Do not award half marks.
In all cases give credit for appropriate alternative answers.

Question 1 (Compulsory)

A company has five departments, each with their own computing resources and performing their own data processing. Each department also has access to the internet. As the level of reliance on computers has increased, the management has realised that each department has its own unique processing requirements and operations. This uncontrolled data processing environment has brought on many problems and the management have decided that this situation cannot be allowed to continue.

(a)   The management have decided to take the information centre approach to controlling end-user computing. Describe this approach, and give **two** reasons why this approach is the most appropriate in this case.   [4]

> **Description:** **An information Centre is an organizational structure that is set up to support end-users [1] in the use and development of their own information system [1].**
>
> **Justification: (i) End-user can continue using and developing their own system to meet their "own unique processing requirements" [1]**
>
> **(ii) The policies set by and control measures implemented by the Information Centre ensures standardization and conformance. [1]**
>
> **(iii) Training and consultation services provided by the Information Centre allows DP operations to be more effective.[1]**
>
> **Award one mark for each justification to a maximum of two**

(b)   Once this approach has been adopted, one of the processes that must be carried
out is the hardware acquisition process.   List and describe the steps in the
hardware acquisition process.   [6]

-       **Determine needs: identify the attributes of the desired product [1]**
-       **Preliminary investigation: Identify the prospective vendors [1] and
        perform a cost-benefit analysis [1] – [max 1 mark]**
-       **Request for proposal: Identify specific product [1] and invite
        vendors to submit quote [1] – [max 1 mark]**
-       **Theoretical benchmarking: evaluate attributes based on vendor's
        claims [1]**
-       **Physical benchmarking: verify attributes by testing [1]**
-       **Final selection: Make a decision on the requisition [1]**

(c)   Since each department has internet access, firewalls should be implemented to
reduce the risk of unauthorised access. What is a firewall?   List **two** design
considerations when implementing firewalls.   [4]

**A firewall is a mechanism to protect a network from unauthorized access
[1], and for preventing information from leaking out of the network. [1].**

-       **Prohibit activities that are not expressly permitted [1].**
-       **Permit activities that are not expressly prohibited [1].**

(d)   After various types of controls are in place, the management decides that a
computer audit should be performed.   The audit can be an internal audit or an
external audit. Describe **two** advantages of each type of audit.   [4]

**Internal audit.   Internal staff is more familiar with the systems and may
be able to spot problems that external parties may miss [1].   The cost of
internal audit is much less that engaging external auditors. [1]**

**External audit.   As the external auditor is answerable only to top
management, there is less tendency of bias or favoritism [1].   External
auditors may be the only option for a standards certification [1].**

(e)   After the management have decided whether to use internal or external auditors, they must decide on the approach they are going to take to auditing. They may audit around the computer or audit through the computer. Describe both of these approaches, and give **one** advantage and **one** disadvantage of each approach.   [6]

Auditing around the computer – auditor infers quality on the basis of only the input and output of a computer system [1]
Advantage – simplicity [1]
Disadvantage – limited number of systems for which this can be done effectively. [1]
Auditing through the computer – logic and controls within the system and not just input and output are tested [1]
Advantage – audit is more thorough [1]
Disadvantage – high costs [1] requires technical expertise [1] (max 1 mark for this part)

(f)   The different information systems that are employed by the company are mainly used to record and analyse information in order to allow effective decision making. Describe **three** categories of decision in the context of management.   [6]

-       **Strategic decision making is used for determining long term [1] objectives, resources and policies of an organization [1].**
-       **Knowledge level decision making means evaluating new ideas for products, services, ways to communicate new knowledge and ways to distribute information throughout the organization [1 mark for a partial answer, 2 for a full answer].**
-       **Unstructured decisions are non-routine decisions [1] in which the decision maker must provide judgment, evaluation and insights into the problem definition [1].**
-       **Structured decisions are repetitive and routine [1] and have a definite procedure for handling them [1]**
-       **Semi-structured decisions are made where only part of the problem [1] has a clear cut answer provided by an accepted procedure [1].**

Do not award half marks.
In all cases give credit for appropriate alternative answers.

