can be done in it as compared to magnetic cards.
(v) They don’t need availability of other end network for basic authentication as much of the data is available on the card itself whereas magnetic stripe card requires dedicated dialup connection availability for all kind of transactions.
(vi) They are not affected by magnetic interferences or other electrical interferences, while magnetic cards can lose data on account of high magnetic interference area.
(vii) They can manage the mechanisms of authentication and non-repudiation in a better way as they have a large storage capacity.

(b) (i) Besides personal information, computerized Smart Cards can also store fingerprints. Hence, with the help of a smart card reader the identity of a person can be verified. (Identity fraud would be minimised.)
(ii) Criminal record could be easily checked.
(iii) Smart Cards could be used as driving license, medical record, health and life insurance card, ATM/debit and credit card.
(iv) Such cards could also be used for disbursement of pension and unemployment funds etc.

(THE END)
# EXAMINERS’ COMMENTS

## SUBJECT
Information Technology

## SESSION
Intermediate Examination - Spring 2013

### General:

The overall performance in the paper was above average as the passing percentage was 42.34%. In questions where practical scenarios were given, many students lacked the ability to understand the exact requirement of the question. Some students wasted time in giving very detailed answers without considering that a question of 4-6 marks should be completed in about 6-10 minutes.

### Question-wise comments:

#### Question 1 (a)

Excellent performance was witnessed in this part of the question. Being the students of chartered accountancy, most of the candidates knew well about the various types of costs that are required to be incurred if a major operation, primarily involving I.T. support, is to be carried out in-house.

#### Question 1 (b)

This part required the students to suggest whether the company should implement the IT manager's advice regarding immediate implementation of in-house processing of invoices and termination of existing arrangements with the third party. This part was not attempted well as students could not elaborate that it is not advisable to bring about such a change without analyzing the situation carefully or before a proper feasibility study has been carried out. Moreover, only few candidates were able to identify that in the given case, if the company (CCL) adopts the IT Manager's recommendation and immediately engages the necessary resources, some of these may become redundant if only a small proportion of the customers opt for e-billing option or if due to any reason, CCL decides to move back to the old arrangement. Many candidates wrote advantages and disadvantages of in-house invoicing which were not relevant.

#### Question 2 (a)

The candidates were required to briefly explain any four types of reports that may be generated from a data processing system with one example. Most of the students responded to this easy question correctly and many were able to secure full marks also.
Examiners’ Comments on Information Technology – Spring 2013

Question 2 (b)

In this part, three situations were given and the candidates were required to identify the type of data processing that was in use in each case and give reasons in support of their answers. The performance in this part was mixed. Most of the students knew that in case of employee attendance, batch processing is in action. However, majority of them could not elaborate that cancelled ATM transaction is a case of interactive online processing while cash withdrawal from ATM involves real time online processing. Moreover, only few students could give appropriate reasons to support their answers.

Question 3 (a)

The first requirement in this part was to identify the issues that Kamil Super Store (KSS) should consider before replacing cash registers with EPOS system. Majority of the candidates did well as they discussed matters such as cost of hardware/software, user friendliness, security and training etc.

The second requirement was to list any six benefits that KSS may obtain by implementing EPOS. This again was quite easy and a large number of students secured full marks. Some students went into further detail and discussed in detail how time can be saved or how cost can be reduced by using electronic point-of-sales (EPOS). Such details were not required. It has been noted that when students find a question easy they tend to go into too much detail. The numbers allocated to a question should give a good idea as to how much details are necessary. Unnecessary details do not add value and result in wastage of time.

Question 3 (b)

 Majority of the students correctly described the key tasks that are performed during risk assessment stage. However, it was observed that many students incorrectly included Disaster Recovery in Risk Minimizing Stage.

Question 4 (a)

Although the question had been asked in a very simple manner but majority of the students either did not attempt the question or were unsuccessful in describing PABX’s features correctly. Many students answered as if they were discussing network communication instead of a PABX. A number of students described benefits that would arise on installation of PABX system which was not required.

Question 4 (b)

This part of the question required students to mention any six activities to be performed by a network administrator. Most of the students performed well. However, some students also included other activities such as those performed by a database administrator. The candidates must know that mixing incorrect points with correct points has a negative impact on their assessment.
Question 5 (a)

The requirement was to specify any five precautions to be taken while downloading software from the Internet. The performance was below average as most answers revolved around anti-virus software and security measures such as firewalls. Other important points such as downloading from official and trustworthy websites only, were mentioned by only about 20% of the students.

Question 5 (b)

The requirement was to mention any two utility programs which may safeguard the data stored on computers from risks associated with downloading software from Internet. Most of the students correctly mentioned and explained programs such as anti-virus, firewalls, back-up software etc. Many of them secured full marks.

