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MET

INSTITUTE OF COMPUTER SCIENCE
UNIVERSITY QUESTION PAPERS (ICS)

EXAM PAPER MAY-2010

SEM-II





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UNIVERSITY QUESTION PAPERS (ICS)

EXAM PAPER MAY-2010

SEM-II

SR.NO	SUBJECT	REMARK
1	DATA STRUCTURES	
2	OPERATING SYSTEM	×
3	FINANCIAL MANAGEMENT	✓
4	COMPUTER GRAPHICS	✓
5	PROBABILITY AND STATISTICS	✓
6	COMMUNICATION & SOFT SKILLS	✓

Con. 3293-10.

(REVISED COURSE)

(3 Hours)



JR-1138

Marks : 100

- N.B. 1) Question 1 is compulsory.
 2) Attempt any Four out of remaining six Questions.
 3) Assumptions should be made whenever required and should be clearly stated.
 4) Answers to questions should be grouped and written together.
 5) Draw the diagrams whenever required.

1. a) For the processes listed below the table, draw Gantt chart and calculate average waiting time and average turnaround time using:- 15
 (i) FCFS (First come first serve)
 (ii) SJF (Shortest job first) in both conditions preemptive and non-preemptive
 (iii) Round-Robin (quantum=2)

Processes	Arrival Time(ms)	Burst Time(ms)
P1	0	8
P2	2	5
P3	3	3
P4	4	5

- b) Explain about five-state Process model in Process Management in detail. 5
2. a) Consider following snapshot of a system:- 12

Process	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P0	0	1	0	7	5	3	4	3	3
P1	2	0	0	3	2	3			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Using banker's algorithm answers the following:-

- (i) What is the context of matrix need?
 (ii) Is the system in safe state? Give the sequence.
 (iii) If a request from process P1 arrives for (1, 0, 3) can the request be granted immediately?
- b) What are the contents of Process Control Block (PCB)? Explain in detail. 8
3. a) What are external and internal fragmentations? Discuss the technique to overcome fragmentations with a suitable diagram. 10
 b) What is O.S? What are the services provided by O.S? Explain any five salient features of UNIX OS? 10
4. a) What is deadlock? What are the necessary conditions for occurrence of deadlock also mention the methods of handling deadlock? 10
 b) What is thread? Explain various kinds of threads in detail. 10

5. a) Why Security is required? What type: of problems one will face if there is a lack of security in the system? Explain how digital documents are secured using digital signature? 10
- b) Explain direct memory access (DMA) in detail with suitable example. 10
6. a) Suppose a disk drive has 300 cylinders, numbered 0 to 299. The driver is currently serving a request at cylinder 135 and previous request was at cylinder 140. The queue of pending request in FIFO order is:-
86, 147, 212, 91, 177, 48, 209, 222, 175, 130
Starting from the current head position, what is the total distance in cylinders that the disk arm moves to satisfy all pending request for each of the following disk scheduling algorithm?
(i) SSTF (ii) SCAN (iii) C-SCAN 12
- b) What is virtual memory? Explain demand paging with suitable example? 8
7. Write short notes on any four:- 20
- Seek Time, Latency Time, Transfer Time in a Disk.
 - IO Buffering.
 - Semaphore.
 - Multiprogramming, Multitasking, Multiprocessing.
 - Context Switching.
 - Micro kernel and Monolithic kernel.



- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any two questions from question Nos. 2 to 4.
 (3) Attempt any two questions from question Nos. 5 to 7.
 (4) Answer to the questions should be grouped.
 (5) Figures to the right indicate full marks assigned to the question.

1. (a) Explain the advantages and disadvantages of a Fund Flow Statement. 10
 (b) From the following Trial Balance, prepare Trading, Profit and Loss account and Balance Sheet of M/s Zankhana Enterprises for the year ended on 31st March, 2010. 10

Debit Balance	Rs.	Credit Balance	Rs.
Goodwill	1,00,000	Capital	7,43,380
Stock as on 1-4-09	2,995	Sales	2,00,000
Land and Building	2,00,000	Discount Received	50
Purchases	1,28,760	Interest Received	185
Plant and Machinery	2,50,000	Return outward	275
Wages (for 10 months)	1000	Creditors	1,990
Furniture	20,000		
Sales Return	2,000		
Cash in hand	9,995		
Power and Fuel	2,000		
Motor car	1,69,900		
Legal Fees	2,000		
Investment in Shares	15,550		
Salary (for 14 months)	28,000		
Debtors	10,500		
Drawings	2,980		
Carriage inward	200		
Total	9,45,880	Total	9,45,880

Adjustments : (a) Stock as on 31st March, 2010 was valued at a cost of Rs. 70,000, however, the market value was Rs. 85,000.

