

M.C.A [SEM – II]

Data Structures

(DEC- 2017)

Q.P. Code :02535

[Time: Three Hours]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:
- 1) Question No. 1 is compulsory.
 - 2) Attempt any four questions out of remaining six questions.
 - 3) All questions carry equal marks.

- Q.1 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
Frequency	45	13	12	16	9	5	2	1

- B) Define Priority Queue. Write an algorithm to [10]
- i) Insert an element in the priority queue.
 - ii) Delete an element from priority queue.

- Q.2 A) Define an expression tree. For the following infix expression, draw the expression tree and find prefix and postfix expression. [10]
 $A*B/(C-D)+E*(F-G)$

- B) For circular linked list write algorithms to [10]
- i) Insert an element in the list
 - ii) Search for an element in the list

- Q.3 A) What is sorting? Sort the following elements using Quick sort method [10]
22, 12, 32, 2, 15, 25, 10. Also give the algorithm and efficiency for the same.

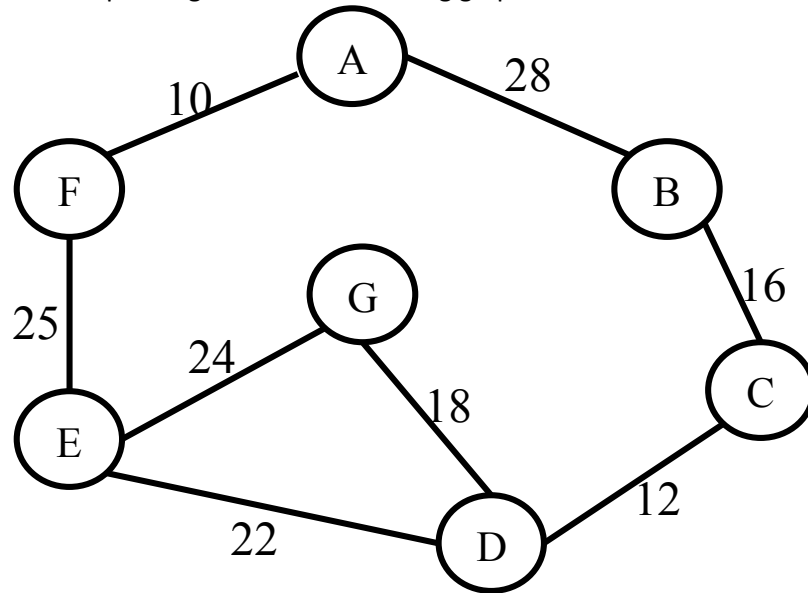
- B) What is Stack data structure? Explain it with suitable example. Write an algorithm for Push, Pop, Stackempty and Stackfull functions. [10]

- Q.4 A) Define an AVL tree. What is the advantage of using AVL trees? Create an AVL tree using the following data entered as a sequential set. [10]
F, V, E, W, D, X, C, Y, B, Z, A.

- B) Explain collision resolution and its techniques in context of hashing. [10]

[TURN OVER]

- Q.5 A) What is minimum spanning tree? Write Kruskal's algorithm to find minimum spanning tree and determine minimum spanning tree of the following graph [10]



- B) Define the efficiency of an algorithm. Explain the process of analysis of an algorithm as well as the notations used (Big O, Ω , θ) [10]

- Q.6 A) What is heap? Write an algorithm for ReheapUp. [10]
Construct a Max heap for the following data values arriving in sequence
35, 33, 42, 10, 14, 19, 27, 44, 26, 31.

- B) What is a Binary Search Tree (BST)? Write an algorithm to [10]
i) Insert a node in BST
ii) Find the smallest node in the BST

- Q.7 A) Define M-way trees. Construct a B-Tree of order 3 by inserting numbers from 1 to 10. [10]

- B) Write a short note on (any two) [10]
i) Doubly linked list
ii) Dijkstra's algorithm
iii) General trees

-----X-----

M.C.A [SEM – II]

Operating Systems

(DEC- 2017)

Q.P. Code :02871

[Time: Three Hours]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:
1. Question.No.1 is compulsory.
 2. Attempt any four from remaining six questions.