Question 2

(a)   State **five** principles that must be considered when determining the
organisational structure of the data processing department.   [5]

- **The objectives of the data processing activity and its component elements should be clearly defined, agreed upon and known.**
- **The environment in which the DP department operates will not remain static.**
- **The reasons for organizing /re-organizing the DP department must be known and clearly defined.**
- **Data processing activity and functions should be grouped according to homogeneity of objectives and purposes.**
- **The levels of authority should be kept to a minimum.**
- **The structure of the data processing function should take into account the personalities and the people involved.**
- **Job descriptions are important as they define the tasks and the duties that must be performed by each individual.**
- **Controls and procedures are important as they can be used to ensure that the tasks are carried out according to job requirements.**

[1 mark each, max 5 marks]

(b)   State whether each of the following statements are true or false. Give reasons for your answer.

    (i)   Decentralisation leads to loss of standardisation.   [1]

    (ii)   In a decentralised organisation, it is easier to understand local data processing needs.   [1]

    (iii)   In a decentralised organisation, it is easier to respond to changes in the business environment.   [1]

    (iv)   In a decentralised organisation, it is easier to control application development.   [1]

    (v)   In a decentralised organisation, economies of scale can be achieved easily.   [1]

    (vi)   If there is a need for consistency in quality, equipment, operations and control procedures, a centralised structure is more appropriate.   [1]

    (vii)   If there is a large pool of capable top level managers, then centralising them is advantageous to an organisation.   [1]

    (viii)   Centralising data processing resources provides better data security.   [1]

(i)   False, as policies are determined centrally, and decentralized units need to conform.

(ii)   True, as the dispersed units are closer to the customer.

(iii)   True, provided that the dispersed units have autonomy to manage their own computing resources.

(iv)   False, as decentralized units may not be aware of what other units are developing and thus duplication may occur.

(v)   False, as the scale of processing in dispersed units may not fully utilize their resources.

(vi)   True, enforcement and control is easier in a centralised environment.

(vii)   False, capable managers should be dispersed to various parts of an organisation for more effective management.

(viii)   True, as physical controls are easier to implement and control OR False, as a disaster can bring computing operations to a complete halt.

(c)   Give **one** advantage and **one** disadvantage of locating data processing activities in a service department.   [2]

Advantage: more powerful computing resources, economy of scale, easier integration, easier control by senior management. Any one advantage 1 mark.

Disadvantage: longer time taken to develop new applications, more backlogs, difficult resource planning. Any one disadvantage 1 mark.

Do not award half marks.
In all cases give credit for appropriate alternative answers.

Question 3

(a)   In risk analysis, risks must be assessed in terms of vulnerability and severity.
Define vulnerability and severity in this context.   [2]

Vulnerability is the probability of risk occurring. [1]
Severity is the extent of damage or loss if that risk occur. [1]

(b)   State **three** reasons why the risk control cycle is an iterative process.   [3]

- **risk analysis may be flawed leading to ineffective measures to be implemented.**
- **risk control programme may be insufficiently effective**
- **types of risks may change, requiring the risk control programme to be modified**
- **policies or statutory requirements on certain risks may change, requiring the risk control programme to be modified**

[1 mark for each - max 3 marks]

(c)   A department frequently encounters problems in the processing of daily
transactions. Three of these problems are listed below. For each of the
problems, suggest **two** forms of control that could be employed.

   (i)   Source documents are occasionally missed during the data entry process.   [2]

   (ii)   Data fields are frequently entered wrongly.   [2]

   (iii)   Source documents are sometimes temporarily or unaccountably removed
            by staff from other departments for various reasons.   [2]

   (i)   record counts, control totals, and hash totals.

   (ii)   validity checks, reasonableness checks, limit checks

   **(iii)   physical controls (like restricting access to the work area, keeping
            documents under lock and key, logging system etc)**

   [1 each max 2 marks per part]

(d)   Requiring a user to use password to access a system may not be effective if such a system is not implemented properly.   Suggest **two** techniques for making the use of passwords more effective.   [2]

       (i)   forcing the user to change the password regularly
       (ii)   using a password checker to eliminate easy to guess password.