[TURN OVER

2. (a) What are the different types of Cash Book ?
 (b) Pass Journal entries in the books of M/s Pretty for the month of February, 2010.

February 1 Ms. Pretty started business with Cash Rs. 1,50,000, Furniture Rs. 10,000, Office equipments worth Rs. 12,000
 February 2 Purchased goods from M/s. Kinjal and Bros. on credit worth Rs. 1,00,000 at a trade discount of 10%
 February 3 Purchased goods from M/s Pratik and Co. in cash worth Rs. 200,000. He also, allowed a trade discount of 10% and 20% Cash discount.
 February 4 Paid Salaries to employees Rs. 1,20,000, Wages Rs. 30,000, Printing and Stationary Rs. 5,000, Fire Insurance premium Rs. 19,000, Telephone expenses Rs. 8,000, Conveyance Rs. 1,000 and Travelling expenses Rs. 5,000.
 February 19 Deposited Cash in Barclays Bank Rs. 50,000
 February 21 Withdrawn cash from business Rs. 10,000.
 February 22 Withdrawn cash from Barclays bank Rs. 10,000 for office use.
 February 25 Goods distributed as free samples Rs. 10,000
 February 26 Sold goods to Ms. Shruti costing Rs. 1,00,000 plus a profit of 10% on cost in cash.
 February 28 Deposited Rs. 30,000 in Barclays Bank.

3. (a) Why is a bank reconciliation statement prepared ? Give reasons.
 (b) Prepare a triple columnar cash book from the following information for the month of February, 2010.

1 Opening Cash balance Rs. 1,00,000 and bank balance Rs. 80,000
 5 Purchases goods from Gitanjali worth Rs. 30,000 at a trade discount of 5% in cash
 8 Purchased goods from Priti worth Rs. 10,000 at a trade discount of 5% and Cash discount of 12%
 11 Paid wages Rs. 1000
 14 Deposited Rs. 5,000 in bank
 17 Sold goods to Mrs. Manoja Rs. 1,00,000 in cash.
 18 Received Rs. 12,000 as advance from Chandra.
 20 Issued a bearer cheque to Mr. Amit for purchase of Furniture worth Rs. 700
 22 Issued an account payee cheque worth Rs. 900 to Mr. Antar for Car repairs.
 28 Deposited all cash into bank exceeding Rs. 2,000.

4. Explain the following in detail :

(a) Fixed cost
 (b) Variable cost
 (c) Semi-variable cost
 (d) Direct and Indirect cost.

5. (a) From the information and assumption that the cash balance in hand on 1-1-2007 is Rs. 72,500, prepare a Cash Budget. Assume that 50% of total sales are cash sales. Assets are to be acquired in the months of February and April; therefore, provisions should be made for the payment of Rs. 8,000 and Rs. 25,000 for the same. An application has been made to the bank for grant of a loan of Rs. 30,000 and the loan amount will be received on the month of May.

It is anticipated that a dividend of Rs. 35,000 will be paid in June. Debtors are allowed one month's credit. Creditors for materials purchased and overheads are allowed 3% on sales is paid to the

Month	Sales Rs.	Materials Purchased Rs.	Salaries & Wages Rs.	Production Overheads Rs.	Office & Selling Overheads Rs.
January	72,000	25,000	10,000	6,000	5,500
February	97,000	31,000	12,100	6,300	6,700
March	86,000	25,500	10,600	6,000	7,500
April	88,600	30,600	25,000	6,500	8,900
May	1,02,500	37,000	22,000	8,000	11,000
June	1,08,700	38,800	23,000	8,200	11,500

(b) Explain advantages of Ratio analysis.

5

6. (a) Assume that a firm has owner's equity of Rs. 1,00,000.
The ratios for the firm are :

15

Current debt to total debt	0.40
Total debt to Owner's equity	0.60
Fixed assets to owner's equity	0.60
Total assets turnover	2 times
Inventory turnover	8 times

Complete the following Balance sheet, given the information above :—

Liabilities	Rs.	Assets	Rs.
Current Debt	?	Cash	?
Long Term Debt	?	Inventory	?
Total Debt	?	Total Current Assets	?
Owner's Equity	?	Fixed Assets	?
Total Capital	?	Total Assets	?