1. (a) What is Operating System? Explain in detail the various services provided by Operating System. (10)
- (b) What are external and internal fragmentations? Discuss the techniques to overcome fragmentations. (10)
2. (a) For the process listed in the following table, Draw Gantt Chart illustrating process execution and calculate Average Waiting Time (10)
 1. First Come First Served (FCFS)
 2. Shortest Job First (SJF) in both conditions preemptive and non-preemptive
 3. Round Robin (Quantum = 2)

Process	Arrival Time(ms)	Burst Time(ms)
P1	0	5
P2	1	3
P3	1	4
P4	2	2

- (b) Explain the detail structure of Process Control Block with the help of suitable diagram and also gives the details of its component. (10)
3. (a) What is the difference between contiguous and linked allocation of file systems. (10)
- (b) Draw a diagram for Five State Process Model and explain each state transition in it. (10)
4. (a) What is semaphore? Explain different types of semaphore. (10)
- (b) Consider the pages are referenced in the following sequence : (10)

2, 3, 3, 1, 5, 2, 4, 5, 3, 2, 5, 2, 3

How many page faults will occur for the following page replacement algorithms, assuming three frames?
 1. FIFO Page Replacement
 2. LRU Page Replacement
 3. Optimal Page Replacement

TURN OVER

Q.P. Code :02871

5. (a) Discuss in detail the different threats to security of system. (10)
- (b) What is process and thread? Explain the relationship between process and thread. Differentiate between user level threads and kernel level threads. (10)
6. (a) How Bankers Algorithm can be used to avoid a deadlock? (10)
- (b) Differentiate between First Come First Served (FCFS) and Shortest Seek Time First(SSTF) disk scheduling algorithm with the help of an example. (10)
7. Write Short Notes on ***any four*** :- (20)
1. Context switching
 2. Buffering
 3. Features of Linux OS
 4. Buddy system
 5. Access matrix model of protection
 6. Concurrency control
-

M.C.A [SEM – II]
Accounting and Financial Management
(DEC- 2017)

Q.P. Code : 05090

[Time: 3 Hours]

[Marks: 100

Please check whether you have got the right question paper.

- 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 indicated full marks assigned to the question

Q. 1 (A) What do you mean by Solvency and Profitability ratio. Explain any two ratios from each one. **10**

(B) From the following Trial Balance of Ms. Wrox. Prepare Trading Account, Profit and Loss Account and Balance Sheet for the year 31/03/2017. **10**

Trial Balance as on 31st March 2017

Particulars.	Debit Amt. (₹)	Credit Amt. (₹)
Sales		1,50,000
Purchases	22,000	
Cash at Bank	80,000	
Purchase return		2,000
Rent received		2,000
Carriage inward	2,000	
Opening Stock	1,50,000	
Bills Payable		5,000
Capital		1,75,000
Bad Debts	1,000	
Loan		5,000
Sundry Debtors	80,000	
Dock charges	1,000	
Legal charges	2,000	
Audit Fees	1,500	
Commission earned		1,000
Drawings	500	
Total	3,40,000	3,40,000

Adjustments:-

- i) Closing Stock on 31st march 2017 50,000 ₹.

TURN OVER

Q. 2 (A) Mr. Tim commenced Business, following transactions for the month are to be journalized. **10**

2017		INR. (₹)
February 01	Commenced business with cash	50,000
February 01	Purchased goods from Mr. Yen	5,000
February 04	Purchased Furniture & paid	7,000
February 07	Sold goods to Mr. Zen on cash basis	4,000
February 08	Mr. Kim purchased goods	6,000
February 09	Goods destroyed by fire	500
February 14	Deposited cash in bank	2,000
February 16	Paid wages	200
February 19	Purchased Mobile for office use	4,000
February 27	Similar Mobile purchased for personal use	4,500

(B) Explain Master, Fixed and Flexible Budget in detail. **10**

Q. 3 (A) From the following prepare Triple Columnar Cash book with Discount, Cash & Bank as columns. **10**

2017	
January	
01.	Cash balance 50,000 and bank balance 90,000
03.	Purchased goods from Mr. Zoe and gave cheque of 10,000
05.	Goods sold to Mr. Yim for 20,000 and received crossed cheque
07.	Paid for wages 500 by cheque
09.	Cash withdrawn from Bank 2,000
11.	Goods worth 20,000 purchased from Mr. Yoe
15.	Purchased split Air Conditioner for cash 20,000
19.	Goods Sold for cash 14,000
26.	Sold goods worth 20,000 for cash @ 10% Cash discount
29.	Deposited cash in Bank 5,000

(B) Explain elements of Cost in detail. **10**

Q. 4 (A) Explain the need for Working Capital. Explain basic Cycle of Working Capital **10**

(B) Explain advantages and disadvantages of a Fund Flow Statement. **10**

Q. 5 (A) Find ratios based on information. 10

Information given is as follows:

Gross profit = 18,000;	Net sales = 50,000	Opening stock 30,000;
purchases = 10,000;	carriage inward = 1,000;	wages = 1,000;
closing stock = 10,000;	Administrative Expenses = 2,000;	Net profit = 16,000;
	Selling & Distribution Expenses = 1,000;	

Find Ratios of :- i) Gross Profit ii) Operating iii) Net Profit iv) Operating Net Profit
v) Stock Turnover