(e)   List **two** techniques for data encryption.   [2]

conventional encryption [1] public key encryption [1]

Do not award half marks.
In all cases give credit for appropriate alternative answers.

Question 4

(a)   A bank is using a 40 year old system that was developed using COBOL for which the system documentation has been found to be inadequate.   The company has decided that it wants to convert the current system to one that uses a modern programming language.   The company wants to be able to extract the intelligence from the existing system without having to start from scratch.

     (i)   Describe how this aim can be achieved by using software re-engineering.   [2]

          Software re-engineering can be employed to address the problem with aging software [1] by salvaging and upgrading it so that the users can avoid a long and expensive replacement project [1].

     (ii)   Describe the three steps in software re-engineering.   [6]

          Reverse engineering [1] is the process of taking existing program's code, file and database descriptions and converting them into design level components [1].   The activities involve extracting underlying business specifications from existing systems [1] [Max 2 marks]

          Revision of design and program specifications [1].   Producing a structured set of documentation for the system [1].   Revising the system specifications and design to meet current business requirements [1]   [Max 2 marks]

          Forward engineering [1].   Using the revised specifications to generate new structured program for a maintainable system [1].

(b)   What is meant by business process re-engineering?   [2]

      Business process re-engineering is the radical redesign of business processes [1] combining steps to cut waste, eliminating repetitive tasks to improve cost, quality or service and to maximise the benefits of information technology[1].

(c)   List the **five** steps in re-engineering.   [5]

      -    **Develop the business vision and process objectives**
      -    **Identify the processes to be redesigned.**
      -    **Understand and measure the performance of existing processes.**
      -    **Identify the opportunities for applying information technology.**
      -    **Build a prototype of the new process.**

      [1 mark each]

Do not award half marks.
In all cases give credit for appropriate alternative answers.

Question 5

(a)   A data centre was set up in an organisation to provide data processing services to other departments.   The director of the company has decided that the data centre must be able to support itself by charging the end user departments for the services provided.

      (i)   List **three** criteria for a successful billing scheme.   [3]

         -     **The charging schemes should be easy enough for users to understand.**
         -     **The charges should be consistent.**
         -     **The charges should be predictable.**
         -     **The charging scheme should produce the desired revenue.**
         -     **The scheme should be able to cater for all costs related to the jobs.**

      [1 mark each - max 3 mark]

(ii)   The monthly cost and usage of the data centre is estimated to comprise: [8]

Non-resource costs
Utilities bill $3,000
Staffing cost $12,000

Resource costs
Printing perishables (paper and ink) $25,000 for 50000 pages
Disk space $40,000 for 1000 GB
Computer Usage $35,000 for 5000 hrs

Calculate the unit rates that should be charged for each resource by completing the following table.

Total non-resource cost	
Total resource cost	

Resource:	Printing services	Disk space	Computer usage
As a percentage of total resource cost			
Non-resource cost to be apportioned			
Total cost for each resource			
Unit rate for each resource			

Total non-resource cost	**$15,000.00**		**[1]**
Total resource cost	**$100,000.00**		**[1]**

Resource:	Printing services	Disk space	Computer usage	
As a percentage of total resource cost	**0.25**	**0.4**	**0.35**	**[1 mark for this row]**
Non-resource cost to be apportioned	**3750**	**6000**	**5250**	**[1 mark for this row]**
Total cost for each resource	**28750**	**46000**	**40250**	**[1 mark for this row]**
Unit rate for each resource	**0.575 /page**	**46 /GB**	**8.05 /hr**	**1 mark for each entry in this row to a max of 3**

(b)   Before an organisation recruits staff, they should provide a job description and a job specification. List **two** pieces of information that would be found in a job description and **two** pieces of information that would be found in a job specification.   [4]

Job description:
Duties, level of complexity, level of responsibility, physical conditions and working environment, equipment used in the job, extent of supervision given, amount of initiative required, tems of employement.
One mark for any suitable piece of information to a maximum of two.

Job specification:
Level of education expected, types of specialised skills required, essential personality characteristics, previous work experience, level of intelligence expected
One mark for any suitable piece of information to a maximum of two.

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