Q.P. Code :02536

[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	I
Frequency	15	12	10	8	5	7	6	5	5

    b) Write Short notes on **10**
   i. Analysis of Algorithm
   ii. Collision resolution schemes in Hashing

Q.2) **a)** What is a stack? List the application of stack and explain any two in detail? **10**
    b) What is a Circular Queue? Give algorithm to insert and display element in a circular queue? **10**

Q.3) **a)** What is Shell sort? Sort the given data using shell sort **10**
   23 3 7 13 89 7 66 26 44 18 90 98 57
    b) Compare Binary Search Tree and AVL Tree? Explain any two rotations in AVL Tree? **10**
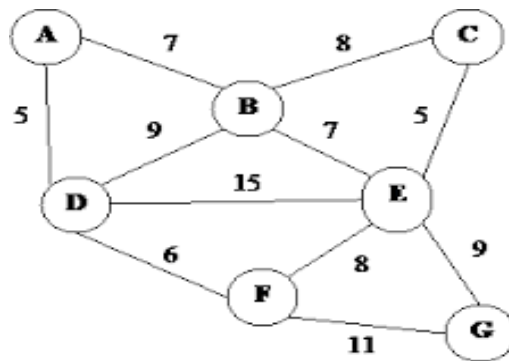
Q.4) **a)** Write algorithms for a Doubly linked list to **10**
   i. Display an element
   ii. Insert an element in the middle of the List
    b) In order and post order traversal of a binary tree are as follows **10**
   Inorder: FCEABHDG
   Postorder: FECHGDBA
   Show a step wise reconstruction of the binary tree.

Q.5) a) Define a B-Tree. Build a B-Tree of order 5 by inserting the following data: **10**
   78, 24, 54, 37, 88, 90, 45, 27, 42, 8, 15, 31, 50
    b) Explain Graph and its Terminology? Discuss adjacency matrix and adjacency List for Graph Storage? **10**

[TURN OVER]

Q.6) **a)** What is a max heap? Write algorithm to Reheap Up and Reheap Down?   **10**
      b) Explain with example steps to convert a General Tree to Binary Tree?   **10**

Q.7) **a)** Compare Linear Search and Binary Search? Search an element 55 in the list using Binary Search   **10**
         15 25 35 45 55 65 75 85 95 105
      b) Determine the minimum spanning tree of the following graph using Prim's   algorithm.   **10**

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(3 Hours)

N.B. :   1) Question No.1 is **compulsory.**
2) Attempt any **four** from the remaining questions.
3) Use of calculator is allowed.

1. (a) Consider the following process arrival times, and run time requirements: (12)

Process Name	Burst Time (ms)	Arrival Time
P1	8	0
P2	6	1
P3	1	2
P4	9	2

For the process listed in the above table, draw a Gantt chart and Find their
Average waiting time and Average turnaround time using:-
(i).   FCFS
(ii). SJF (Preemptive and Non-Preemptive).
(iii). Round Robin (quantum=2)

(b) What is deadlock? List the necessary and sufficient conditions for deadlock (08)
occurrence.

2. (a) Consider the following snapshot of the system:- (10)

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

Using Bankers Algorithm.
(i).   What is the content of matrix need?
(ii). Is the system in safe state? Give the sequence.
(iii). Is the request from P1 arrives for (0, 1, 0), can be the request be granted
immediately?

(b) What is external and internal Fragmentation? Discuss the techniques to overcome (10)
fragmentations.

2. (a) Given the disk has 200 (0 – 199) cylinders. Suppose the disk queue contains the (10)
request for I/O to blocks on the cylinder in the following order:-
20, 80, 130, 45, 185
The head of the disk drive is currently at cylinder 100.What is the Total head
movement for the following algorithm?
(i)SSTF (ii)SCAN (iii)C-SCAN (iv)LOOK

(b) What is Process Control Block (PCB)? Explain the structure of PCB. (10)

3. (a) Consider the pages are referenced in the following sequence. (10)
0, 2, 1, 6, 4, 2, 1, 0, 3, 1, 2, 3
How many page faults will occur for the following page replacement algorithm, assuming three frames?
(i). FIFO replacement
(ii). LRU replacement
(iii). Optimal replacement
   (b) What are the different threats to the security of the system? (10)

4. (a) What is critical section? What are requirements to be met by any solution to the critical section Problem? (10)
   (b) Differentiate between Simple Paging and Simple Segmentation. (10)

5. (a) Explain the concept of Spooling and explain how it is different from buffering. (10)
   (b) What is Semaphore? What are the different types of semaphore? Differentiate between semaphore and monitor. (10)

6. (a) What is shell? List the types of shell in LINUX. Explain any three filters commands in brief. (10)
   (b) List the file allocation methods. Explain any three methods in brief. (10)

7.   Attempt **any four** (20)
      1. Loader
      2. Kernel level thread
      3. Buddy system
      4. One time password
      5. Race condition
      6. Compiler

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Please check whether you have got the right question paper.