Question 6

Since this question was included in Section-B of the paper, most of the students left it on choice. However, most of those who did attempt, performed well. In part (b) of the question, some candidates wrote about change management process instead of mentioning the controls over changing of programs.

Question 7

In part (a) of the question, the students were required to mention whether they would prefer magnetic stripe card or smart card for use as national identity card and list any six advantages in support of their choice. In part (b) the students were required to mention the main purposes for which their preferred choice could be used. The performance was average as many students chose magnetic stripe card as their choice. However, those who chose smart card, were able to perform well as they explained its advantages and uses correctly.

THE END
Information Technology

Intermediate Examination
Autumn 2013
Module D

Instructions to Candidates:
(i) All the Questions from Section-A are compulsory.
(ii) Attempt any TWO out of THREE Questions from Section-B.

Section-A

Q.1 Capturing data through Keyboard is one of the classical and most commonly used method. However, with the increasing quantum of data entry many other data capturing processes have been evolved. Among such processes, “Character recognition processes” introduced a revolutionised way of data capturing.

(a) Briefly explain the Magnetic Ink Character Recognition (MICR) process and identify its three main advantages. (06)

(b) State why application of MICR is limited. (02)

(c) Identify an appropriate data input device which is required in each of the following cases:
   (i) Voice recording
   (ii) Capturing photographs electronically
   (iii) Uploading paper photographs to facebook
   (iv) Transforming images of handwritten text into machine-editable text (02)

Q.2 (a) Briefly explain the three levels of Management Information System. Give two examples of the information generated at each of the above level. (07)

(b) During the past decade, e-commerce has gained increasing popularity. Most of us are now using e-commerce either directly or indirectly. Identify any six areas where e-commerce technology is used. (03)

Q.3 Dynamic Limited intends to develop a computer program for the purpose of calculating annual performance bonus for its employees. There are two types of employees viz., permanent and contractual. All the employees have been classified into three categories A, B and C. Managerial staff is placed in category A whereas non-managerial staff are placed in either category B or category C.

Employees in category A, contractual employees and employees whose service period is less than nine months are not eligible for the award of bonus.

On a scaled score of 1 to 100, the amount of bonus for the eligible employees is determined as follows:

<table>
<thead>
<tr>
<th>Scaled Score</th>
<th>No. of Basic Salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 and above</td>
<td>2.0</td>
</tr>
<tr>
<td>65 – 79</td>
<td>1.5</td>
</tr>
<tr>
<td>50 – 64</td>
<td>1.0</td>
</tr>
<tr>
<td>Less than 50</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Prepare a program flowchart showing the process of calculation of bonus. (10)

Continued on next page....
Q.4 Knock Tel (KT) is a mobile service provider and is planning to initiate mobile banking services in association with a leading bank. As the head of marketing, you have been assigned to assess the prospects of launching such a scheme and report to the CEO of the company.

As part of your assignment, you are required to:

(a) Identify six types of services which can be offered to mobile banking customers. (03)
(b) Briefly describe two challenges which KT might have to face in launching the mobile banking services. (03)
(c) Identify four benefits that the Bank may secure by partnering in the above project. (04)

---

Section-B

Q.5 (a) Segregate the following into preventive, detective and corrective controls and give brief justification in support of your choice.
   (i) Reviewing credit card bill before payment.
   (ii) Keeping ATM card PIN separate from ATM card.
   (iii) Monitoring expenditures against budgeted amounts.
   (iv) Submitting revised invoices after correction.
   (v) Updating IT access lists if individual’s role changes.
   (vi) Review of implemented controls by internal auditor.
   (vii) Mandatory change of computer passwords after every 45 days. (07)

(b) Identify any six uses of audit trail in a computerized environment. (03)

Q.6 Return Exchange (RE) is a foreign exchange dealer. Presently RE is using spreadsheets to keep record of its transactions and generate operational level reports. However, its business has grown over the years and now it is operating branches in all major cities across the country. The management is planning to acquire integrated software from a local software house to meet its increasing needs.

Identify any five logical access controls that may be embedded in the above software to ensure the security of data and identify one type of security breach which each control is expected to cover. (10)

Q.7 (a) Describe Hot site and Cold site and in each case, give examples of three types of businesses which would prefer to use them. (07)

(b) As part of Business Continuity Plan, Unified International (UI) envisages to set up its own hot site. Identify the factors which determine the extent of costs that UI would have to incur on setting up such a site. (03)

(THE END)
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examinations – Autumn 2013

A.1 (a) Magnetic Ink Character Recognition is a technology which is used to facilitate the processing of voluminous numerical data, for example, cheques and sales/promotional schemes coupons. The process involves the following steps:

- Information such as cheque number, account number etc. is printed at the bottom of the cheque in a specified font using ink with a magnetic signature.
- Cheques are placed in a reader–sorter unit where they pass through a magnetic field which causes the particles in the ink to become magnetized.
- Read heads interpret the characters. The data being read can be entered directly into a computer or can be transferred to a magnetic tape for processing at a later stage.

