

Sem-II - choice based / Nov-2018

(Time: 3 hours)

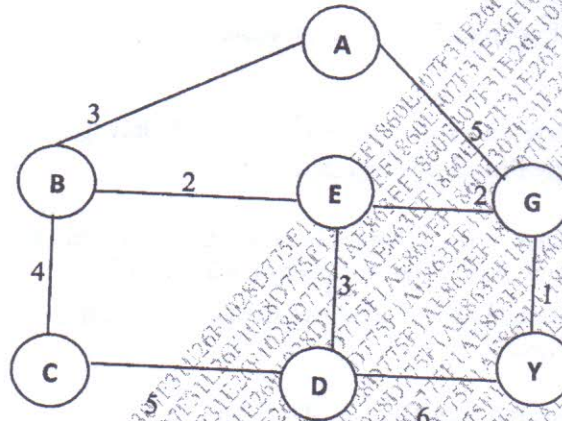
Total marks: 80

Note:

1. Q1 is compulsory
2. Attempt any Three from remaining Five questions

- Q.1(a) Differentiate between a singly linked list and a doubly linked list. Write an algorithm to append two singly linked lists together. 10
- (b) Define Graph. What is the difference between graph and tree. Explain graph storage structure Adjacency matrix and Adjacency list in detail. 10
- Q.2(a) Define Heap. State and explain its types. Create a max heap for the following data values, 28, 37, 15, 9, 10, 45, 34, 55. 10
- (b) What is binary search tree. Give an algorithms to 10
1. Find largest node in the BST
 2. Delete a node from BST
- Q.3(a) Why there is a need for balancing a binary search tree? State & explain the rotations of AVL tree with suitable example? 10
- (b) Write an algorithm for binary search of an element. 10
- Consider the list of size 7 with target 80,
23, 36, 78, 80, 98, 112, 780
- Apply binary search for searching the given the target in above list. Show the tracing.
- Q.4(a) Define Binary Tree. State types of Binary tree. Write an algorithm for the following 10
1. Preorder Traversal
 2. Postorder Traversal
 3. Inorder Traversal
- (b) Define hashing. State and explain different hashing technique with suitable example. Explain any one collision resolution technique. 10
- Q.5(a) Differentiate B-tree and B* tree. Build a B-tree of order 4 by inserting the data in the sequence 18 33 44 60 35 26 31 98 45 6 10 76 21 79 9 10
- (b) Write an algorithm for insertion sort. Consider the list of size 7: 47, 105, 26, 40, 76, 85, 19 10
- Apply insertion sort to sort above list. Show the tracing.

- Q.6(a) Explain the concept of complexity of an algorithm. Explain the Big-O notation. Explain the techniques of backtracking and divide and conquer.
- (b) Travers the following graph in BFT. Find out Minimum spanning tree using Prim's algorithm.



Sem - II (Choice based)

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Note:

1. Q1 is compulsory
2. Attempt any three from remaining questions
3. Answers to sub questions should be answered together
4. Illustrate answers with diagram wherever necessary

- 1 a) Consider following snapshot of the system:-

10

Processes	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P0	0	1	0	7	5	3	3	3	2
P1	0	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 answer the following:-

- i) What are the contents of need matrix?
- ii) Find if the system is in safe state? If it is, find the safe sequence.
- iii) If the request from process P1 arrives for (1,0,2), can the request be granted immediately

- b) What do you mean by concurrency control? Explain the use of semaphore and monitors in concurrency control with example.

10

- 2 a) Consider the head of a moving hard disk with 200 tracks is currently serving a request at track 100. If the queue of request in FIFO order is 55, 58, 39, 18, 19, 160, 150, 38, 184. What is the total head movement under the following scheduling algorithms.

10

1) SSTF 2) SCAN 3) FCFS 4) C-SCAN

- b) What is fragmentation. Explain Internal and External Fragmentation. How can it be tackled?

10

- 3 a) What is a domain of protection? Explain Access Matrix model of Protection. Describe the various methods of implementing Access Matrix.