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

1. A   What is Ratio Analysis? Classify the different ratios. Explain Current ratio and liquid ratio.   **10**

   B   Following is the trial balance and adjustments of M/s Ranawat and Co. for the year   **10**
   ended 31st March, 2017. Prepare trading A/c and profit and loss A/c and Balance sheet as
   on 31st March, 2017.

Trial Balance

Particulars	Debit Balance (₹)	Particulars	Credit Balance (₹)
Opening Stock	50,000	Capital	2,20,000
Debtors	50,000	Return Outward	2,000
Purchases	1,20,000	Creditors	35,500
Wages	34,000	Sales	2,00,000
Return Inward	6,000	Discount Received	7,000
Carriage Inward	4,700	Bills Payble	4,000
Audit Charges	20,000		
Rent	30,800		
Printing and stationary	15,000		
Drawing	10,000		
Cash at Bank	16,700		
Machinery	1,00,000		
Cash n Hand	11,300		
Total	**4,68,500**		**4,68,500**

Adjustments:
1. Closing Stock was valued at ₹ 35,000.
2. Depreciate Machinery at 15%
3. Outstanding Audit Charges ₹ 2,000/-

2. A   What is cash book? Why we use triple column cash book? What is Contra Entry?   **10**

   B   Journalize the following transactions in the books of M/s Ranjeet and co.   **10**

   1 Apr   Started business with cash ₹ 1,00,000/- Machinery costing ₹ 50,000/-
   4   Bought from Shivraj goods worth 50,000 off 10% T.D.
   7   Sold the goods of ₹ 30,000 to Manpreet at 10% profit.
   10   Withdrew from Bank ₹ 7,000 for self use.
   16   Uninsured Goods worth ₹ 15,000 were lost by fire.

Turn Over

19	Received the amount due from Manpreet in cash after deducting ₹ 3,000 as cash discount.	
22	Paid ₹ 5,000 for travelling	
23	Received Rent ₹ 1,500	
28	Deposited ₹ 6000/- in Bank	
30	Paid salary ₹ 15,000	

3.   **A**   Explain the following terms: **10**

           1. Credit Transaction   2. Bad Debt   3. Solvent   4. Drawings   5. Goods

      B   What do you mean by an Account? Classify the Accounts. What are the golden rules of   **10**
            Accounting?

4.   **A**   What is Double Entry System of Book Keeping? Explain its advantages.   **10**

      B   Prepare a Three column cash book with cash, bank and discount column from the   **10**
            following transactions of Mr. Kundan

1	Cash in hand ₹75,000 and cash at Bank ₹3,500.	
2	Deposited into Bank ₹3,000.	
4	Bought Machinery for Cash ₹12,500.	
7	Purchased goods for cash ₹5,000.	
12	Paid legal charges ₹5,000	
14	Sold goods of ₹10,000. Amount received by Crossed Cheque immediately.	
20	Withdraw from Bank ₹2,000 for personal use.	
23	Received Crossed Cheque from Mohit ₹5,000	
27	Sudhakar deposited ₹3,000 directly on account.	
30	Paid Rent by cheque ₹8,000.	

5.   **A**   What is Working Capital, Gross working Capital and Net Working Capital? What is the   **10**
            importance of Working Capital Management?

      B   1. From the Following Information calculate 1) Stock Turnover Ratio 2) Selling and
                 Distribution Expense Ratio

Particulars	Ratio	Particulars	Ratio
Opening Stock	28,000	Carriage Inward	4,000
Closing Stock	22,000	Selling and Distribution Expenses	6,000
Purchases	46,000	Capital Employed	2,00,000
Sales	90,000	Sales Return	10,000

         2. From the Following calculate 1) Gross Profit Ratio 2) Debtors Turnover Ratio
            3) Average Collection period

Particulars	Ratio	Particulars	Ratio
Opening Stock	27,000	Cost of Goods Sold	1,20,000
Closing Stock	33,000	Bills Receivable	6,000
Debtors	14,000	Sales	1,50,000

6. A   What is Cash Budget? Explain the format and importance of cash budget   **10**

   B   Explain the following Terms   **10**

   a. Fixed Cost   b. Variable Cost

   c. Semi-variable Cost   d. Direct and Indirect Cost

7. A   What do you mean by Cash Flow and Fund Flow Statement? Explain the importance of   **10**
        Cash Flow and Fund and Flow statement.

   B   Prepare the cash budget for April, May and June for the company named Yamuna   **10**
        Industries Ltd. Company has 40,000 as in hand cash on April 1st Further information is
        given below.

Months	Sales (₹)	Purchase (₹)	Wages (₹)	Production overhead (₹)
February	1,00,000	50,000	9,000	7,000
March	1,20,000	70,000	6,000	6,000
April	1,60,000	75,000	7,000	8,000
May	1,40,000	1,00,000	8,500	9,500
June	1,00,000	90,000	10,500	8,000

Information:

1. Credit Period allowed by supplier -1 month
2. Credit period allowed to customer -2 month. 25% sale is on cash basis.
3. Delay in payment of wages is ½ month
4. Overheads have 1 month delay in payment.

