

MCA Sem II
Principles & Practices of Management

Con/4868-07.

BB-3652

(3 Hours)

[Total Marks : 100

Note:

1. Question no. 1 is compulsory.
2. answer any four out of the remaining six questions.
3. answer to questions should be grouped and written together.
4. use legible handwriting . use a blue/black ink pen to write answers. Use of pencil should be done only to draw diagram and graphs.
5. All questions carry equal marks .

1. A. Explain the following approaches to management in detail : (15)
I) Scientific approach of F W Taylor
II) Human relations approach of Elton Mayo
B. Explain the concept of MBO. (5)
2. A. Explain the following 2 theories of motivation — (10)
I) Theory of X and theory of Y
II) Herberg's theory
B. What is new product development . (10)
3. A. Explain organization structure? And explain matrix organization with example. (10)
B. Discuss the marketing research in detail . (10)
4. A. Explain leadership and characteristics of good leader. (10)
B. Discuss the main features of marketing mix. (10)
5. A. What is performance appraisal and explain the methods of performance appraisal . (10)
B. Distinguish between power and authority . Authority and responsibility goes hand in hand together explain . (10)
6. A. Explain internal and external sources of recruitment . (10)
B. Explain the main functions of management, (10)
7. Write a short notes on any 4 : (20)
i. Fund flow
ii. TQM
iii. Ratio analysis
iv. Foreign market
v. Systems approach

Con/4864-07.

BB-3648

(3 Hours)

[Total Marks : 100

N.B. 1) Question 1 is compulsory.

2) Attempt any four out of the remaining questions.

3) Assumptions should be made whenever **required** and should be **clearly** stated.

4) Answer to questions should be **grouped** and **written together**.

1. a) Explain briefly the following terms: 10
- i) External fragmentation,
 - ii) binary semaphores,
 - iii) paging,
 - iv) threads,
 - v) thrashing
- b) i) Describe the differences among short-term, medium term and long term scheduling. 5
- ii) What are the main functions of an operating system? 5
2. a) Explain the difference between micro kernel and monolithic kernel architectures. Give examples of both types of operating systems 8
- b) Given a system that uses round-robin scheduling, assume that it performs context switch in zero time. 12
1. If the following conditions prevail, what will be the execution time of a process?
- i) ready queue always contains n processes
 - ii) each process is allowed to run only one instruction before context switch is made and CPU is allotted to another process
 - iii) a process takes ' t ' microseconds to execute in a uniprocessing environment
2. If the context switch takes ' m ' microseconds for a context switch and there are ' p ' instructions in a process, calculate the execution time of a process in above conditions.
3. a) What is meant by process priority? How many different types of priorities are there and how important is the role of priority in process scheduling? 10
- b) Explain the concept of DMA and the goals of I/O software. 10

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Operating systems

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4. a) Why is the average search time to find a record in indexed sequential file less than that for a sequential file? 10
- b) What is the concept of working set? How is the resident set size determined? Briefly describe the different policies in determining the working set size. 10
5. a) Compare the performance of C-SCAN and SCAN scheduling assuming uniform distribution of request. 8
- b) Suppose that a disk driver has 500 cylinders, numbered 0 to 499. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests in FIFO order, is:
86, 147, 412, 91, 177, 48, 309, 222, 175, 130
Starting from the current head position, what is the total distance in cylinders, that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?
i) SSTF, ii) SCAN, iii) C-SCAN 12
6. a) Explain in brief the advantages of segmentation and paging. Why are these two schemes combined in some systems? List the advantages of segmentations over paging. 10
- b) In a simple paging system with 2^{20} bytes of physical memory, 128 pages of logical address space and page size of 2^{10} bytes, how many bits are in logical address? Explain the difference between physical address space and logical address space 10
7. Write short notes on any four 20
- i) Buffering
 - ii) Spooling
 - iii) RAM disk
 - iv) Banker's Algorithm
 - v) Deadlocks
 - vi) Clocks.

Combinatorics & Probabilities

240 : 2ndHf-I

Con. 4866-07.