10

- b) For the process listed in table, draw a Gantt chart and find their average waiting time and average turnaround time using

10

- i. FCFS
- ii. Round Robin (quantum=3)
- iii. SJF (both preemptive and non-preemptive)

Process	Arrival Time	Processing Time
P1	0	5
P2	1	3
P3	1	4
P4	2	2

- 4 a) What is Segmentation? Explain the segmentation hardware with an example. 10
b) Given a reference string to the following pages by a program 10
6,0,1,2,0,4,3,0,2,6,3,2,0,1,6.
How many page faults will occur for the following page replacement algorithm
assuming four frames
a) FIFO
b) Optimal Replacement
c) LRU
- 5 a) Describe the differences among short-term, medium-term and long-term 10
schedulers.
b) What is a process? Draw the five state process model and explain each state 10
transition in it. Also Explain the process of Context Switching.
- 6 Write notes on any four 20
a) OS services and components
b) thrashing
c) Process Control block
d) Linker and loader
e) Multi threading

Sem-II - Choice based

[Time: 3 Hours]

[Total marks: 80]

N.B. (1) Question 1 is compulsory.

(2) Attempt any three from remaining five questions.

Q.1. Answer the following

Compare Distance Vector and Link state routing algorithm.

(20)

(a)

- (b) List and explain in brief any five connectivity device
- (c) Explain in brief Three way handshake for TCP connection
- (d) Compare OSI and TCP/IP

Q.2. (a) Write Short notes on

- (i) SMTP
- (ii) FTP

(10)

(b) An organization is granted a block of with starting address as 14.24.71.53/18.

(10)

Find the following

- (i) Default and custom Subnet mask in dotted decimal
- (ii) Number of subnets and number of hosts in each subnet
- (iii) Subnet address
- (iv) First usable and last usable host
- (v) Broadcast address

Q.3. (a) Explain the different types of impairment that can effect wired transmission?

(10)

(b) Explain IPv4 header

(10)

Q.4. (a) What is inter domain routing and intra domain routing? Explain BGP routing protocol in detail.

(10)

(b) Explain FDMA and CDMA using suitable example

(10)

Q.5. (a) Give differences

(10)

- (i) DHCP and BOOTP
- (ii) Unicasting and Multicasting

(b) Explain CSMA, CSMA CD and CSMA CA

(10)

Q.6. (a) Explain guided and unguided media in brief

(10)

(b) Explain Queue Management Algorithms

(10)

Sem-II - choice Based

(3 Hours)

Total Marks: - 80

N.B.

1. Question no.1 is compulsory.
2. Attempt any three questions from the remaining five questions.
3. Figures to the right indicate full marks

- 1 (a) This of the following defines a relation on the set N of natural numbers. (10)
 $R_1: x > y, R_2: x + y = 10, R_3: x + 4y = 10$ for all $x, y \in N$. Determine which of the relations are
 1) reflexive
 2) symmetric
 3) antisymmetric
 4) transitive
- (b) Use a truth table to test the validity of the following argument. (5)
 If you invest in the Gomeratic Corporation, then you get rich.
 You didn't invest in the Gomeratic Corporation.
 Therefore, you didn't get rich.
- (c) Write the difference between MADM and MCDM. (5)

- 2 (a) Use SAW method and suggests the best alternatives? Where C1, C2, C3, C5 C6 are beneficial columns and C4 is no beneficial column. (10)

Weight	0.2	0.1	0.1	0.1	0.2	0.3
	C1	C2	C3	C4	C5	C6
A1	2.0	1500	20000	4.5	5	9
A2	2.5	2700	18000	6.5	3	5
A3	1.8	2000	21000	4.5	7	7
A4	2.2	1800	20000	5.0	5	5

- 2 (b) Prove using mathematical induction that for all $n \geq 1, 1 + 4 + 7 + \dots + (3n - 2) = n(3n - 1)/2$. (10)

- 3 (a) Fast Track Ltd. Are evaluating four alternative single period investment opportunities whose returns are based on states of economy. Possible states of nature and associated probability distribution are given below. (10)

State of Nature	Fair	Good	Great
Probability	0.2	0.5	0.3

The returns in Rupees for each investment opportunities and each state of nature are as follows.

Alternatives	State of Economy		
	Fair	Good	Great
AI	1000	3000	6000
AII	500	4500	6800
AIII	0	5000	8000
AIV	-4000	6000	8500

Construct decision tree and suggest the best alternative for investment.

