MET

INSTITUTE OF COMPUTER SCIENCE

UNIVERSITY QUESTION PAPER (ICS)

RE-EXAM PAPER DEC-2010

SEM-II

MCA Sem II Nov. 2010

Data Structures

AP-57

Con. 5907-10.

(REVISED COURSE)

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** out of remaining **six** questions.

(3) **Figures** to **right** indicate **full** marks.

1. (a) Differentiate between : 10
   (i) Singly Linked List and Doubly Linked List
   (ii) Tree & Graph

   (b) Given a set of symbols & corresponding frequency table as below. Explain the steps to find Huffman code for each of character 10

Symbol	A	C	D	G	I	K	M	N	O
Frequency	10	3	4	2	4	2	3	6	8

2. (a) Write an algorithm to create an empty queue and to insert element in a queue. Also define circular queue. 10

   (b) (i) Write an algorithm to sort elements using bubble sort. 10
   (ii) Sort following array elements using bubble sort:
   7 8 26 44 13 23 98 57

3. (a) A binary tree has 8 nodes. The inorder and postorder traversal of the tree is given below : 10
   Postorder : F E C H G D B A
   Inorder : F C E A B H D G
   Show a stepwise reconstruction of binary tree along with its preorder traversal.

   (b) Define reheapup operation for a heap. Create a max heap using following : 10
   42,23,74,11,65,3,94,36,99,87

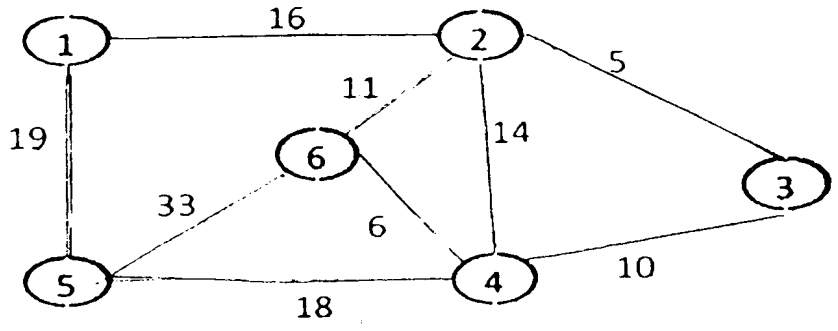
4. (a) Define Doubly linked list. Write an algorithm to : 10
   (i) Search the element in doubly linked list
   (ii) Print the list elements in reverse order.

   (b) Define clustering in hash list. Using mid-square method and key offset, store the keys shown below in array of size 13 : 10
   55,65,20,12,66,26,90

[TURN OVER

5. (a) Define binary tree traversal. Explain breadth-first traversal of a graph with example. 10

(b) Give minimum spanning tree using Kruskal's and Prim's algorithm for graph shown below: 10



6. (a) Define collision. Explain collision resolution methods with example. 10

(b) Define M-way tree. Construct B-tree of order 3 for following data arriving in sequence: 21,57, 78, 42, 45, 65,71,59 10

7. (a) Define graph. Distinguish between undirected and directed graphs. Explain with example how adjacency list stores graph information into it. 10

(b) An array contains the elements shown below. Using binary search algorithm, trace the steps to search element 44. At each loop iteration, show the contents of first, last & mid. 10

8, 13, 17, 26,44, 56, 88, 97

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(REVISED COURSE) Operating System

(3 Hours) [Total Marks 100

N.B. : 1) Question No. **1** is **compulsory.**
2) Answer any **four** questions from remaining **six** question.
3) All questions carry **equal** marks.
4) Assumptions should be made whenever **required** and should be **clearly** stated.
5) **Draw** the **diagrams** whenever **required.**

1. (a) For the processes given in the table :- 12

Process	Arrival Time(ms)	Processing Time(ms)
A	0	3
B	1	5
C	3	2
D	9	5
E	12	5

Using FCFS,SJF,SRT and RR(quantum=2) scheduling algorithm
(1) Draw a chart illustrating process execution.
(2) Find the average turn around time for each process.
(3) Find the average waiting time for each process

(b) What is semaphore? Explain different types of semaphore. 8
Explain the difference between semaphore and monitor.