MCA. sem-II

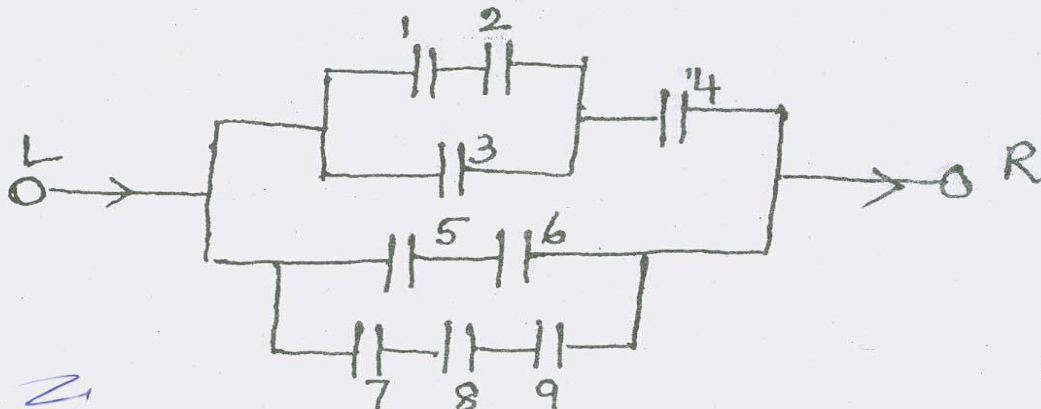
BB-3642

(3 Hours)

[Total Marks : 100

- N.B: (1) Question No. 1 is compulsory.
 (2) Attempt any four out of remaining six questions in which two questions should be from Question No.2 to Question No. 4 and remaining two questions from Question Nos. 5 to 7.
 (3) Assume any necessary data but justify the same.
 (4) Figures to the right indicate marks.
 (5) Use of calculator is allowed.

1. (a) Obtain the recurrence relation and initial conditions to find the maximum number of regions defined by n lines in a plane. Assume that the lines are not parallel and lines not intersecting at one point, $n > 2$. Solve the recurrence relation. [10]
- (b) Prove that Mean, Median and Mode of Normal Distribution Coincides. [10]
2. (a) The joint probability density function of the two dimensional random variable (X, Y) is given by
 $f(x, y) = 2; 0 < x < 1, 0 < y < x;$
 $= 0; \text{elsewhere}$
 - i) Find the marginal distribution functions of X and Y .
 - ii) Find the conditional distribution of $x | y$ and $y | x$.
 - iii) Check for independence of X and Y .
- (b) (i) A consignment of 16 CD Player contains 5 defectives. The CD Players are selected at random, one by one, and examined. These examined are not put back. What is the probability that the 10th one examined is the last defective? [5]
- (ii) A man with n keys wants to open his door and tries the keys independently and at random. Find the mean and variance of the number of trials required to open the door if unsuccessful keys are eliminated from further selection. [5]
3. (a)(i) Let X_1, X_2 be independent random variables each having geometric distribution. Show that the conditional distribution of X_1 given $X_1 + X_2$ is uniform. [5]
- (ii) A department in the works has 10 machines which may need adjustment from time to time during the day. Three of these machines are old, each having the probability of $\frac{1}{11}$ of needing adjustment during the day and 7 are the new, having corresponding probabilities of $\frac{1}{21}$. Assuming that no machine requires adjustment more than twice on the same day, determine the probabilities that on a particular day if just two machines need adjustment, they are of the same type. [5]
- (b) (i) The joint probability distribution of two random variables X and Y is given by :
 $P(X = 0, Y = 1) = 1/3, P(X = 1, Y = -1) = 1/3$ and $P(X = 1, Y = 1) = 1/3$
 Find the Marginal Distributions of X and Y and the conditional distribution Of X given $Y = 1$. [5]
- ii) In the following figure assume that the probability of a relay being closed is P and that a relay is open or closed independent of any other. Find the probability that current flows from L to R . [5]



