



ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008
COMPUTER ARCHITECTURE AND SYSTEM SOFTWARE
SEMESTER - 2

Time : 3 Hours]

[Full Marks : 70

GROUP - A**(Multiple Choice Type Questions)**

1. Choose the correct alternatives for the following :

10 × 1 = 10

- i) The instruction LOAD A is a
 - a) zero-address instruction
 - b) one-address instruction
 - c) two-address instruction
 - d) three-address instruction.

- ii) The purpose of cache memory in a computer is to
 - a) ensure fast booting
 - b) reduce load on CPU registers
 - c) replace static memory
 - d) speed up memory access.

- iii) Object code is
 - a) input to assembler
 - b) output of assembler
 - c) intermediate code
 - d) none of these.

- iv) Which of the following is not an advantage of Dynamic RAMs ?
 - a) High density
 - b) Low cost
 - c) High speed
 - d) No need of memory refresh.

II-222444 (1)



(1 to 2) 82



- v) DMA module can communicate with CPU through
- a) interrupt
 - b) cycle stealing
 - c) branch instruction
 - d) none of these.
- vi) The number of fetch operation(s) to execute instruction in immediate mode is
- a) 0
 - b) 1
 - c) 2
 - d) none of these.
- vii) A CPU has 16-bit program counter (PC). This means CPU can address memory locations
- a) 16K
 - b) 32K
 - c) 64K
 - d) 256K.
- viii) The major objective in choosing page replacement policy is to
- a) minimize hit ratio
 - b) reduce size of page
 - c) maximize hit ratio
 - d) none of these.
- ix) The sum of $(24D)_{16}$ and $(9AA)_{16}$ is
- a) $(BE7)_{16}$
 - b) $(BF6)_{16}$
 - c) $(AF7)_{16}$
 - d) $(BF7)_{16}$.
- x) In a stack computer, there is support for
- a) PUSH and POP instruction only
 - b) zero address instruction only
 - c) zero address instruction, PUSH and POP
 - d) none of these.

**GROUP - B****(Short Answer Type Questions)**

Answer any three of the following.

 $3 \times 5 = 15$

2. Convert the hexadecimal number FCO6 into decimal, binary and octal.
3. In floating-point number representation system, if 24 bits are reserved for mantissa and 8 bits are reserved for signed exponent, determine the values of maximum & minimum positive & negative numbers in this scheme.
4. Why are sub-routines written & used ? What is a stack ? What are the operations that can be performed on stack ? What is a 'macro' ? What is the basic difference between a 'macro' and a 'sub-routine' ?
5. Write down the Register Transfer Language for execution of

LDAX B

STAX D

6. Comment on Direct Mapping Function of 2048 word Cache Memory onto 65,536 word Main memory.

GROUP - C**(Long Answer Type Questions)**

Answer any three of the following questions.

 $3 \times 15 = 45$

7. a) What is virtual memory ? What could be the maximum size of virtual memory ?
Justify. 3
- b) Briefly describe an instruction execution cycle with proper timing diagram. 3
- c) Explain the Booth's algorithm. Illustrate with example. 3
- d) Briefly discuss different types of ROM. 3
- e) Differentiate between static RAM and dynamic RAM. 3
8. a) What are the differences between RISC and CISC processors ? 4
- b) Explain the concepts of sequential processing, pipelining and parallel processing with examples. 6





- c) What are the elements of a machine instruction ? 3
- d) What is meant by memory access time ? 2
9. a) What is meant by random access and sequential access of memory devices ? Explain. 4
- b) What is hit ratio in a two-level memory system ? 3
- c) Provide the architecture of CPU. 4
- d) Given a task that can be divided into m subtasks, each requiring one unit of time, how much time is required for an m -stage pipeline to process n tasks ? 4
10. a) Discuss the efficiency and throughput of a k -stage pipeline system processing n tasks. 5
- b) A non-pipeline system takes 50 ns to process a task. The same task can be processed in a six-segment pipeline with clock cycles of 10 ns. Determine the speedup ratio of the pipeline for 100 tasks. What is the maximum speedup that can be achieved ? 5
- c) Explain paging in Memory with suitable examples. 5
11. a) It is desired to have 5kB of memory in a computer. 4kB should be ROM and 1kB should be RAM. You have to design the chip-select signals of Memory-chips in such a way that first 4k addresses should select ROM and next higher 1k addresses should select RAM. You have been given a number of ROM chips (namely 2716 which is $2k \times 8$) and RAM chips (namely 2142 which is $1k \times 4$).
b) Describe Set Associative Mapping Function of 2048 word Cache Memory on 65,536 word Main Memory.
c) Describe in detail how physical address is generated from Virtual address using Virtual memory technique.
d) What is parallel processing ? 5 + 5 + 3 + 2

