

[Time: 3 Hours]

[Marks:80]

- N.B:
- Please check whether you have got the right question paper.
 - Questions 1 are compulsory.
 - Answer any 3 from the remaining 5 questions.
 - Provide illustrations wherever required.

- Q.1
- A. What is a data structure? Explain and differentiate between the different types of data structures 10
- B. Explain the concept of sorting. Consider the following set of 10 elements 10
43 12 56 69 21 105 63 72 36 23
Show the steps to sort the elements using insertion sort showing the passes and write the algorithm.
- Q.2
- A. What is a heap? Write algorithms for 10
1. Building a heap
 2. Deleting a heap
- B. Define a B-tree. Given the following set of numbers create a B-tree of order 3 10
43 10 35 111 44 54 42 76 89 23
Show the deletion of three numbers from the B-tree
- Q.3
- A. Define a minimum spanning tree. Explain the Krushkal's algorithm to generate a minimum spanning tree with a suitable example 10
- B. Explain the doubly linked list. For a doubly linked list write algorithms to 10
1. Find the number of elements in the list
 2. Delete an element in the list
- Q.4
- A. What is analysis of an algorithm? Explain the various notations used while analyzing an algorithm (Big - O, Ω , θ) 10
- B. What is an expression tree? Construct the expression tree and explain the tree traversals of an expression tree using the following expression. 10
 $a / b * (c + d) * e - (a * c)$
- Q.5
- A. Write an algorithm for binary search. For the following array of 10 elements search 167 using binary search. Also trace the steps. 10
25 62 71 86 92 106 110 134 167 178
- B. Explain the Queue as a data structure. Write algorithms for adding to and deleting an element from the Queue.
- Q.6
- A. What is a Binary search tree? Write algorithms for
- a) Finding the minimum element from the Binary search -tree
 - b) Inserting an element in the Binary search -tree
- B. Build an AVL tree with the following values:
15, 20, 24, 10, 13, 7, 30, 36, 25
Remove 24 and 20 from the AVL tree.



(Time: 3 Hours)

Total Marks: 80

Please check whether you have got the right question paper.

- N.B. : 1) Question No.1 is **compulsory**.
2) Attempt any **three** from the remaining **five** questions.
3) Figures to the right indicate full marks.

1. (a) Explain IEEE 802.3 standard in detail. [10]
(b) Explain types of networking devices in detail. [10]
2. (a) Differentiate between the following (any two): [10]
(i) RIP and BGP
(ii) Switch and Router
(iii) POP and IMAP
(b) Describe various queue management algorithms used by TCP. [10]
3. (a) Calculate CRC for the following bitstream 11101011011 using the divisor 1011. [10]
(b) Define congestion. Discuss how congestion is handled by the TCP protocol. [10]
4. (a) What is classful and classless addressing? Explain classful addressing in detail. [10]
(b) Explain Electronic mail? How SMTP is used in E-mail? [10]
5. (a) Explain OSI Layer in detail. [10]
(b) What is the requirement of MPLS? Describe the features of MPLS. [10]
6. (a) Write short note on following (any two): [10]
(i) SNMP
(ii) IP over ATM
(iii) DNS
(iv) HTTP
(b) Explain guided media in detail. [10]



Q.P. Code :09902

[Time: 3 Hours]

[Marks:80]

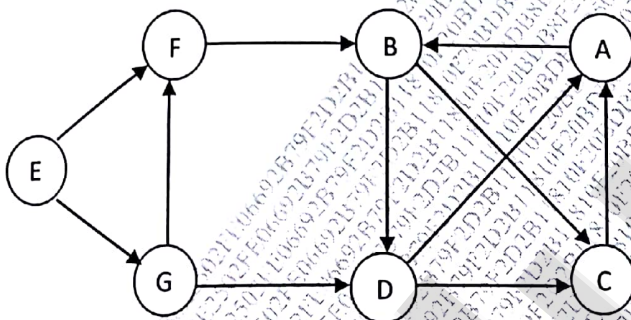
N.B:

Please check whether you have got the right question paper.