Three main advantages associated with the use of MICR are as follows:

(i) Cheques may be roughly handled, folded, smeared and stamped but they can still read with a high degree of accuracy.
(ii) Processing is quicker because cheques are fed directly into the input device.
(iii) Magnetic ink characters appear just like ordinary characters and are readable.
(iv) Risk of fake copies of cheques being processed is minimized.

(b) Application of MICR is mostly limited to banks, because it uses only 10 digits and 4 special characters needed for bank processing. No alphabetic characters are available. Besides this, its equipment are costly and standards are time consuming.

(c) | S.No. | Purpose | Data Input Device |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Voice recording</td>
<td>Microphone</td>
</tr>
<tr>
<td>(ii)</td>
<td>Capturing photographs electronically</td>
<td>Web/Digital Camera</td>
</tr>
<tr>
<td>(iii)</td>
<td>Uploading paper photographs to facebook</td>
<td>Image processing / Flatbed Scanner</td>
</tr>
<tr>
<td>(iv)</td>
<td>Translate images of handwritten text into machine-editable text</td>
<td>Optical Character Recognition Scanner</td>
</tr>
</tbody>
</table>

A.2 (a) Three levels of Management Information System (MIS) are explained as follows:

(i) **Operational level MIS**
Such MIS are essentially used for processing transactions and updating files etc. Usually, the inputs of such systems are basic transaction data and usual outputs are simple reports that list the input data after sorting or otherwise.

Examples of information generated at this level:
- Sales invoices
- Overtime reports

(ii) **Tactical level MIS**
The MIS at this level uses the same data which is used at the operational. However, at this level, the data is used to produce more meaningful information and provide support for semi-structured decision making.

Examples of information generated at this level:
- Price variance
- Monthly sales forecast
- Production budget
(iii) **Strategic Level MIS**

At strategic level the information system is likely to be formal because it is not possible always to quantify or programme strategic information. Human judgment is used more often at this level, as many strategic decisions cannot be programmed.

The examples of information generated/required at this level include:

- Ad-hoc market analysis
- Annual sales analysis report
- Divisional/Branch-wise/Segmental income statement

A.2 (b) Common uses of e-commerce are as follows:

(i) Online / E-Marketing / Customer Relationship Management (CRM)
(ii) Business Services / EDI / Supply Chain Management (SCM)
(iii) Online trading / Online Transaction Processing / Internet Shop – Website
(iv) Communication Services / E-mails
(v) Online banking / Electronic Fund Transfer
(vi) Information Services
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examinations – Autumn 2013

A.3

[Flowchart diagram]

Print B

B = 2 * BS

B = 1.5 * BS

B = 1 * BS

IF SS ≥ 80

IF 65 ≤ SS ≤ 79

IF 50 ≤ SS ≤ 64

B = 0

End
A.4 (a) Following services could be offered through mobile banking:

(i) Account opening facility to maintain balance.
(ii) Fund transfers.
(iii) Ordering cheque books.
(iv) Balance checking in the account/ Status of cheques deposited.
(v) Stop payment.
(vi) Mini-statements and checking of account history.
(vii) Online payments like mobile phone and other utility bills etc.
(viii) Alerts on account activity or passing of set thresholds.

(b) KT may face the following challenges while launching the application of mobile banking:

(i) Security: Security of financial transactions being executed from remote locations and transmission of financial information over the air, are the most complicated challenges.

(ii) Maintaining Service Standards: Provision of uninterrupted services would be a challenge as it may be affected by various external factors beyond the company's control.

(c) The bank may gain the following benefits:

(i) Able to penetrate into low income earners market.
(ii) Ability to expand the business to customers in far off areas.
(iii) Low average transaction cost as compared to conventional banking.
(iv) Increased chances of retaining existing customers by offering them additional banking services.
(v) Competitive advantage over competitors who are not offering such services.

A.5 (a) (i) Reviewing credit card bill before payment.
   It is a detective control as it enables to find any incorrect/fraudulent transaction billed.

(ii) Keeping ATM card PIN separate from ATM card.
   It is a preventive control because it prevents from misuse of ATM card if it is accidentally or due to any mishap falls in wrong hands.

(iii) Monitoring expenditures against budgeted amounts.
   It is a detective control as it enables to timely detection of any deviation from budgeted expenses.

(iv) Submitting revised invoices after correction.
   It is a corrective control as it enables to submit corrected data.

(v) Updating IT access lists if individual’s role changes.
   It is a preventive control because timely updating changes in access lists helps to prevent any misuse of access rights.

(vi) Review of implemented controls by internal auditor.
   It is detective control as it enables to identify any weaknesses in the implemented controls or any breach of implemented control by an independent but authorized individual.