(B) Explain in details Job and process costing. 10

Q. 6 (A) From the following data prepare a cash budget for three months from June to August 10

Month	Sales (₹)	Purchases (₹)	Expenses (₹)	Overhead (₹)
April	5,000	2,000	200	100
May	12,000	3,000	100	100
June	9,000	2,000	400	300
July	7,000	2,000	300	100
August	6,000	1,000	200	200

Additional Information

- i. Cash as on 1st June (estimated) ₹. 50,000/-
- ii. Period of credit allowed by suppliers is one month.
- iii. Sales are in cash
- iv. Each month 200/- to be paid for wages
- v. Delay by two months for Expenses as well as Overhead

(B) Explain importance of Journal and Ledger in Accounting 10

Q. 7 (A) What is an account and explain different types of accounts with examples? 10

(B) Differentiate between Trade discount and cash discount with the help of example. 10

M.C.A [SEM – II] Computer Graphics

(DEC- 2017)

Q.P. Code :04108

[Time: 3 Hours]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:**
1. **Q.1 is compulsory**
 2. **Answer any four questions from Q2 to Q7**
 3. **Figures to the right indicate full marks.**
 4. **Assume any additional information, but justify the same.**

- Q.1** a. Discuss types of Projections in Computer graphics with suitable examples. **10**
b. Write Bresenham's algorithm for line drawing with an example. **10**
- Q.2** a. What is a fractal? What are its Different Types? How is a fractal dimension measured? **10**
b. Describe the transformation ML which reflects an object about a line $y = mx + b$ **10**
- Q.3** a. Write an algorithm for Liang Barsky line clipping and Find the clipping coordinates for the line $(-1, 7)$ and $(11, 1)$ where $(x_{wmin}, y_{wmin}) = (1, 2)$ and $(x_{wmax}, y_{wmax}) = (9, 8)$. **10**
b. Explain the Z buffer algorithm for hidden surface removal? **10**
- Q.4** a. Explain the algorithm for drawing a circle using midpoint approach. **10**
b. Describe Phong shading technique with the help of a diagram. **10**
- Q.5** a. Describe any three 2 dimensional transformation methods. **10**
b. Explain different methods of character generation. **10**
- Q.6** a. Describe Window to viewport transformation with diagram. **10**
b. Construct a Bezier of order 3 and with 4 polygon vertices A (1, 1), B(2, 3), C(4, 3) and D(3, 1). Generate atleast 3 points on the curve. **10**
- Q.7** a. Write short notes on **any 4**: **20**
a. Color models
b. Frame buffer
c. Computer Animation
d. DVST
e. Output primitives
-

M.C.A [SEM – II]
Probability and Statistics
(DEC- 2017)

Q.P. Code :09922

[Time: 3 Hours]

[Marks:100]

Please check whether you have got the right question paper.

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

1. a) i) What is the probability that 4 S's come consecutively in the arrangement of the letters in the word 'MISSISSIPPI'. [05]
ii) Using usual notations find the harmonic mean of Beta Distribution of second kind. [05]
- b) i) Find the Karl Pearson's coefficient of correlation for the data [05]

X	2	3	4	5	6
y	3	4	4	6	8

- ii) Suppose a random variable ,X, takes on the values -3,-1,2 and 5 with probabilities $\frac{2k-3}{10}, \frac{k-2}{10}, \frac{k-1}{10}, \frac{k+1}{10}$ [05]
Determine the distribution (CDF) and the expected value of x.
2. a) The joint probability density function of two dimensional random variable (X, Y) is given by [10]
 $f(x,y)=1 - e^{-x} - e^{-y} + e^{-(x+y)}, x \geq 0, y \geq 0$
 $f(x, y) = 0$; elsewhere
i) Find marginal density functions of X and Y.
ii) Find $P(X+Y \leq 1)$
- b) The mean and S.D. of a group of 100 items were 40 and 10 respectively. It was later found that two value were wrongly recorded as 30 and 72 instead of 3 and 27. Find the corrected mean and S.D. [05]
- c) If X is the Poisson variate such that [05]
 $P(X = 2) = 9P(X = 4) + 90P(X = 6)$
Find the value λ and X.

3. a) i) State and Prove Bayes Theorem. [05]
ii) In a sample of 1000 cases the mean of certain test is 14 and S.D. is 2.5. Assuming the distribution to be normal find [05]
1) How many students score between 12 and 15?
2) How many scored above 15?
{Given
 $P(0 \leq z \leq 4) = 0.1554$
 $P(0 \leq z \leq 0.8) = 0.2881$
 $P(0 \leq z \leq 1.6) = 0.4452$ }

3. b) i) The diameter of an electric cable say X, is assumed to be a continuous random variable with p.d.f **[05]**

$$f(x) = 6x(1-x), 0 < x < 1$$

Determine a number 'b' such that $P(X < b) = P(X > b)$

- ii) The following data gives the number of radio sets sold by showroom during 10 days: **[05]**
12,17,20,16,13,11,18,12,18,13 find the coefficient of variation.