1. Q.1 is compulsory attempt any 3 questions out of remaining six questions.
2. Assume any necessary data to justify the same
3. Figures to the right indicate full marks
4. Use of scientific calculator is allowed.

- Q.1 A Determine whether the given relation is reflexive, irreflexive, and symmetric asymmetric antisymmetric and transitive. Also determines whether the relation is equivalence or not. $R = \{(4,5), (5,4), (6,7)\}$ on $A = \{4,5,6,7\}$ 10
- B Obtain principal disjunctive form $(\sim P \vee \sim Q) \rightarrow (P \leftrightarrow Q)$ 5
- C Write the difference between MCDM and MADM. 5

- Q.2 A Using mathematical induction prove that $1^2 + 2^2 + \dots + n^2 = [n(n+1)(2n+1)]/6$ 10
- Q.2 B Find adjacency lists and adjacency matrix for the following graph 5



- Q.2 C A manager has to make a choice from 3 available courses of action A1, A2, A3. There are 2 possible states of nature s_1 and s_2 with probabilities of occurrence as 0.7 & 0.3. for s_1 the payoff for 3 actions is Rs.25000, Rs.35000 and Rs.20000 while for state s_2 the payoffs are Rs.45000, Rs.50000 and Rs.35000. represent the problem with the help of a decision tree and suggest the most preferred decision and corresponding expected value. 5
- Q.3 A Draw a hasse diagram of poset(A,R) where $A = \{1,2,3,6,8,12\}$ and the relation R define as $a R b$ iff 'a divides b'. 10
- B Use SAW method and suggests the best alternatives? Where C1 and C3 are beneficiary criteria and C2 and C4 non beneficiary criteria? 10

Weight	0.2	0.3	0.4	0.1
	C1	C2	C3	C4
A1	20	30	20	12
A2	10	30	25	30
A3	30	5	15	10
A4	20	10	20	10

Q.P. Code :09902

Q.4 A Prove the following argument without using truth table. If I try hard and I have talent then I will become a musician. If I becomes of musician then I will be happy .therefore I will not happy then either I didn't try hard or I do not have talent.

B Perform fast multiplication of integer using divide and conquer approach

- 1) 1214x550
- 2) 1025x7328

C What are the characteristics of a complex business problem, explain any two

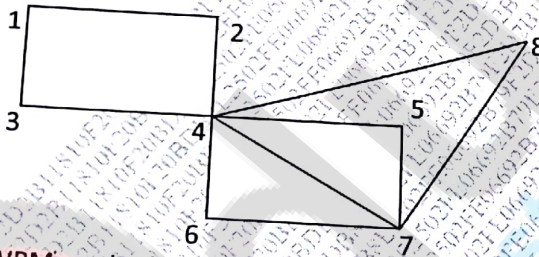
Q.5 A Determine whether sequence $\{a_n\}$ is solution of recurrence relation $a_n = 2a_{n-1} - a_{n-2}$ for $n = 2, 3, 4, \dots$ where $a_n = 2^n$ for every non negative n

B Let $A = \{a, b\}$ and the relation is given by $R = \{(a, a), (b, b), (a, b)\}$, determine whether it is a POSET or not?

C An American roulette wheel has 38 equally likely outcomes. The numbers are 0, 00, 1, 2, 3, ..., 36. A winning bet placed on a single number pays 35 to 1 i.e. you will be paid 35 times your bet is returned so you get 36 times your bet after your bet is collected. So considering all 38 possible outcomes and the expected value resulting from a \$1 bet on a single number. Calculate expected value.

Q.6 A Find particular solution of $a_r + 5a_{r-1} + 6a_{r-2} = 3r^2$

B Find Euler circuit of following graph.



C Use WPM method and suggests the best alternatives. All as criteria are beneficiary criteria.

Weight	0.20	0.15	0.40	0.25
	C1	C2	C3	C4
A1	25	20	15	30
A2	10	30	20	30
A3	30	10	30	10

Q.5 A) Consider a system with a following current resource allocation State:-

Process	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P0	2	3	2	9	7	5	5	4	3
P1	4	2	2	5	4	4			
P2	5	2	4	11	2	4			
P3	4	3	3	4	4	4			
P4	2	2	4	6	5	5			

Algorithm.