END



ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008
INFORMATION SYSTEM ANALYSIS & DESIGN
SEMESTER - 2

Time : 3 Hours]

[Full Marks : 70

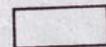
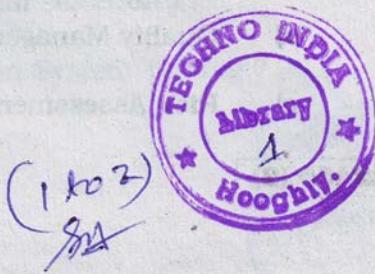
GROUP - A**(Multiple Choice Type Questions)**

1. Choose the correct alternatives for the following :

10 × 1 = 10

- i) A Feasibility study should focus on
- a) Operational feasibility
 - b) Technical feasibility
 - c) Economic feasibility
 - d) All of these.
- ii) Cost-Benefit analysis
- a) compares the cost with the benefits, of introducing a Computer based system
 - b) estimates the hardware and software costs
 - c) evaluates the tangible and non-tangible factors
 - d) all of these.
- iii) The outcome of the analysis of SDLC phase is
- a) preparation of Program Specification Document
 - b) preparation of file layout and Screen Design Document
 - c) preparation of 'pseudo codes'
 - d) none of these.

II-222455 (2)





- iv) In which software development problem solving stages are the results delivered ?
- a) Status quo
 - b) Problem definition
 - c) Technical development
 - d) Solution integration.
- v) A system can be defined as the
- a) orderly grouping of independent components not linked together according to a plan to achieve a specific objective.
 - b) orderly grouping of independent components linked together according to a plan to achieve a specific objective.
 - c) orderly grouping of dependent components linked together according to a plan to achieve a specific objective.
 - d) orderly grouping of interdependent components linked together according to a plan to achieve a specific objective.
- vi) Which of the following statements are true ?
- a) In a system the central objective is of prime importance.
 - b) BCNF is stronger than the 3NF.
 - c) Feasibility study is not required in the system development life cycle.
 - d) In system development life cycle testing is done before the design phase.
- vii) Economic feasibility is also known as
- a) Cost benefit analysis
 - b) Demand supply analysis
 - c) Both (a) and (b)
 - d) None of these.
- viii) The most important feature of Spiral model is
- a) Quality Management
 - b) Maintenance
 - c) Risk Assessment
 - d) None of these.



- ix) SRS stands for
- Software Requirement Specification
 - System Requirement Specification
 - System Rectification Standard
 - None of these.
- x) BCNF is a type of
- | | |
|------------------|-------------------|
| a) Indexing | b) DFD |
| c) Normalisation | d) None of these. |

GROUP - B**(Short Answer Type Questions)**

Answer any three of the following.

 $3 \times 5 = 15$

- Discuss the different Project Management Activities.
- What is System Analysis ? What are the roles of a System Analyst ?
- What are Cohesion and Coupling ?
- What is data dictionary ? Why is it needed ?
- What are super key and candidate key ?

GROUP - C**(Long Answer Type Questions)**

Answer any three of the following.

 $3 \times 15 = 45$

- What are the important elements of a System ?
 - What is Transitive Dependency ? Illustrate with examples.
 - What is the difference between First and Third Normal Forms ?
- What factors must be considered prior to system selection ?
 - What is the difference between Unit Testing and System Testing ?
 - What is post-implementation review ? Explain.





9. a) What do you mean by normalization ? 3
- b) Define primary key and foreign key with examples. 4
- c) Explain 1st NF, 2nd NF & 3rd NF with example. 8
10. a) What is DFD ? Discuss different symbols used in DFD. 4
- b) Differentiate between Logical DFD & Physical DFD. 2
- c) Draw a Physical DFD for a Payroll System of any Organization. 5
- d) Draw a DFT for a Quiz Software. 4
11. a) Distinguish between software verification and software validation. 6
- b) The discount policy has following conditions for the customers. If customer is from the 'book stores' :

Get a trade discount of 25% if orders for 6 or more copies per book title.