2. (a) What is dynamic & fixed partition? What are the problems with them and how can we solve these problems? Explain with suitable example. 12

(b) Discuss the goal of I/O software 8

3. (a) What is deadlock? Write the Banker's algorithm and explain how it can be used to avoid a deadlock. 10

(b) Consider the following snapshot of a system: 10

Processes	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	2	0	0	2	0	1	0	2	0
P2	1	2	0	2	5	2			
P3	0	1	1	1	4	2			
P4	0	0	1	2	0	1			

Using Banker's algorithm,
(i) What is the context of matrix need
(ii) Is the system in safe state ? Give the sequence.
(iii) Is the system currently deadlocked ?

4. (a) Given reference string to the following pages by a program 12
1,0,2,2,1,7,6,7,0,1,2,0,3,0,4,5,1,5,2,4,5,6,7,6,7,2,4,2,7,3,3,2,3
How many page faults will occur for the following page replacement algorithms, assuming three frames?
1. LRU replacement
2. FIFO replacement
3. Optimal replacement

(b) What are the different threats to security of a system? Discuss threats monitoring 8

5. (a) Explain the access matrix model of protection. How does it serve a useful abstraction for reasoning about protection mechanisms in a computer systems? 10

(b) Explain direct memory access(DMA) in detail with suitable example 10

6. (a) Consider the head of a moving hard disk with 200 tracks is currently serving a request at track 100 If the queue of requests in FIFO order is 27,129,110,186,147,41,10,64,120 What is the total head movement under the following scheduling algorithms? 12
(1) FCFS , (2) SSTF, (3) SCAN , (4) C-SCAN

(b) With the help of an example and suitable diagram, explain the address mapping scheme in paging 8

7. Write a short notes on any four:- 20
a) Linker
b) RAID
c) Unix operating system
d) Spooling
e) Context switching

MCA - SEM II - 09/12/2010

Sub. - Financial - Management

AP-5702

Con. 5970-10

(3 Hours) [Total Marks : 100

N.B.: 1) Question no. 1 is compulsory.
2) Attempt any two questions from 2-4.
3) Attempt any two questions from 5-7.
4) Answer to the questions should be grouped and written together.
5) Figures to the right indicates full marks assigned to the question.

1. a) What is cashflow statement? (10)
What is the need of a cashflow statement?

b) The following is the Trial balance of Nitin Bros as on 31st March, 2009. (10)

Particulars	L.F.	Debit Rs.	Credit Rs.
Furniture		45,000	
Plant & Machinery		1,47,000	
Investments		25,000	
Bad debts		2,000	
Sundry Debtors		51,000	
Purchases		2,90,000	
Stock on 1st April,2008		90,000	
Interest		875	
Bill payable			11,000
Sundry creditors			25,000
General expenses		1,750	
Interest Charges		1,250	
Discount		8,000	9,000
Purchase returns			1,250
Sales returns		2,500	
Bills Receivable		26,000	
Capital			3,12,750
Sales			3,50,000
Insurance		2,500	
Stationery		500	
Wages		5,000	
Salaries		10,000	
Carriage		625	
		7,09,000	7,09,000

2. a) What is Double Entry System of Book-Keeping? (10)
Explain its advantages

b) Mr. Gupta commenced business as on 1st January, 2009. Following transactions for the month of January, 2009 are to be journalized in his books :

		Rs.
2009		
Jan. 1	Invested cash for commencement of the business	3,00,000
Jan. 2	Purchased Machinery	1,10,000
Jan. 2	Wages paid for installation of machinery	10,000
Jan. 4	Purchased Furniture	15,000
Jan. 5	Bought Computer from Raman	28,600
Jan. 6	Bought goods from Mongia & Co.	7,000
Jan. 8	Paid Raman by cheque in full settlement	28,000
Jan. 10	Sold goods to Pawan	12,000
Jan. 12	Pawan cleared his account by paying cash	11,500
Jan. 19	Paid for stationery	800
Jan. 22	Old Newspaper sold	150
Jan. 25	Paid electricity charges	800
Jan. 27	Salaries paid by cheque	3,000
Jan. 31	Cash withdrawn for personal purpose	2,000
Jan. 31	Cash sales for the month	18,000