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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. Compare Vector scan displays and Raster scan displays.   **10**
     b. Derive Bresenham's Circle drawing algorithm.   **10**

Q.2 a. What are the steps in animation? Explain.   **10**
     b. Explain the construction and working of Cathode Ray Tubes.   **10**

Q.3 a. Explain window to Viewport Transformation. Find the normalization transformation window to viewport, with **10** window, lower left corner at (1, 1) and upper right corner at (3,5) onto a viewport with lower left corner at (0,0) and upper right corner at (1/2, 1/2).
     b. Compare and Contrast B-Spline and Beizer curves.   **10**

Q.4 a. Explain the different types of projections.   **10**
     b. Give comparison of Boundary fill and Flood fill algorithm. Write a procedure to fill a region bounded by **10** different colors using 8 connected approach.

Q.5 a. Give details of the Scan-line polygon fill algorithm.   **10**
     b. Use Cohen Sutherland algorithm to clip two lines P1(40, 15) – P2(75, 45) and P3(70, 20) – P4(100,10) against a **10** window A(50, 10), B(80, 10), C(80,40) and D(50, 40).

Q.6 a. Explain the concept of fixed point scaling of a triangle with a diagram.   **10**
     b. Explain the output primitives.   **10**

Q.7 Write short notes on **any 4**   **20**
       a. Inverse Transformations
       b. Frame Buffer
       c. Antialiasing
       d. Homogeneous Coordinates
       e. 2D Rotation

(3 Hours)   **Total Marks: 100**

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 in parenthesis indicate full marks
      5) Use of scientific calculator is allowed

1.   (a)   Find Bowley's coefficient of skewness for the following data: (10)

Age	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of people	15	15	23	22	25	10	5	10

1.   (b)   A calculator operates on two 1.5 volt batteries for a total of 3 volts. The actual   (10) voltage of a battery is normally distributed with mean 1.5 and variance 0.045. The tolerance in the design of the calculator is such that it will not operate satisfactorily if the total voltage fails outside the range 2.7 to 3.3 volts. What is the probability that the calculator will function correctly? $P(0 < z < 1) = 0.3413$

2.   (a)   Find Spearman's rank correlation coefficient for the following data: (10)

Marks in SP	52	34	47	65	43	34	54	65
Marks in DM	65	59	65	68	82	60	57	58

2.   (b)   In a shooting test, the probability of hitting the target is 1/2 for A, 2/3 for B and   (10) 3/4 for C. If all of them fire at the target, find the probability that

- None of them hits the target
- At least one of them hits the target

3.   (a)   Prove that geometric distribution is memoryless   (10)

     (b)   Find the median and mode for the following data   (10)

Age	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No. of workers	5	10	15	25	65	40	23	10

4.   (a)   Find the mean and variance of Beta distribution of first kind   (10)

4.   (b)   Mean of two samples of size 50 and 100 are 54.1 and 50.3 and standard   (10) deviation is 8 and 7, respectively. Find the mean and standard deviation of the sample obtained by combining the two samples.

5. (a) The mean lifetime of a sample of 25 bulbs is found as 1550 hours with a standard deviation of 120 hours. The company manufacturing the bulbs claims that the average life of their bulbs is 1600 hours. Is the claim acceptable? (t_{tab} at 5% LOS is 1.71) (10)

5. (b) Find the probability that all the vowels in the word "ACCREDITATION" come together (10)

6. (a) A taxi cab company has 12 Ambassadors and 8 Fiats. If 5 of these taxi cabs are in the workshop for repairs and an Ambassador is as likely to be in for repairs as a fiat, what is the probability that (10)

- 3 are Ambassadors and 2 are Fiats
- At least 3 of them are Ambassadors
- All 5 are of the same make

6. (b) The following data gives number of television sets sold by a showroom across different days in a month (10)

12 17 20 16 13 11 18 12 18 13

Find coefficient of range and coefficient of variation

7. (a) The number of hardware failures in a week of operations has the following probability distribution: (10)

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 number of failures.

7. (b) The following data gives the number of aircraft accidents that occurred during the various days of the week (10)

Day	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	15	19	13	12	16	15

Chi Square tabulated at 5% LOS is 11.07

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(3 Hours)

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

1. (a) "Grapevine Communication plays important role in an organization". Justify the given statement. (10)
   (b) Write a covering letter and a resume for the post of Senior QA Software Tester in "PQR Associates". (10)

2. (a) Draw and explain Communication process. (10)
   (b) Explain "Effective communication is incomplete without body language and paralanguage". (10)

3. (a) Explain the term Emotional Intelligence and its role in industry. (10)
   (b) What is leadership? Explain different types of leadership. (10)

4. (a) List and Explain Do's and Don'ts of Group Discussion. (10)
   (b) Explain importance of Horizontal Communication in an organization. (10)

5. (a) Explain formal and informal report writing. Explain various components of a formal report. (10)
   (b) Explain physical barriers in communication. (10)

6. (a) What is motivation? Explain importance of motivation in an organization. (10)
   (b) Explain the role of team in an organization. (10)

7. Write Short Notes on *any four* :- (20)
   a. Etiquette for email drafting
   b. Decision Making
   c. Assertiveness
   d. Time Management
   e. Ethical aspects of Communication

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