(b) What ratios help us identify the short term solvency, immediate solvency and long term solvency of a company ?

6

7. (a) Prepare a statement showing estimate of working capital for 1,00,000 units.

15

Raw Materials	Rs.	5 per unit
Labour	Rs.	3 per unit
Overheads	Rs.	2 per unit
Selling price	Rs.	20 per unit.

(i) Raw materials are to be kept in stock for 1 month, Materials are in process for 1 month and finished goods are to be kept in stock for 1 month.

(ii) Debtors are allowed 2 months credit and Creditors allow us 3 months credit

(iii) Overheads are outstanding for 1 month

(iv) Cash in hand is Rs. 20,000.

(b) What is Gross Working Capital and Net Working Capital.

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1st CA SEM-II - May - 2016
Sub. - Computer - Graphics.
DATE: 29/05/10.



- 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.

Q1

- A) Develop a 2D rotation matrix with respect to a fixed point $P(X_c, Y_c)$ (10)
 B) Derive the Bresenham's line generation algorithm for lines with slope m (10)
 where $|m| < 1$.

Q2

- A) Determine region codes and clip the following lines using Cohen Sutherland algorithm. The window boundaries are Window's lower left corner = (100, 100), Window's upper right corner = (200, 200). End Points of the lines are
 i) $A = (250, 150)$, $B = (260, 180)$. ii) $C = (150, 50)$, $D = (150, 300)$.
 iii) $E = (150, 90)$, $F = (300, 110)$ iv) $G = (70, 170)$, $H = (130, 180)$
 B) 1) Discuss different ways of motion specification (5)
 2) Explain in brief phong shading technique. (5)

Q3

- A) A Polygon ABCD is translated by 50 units in x direction and 50 units in y direction. It is then rotated by 270 degrees in anticlockwise direction about the fixed point P. It is then scaled so that it doubles in size. Find the new coordinates of the polygon. The original coordinates are $A = (100, 100)$, $B = (200, 100)$, $C = (200, 200)$, $D = (100, 200)$. Fixed point $P = (150, 150)$
 B) 1) Perform uniform scaling on the unit cube by factor 2. (5)
 2) Explain in brief the winding number protocol. (5)

Q4

- A) What are Display Files? Explain the structure and working of a Display file. Discuss how are characters stored in a display file. (10)
 B) List the properties of curve and differentiate between Bezier and B-spline curve. (10)

A) How does a raster scan system work? How is it different from random scan system? (10)

B) Give a single 4x4 matrix for the following transformations (10)
 i) Rotate by 180° around Y axis
 ii) Translate by 3 units in X axis and 4 units in Z axis.
 iii) Scale by 4 units in Y axis.

C) Describe various Cohen models used in graphics system. (10)

D) Explain the Midpoint Subdivision Algorithm. Prove that it works successfully with lines that are partially inside and partially outside the viewing window. (10)

E) Write Short notes on any four: (20)

- Even-Odd Method
- Colour Tables
- Ray Tracing
- Viewing Pipeline
- Z-Buffer

(3 Hours)

[Total Marks : 100

- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any four question 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.



I. (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 variance Beta distribution of second kind is $\frac{m(m+n-1)}{(n-1)^2(n-2)}$ [5]

where m and n are parameters of the distribution.

(b) (i) Calculate Karl Pearson's coefficient of correlation between the price and the supply of a commodity from the following data. [5]

Price (Rs)	8	10	15	17	20	22	24	25
Supply (in Kg)	25	30	32	35	37	40	42	45

(ii) Let X be a random variable with following probability distribution

X	-3	6	9
P(X=x)	1/6	1/2	1/3

Find $E(X)$ and $E(X^2)$ and using the laws of expectation, evaluate $E(2x+1)^2$.

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

$$(X, Y) \text{ is given by } f(x, y) = \begin{cases} \frac{8}{9}xy, & 1 \leq x \leq y \leq 2 \\ 0, & \text{otherwise} \end{cases} \quad [10]$$

(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) The mean and standard deviation of 200 items are found to be 60 and 20 respectively. At the time of calculations two items were wrongly taken as 3 and 67 instead of 13 and 17. Find the correct mean and standard deviation. [5]

(ii) The number of jobs arriving at a computer center between 9am and 10 am is a random variable X with a Poisson distribution with mean 2. The number of jobs arriving between 10 am and 11 am is a random variable Y with Poisson distribution with mean 6. If X and Y are independent, find the probability that more than 5 jobs will arrive between 9 am and 11 am. [5]