[TURN OVER

3. a) What is Trial Balance? Explain the process of preparation of Trial Balance. (10)

b) Record the following transactions in Cash Book with Cash and Bank and Discount Column in the books of Manohar Lal & Sons : (10)

		Rs.
2009		
Jan. 1	Balance of cash	2,17,000
	Bank Balance	35,000
Jan. 3	Shares of XYZ Ltd. were sold at 20% less than the face value (face value Rs. 50,000)	
Jan. 5	Paid to Rachit by cheque	9,600
	Discount received	200
Jan. 6	Received a cheque from Sanjeev in full settlement of a claim of Rs 70,000	66,700
Jan. 7	Paid telephone charges	3,000
Jan. 10	Deposited Sanjeev's cheque into bank	
Jan. 13	Purchased goods in cash from ChandTraders	25,000
Jan. 16	Payment made to Naveen	31,000
	and discount allowed by him	1,000
Jan. 20	Cash withdrawn for private use	6,500
Jan. 23	Issued cheque for cash purchases	10,000
Jan. 27	Paid commission	1,500
Jan. 29	Deposited into bank	20,000
Jan. 31	Rent Received	6,000
Jan. 31	Bad Debts recovered	250
Jan. 31	Deposited cash in excess of Rs. 52,500 into bank	

4. a) What is Balance Sheet? Give specimen format of Balance sheet. (10)

b) What are the reasons for differences in cash book balance and pass book balance? (10)

5. a) Give format of a Cost Sheet. (10)

b) The following is the profit and loss account and balance sheet relating to Ramesh Company presented as on 31st March 2009. (10)

Profit and Loss Account

Particulars	Amount Rs.	Particulars	Amount Rs.	Amount Rs.
To Opening Stock	3,000	By Gross Sales	2,00,000	
To Purchase	1,20,000	Less: Sales Return	5,000	1,95,000
To Wages (Direct)	7,000	By Closing Stock		5,000
To Gross Profit c/d	70,000			
	2,00,000			2,00,000
To Administrative Expenses	15,000	By Gross Profit b/d		70,000
To S & D Expenses	20,000	By Dividend Received		10,000
To Loss on Sale of Fixed Assets	5,000			
To Net Profit	40,000			
	80,000			80,000

Balance Sheet as on 31st March 2009

Liabilities	Amount Rs.	Assets	Amount Rs.
Equity Share Capital (5,000 equity shares of Rs 100 each)	5,00,000	Land	1,00,000
General Reserve	50,000	Building	3,00,000
Profit and Loss Account	70,000	Plant & Machinery	2,00,000
Sundry Creditor	80,000	Stock	5,000
		Debtors	55,000
		Bank Balance	40,000
Total	7,00,000	Total	7,00,000

From the above information you are required to calculate :

1) Gross Profit Ratio
2) Operating Ratio
3) Current Ratio
4) Liquid Ratio
5) Stock Turnover Ratio
6) Debtors Turnover Ratio

6. a) Explain the various factors affecting working capital requirement. (10)

b) What are the limitations of Ratio Analysis ? (10)

7. a) Explain the importance of cash Budget. (10)

b) Prasad & Co. wishes to prepare cash budget from January. Prepare a cash budget for the first six months ending 30th June 2010 from the following estimated revenue and expenses. (10)

Month	Total Sales Rs.	Materials Rs.	Wages Rs.	Production Overheads Rs.	Selling and Distribution Overheads Rs.
January	1,00,000	1,00,000	20,000	16,000	4,000
February	1,10,000	70,000	22,000	16,500	4,500
March	1,40,000	70,000	23,000	17,000	4,500
April	1,80,000	1,10,000	23,000	17,500	5,000
May	1,50,000	1,00,000	20,000	16,000	4,500
June	2,00,000	1,25,000	25,000	18,000	6,000

Additional Information :

1. Cash balance on 1st January was Rs. 50,000. A new machinery is to be installed at Rs. 1,00,000 on credit, to be repaid by two equal installments in March and April.
2. Sales commission @ 5% on total sales is to be paid within a month of following actual sales.
3. Rs. 60,000 being the amount to be received in March on issue of shares.
4. Period of credit allowed by suppliers - 2 month.
5. Period of credit allowed to customers- 1 month.
6. Delay in Payment of overheads - 1month
7. Delay in payment of wages - ½ month
8. Assume cash sales to be 50% of total sales.