(vii) Mandatory change of computer passwords after every 45 days.
   This is a preventive control as it minimizes the risk of password compromise.
(b) Uses of audit trial in a computerized environment are as follows:

(i) To follow the history of a transaction.
(ii) To establish accountability of a transaction.
(iii) Investigate the causes when a record is found to be erroneous.
(iv) Assist recovery from data.
(v) Correct false information that has been sent to system users.
(vi) Monitor procedural violations to highlight possible breaches of security.
(vii) Monitor the way the system is being used.

A.6 Following are some of the security features that could be implemented in RE’s integrated software to ensure the security of data:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Logical Access Control</th>
<th>Security breach expected to cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Each user has a unique name based ID and password.</td>
<td>▪ Sharing of user IDs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Inappropriate control over segregation of duties.</td>
</tr>
<tr>
<td>(ii)</td>
<td>Passwords meet minimum length criteria, are difficult to guess and based on alphabetical characters</td>
<td>▪ Compromise of passwords.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td>(iii)</td>
<td>Mandatory password change after a certain period is ensured.</td>
<td>▪ Compromise of passwords.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td>(iv)</td>
<td>The inactive accounts are disabled after a pre-defined period of non-use.</td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td>(v)</td>
<td>The application locks a user ID in case of 3 wrong password attempts.</td>
<td>▪ Compromise of passwords.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td>(vi)</td>
<td>The application employs automated mechanisms to ensure that all important activities are stored in audit logs.</td>
<td>▪ Misuse of authority by privileged users.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td>(vii)</td>
<td>Mechanism is in place to ensure that audit logs cannot be tampered with.</td>
<td>▪ Misuse of authority by privileged users.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td>(viii)</td>
<td>Each user is provided with operating privileges (authorizations) on need-to-have basis.</td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td>(ix)</td>
<td>The application enforces separation of duties through assigned access authorizations.</td>
<td>▪ Inappropriate control over segregation of duties.</td>
</tr>
<tr>
<td>(x)</td>
<td>The application terminates a session after a specified time period of inactivity.</td>
<td>▪ Unauthorised access.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Leakage of confidential information.</td>
</tr>
</tbody>
</table>

A.7 (a) A hot site is a duplicate of the original site (computer room with all required facilities) of the organization, with full computer systems as well as near-complete backups of user data. Ideally, a hot site will be up and running within few hours. This type of backup site is the most expensive to operate.

Hot sites are usually used by the organizations that operate real time processes such as:

- Banks / financial institutions.
- E-commerce providers / Ebay etc.
- Air lines.

A cold site is a facility with the space and basic infrastructure adequate to support resumption of operations. It does not include backed up copies of data and information from the original location of the organization, nor does it include hardware already set up. It includes minimal start-up costs, but requires additional time following the disaster to have the operation running at a capacity close to that prior to the disaster. It
is the least expensive type of backup site for an organization to operate. Cold sites are usually used by the organizations that do not require to be operative immediately and some time lapse doesn’t really hurt the business. These may include:

- Non-governmental organizations / welfare trusts.
- Education institutions.
- Service industry / audit firms

(b) Following factors would determine the extent of costs that UI have to incur on setting up its own hot site:

   (i) number and type of devices needed;
   (ii) amount of data storage needed;
   (iii) processing speeds needed;
   (iv) recovery time frame;
   (v) number of staff needed;
   (vi) requirement of office facility(area), furniture, equipment and supplies;
   (vii) method of activation of the facility i.e., remote site activation or on-site activation;
   (viii) access to shared space or dedicated space at the site.

(THE END)
**THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN**

**EXAMINERS’ COMMENTS**

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>SESSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology</td>
<td>Intermediate Examination - Autumn 2013</td>
</tr>
</tbody>
</table>

**General:**

The paper consisted of short questions which covered a large part of the syllabus. While most candidates demonstrated a basic level of understanding of IT, the incomplete answers also showed that generally there was a lack of preparation and focus with regard to the study of this subject. There were also a few instances where students wasted their time by answering all the three optional questions.

**Question-wise comments are as under:**

**Question 1 (a)**

Most candidates explained Magnetic Ink Character Recognition (MICR) technology correctly. However, the candidates generally failed to provide three advantages of this technology. Some candidates confused it with bar code information and plastic/payment cards.

**Question 1 (b)**

Students were not able to explain why use of MICR is limited i.e. because MICR can process only 10 digits and 4 specific characters. It cannot process ordinary characters like a, b, c, d. The reason given by majority of the students was that MICR is expensive.

**Question 1 (c)**

In this part, four different methods of data input were given and the candidates were required to identify data input device that is used in each method. A large number of students were able to secure full marks. The most common error was that voice recorder was identified as the data input device. In fact, the microphone installed in the voice recorder is the data input device.

**Question 2 (a)**

Majority of the candidates did not know about the three levels of Management Information System (MIS). Instead, they explained the different types of MIS systems like TPS, DSS, ESS etc. Even those who explained the various levels of MIS correctly were mostly unable to give proper examples of the information generated at each level.