If customer is from 'Libraries and individuals' :

5% allowed on order of 6 – 19 copies per book title

10% on orders for 20 copies per book title and

15% on orders for 50 copies or per book title.

Develop a process description in

3 x 3

- i) Structured English
- ii) Decision Table
- iii) Decision Tree.

END

BED - 08

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008
COMPUTER PROGRAMMING
SEMESTER - 2

Time : 3 Hours]

[Full Marks : 70

GROUP - A**(Multiple Choice Type Questions)**

1. Choose the correct alternatives for the following : $10 \times 1 = 10$
- i) To detect the undefined variable, the statement is
- | | |
|------------------------|--------------------|
| a) Option Base | b) Option Explicit |
| c) Option compare text | d) None of these. |
-
- ii) The default lower index of an array is
- | | |
|------|-------------------|
| a) 2 | b) 1 |
| c) 0 | d) None of these. |
-
- iii) What will be the result of the following expression $5 \text{ MOD } 100$?
- | | |
|-------------|--------|
| a) An error | b) 5 |
| c) 0 | d) 20. |
-
- iv) The type declaration character for data is
- | | |
|------|-------------------|
| a) # | b) \$ |
| c) | d) None of these. |
-
- v) Dim x, y as integer. What is x and y data type ?
- | |
|--|
| a) x and y are both integers |
| b) x is string and y is integer |
| c) x is variant and y is integer |
| d) x and y are both local integer variables. |
-

(1x02)
SPT





vi) What is the size of the variant data type ?

- | | |
|---------|-------------------|
| a) 1024 | b) 255 |
| c) 256 | d) None of these. |

vii) Dim n As Integer

If n = 0 Then

MsgBox ("ZERO")

Else

MsgBox ("EMPTY")

End If

Output of the code segment is

- | | |
|------------------|-------------------|
| a) ZERO | b) EMPTY |
| c) Compile Error | d) None of these. |

viii) Dim c, a As Integer, b As Integer

a = 10

b = 3

c = a \ b

MsgBox (c)

Output of the code segment is

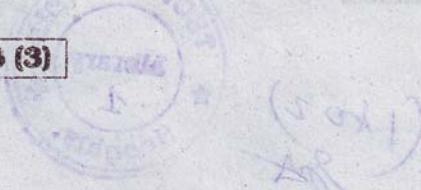
- | | |
|------------------|-------------------|
| a) 3.3333333 | b) 3 |
| c) Compile Error | d) None of these. |

ix) Complexity of selection sort is

- | | |
|-------------|--------------------|
| a) $O(n^2)$ | b) $O(n \log_2 n)$ |
| c) $O(n)$ | d) None of these. |

x) ADO is a/an

- | | |
|---------------------|------------------|
| a) method | b) object model |
| c) inbuilt function | d) all of these. |



**GROUP - B****(Short Answer Type Questions)**

Answer any three of the following.

 $3 \times 5 = 15$

2. "VB is front-end tool" — Explain with suitable example. What are the advantages of Visual Basic ? $3 + 2$
3. Write an application program in VB to print the Fibonacci numbers upto 50. 5
4. Write a Program module to calculate the Factorial of any Number. 5
5. Write the differences between any two of the following : $2 \times 2 \frac{1}{2}$
- a) List Boxes and Combo Boxes
 - b) Option Button and Check Boxes
 - c) Input Box and Message Box.
6. Why is VB6 an Event Driven programming language ? Explain with Example. 5

GROUP - C**(Long Answer Type Questions)**

Answer any three of the following.

 $3 \times 15 = 45$

7. Explain loop structure in Visual Basic ? Write a program to print first 50 numbers of a Fibonacci series. Write a program to sort 10 user input numbers in ascending order and display them. $4 + 5 + 6$
8. a) What are dynamic array and multidimensional array ? Explain with an example. 5
 b) Write the difference between Public function and Private function. 5
 c) Write a VB code segment to check if a string is palindrome or not. (If a string is same from both sides then it is called palindrome, e.g., MADAM). 5
9. a) Write a VB program to check whether a year is leap year or not.
 b) Write a VB program that allows the user to input his name and print the initial name. For example : Vinoy Kumar Singh
 Output : V.K.S
 c) What function can be used to convert the lowercase letters to uppercase and vice-versa ? $6 + 6 +$





10. Write a program to add, edit, delete records to/from the table. What is Option Explicit statement ? Explain with suitable example. Describe the scopes of Dim, Private and Public variables. 5 + 4 + 6

11. Write short notes on *any three* of the following : 3 × 5

- a) Inheritance
- b) Multidimensional array
- c) Structured programming
- d) Cint() and Val()
- e) Random Access File.