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MCA sem II Computer Graphics

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Con. 5915–10. (REVISED COURSE) AP–5760

(3 Hours) [Total Marks : 100

N.B. i) Question No. **1** is **compulsory.**
ii) Attempt **any four** from question nos. 2 to 7.
iii) **Figures** to the **right** indicate marks.
iv) **Mixing** of sub questions is **not allowed.**

1. A) Explain Sutherland –Cohen line clipping algorithm. 10
Given a clipping window – A(20,20) B(60,20) C(60,40) D(20,40). Using Sutherland Cohen algorithm find the visible portion of line segment joining the points P1(40,80) P2(120,30).
B) Devise generalized Bresenham's line drawing algorithm. 10

2. A) Explain window to view port mapping. 10
Find the normalization transformation that maps a window whose lower left corner is at (1,1) and upper right corner is at (3,5) onto
1) a viewport that is the entire normalized device screen.
2) a viewport that has lower left corner at (0,0) and upper right corner (1/2,1/2)
B) Compare and contrast between – 10
1. flood fill and boundary fill algorithm used for region filling.
2. parallel and perspective projection.

3. A) Explain the Midpoint Subdivision Algorithm. Prove that it works successfully with lines that are partially inside and partially outside the viewing window. (10)
B) Derive 2D rotation and scaling transformation matrices with respect to fixed point (Xp,Yp). 10

4. A) How does a raster scan system work? How is it different from random scan system? (10)
B) What are display files? Explain with examples, how are polygons and characters represented in Display File. 10

5. A) Deduce the Mid-point Circle Algorithm. (10)
B) Explain the construction and working of CRT's and DVST's. (10)

6. A) What are Homogeneous co-ordinates? Explain its significance with examples 10
B) Construct the Bezier curve of order 3 & with 4 polygon vertices A(1,1), B(2,3), C(4,3) & D(6,4) 10

7. Write short notes on any **Four** :- 20
a) Morphing
b) Frame Buffer
c) Kinematics and Dynamics
d) Phong Shading
e) Character generation.

12/2010 MCA Sem II. Communication ...
MCA Sem II Probability & Statistics

Con. 5968-10.

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** out of **remaining six** questions.
(3) Assume any necessary data but justify the same.
(4) Figures to the right indicate marks.
(5) Use of scientific calculator is allowed.

1. (a) (i) What is the probability that 4 A's come consecutively in arrangements of the letters in the word 'MAHARASHTRA'. [5]

(ii) Show that the r^{th} moment of Beta distribution of first kind about origin is [5]

$$\mu_r' = \frac{1}{\beta(m,n)}\beta(m+r,\ n).$$

where m and n are parameters of the distribution

(b) (i) The ages of husbands and wives in seven couples were as follows. [5]

Age of husband	45	44	50	53	66	30	48
Age of wife	42	40	41	42	56	30	43

Find the Karl Pearson's coefficient of correlation between the age of husband and age of wife.

(ii) The number of hardware failure system in a week of operation has the following probability mass function. [5]

No. of failures	0	1	2	3	4	5	6
Probability	0.18	0.28	0.25	0.18	0.06	0.04	0.01

Find the expectation and variance of the number of failure.

2. (a) The joint probability density function of the two dimensional random variable [10]

(X,Y) is given by $f(x,y)=\begin{cases} \frac{8}{9}xy, & 1 \le x \le y \le 2 \\ 0, & otherwise \end{cases}$

(i) Find the marginal densities of X and Y.

(ii) Find the conditional density function of Y given X=x, and the conditional density function of X given Y=y.