- What is the content of matrix need?
 - Is the system in safe state? Give the sequence.
 - If the request from P2 arrives for (0,0,1), can the request be granted immediately?
- B) What criteria are important in choosing a file organization? List and briefly explain any three file organizations.

- Q.6 Differentiate between the following.
- User level threads and Kernel level threads.
 - Fixed partitioning and Dynamic partitioning
 - Semaphore and monitor

- Q.7 Write a short note on any three
- Android OS architecture
 - Race condition
 - Multi-tasking, Multiprogramming and Multiprocessing OS
 - Buddy system
 - Password selection strategies

Q.P. Code :10689

[Time: 3 Hours]

[Marks:80]

- Please check whether you have got the right question paper.
- N.B: 1. Question 1 is compulsory.
2. Attempt any three from Q.2 To Q.6

Q.1 A) From the following Trial Balance of Mr. Goswami, prepare Trading & Profit & Loss A/c for the year ended 31st March, 2017 & a Balance sheet as on that date.

10

	Debit (Rs)	Credit (Rs)
Capital		38,000
Drawings	2,500	
Purchases	16,000	
Sales Returns	400	
Purchase Returns		900
Furniture	6,000	
Sales Cash		12,000
Sales Credit		16,000
Buildings	12,000	
Opening Stock	6,000	
Sundry Expenses	500	
Bills Payable		900
Commission Received		250
Rent, Rates & Taxes	250	
Wages & Salaries	7,250	
Carriage Inwards	250	
Carriage Outwards	350	
Bills Receivable	800	
Travelling Expenses	600	
Bad Debts	400	
Sundry Debtors	10,800	
Insurance Premium	300	
Postage	150	
Motor car Expenses	1,200	
Cash-in-Hand	880	
Sundry Creditors		4,380
Motor Car	5,800	
	72,430	72,430

Adjustment –

Closing Stock amounted at cost price Rs 12,250 & Market value of stock of Rs 14,000.

B) Explain Financial Management? Briefly explain the role of financial manager.

10



Q.2 A) Journalise following transactions in the books of Rin Supreme.
2017

- Feb 1 Business Started with Cash Rs 50,000
Feb 2 Cash Deposited into Bank Rs 24,000
Feb 3 Goods purchased from Rima & paid by cheque Rs 7,000
Feb 4 Sold goods & cheque received from Rani Rs 12,000
Feb 5 Purchased goods from Rasna Rs 8,000
Feb 6 Purchased goods from Ms. Rita Rs 3,000
Feb 7 Paid salary to Rina, a typist Rs 4,000
Feb 8 Purchased furniture of Rs.10,000 & payment paid by cheque
Feb 9 Withdraw cash for personal use Rs.8,000
Feb 10 paid Rent Rs.3,000 by cheque.

B) What are the advantages of Double Entry system of Book-keeping?

Q.3 A) The following forecasts have been made for ABC Ltd for the period January to April 2016:

Particulars	January	February	March	April
Sales	75,000	1,05,000	1,80,000	1,05,000
Raw materials	70,000	1,00,000	80,000	85,000
Manufacturing Exps	10,000	20,000	29,000	16,000
Loan Installment	1,000	11,000	21,000	21,000

1. All sales are made on credit basis. 2/3rd of Debtors are collected in the same month. There is no expected Bad Debt. The Debtors on January 1, 2011 were Rs 30,000.
2. The minimum cash balance, the firm must have is estimated to be Rs 5,000, however, the cash balance on January 1 was Rs 6,500.
3. Borrowing, if any can be made.

Prepare a cash budget for the period of four months (from Jan to Apr)

B) Explain the meaning & uses of Cash Flow Statement.

Q.4 A) Explain the following terms-

- i. Debtor ii. Creditors iii. Goods iv. Bad Debt v. Drawing

B) Profit & Loss Statement for the year ending 31st December 2016.