**Question 2 (b)**

In this part, a large majority of students were able to identify six areas where e-commerce is commonly used. However, many students described e-commerce models like B2B, B2C and G2C etc. which were not relevant in the given question.
Question 3

Flowcharts are regular examination topics. For the examinations, candidates are expected to develop the ability to design and present good process flows using appropriate format with correct terminology and formulae. A number of students did not develop flowchart with correct logic. They just put the narration/computation factors in flowchart boxes and connected them without considering logical relationship. In several answers, even where the logic was correct, the flows were inefficient. Many students used incorrect symbols though there are only 4-5 different symbols. Many of the flowcharts were drawn freehand which gave a poor impression.

Question 4

This multi-part question required candidates to demonstrate a good understanding of mobile banking service. This service is in common use and increasing facilities are being offered through it. Accordingly, candidates were required to demonstrate their understanding of the service that was offered by a bank in collaboration with a mobile phone service provider.

Candidates generally performed well on this question and answered all the parts, even though several answers were incomplete.

Surprisingly, some candidates confused this question with online banking and e-commerce, and missed out on some easy marks.

Performance in each part is discussed below:

Question 4 (a)

Majority of the students were able to list down the types of services that are being offered through mobile banking. However, some students mentioned advertisement of banking services also which is not a mobile banking service.

Question 4 (b)

Most of the candidates were unable to identify the real challenges to be faced by the mobile service provider while launching mobile banking services in association with a bank. Most of them identified cost as the major challenge. Had they read the question carefully, they should have realized that Knock Tel (KT) had already overcome the cost challenge because of its collaboration with a bank.

Question 4 (c)

This was quite easy. Most candidates were able to describe the benefits to the bank in launching mobile banking services as these are quite commonly known.
Examiners’ Comments on Information Technology – Autumn 2013

Question 5 (a)

In this part, seven different types of controls were mentioned and in respect of each control the candidates were required to identify whether it was a preventive, detective or a corrective control and to justify their choices also. Generally, the candidates were able to classify the controls correctly; however there was some confusion on sub-part (i) “Reviewing credit card bill before payment”. Most students identified it as a preventive control whereas reviewing a bill is basically a detection exercise. Moreover, mainly due to lack of writing skills many candidates were unable to provide appropriate justification for their choices.

Question 5 (b)

This question on the uses of the Audit trail was quite easy and most candidates scored quite well. However, many candidates gave partial answers and did not correctly identify the required six uses. Some candidates incorrectly stated that the audit trail is used to report accounting and procedural errors.

Question 6

The candidate were required to (1) suggest logical access controls for an integrated software (2) identify a security breach which each control is expected to cover. The performance was quite poor as many students mentioned encryption, antivirus, firewalls etc. which are not logical access control. Some candidates mentioned physical access control.

Question 7 (a)

Most of the candidates who attempted this question demonstrated that they understood the concept of Hot Site and Cold Site, but many candidates gave incorrect examples of organizations/businesses that would prefer to use them. Moreover, it was disappointing to note that even at this level, there were many who believed that a Hot Site is a website which is frequently visited and a Cold Site is one which is rarely visited.

Question 7 (b)

The requirement in this part was to identify the factors which determine the extent of costs that would have to be incurred in establishing a Hot Site. Very few students seemed to know the correct answer. Most of the students used guesswork and identified the types of cost rather than the factors which determine the extent of costs.

THE END
Information Technology

Instructions to Candidates:
(i) All the Questions from Section-A are compulsory.
(ii) Attempt any TWO out of THREE Questions from Section-B.

Section-A

Q.1 Target Distribution (TD) is a small-sized distributor of FMCG. Presently the firm is using standalone computers for its operations. Data is transferred internally either through USBs or through the Internet. In view of the expansion of business and increase in workload, Manager Operations has proposed that the computers may be connected through a Local Area Network (LAN).

(a) Briefly explain how the creation of a LAN may be advantageous for the operations of TD. (04)

(b) Briefly describe star and ring topologies. Compare these topologies in the context of the following:
- single point of failure
- network expansion
- Security
- cost

Also recommend which topology would be most suitable for the operations of TD. (07)

Q.2 (a) What do you understand by ‘Decision Support System’ (DSS)? State any three features of a DSS. (04)

(b) A spreadsheet is a type of decision support system which is useful for strategic, tactical as well as operational level of management.

Identify any two generally used spreadsheet packages and list two uses of spreadsheets for each level of management. (04)

Q.3 (a) Explain ‘Web Browser’ and ‘Internet Search Engine’. Give names of two commonly used web browsers and internet search engines. (06)

(b) Briefly describe how Internet Search Engine works. (04)

Q.4 The new Chief Executive of Gravity Limited (GL) has instituted a number of reforms in the company. Consequently, GL’s IT system requires a lot of changes. Aleem, the IT manager of the company is confident that he can manage these changes but is concerned about the process of documentation of these changes.