(b) USE WPM and WSM Method to solve the following decision matrix. (10)

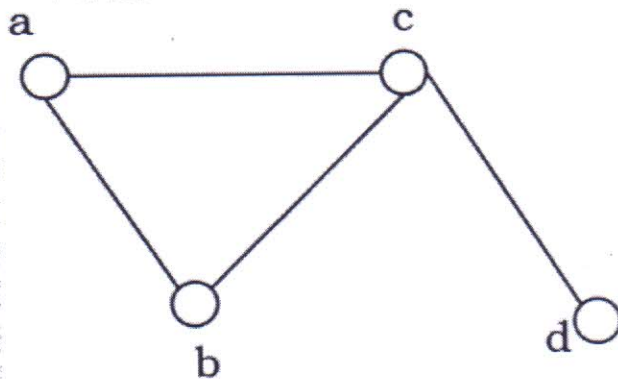
	C_1	C_2	C_3	C_4
Alts.	0.20	0.15	0.40	0.25
A_1	25	20	15	30
A_2	10	30	20	30
A_3	30	10	30	10

4 (a) Using Divide and Conquer compute the product of
1) $x=12345$ and $y=6789$ 2) $x=8531$ and $y=7289$ (10)

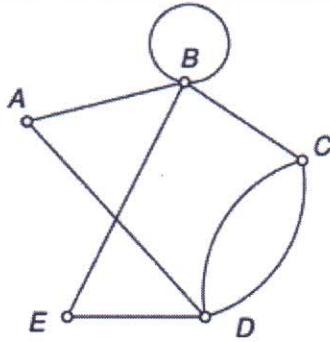
4 (b) Without using truth table prove that (10)
1) $\square B \square (\square A \square B) \square (A \square B)$ is a tautology.
2) $(Q \square P) \square (\square P \square Q)$ is a contradiction.

5 (a) What is the solution of the recurrence relation $a_n = -a_{n-1} + 4a_{n-2} + 4a_{n-3}$ (10)
With $a_0=8$, $a_1=6$ and $a_2=26$?

(b) Find the adjacency list and adjacency matrix for the following graph (10)



- 6 (a) Find all the Euler Path and Euler Circuit for the following graph (10)



- (b) Construct the Hasse diagram of $(P(\{a, b, c\}), \subseteq)$. Also find Maximal, Minimal, Least and Greatest elements if it exists. (10)

Sem-II - choice based.

(3 Hours)

Total Marks: 80

- N.B.** (1) Question No. 1 is compulsory.
 (2) Attempt any Three from the remaining Five questions.
 (3) Answers to questions should be grouped and written together.

From the following Trial Balance of Mr Swami, prepare Trading & Profit & Loss A/c for the year ended 31st March, 2018 & 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 on 31st march 2018 amounted to Rs 12,250. Market value of stock of Rs 14,000.

- Define Financial Management? Briefly explain the role of financial manager.

[10]

A. Journalise following transactions in the books of Rishi Traders [10]

- Feb 1, 2018 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.10000 & payment paid by cheque
 Feb 9 Withdraw cash for personal use Rs.8000
 Feb 10 paid Rent Rs.10000 by cheque.

B. what are the advantages of Double Entry system of Book-keeping? [10]

A. Prepare Cash budget for March-May 2016 from the following information [10]

Month	Credit Sales (Rs.)	Credit Purchases (Rs.)	Office expenses (Rs.)	Other expenses (Rs.)
January	289000	272000	12000	5000
February	122500	228000	9000	6000
March	169000	110000	8000	5000
April	107000	128000	9000	8000
May	120000	151000	8000	6000
June	198000	140000	10000	9000

Other information:

- 1) Cash balance as on 1st March is Rs.10000.
- 2) Credit allowed by supplier is two month.
- 3) Credit allowed to customer is one month.
- 4) Delay in payment of office expenses and other expenses are one month.
- 5) Dividend received Rs.5000 in the month of April
- 6) Interest paid Rs.3000 in the month of May

B. Explain with diagram the Break Even Point, its Uses & Limitations [10]

A. Profit & Loss Statement for the year ending 31st December 2018

[10]

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

Balance Sheet:

Particulars	Rs	Particulars	Rs
Share Capital	1,50,000	Fixed Assets (Net)	80,000
Reserves	60,000	Current Assets :	
Profit & Loss	24,000	Stock	1,88,000
Debentures	60,000	Debtors	1,64,000
Current Liabilities	1,52,000	Cash	14,000
	4,46,000		4,46,000

From the above Information Calculate all four give ratios:

Current Ratio, Liquid Ratio, Net Profit Ratio & Debtors Turnover Ratio

B. Explain ARR and Payback Period in detail.

[10]

A. Explain following: (Attempt All)

[10]

- WACC
- Degree of Operating Leverage
- Degree of Financial Leverage
- Capital Gearing Ratio
- Cost of Equity

B. Explain role of Financial Accounting & Cost Accounting

[10]

A. Explain with example difference between Fund Flow Statement & Cash Flow Statement

[10]

B. Explain with two examples two ratios used for measuring liquidity of a company

[10]