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- 4 (a) i) The marks obtained by a number of students for a certain subject are assumed to be approximately normally distributed with mean value 65 and with a standard deviation of 5. If 3 students are taken at random from this set, what is the probability that exactly 2 of them will have marks over 70? [5]
- ii) Prove that Poisson distribution is a limiting case of the binomial distribution. [5]
- (b) i) If X has an exponential distribution, then for every constant $a \geq 0$, one has $P(Y \leq x | X \geq a) = P(X \leq x)$ for all x , where $Y = X - a$. [5]
- ii) If four squares are chosen at random on a chessboard, find the chance that they should be in a diagonal line. [5]
- 5 (a) i) Solve the following recurrence relation $a_n = 5a_{n-1} - 6a_{n-2}$, using the generating functions, $n \geq 2$, with the initial conditions $a_0 = 6$ and $a_1 = 30$. [5]
- ii) Let $\{a_n\}$ and $\{b_n\}$ be sequences of real numbers. Show that $\Delta(a_n b_n) = a_{n+1}(\Delta b_n) + b_n(\Delta a_n)$ [5]
- (b) i) Find the particular solution of $a_n - 6a_{n-1} + 9a_{n-2} = (n+1) \times 3^n$ [5]
- ii) What is the solution of the recurrence relation $a_n = 2a_{n-1} - a_{n-2}$, with initial condition $a_1 = 1.5, a_2 = 3$. [5]
6. (a) i) In how many ways may n girls and n boys be seated in a row of $2n$ chairs, if the two sexes must alternate? [5]
- ii) Find the number of positive integers between 1 and 600 inclusive, which are not divisible by 2, 3, 5 or 7? [5]
- (b) i) How many onto functions are there from a set with six elements to a set with three elements? [5]
- ii) The shopkeeper has to dispatch 9 parcels of the same size in three boxes. The first box cannot accommodate more than 4 parcels, the second can't accommodate more than 3 parcels, while the third can't accommodate more than 2 parcels. In how many ways can the shopkeeper dispatch these parcels? [5]
7. (a) i) Give a formula for the coefficient of x^k in the expansion of $(x^2 - 1/x)^{100}$. [5]
- ii) Prove Vandermonde's identity using combinatorial arguments [5]
- (b) i) How many ways are there to distribute hands of 5 cards at a time to each of four players from the standard deck of 52 cards? [5]
- ii) A machine that inserts letters into envelopes goes haywire and inserts letters randomly into envelopes. What is the probability that in a group of 100 letters [5]
- No letter is put into the correct envelope?
 - Exactly 1 letter is put into the correct envelope?
 - Exactly 98 letters are put into the correct envelope?
 - Exactly 99 letters are put into the correct envelope?
 - All letters are put into the correct envelope?

- Note: 1) Question No. 1 is compulsory.
 2) Answer any four from remaining six.
 3) All questions carry equal marks.

Q.1 A) Differentiate the following terms: (10)

- i) Directed & Undirected Graphs
- ii) Internal and external sorting

B) Explain the following terms: (10)

- i) Binary Tree ii) Max Heap iii) Collision
- iv) AVL Node Structure

Q.2 A) Given the set of symbols and corresponding frequency table as below, explain the steps to find Huffman code: (10)

Symbol	A	B	C	D	E	F	G	H	I
Frequency	9	6	5	3	1	12	7	8	4

B) Describe in detail Relative File and its access method. (10)

Q.3 A) What do understand by ReheapUp? Write an algorithm for the same. (10)

B) Explain with suitable example, how to find out the shortest path between two nodes in a graph and also write the algorithm for the same. (10)

Q.4 A) Consider the following set of numbers: (10)

85 36 87 10 91 18 15 52 73 34

Implement a heap sort on this array and show the resulting array after every pass.

B) Using the digit - extraction method (first, third and fifth digits) & quadratic probing, store the keys shown below in an array with 19 elements. How many collisions occurred? What is the density of the list after all keys have been inserted? (10)

224562	137456	214562
140145	214576	162145
144467	199645	234534

Q.5 A) What is a general tree? Explain the conversion of a general tree to binary tree with the help of a suitable example. (10)

B) Given the set of numbers, create B-tree of order 3 and show the deletion of any three numbers from the same.

28 7 26 98 19 31 50 41 (10)

Q.6 A) What is inverted file organization? Where is it used?

B) Write the pseudocode for:

- i) Rotate AVL tree right.
- ii) Counting the total number of nodes in a binary tree. (10)

Q.7 A) Write short notes on: (10)

- i) Direct File Organization
- ii) Multilist File organization

B) Give the Breadth First Traversal and Depth First traversal of the graph in the figure given below: (10)