4. a) i) Find the Spearman's rank correlation coefficient for the following data. **[05]**

Marks in DS	63	70	45	59	75	59	35	70	59	50
Marks in CG	57	63	40	53	55	76	43	63	65	45

- ii) The following table gives the number of runs scored by a player during 10 test matches. Find whether the numbers of runs are uniformly distributed over the matches. **[05]**

Test match	1	2	3	4	5	6	7	8	9	10
Runs scored	8	8	10	9	12	8	10	14	10	11

(Given for 9 degrees of freedom at 5% level of significance, the table value of χ^2 is 16.9)

- b) i) For (M/M/1): (FCFS/ ∞ / ∞) queuing model, the mean arrival rate (λ) and mean service rate (μ) are constant. Assuming expression for steady state probability of exactly 'n' customers in the style as **[05]**

$P_n = \left(\frac{\lambda}{\mu}\right)^n \left(1 - \frac{\lambda}{\mu}\right)$ obtain the expression for expected number of customers in the system.

- 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 average number of customers in the system the average time a customer spends in the system. **[05]**

5. a) i) An attempt was made to check whether there is any effect on marks after listening to music. Students were given similar test papers before and after listening to music. Following numbers indicate the changes in marks of 12 students after listening to music. 5,2,8,-1,3,0,6,-2,1,5,0,4 **[05]**

Can it be concluded that listening to music will be in general accompanied by an increase in marks.

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

- ii) Show that Geometric distribution is memoryless. **[05]**

5. b) i) Calculate Bowley's Coefficient of skewness from following data. [05]

Values	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	6	8	17	21	15	11	2

- ii) A random variable X has following probability distribution function [05]

$$F(x) = \begin{cases} ke^{-2x}, & x \geq 0 \\ 0, & \text{otherwise} \end{cases}$$

Find k and median of the distribution.

6. a) i) A consignment of 15 record players contains 4 defective. The record players are selected at random, one by one, and examined. Those examined are not put back. What is the probability that the 9th one examined is the last defective? [05]

- ii) A problem in Statistics is given to three students A, B and C whose chances of solving it are $1/2$, $3/4$ and $1/4$ respectively. What is the probability that the problem will be solved if all of them try independently? [05]

- b) i) Consider discrete random variables X and Y with the joint pmfs as below. Are X and Y are un-correlated? Justify. [05]

Y→	-1	0	1
X↓			
-2	1/16	1/16	1/16
-1	1/8	1/16	1/8
1	1/8	1/16	1/8

- ii) X and Y are independent variables with mean 10 and 20, and variances 2 and 3 respectively. Find the variance of $3X+4Y$. [05]

7. a) i) Find the mean deviation about the arithmetic mean of the following data. [05]

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	5	7	11	22	11	7	5

- ii) Ram plays 12 games of chess with computer and he wins 6 games while compute wins 4 games and 2 games end in tie. Ram again decides to play 3 more games. Find the probability that two games end in tie. Also find the probability that computer wins at least one game. [05]

- b) i) A coin is tossed till tail appears. What is the expectation of number of tosses required? [05]

- ii) Calculate Modal marks for the following. [05]

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Total no of students	5	10	14	19	17	15	5

M.C.A [SEM – II]
Communication and Soft Skills
(DEC- 2017)

QP CODE: 28631

[Total Marks:100]

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

2) Attempt any **four** from 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 Questions.

1. (a) Explain process of communication and its evolutionary concept (10)
(b) Discuss methods to improve communication (10)
2. (a) Explain various barriers to communication and ways to overcome it. (10)
(b) State principles of correspondence (10)
3. (a) State various types of letters and format of letters. (10)
(b) Write a detailed “Resume” in response to an advertisement for a seeking a position of a Chef in a five star hotel (10)
4. (a) What are the primary factors that influence one’s personality (10)
(b) What do you mean by emotional intelligence? Explain with examples (10)
5. (a) Write a business report on survey of “Ban of Plastics” in your area (10)
(b) Draft a notice and agenda for employees to attend flag hoisting on 26th January (10)
6. (a) Explain the types and importance of non-verbal communication (10)
(b) Explain Grapevine and its effectiveness in communication (10)
7. Write Short Notes on **any four** :- (20)
 - (a) Difference between Bio-data and Resume
 - (b) Team-building
 - (c) Upward VS Downward communication
 - (d) Do’s and Don’ts in Group Discussion
 - (e) Negotiation