Particulars	Rs	Rs
Sales: Cash	64,000	
Credit	6,84,000	
Total Sales	7,48,000	
Less: Cost of Sales	5,96,000	
Gross Profit		1,52,000
Less : Expenses:		
Ware housing Transport	48,000	
Administration	38,000	
Selling	28,000	
Debenture Interest	4,000	1,18,000
Net Profit		34,000

Q.P. Code :10689

Balance Sheet:

Liabilities	Rs	Assets	Rs
Share Capital	1,50,000	Fixed Assets (Net)	80,000
Reserves	60,000	Current Assets	
Profit & Loss Account	34,000	Stock	1,88,000
Debentures	50,000	Debtors	1,64,000
Current Liabilities	1,52,000	Cash	14,000
	4,46,000		4,46,000

From the above Information Calculate:

1. Current Ratio
2. Liquid Ratio
3. Net Profit Ratio
4. Debtors Turnover Ratio

- A. Explain Budgetary control in Detail.
- B. Explain role of Financial Accounting & Cost Accounting.

- A. Explain with diagram working capital Cycle.
- B. Explain with two examples two ratios used for measuring liquidity of a company.



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Q.P. Code: 08931

[Time: Three Hours]

[Marks:80]

- please check whether you have got the right question paper.
- N.B:
1. Q.1 is compulsory.
 2. Attempt any three from remaining five questions.
 3. Answers to sub questions should be written together.

1. A) Consider the following snapshot of the system?

10

Processes	Allocation				Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	4	2	0
P1	1	1	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	1	0	1	4	1	6	5	6				

Using Bankers algorithm answer the following

- What is the content of matrix need?
 - Is the system in safe state? Give the safe sequence.
 - If a request from a process P1 arrives for (0, 4, 2, 0). Can the request be granted immediately?
- B) What is an operating system? What are the main functions of operating system? Discuss different types of operating system.

10

2. A) For the following processes given in the table:

10

Process	Arrival Time (ms)	Burst Time (ms)
P	0	10
Q	1	6
R	3	2
S	5	4

Using FCFS, SJF, SRT, RR (Quantum=4ms) Scheduling algorithm:

- Draw a chart illustrating process execution.
 - Find the average turnaround time.
 - Find the average waiting time.
- B) What do you mean by concurrency control? Explain different types of semaphore and state the use of semaphore and monitors in concurrency control with example.
3. A) Given reference string in the following pages by a program:
8, 1, 2, 3, 1, 4, 1, 5, 3, 4, 1, 4, 3, 2, 3, 1, 2, 8, 1, 2

10

[TURN OVER]

9C038EE614896F8B498AFED51880929A



How many page faults will occur for the following page replacement algorithms, assuming three frames?

- i. LRU replacement
- ii. FIFO replacement
- iii. Optimal replacement

B) What is a domain? Discuss the access control mechanisms in the context of data files. What are capability lists? How are they used to enhance protection? 10

4. A) Suppose a disk drive has 400 cylinders, numbered 0 to 399. The driver is currently serving at cylinder 120, previous request served was at cylinder 140. Suppose the disk queue contains for I/O to blocks on the cylinder in FIFO order is: 10
86,147,312,91,177,48,309,222,175,130

Determine total head movement in tracks for :

- i. SSTF
- ii. SCAN
- iii. Look

State the best algorithm.

B) What is fragmentation? How does it occur? Discuss the technique to overcome fragmentations. 10

5. A) Attempt the following 10
i. Explain various process states with a suitable diagram.
ii. Differentiate between Monolithic kernel and Micro Kernel.

B) What is the principle of locality? Why is it crucial to use Virtual memory? What is the purpose of Translation Look aside buffer? How to calculate number of bits in logical address and physical address when logical address space of 8 pages of 1024 word each, mapped to physical memory of 32 frames? 10

6. Write a short note on : (Any Four) 20

- i. Belady's Anomaly
- ii. Process Control Block (PCB)
- iii. Clock hardware and software
- iv. Free space management
- v. Overlays
- vi. iOS

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