(a) Specify five good practices that Aleem may follow in order to ensure proper documentation. (05)

(b) Identify any six types of Computer Aided Software Engineering (CASE) tools and specify how Aleem may use these tools in the system development process. (06)

Continued on next page....
Section-B

Q.5 Space Communication (SC) is a leading telecom operator of the country. It is in the process of replacing its existing IT system with a new and more efficient system. The new system has better processing capability, wide range of reporting options and is more user-friendly. The management is however divided over the system changeover methodology, i.e., whether to make a parallel-phased changeover or use the direct changeover approach.

(a) Prepare a comparison of the two changeover methods which are under management’s consideration and recommend which of them would be suitable for SC. (06)
(b) Identify the matters that management should consider to ensure successful system changeover. (04)

Q.6 International Finance Limited (IFL) is an emerging brokerage house with branches in three cities. The management is planning to establish a centralised computer data centre. Besides, logical security of the data centre, the management is keen to identify possible physical threats and deploy appropriate mitigating controls at the data centre.

(a) List four exposures/risks that may arise due to weak physical access security at the data centre. (03)
(b) Identify ten physical access controls that you would recommend to address these risks. (05)
(c) How can IFL mitigate the losses from the physical threats? (02)

Q.7 The management of POW Paints has decided to develop a new software application for recording its sales and purchases. As IT Head of the company, you are well aware of the importance of effective planning and user co-ordination in the successful completion of the project.

(a) Write a memo to the users describing their key responsibilities. (05)
(b) Briefly describe the key strategies that would help in achieving the objectives of cost efficiency and timely completion of assignment. (05)

THE END
Section A

Ans.1 (a) TD may obtain the following benefits by creating a LAN:

(i) Sharing of equipment like printers and scanners will help in cost efficiency.
(ii) Common data may be shared among concerned departments/users thus eliminating the delays and infiltration of viruses through the use of USBs would be mitigated.
(iii) Data backup management would be easier if the data is stored centrally.
(iv) Better security controls may be implemented over data and use of Internet with much ease.

(b) | **Ring topology** | **Star topology** |
---|---|---|
In this topology all machines are connected to form a loop. A single channel connects all computers. | In star topology each node (file server, workstations, and peripherals) is connected directly to a central network hub or switch. |
Single point of failure | Central network hub/switch is single point of failure. |
In case of single loop, every point on the cable is a single point of failure i.e. if there is a failure at any one point, the entire network is affected. This disadvantage can be avoided by using double loop but it would slow the network. | |
Network expansion | The peripheral devices can be added without disrupting the network, however, it would only be possible if ports are available on central hub/switch. |
It is relatively easy to connect new devices in this topology. However, the network may be disrupted while a computer is added. | |
Security | All addresses, destinations and data flow is managed by central hub/switch. Consequently, different kinds of security measures can be implemented like port level security, MAC address authentication etc. |
The data has to traverse the whole cable before reaching the destined computer and is practically accessible to all other nodes. | |
Cost | More expensive than ring topology as it requires a central hub/switch and more cable is required to connect all workstations to the hub/switch. |
It is less expensive than star topology. | |

**Recommendation:** Though star topology is expensive to create than ring, however, keeping rest of the comparison in view, star topology is recommend for TD.
INFORMATION TECHNOLOGY
Suggested Answers
Intermediate Examinations – Spring 2014

Ans.2 (a) Decision support systems are computer based systems which are designed to produce information in such a way as to help managers to make better decisions.

Key features of a DSS are as follows:

(i) It provides range of responses and/or the likely impact of the decisions.
(ii) It is flexible and user friendly.
(iii) It combines data and analytical models / data analysis tools.
(iv) It has more analytical power than routine MIS systems.

(b) Examples of spreadsheet packages are SuperCalc 5, Lotus 1-2-3, VP Planner, MS Excel and Wingz.

<table>
<thead>
<tr>
<th>Management level</th>
<th>Uses of spreadsheet as a DSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic level</td>
<td>Market share analysis</td>
</tr>
<tr>
<td>Tactical level</td>
<td>Profit projections</td>
</tr>
<tr>
<td>Operational level</td>
<td>Project budgeting and control</td>
</tr>
<tr>
<td></td>
<td>Variance analysis</td>
</tr>
<tr>
<td></td>
<td>Inventory re-ordering decision</td>
</tr>
<tr>
<td></td>
<td>Overtime calculations/estimation</td>
</tr>
</tbody>
</table>

Ans.3 (a) A web browser is a software application that enables a user to display and interact with information resources such as text, images and other information typically located on a web page on the World Wide Web. Text and images on a web page can contain hyperlinks to other web pages at the same or different websites. Web browsers allow a user to quickly and easily traverse these links.