END



ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008
MATHEMATICS
SEMESTER - 2

Time : 3 Hours]

[Full Marks : 70

GROUP - A**(Multiple Choice Type Questions)**

1. Choose the correct alternatives for any ten of the following :

 $10 \times 1 = 10$

- i) The order and degree of the differential equation

$$\left(\frac{1 + d^2 y}{dx^2} \right)^{3/2} = a \frac{d^2 y}{dx^2} \text{ are}$$

- | | |
|---------|-------------------|
| a) 2, 1 | b) 2, 2 |
| c) 2, 3 | d) none of these. |

- ii) The particular integral of $\frac{d^3 y}{dx^3} - 4 \frac{dy}{dx} + 9y = e^{2x}$ is

- | | |
|-----------------------|-----------------------|
| a) $\frac{e^{2x}}{9}$ | b) $\frac{e^{2x}}{3}$ |
| c) $\frac{e^{2x}}{6}$ | d) none of these. |

- iii) Auxiliary equation of the differential equation $\frac{d^2 y}{dx^2} + 4y = \sin x$ is

- | | |
|-------------------------------|------------------------------------|
| a) $y = \cos 2x + \sin 2x$ | b) $y = c_1 \cos 2x + c_2 \sin 2x$ |
| c) $y = c_1 \cos x + \sin 2x$ | d) none of these. |

- iv) Integrating factor of $x dy = y dx$ is

- | | |
|--------------------|----------------------|
| a) $\frac{1}{x^2}$ | b) $\frac{1}{x}$ |
| c) $\frac{y}{x}$ | d) $\frac{1}{y^2}$. |

II-222477 (4)



(1 to 3)
SOMA



- v) A bounded sequence is
 a) convergent b) divergent
 c) oscillatory d) none of these.
- vi) A monotone increasing sequence is
 a) bounded above b) bounded below
 c) convergent d) divergent.
- vii) If $\lim_{n \rightarrow \infty} a_n = 0$, then the series $\sum_n (-1)^n a_n$ is
 a) convergent b) divergent
 c) none of these.
- viii) The infinite series $\sum \frac{n}{(n+1)^2(n+2)}$ is
 a) convergent b) divergent
 c) oscillatory d) none of these.
- ix) The dimension of the subspace $\{(x, 0, y, 0); x, y \text{ are real}\}$ is
 a) 1 b) 2
 c) 3 d) 4.
- x) If $\sum_n |a_n|$ is convergent then $\sum_n a_n$ is
 a) convergent b) divergent
 c) oscillatory d) none of these.
- xi) Sum (union) of two subspaces of a vector space is a
 a) subspace of the vector space b) not a subspace of the vector space
 c) none of these.



xii) $T : \mathbb{R}^2 \rightarrow \mathbb{R}$ is defined by $T(x_1, x_2) = x_1, x_2$. Then kernel of T is

- a) $\{(x_1 - x_1) : x_1 \text{ is real}\}$
- b) $\{(0, 0), (1, -1)\}$
- c) $\{(0, 0)\}$
- d) $\{(2, -2)\}$.

xiii) The series $\sum_{n=1}^{\infty} \frac{1}{n^p}$ is convergent if

- a) $P \geq 1$
- b) $P > 1$
- c) $P < 1$
- d) $P \leq 1$.

GROUP - B

(Short Answer Type Questions)

Answer any three of the following.

$3 \times 5 = 15$

2. Test the convergence of the series :

$$x + \frac{2^2 x^2}{2!} + \frac{3^3 x^3}{3!} + \frac{4^4 x^4}{4!} + \dots, x > 0.$$

3. Examine conditional convergence of the series.

$$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$$

4. Show that the differential equation of all circles touching the x -axis at origin is

$$(x^2 - y^2) \frac{dy}{dx} = 2xy.$$

5. Let V = set of all second order square matrix. $T : V \rightarrow V$ is defined by

$T(X) = AX - XA$, where $A = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$. Find a basis of $\text{Ker}(T)$ and hence nullity.