(b) (i) Mean and standard deviation of 100 items are 40 and 10. If at the time of calculation two items are wrongly taken as 30 and 72 instead of 3 and 27, find the correct mean and standard deviation. [5]

(ii) Prove that mean and variance of Poisson distribution are equal. [5]

[TURN OVER

3. (a) (i) The contents of urns I, II and III are as follows [5]

Urn I 1 white, 2 black and 3 red balls
Urn II: 2 white, 1 black and 1 red balls, and
Urn III: 4 white, 5 black and 3 red balls.

One urn is chosen at random and two balls are drawn. They happen to be white and red. What is the probability that they come from I, II or III.

(ii) A calculator operates on two 1.5 volts batteries (for a total of 3 volts). The actual voltage of a battery is normally distributed with mean of 1.5 volts and variance of 0.045. The tolerance in the design of the calculator are such that it will not operate satisfactorily if the total voltage falls outside the range (2.70,3.30) volts. What is the probability that the calculator will function correctly ?[Given $P(0 \le Z \le 1)=0.3413$] [5]

(b) (i) A continuous random variable X has probability density function [5]

$f(x) = ax \quad 0 \le x \le 1$
$= a \quad 1 \le x \le 2$
$= -ax+3a \quad 2 \le x \le 3$
$= 0 \quad$ otherwise

Compute $P(X \le 1.5)$

(ii) Find the coefficient of variation for the following distribution. [5]

Age in years	20-25	25-30	30-35	35-40	40-45	45-50
No of policy holders	2	7	5	2	4	5

4. (a) (i) The following are the marks obtained by 8 students in two subjects DS and PS. Calculate the Spearman's rank correlation coefficient. [5]

Marks in DS	20	23	23	25	27	27	32	45
Marks in PS	18	22	24	29	33	36	36	36

(ii) The following table gives the number of accidents in a city during a week. Find whether the accidents are uniformly distributed over a week. [5]

Day	: Sun	Mon	Tue	Wed	Thu	Fri	Sat
No of accidents	: 10	8	11	9	12	10	10

(Given for 6 degrees of freedom at 5% level of significance, the table value of χ^2 is 12.59)

(b) (i) For the (M/M/1): (FCFS/∞/∞) queuing model, the mean arrival rate(λ) and mean service rate(μ) are constant. Assuming the expression for steady state probability of exactly 'n' customers in the system, obtain the expression for expected number of customers in the system. [5]

(ii) Customers arrive at a post office at an average rate of 15 per hour. The average time required to provide service to a single customer is 3 minutes. Find [5]

(1) utilization factor
(2) average waiting time in the system
(3) average number of customers in the system.

5. (a) (i) A certain injection administrated to 12 patients resulted in the following changes of blood pressure [5]

5, 2, 8, -1, 3, 0, 6, -2, 1, 5, 0, 4

Can it be concluded that the injection will be in general accompanied by an increase in blood pressure.

(Given : The value of t_α at 5% level of significance for 11 degrees of freedom is 2.201)

(ii) Prove that geometric distribution is memoryless. [5]

(b) (i) Calculate the Bowley's coefficient of skewness for the following data [5]

C.I.	30-35	35-40	40-45	45-50	50-55	55-60
Frequency	5	10	30	35	15	5

(ii) A random variable X takes the values 1, 2, 3 and 4 such that [5]
$4P(X=1)=2P(X=2)=3P(X=3)=P(X=4)$,
find the probability distribution and cumulative distribution function of X

6 (a) (i) Prove with example that three events may be pairwise independent but need not be mutually independent. [5]

(ii) An MCA applies for a job in two firms X and Y. The probability of his being selected in firm X is 0.7 and being rejected at Y is 0.5. The probability of atleast one of his applications being rejected is 0.6. What is the probability that he will be selected in one of the firms? [5]

(b) (i) Two discrete random variables X and Y have joint pmf given by the following table [5]

X \ Y	1	2	3
1	2/16	2/16	1/16
2	3/16	2/16	1/16
3	2/16	1/16	2/16

Compute the probability of each of the following events.
(1) X is odd (2) XY is even

(ii) If X is a continuous random variable with pdf f(X), then prove that [5]
$E(aX+b)=aE(X)+b$ and $V(X)=a^2V(X)$,
where a and b are constants.