Two commonly used web browsers are Google Chrome and Internet Explorer. Other examples of web browsers include Mozilla Firefox, Opera, and Safari.

A internet search engine is a software system that is designed to search for information on the World Wide Web/the Internet. The search engine retrieves a list of items that matches the criteria provided by the user.

Examples of popular Internet Search Engines: (only two are required)
Google, Bing, Yahoo, Dogpile, Ask, AOL and Alta-Vista.

(b) Internet search engine stores information about many web pages, which they retrieve from the HTML of the pages. These pages are retrieved by a Web crawler (sometimes also known as a spider) – an automated Web browser which follows every link on the site. The search engine then analyzes the contents of each page and indexes it according to its ranking/popularity.

When a request is received the engine looks for the words or phrases exactly as entered or as close thereof as possible.

Ans.4 (a) Aleem should follow the following good practices in order to ensure proper documentation:
(i) Specify all the change requirements of IT system and record them in writing.
(ii) Retain the working papers which are made during development of changes in I.T. system.
(iii) Document testing exercises, their results and actions taken thereof.
(iv) Give distinguishing and identifiable numbers to change version of IT system.
(v) Add comments explaining the defined variables, loops and routines etc., wherever necessary.
Key types of CASE tools and their usefulness in system development process are as follows:

(i) **Diagramming tools**: Such tools automate the production of diagrams and hence these tools may be used to draw the system models.

(ii) **Analysis tools**: They are used to check the logic, consistency and completeness of system diagrams, forms and reports.

(iii) **CASE repository**: It is a specialized database where every element defined by a developer is stored and is shared with other developers.

(iv) **Screen and layout generators**: These tools allow prototyping of the user-interface to be produced and amended quickly.

(v) **Document generators**: They are used to assemble, organize and report on system models, descriptions, specifications and prototypes that can be reviewed by system owners, users, designers and developers.

(vi) **Code generators**: They automate the production of code based on the processing logic input to the generator.

### Ans.5 (a)

<table>
<thead>
<tr>
<th>Parallel-phased changeover</th>
<th>Direct changeover</th>
</tr>
</thead>
<tbody>
<tr>
<td>It involves implementation of one part of the system at a time, keeping the old system running in parallel.</td>
<td>It involves replacing the old system with the new system in one go.</td>
</tr>
<tr>
<td>Costly than direct changeover as one need to employ two set of workers on at least one part of the system at the same time.</td>
<td>Cheaper than parallel running as you don’t have to employ two sets of workers</td>
</tr>
<tr>
<td>This method provides a degree of safety, should there be problems with the new system.</td>
<td>It involves serious risks. In case of any problem the operations/business may suffer significantly</td>
</tr>
<tr>
<td>System or program corrections are easy to manage.</td>
<td>System or program corrections are difficult to manage</td>
</tr>
<tr>
<td>It is a slower method of implementation than direct changeover.</td>
<td>It is the quickest method as far as implementation is concerned</td>
</tr>
<tr>
<td>It is best suited for very large or geographically dispersed systems.</td>
<td>It is best suited when the two systems are substantially different</td>
</tr>
</tbody>
</table>

**Recommendation:**
SC should use parallel-phased changeover approach since it has countrywide offices; and it is a safe method than direct changeover.

(b) The management should consider the following factors to ensure successful system changeover:

- The coordination of the changeover i.e., who is responsible and how coordination is to be achieved.
- Assign proper method of error reporting and rectification during system change.
- The people who are involved, how the change affects them, how they can be trained on the new system.
- The method of monitoring and evaluating the results of the system changeover.
**ANS. 6 (a)** Following exposures/risks may arise due to weak physical access security at the data centre:

- Unauthorized entry / piggy backing.
- Damage to equipment or documents on account of vandalism.
- Copying or viewing of sensitive or copyrighted material/public disclosure/compromise of sensitive information.
- Embezzlement or theft of equipment or documents.

(b) Following physical access controls are recommended:

- Controlled single entry point
- Door locks with logging function - electronic, biometric
- Deadman doors
- Controlled visitor access and Visitor logs
- Identification badges
- Security guards
- Alarm system
- Affix list of authorized personnel at the entrance
- CCTV monitoring
- Periodic security audits and reviews

(c) The company should take the following measures to mitigate the losses from the physical threats:

- Offsite storage of backup.
- Insurance coverage for IT infrastructure.