6. Define a monotonic sequence. When is a monotone sequence convergent? Is the sequence $\left\{ \frac{3n+1}{n+2} \right\}_n$ convergent?



**GROUP - C****(Long Answer Type Questions)**

Answer any three questions.

 $3 \times 15 = 45$

7. a) Examine if the set S is a subspace of R^3 where,

$S = \{(x, y, z) \in R^3 : x + 2y - z = 0, 2x - y + z = 0\}$. If S be a subspace determine its dimension.

- b) If $\{\alpha, \beta, \gamma\}$ is a basis of a real vector space V , show that $\{\alpha + \beta, \beta + \gamma, \gamma + \alpha\}$ is also a basis of V .

- c) Show that the vectors $(1, -2, 3)$, $(2, 3, 1)$ and $(-1, 3, 2)$ form a basis of R^3 . Determine co-ordinates of $(1, 0, 0)$ relative to this basis. $5 + 5 + 5$

8. a) A linear mapping $T: R^3 \rightarrow R^2$ is defined by

$$T(3x - 2y + z, x - 3y - 2z), (x, y, z) \in R^3.$$

Find the matrix of T relative to the ordered bases $(0, 1, 0)$, $(1, 0, 0)$, $(0, 0, 1)$ of R^3 and $(0, 1)$, $(1, 0)$ of R^2 .

- b) Determine the linear mapping $T: R^3 \rightarrow R^3$ that maps the basis vectors $(1, 0, 0)$, $(0, 1, 0)$, $(0, 0, 1)$ to the vectors $(-1, 2, 1)$, $(1, 1, 2)$, $(2, 1, 1)$ respectively. Find $\text{Ker } T$ and verify that $\dim \text{Ker } T + \dim \text{Im } T = 3$.
- c) If $V(F)$ is the vector spaces of all 2×2 matrices then exhibit a basis for $V(F)$ and also find the dimension. $5 + 5 + 5$

9. Test the convergence of any three of the following series. 3×5

a) $1 + \frac{2}{1!} + \frac{2^2}{2!} + \frac{2^3}{3!} + \dots$

b) $\frac{1}{2} + \frac{1}{3} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{2^3} + \frac{1}{3^3} + \dots$

c) $\sum_{n=1}^{\infty} \frac{n! 2^n}{n^n}$

d) $\frac{1}{1+\alpha^2} - \frac{1}{2+\alpha^2} + \frac{1}{3+\alpha^2} - \dots$



3 × 5

10. Solve any three of the following :

- a) $\frac{dy}{dx} + \frac{1}{x} \sin 2y = x^3 \cos^2 y$
- b) $y = px + p^n ; p = \frac{dy}{dx}$
- c) Solve $\frac{d^2y}{dx^2} + a^2y = \sec ax$
- d) $x^2 \frac{d^2y}{dx^2} + 4x \frac{dy}{dx} + 2y = \log x.$

11. a) What do you mean by convergence of a sequence ? Examine convergence of a sequence $\{x_n\}$, where $x_n = 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$.
- b) If $x_1 = \sqrt{2}$, $x_{n+1} = \sqrt{2x_n}$. Show that the sequence $\{x_n\}$ is monotonically increasing and bounded. Hence show that $\lim_{n \rightarrow \infty} x_n = 2$.
- c) Prove that every convergent sequence is bounded. Is the converse true ? Justify your answer.

5 + 5 + 5

END





ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008
ENGLISH LANGUAGE & COMMUNICATION
SEMESTER - 2

Time : 3 Hours]

[Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

1. Read the passage given below and then answer the questions, which are based on what is stated or implied in the passage :

There was a time when mankind flew pigeons as messengers to exchange information for erstwhile Maharajas. Well, that was then. Today, believe it or not, you have the facility to send quotations to Paris from anywhere in India at the cost of a local call. The world of communication and with it the entire system is making rapid strides to the benefit of mankind.

With just a telephone line, a modem, a PC and an Internet connection, you can literally programme your future. What you never thought possible a shortwhile ago is a reality today, knocking at the door. Internet sounds familiar ? Obviously, when you consider different media channels agog with write ups, what's good and what's not, latest discoveries and so on. It's difficult not to have heard of it. You find virtually every organization going in for internet address. The importance of electronic communication, is obvious so are E-mail, Video Telephony and Internet.