7. (a) (i) Find the mean deviation about the arithmetic mean of the following data. [5]

X	10	11	12	13	14
Frequency	3	12	18	12	3

(ii) Sample survey was taken to check which newspaper (A,B,C) people read. In a sample of 100 people the following results are obtained. 60 read A, 40 read B, 70 read C, 45 read A and C, 32 read A and B, 38 read B and C, 30 read A, B and C. If a person is selected at random, find the probability that he reads at least two newspapers. Also find the probability that he doesn't read any paper. [5]

(b) (i) A box contains 2^n tickets among which ${}^nC_i$ tickets bear the number i, $i = 0, 1, 2, \ldots, n$. A group of m tickets is drawn. What is the expectation of the sum of their numbers? [5]

(ii) Calculate the mode of the following : [5]

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	7	9	14	18	8	5

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3. (a) (i) The contents of urns I, II and III are as follows. [5]

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Compute $P(X \le 1.5)$

(ii) Find the coefficient of variation for the following distribution. [5]

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No of policy holders	2	7	5	2	4	5

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Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
No of accidents	10	8	11	9	12	10	10

(Given for 6 degrees of freedom at 5% level of significance, the table value of χ^2 is 12.59)

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(Given : The value of t_α at 5% level of significance for 11 degrees of freedom is 2.201)

(ii) Prove that geometric distribution is memoryless. [5]

(b) (i) Calculate the Bowley's coefficient of skewness for the following data. [5]

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find the probability distribution and cumulative distribution function of X.

6. (a) (i) Prove with example that three events may be pairwise independent but need not be mutually independent. [5]

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X \ Y	1	2	3
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3	2/16	1/16	2/16

Compute the probability of each of the following events.
(1) X is odd (2) XY is even

(ii) If X is a continuous random variable with pdf f(X), then prove that [5]
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Frequency	3	12	18	12	3

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(ii) Calculate the mode of the following : [5]

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	7	9	14	18	8	5

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2010 MCA Sem II Communication & Soft Skills

ws Oct Sacn- 10 81

Con. 5986–10. (K·T)

AP–5[illegible]57

(3 Hours) [Total Marks : 1[illegible]

N.B: (1) **Question No. 1 is compulsory.**
(2) Attempt any **four (4)** questions of the remaining **six (6)** questions.
(3) Answers to the questions should be **grouped** and written **together.**
(4) **Figures** on the right indicate **full marks** assigned to the question.

1. (a) "Communication is a Two-Way process". Substantiate this statement, indicating clearly the role of each constituent element. **10**

(b) Discuss the role of E-Commerce in business transactions, highlighting its advantages over the traditional methods of communications. **10**

2. (a) What is the role of body language and paralanguage in making an effective presentation? **10**

(b) Write short notes on:

(i) Psychological barriers to communication. **5**
(ii) Ethical aspects of communication. **5**

3. (a) Explain the concept of vertically upward /downward communication with appropriate examples. **10**

(b) What is the role of grapevine as an informal channel of communication in an organization? **10**

4. (a) Describe some of the important points one should bear in mind for meaningful participation in a Group Discussion. **10**

(b) What qualities does an employer look for in a potential candidate while interviewing him? **10**

5. (a) As General Secretary of the Students' Council draft a notice along with the agenda for a meeting of the Students' Council, to plan the week long Annual Technical Fest to be held in your College. **10**

(b) Write the minutes of the meeting of the cultural committee of the Students' Council which was held to plan the Technical Fest. **10**

6. (a) As the Business Development Manager of a firm that provides IT Solutions write a sales letter to prospective clients offering them your services for designing and hosting their web sites. **10**

(b) The Annual Maintenance Contract for maintenance of computers in your organization has been unsatisfactory. As the Manager Administration write a letter to the Manager, Customer Services of the contractor expressing your dissatisfaction with the service. **10**

7. (a) What is the importance of listening in communication? Discuss briefly any three blocks to effective listening. **10**

(b) Use any **five** of the following words in sentence of your own. **10**
(i) opinion
(ii) defective
(iii) negotiate
(iv) dominate