**ANS. 7 (a)**

<table>
<thead>
<tr>
<th>To:</th>
<th>The User Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>From:</td>
<td>IT Head</td>
</tr>
<tr>
<td>Subject:</td>
<td>Users' responsibilities in application development</td>
</tr>
</tbody>
</table>

As you are aware, we would soon be developing a new application for recording sales and purchases. We believe that users' role is of utmost importance in the successful development of this application. In order to ensure successful and timely completion of this project, I request your full cooperation and involvement. For mutual convenience, I am listing below key areas in which your support would be inevitable during the course of project:

(i) Coordinating with the system analysis team in order to:
   - **Perform a detailed review of each business requirement;**
   - **Define the system to be developed according to the business needs;**
   - **Analyzing solution developed by IT specialists and making recommendations;** and
   - **Approving the analysis by signing off on the business requirements.**

(ii) Reviewing the test conditions and ensuring that all aspects of the system functionality are tested, as far as possible, under live environment.

(iii) Attend training session and try to make best utilization of the available training facility.

(iv) Timely availability of required data.
(b) Following key strategies may help in achieving the objectives of cost efficiency and timely completion of assignment:

(i) **Proper Planning** – ensuring the current and future requirement and identifying timelines.

(ii) **Monitor the project plan** – continuously monitoring and managing the project plan helps in ensuring that the project remains on track and all major project milestones are met.

(iii) **Find errors early** – the sooner errors are found; the less costly it is to correct them.

(iv) **Complete the testing phase** – Any compromise in the testing phase may have disastrous in the long term.

(v) **Choose the right implementation method** – that best suits the organization, project and employees.

THE END
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

EXAMINERS’ COMMENTS

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>SESSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology</td>
<td>Intermediate Examination - Spring 2014</td>
</tr>
</tbody>
</table>

General:

The overall performance of the candidates was good. Those who could not perform well were those who lacked knowledge and writing/presentation skills.

The question-wise comments are as under:

Question 1(a)

In this question, the candidates were required to highlight the advantages of Local Area Network (LAN). A good performance was witnessed in this part of the question as majority of the candidates described benefits of LAN correctly. Some candidates also discussed certain irrelevant things like security risks associated with LAN environment.

Question 1(b)

A number of students came-up with suitable comparison of LAN topologies i.e. Ring and Star topologies. However, majority of the candidates recommended “Ring Topology which was not correct.

Question 2(a)

The requirement was to describe a Decision Support System (DSS) and to state any three features thereof. This was a straightforward question and the topic has been tested frequently in the past. Hence, most of the students were able to perform well.

Question 2(b)

The requirement was to mention two generally used spreadsheets and two uses of spreadsheets for three different levels of management. About half the candidates could only mention one package i.e. Excel. While specifying the uses, very few could identify the appropriate level of management.

Question 3(a)

This was one of the easiest of questions in which the candidates were required to explain Web Browser and Internet Search Engine along with two examples of each. It was well attempted by almost all the candidates.
Question 3(b)

The requirement here was to mention how a search engine works. Very few students were able to answer it well. Most students tried to explain how to input search queries instead of explaining how the search engine works. Only few students could cover concepts such as web crawler, indexing etc.

Question 4(a)

In this part of the question, the students were required to mention five good practices which may be followed to ensure proper documentation. Many students got confused or did not know the correct answer and therefore mentioned best practices of computer programming. Interestingly, some students mentioned the requirements of the auditing standards.

Question 4(b)

This part of the question required students to mention key types of CASE tools and their usefulness in system development process. Though it was well attempted by the majority of the students, the identical nature of many answers indicated rote learning from the same source.

Question 5(a)

In this part, the students were required to compare Parallel phased and Direct changeover approaches and recommend the correct approach under the given scenario. Most of the students correctly compared the two approaches in terms of cost, time, risk and suitability. However, they were not very sure about which approach to recommend in the given situation. Many students only recommended one of the two approaches without specifying any reason to support their choice.

Question 5(b)

In this part, the students were required to mention the factors to be considered by the management for ensuring successful system changeover. This part was generally well attempted.

Question 6

This question pertained to risks and controls related to establishment and operation of a data centre. There were three parts and performance in each part is discussed below:

Question 6 (a)

Majority of the candidates got full marks as they could easily identify four risks that may arise because of weak physical access security.
Question 6 (b)

This part was also attempted well by majority of the students as they could easily identify 10 physical access controls to address the risks identified in (a) above. However, some students repeated the same points in different ways to achieve the total of 10. As has been discussed many times, such a practice gives no advantage to the student and instead, results in waste of precious time.

Question 7

Only few candidates attempted this question. Though some students secured full marks, very few of the others were able to get good marks.

Question 7 (a)

The requirement was to write a memo to users describing their responsibilities during a software development project. This was not well attempted and most of the students could not grasp what was required. Many students described good performing practices whereas some of them narrated the information that would be required by the users. Very few candidates gave the answer in the form of a memo.

Question 7 (b)

This part required students to mention strategies that would help to achieve objectives of cost efficiency and timely completion of assignment. The response here was also not very encouraging. While discussing cost efficiency, a significant number of candidates discussed cost of hardware also which was irrelevant. Some compared in-house development with outsourcing which was also not required. However, the issue of timely completion was handled in a much better way.

THE END