But what is Internet ? Is it the same thing as Information Superhighway ? What is Information Superhighway ? If these are some questions bothering you, you're on the right track. It only shows an injected enthusiasm amongst us. Thus to stub out any further confusion, Internet is a very important part of Information Superhighway. And the benefit of Information Superhighway as a whole is much broader than its components.

Information Superhighway as it develops, will help in exchanging quantum of information of any kind. It presents a range of technologies, including Integrated Services Digital Network (ISDN), Fibre optics and Asynchronous transfer mode (ATM) in hardware terms. And in software terms it presents Electronic Data Interchange (EDI), X-400, E-mail and Video Telephony as various approaches.

a) Mark whether the following statements are True or False : 5

- i) Nowadays communication is quick but very expensive
- ii) Nations are coming closer with electronic communication
- iii) Today most organizations are using the Internet.
- iv) Internet and Superhighway are the same thing.
- v) Internet can only be used for commercial purpose.

b) Choose the correct alternative : 2

i) Stub out means

- a) put an end
- b) fresh start
- c) both (a) and (b).

ii) erstwhile means

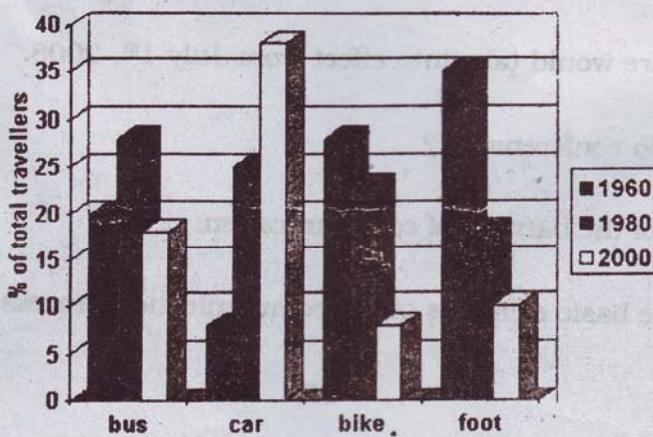
- a) current
- b) ancient
- c) former
- d) none of these.

c) Name two modes of electronic communication. 1

d) What is the difference between Internet and Information Superhighway ? 2

**GROUP - B****(Short Answer Type Questions)**Answer any *three* of the following. $3 \times 5 = 15$

2. You are the manager of a garments factory. Write out an advertisement for the 'Situation Vacant' column of the local newspaper describing the person you want to operate as supervisor.
3. As a health officer under Government of West Bengal, prepare a public notice to make the people of your locality aware of the consequences of 'Bird Flu', which can cause fatal harm to people around.
4. Write a report for a university lecturer describing the information below. The graph below shows the different modes of transport used to travel to and from work in one European city in 1960, 1980 and 2000.



5. As a boss to your subordinates, write a memo mentioning the date, time and venue of a meeting.

GROUP - C**(Long Answer Type Questions)**Answer any *three* questions. $3 \times 15 = 45$

6. Assume that you are Sheela Khare, the local Director of NIIT, Kolkata Chapter. Draft a sales letter for prospective students. Mention the value of NIIT training and the relevance of its courses.





7. Your company is considering a proposal to make an in-house canteen for office employees. Your office has around 100 employees. Make a report to give an estimate of the area, manpower and money required to set up and run the canteen.
8. You are Pashupati Shah, the Regional Sales Manager of Easy Home Appliances, Mumbai. You have to write a memo to Reena Chatterjee, Assistant Manager (Sales) explaining a new procedure for reporting monthly sales performance. The special features of the new procedure include :
- i) use of double entry system to record monthly sales performance instead of the existing single entry system;
 - ii) a separate format for sales performance below quota; and
 - iii) a computerized database.

The new procedure would take into effect from July 1st, 2008.

9. a) What is video conferencing ? 4
- b) State some of the barriers of communication. 6
- c) Illustrate the basic elements of the communication process. 5

OR

Write an application letter and CV of an experienced computer engineer looking for a suitable job in a renowned software company whose age is 35 years and who has 10 years of work experience.

END