[TURN OVER

3. (a) (i) Measurements at the University of Mumbai on a certain day indicated that the source of incoming jobs is 15% from MIDC Thane, 35% from MIDC Talaja, and 50% from MIDC Andheri. Suppose that the probabilities that a job initiated from these MIDCs requires set-up are 0.01, 0.05, and 0.02 respectively. Find the probability that a job chosen at random at University of Mumbai requires set-up. Also find the probability that a randomly chosen job comes from MIDC Talaja, given that it requires set-up. [5]

(ii) The height of a group of 1000 students follows a normal distribution with mean 165cm and S.D. 5cm. Find the number of students having height (a) up to 171 cm, (b) below 165 cm. [Given $P(0 \leq Z \leq 1.2) = 0.3849$, where Z is standard normal variate] [5]

b(i) A continuous random variable X has p.d.f. [5]

$$\begin{aligned} f(x) &= ax & 0 \leq x < 1 \\ &= a & 1 \leq x < 2 \\ &= -ax + 3a & 2 \leq x < 3 \\ &= 0, & \text{otherwise} \end{aligned}$$

Compute $P(X \leq 1.5)$

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

Class Interval	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	7	12	16	13	13	4

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) Weights in kg of 10 students are given below [5]

38, 40, 45, 53, 47, 43, 55, 48, 52, 49

Can we say that the variance of the normal distribution from which the above sample is drawn is 20 kg? (Given for 9 degrees of freedom at 5% level of significance, the table value of χ^2 is 16.99)

(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) A self-service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes, while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service

rate, find the average number of customers in the system. Also find the average time a customer spends in the system. [5]

5. (a) (i) The average height of 16 students is 170 cm with a standard deviation of 10 cm. Test at $\alpha=5\%$ whether the average height of the population is 172 cm. [5]
(Given: The value of t_{α} at 5% level of significance for 15 degrees of freedom is 2.131)

(ii) The probability mass function of a discrete random variable X is given by [5]

$$P(X=x) = \begin{cases} {}^n C_x p^x q^{n-x}, & x = 0, 1, 2, \dots, n \text{ where } q = 1 - p \\ 0, & \text{otherwise} \end{cases}$$

Find its variance.

(b) (i) From the following frequency distribution of marks of students in an examination, calculate the value of Karl Pearson's coefficient of skewness. [5]

Marks less than	10	20	30	40	50
No of students	5	12	32	44	50

(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 mutually independent but need not be pair wise independent. [5]

(ii) Ram plays 12 games of chess with computer and he wins 6 games while computer wins 4 games and 2 games end in a tie. Ram again decides to play 3 games more. Find the probability that Ram wins all three games. Also find the probability that Ram and computer win alternatively. [5]

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

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

Are X and Y independent? Are they un-correlated?

(ii) Let X be a random variable for which $E(X)=10$ and $V(X)=25$. Find the values of a and b such that $Y=aX-b$ has expectation zero and variance 1. [5]

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) A series of n jobs arrive at a computing centre with n processors. Assume that each of the n^n possible assignments vectors (processor for job 1, ..., processor for job n) is equally likely. Find the probability that exactly one processor will be idle? [5]

(b) (i) A box contains 2^n tickets among which ${}^n C_i$ tickets bear the number i , $i=0,1,2,\dots,n$. 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

Con. 3304-10.

(3 Hours)

[Total Marks : 100]

MCA-SEM-II-May-2010
Sub. Communication Skills
JR-1147

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



1. A) What is the 7 C's of communication? Explain the process of communication through a diagram. 10
- B) Write on (any two):-
- Property rights,
 - Patents
 - Tele conferencing
 - Letter of reference
 - Voice system.
2. A) Draft the notice with agenda for a meeting of the student's council called to plan the IT fest 2010 to be organized in your college. 10
- B) Write the minutes of the above meeting. 10
3. A) What is team work? Is team work essential? List out the elements of teamwork. 10
- B) Define the term leadership and explain the different types of leadership. 10
4. A) Explain grapevine communication, and its importance in an organization. 10
- B) What is GD? What are the guidelines that a candidate must keep in mind during the GD? 10
5. A) Explain what are interviews and its role-play techniques with example. 10
- B) Explain briefly what a report is and why report writing is essential for one and all in an organization. 10
6. Write a report to be presented to the Director of your Institute, on the possibility of starting a books and stationary shop on the institute premises. 20
7. Write short notes on (any 4) :- 20
- a) Emotional intelligence
 - b) Motivation
 - c) Assertiveness
 - d) Decision-making