MCA / Sem-II (Choice Base) / Data Structure / May-2017

Q.P. Code :06213

[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
- Questions 1 are compulsory.
- Answer any 3 from the remaining 5 questions.
- Provide illustrations wherever required.

Q.1) a) What is a queue? Explain the working of an ordinary queue and write algorithms to **10**
i) Insert an element in the queue.
ii) Delete an element form the queue.

b) Given a set of symbols and corresponding frequency table as below, explain the step to find the Huffman code for each character. **10**

Symbol	A	B	C	D	E	F	G	H	I
Frequency	10	3	4	2	4	2	3	6	8

Q.2 a) Define and explain the working of the stack data structure. Give algorithms for the Push Pop, Stack Full, Peek and stack Empty functions. **10**

b) What is a heap? Give the algorithm for Reheap Up. **10**
Construct a Max Heap for the following data values arriving in sequence 12,3,10,14,58,26,18,2,91,3.

Q.3 a) What is a Binary Search Tree? Write the algorithms to **10**
i) Find the maximum value in a BST
ii) Search for an element in a BST

b) What is sorting? Sort the following elements using Selection Sort method 14, 6, 4, 8, 11, 12, 10, 13.Also give the algorithm for the same. **10**

Q.4 a) Explain the circular linked list. For a circular linked list write algorithms to **10**
i) Find the numbers of element in the list.
ii) Delete an element in the list.

b) Define hashing .Explain the terms synonyms, collision and home address. Using modulo division and linear probing method, store the keys given below in an array of 13 elements. How many collisions occurred? **10**

28	7	846
786	431	870
612	675	870
546	34	12

[P.T.O]

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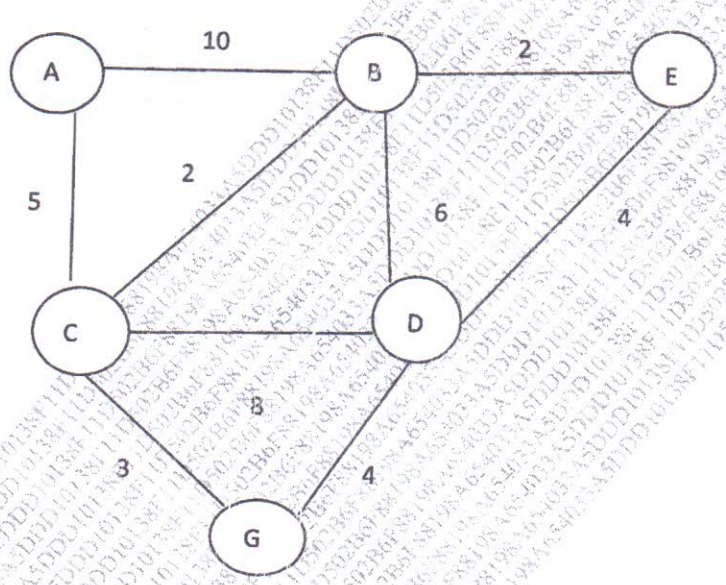
Q.5 a) Differentiate between
- i) Singly Linked List and Doubly Linked List
- ii) Linear and Binary search

10

b) What is a network? Explain the shortest path problem. Apply Dijkstra's algorithm and find the shortest path from node A. 10



Q.6 a) Write short notes on
- i) Analysis of an algorithm
- ii) Backtracking Divide and Conquer techniques

10

b) What is a multiway tree? How is the B Tree an improvement over the multiway tree? Construct a B Tree of order 3 for the following data value arriving in sequence: 92,24,6,7,11,8,22,4,5,16,19,20,78 10

MCA / Sem-II (Choice Base) / Computer Networks / May-17

QP CODE: 08799 514 515 516 518

(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.

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1. (a) An organization is granted the block 130.34.12.64/26. The organization needs four subnetworks each with an equal amount of hosts. Design the subnetworks and find the first address, broadcast address, subnet mask and number of addresses in each subnetwork. **[10]**

(b) What is inter domain routing? Explain BGP in detail. **[10]**

2. (a) Discuss the various multiple access protocols in detail. **[10]**

(b) (i) Given the data word 101001111 and the divisor 10111, show the generation of the CRC code word at the sender site. **[05]**

(ii) We have a channel with a 1MHz bandwidth. The SNR for this channel is 63. What are the appropriate bit rate and signal level? **[05]**

3. (a) What is link state routing? Explain how the shortest path is calculated using Dijkstra's algorithm with example. **[10]**

(b) Explain Go Back N protocol with help of FSM from the sender and receiver perspective **[10]**

4. (a) Explain how the congestion is controlled by TCP? **[10]**

(b) Discuss various queue management algorithms in detail. **[10]**

5. (a) Discuss about the different types of guided media. **[10]**

(b) (i) Explain how the multi cast tree is constructed using various methods. **[05]**

(ii) Explain the 4-way handshaking of TCP connection termination. **[05]**

6. **Answer ~~any 4 from~~ all the following:** **[20]**

Query 11/40

(a) Explain the terms: Extranet, Intranet and Internet
(b) Write short notes on IP Over ATM
(c) Discuss different types of topology with its advanges and disadvantages
(d) Write short notes on IEEE 802.3

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MCA/Sem-II (Choice Base)/ Operating System / may-2017

Q.P. Code: 08930

[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

Process	Current Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	2	0	0	1	4	2	1	2	3	3	2	1
P1	3	1	2	1	5	2	5	2				
P2	2	1	0	3	2	3	1	6				
P3	1	3	1	2	1	4	2	4				
P4	1	4	3	2	3	6	6	5				

Using Bankers algorithm
- i. What is the content of Matrix Need?
- ii. Is the system in safe state? Give safe sequence.
- iii. If the request from P4 arrives for (0,0,2,0) can the request be granted immediately?

B) Define paging? Explain the techniques that are used for structuring the page table. 10

2 A) Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 2,150, and the previous request was at cylinder 1805. The queue of pending requests, in FIFO order, is: 10
2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681
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. FCFS
- ii. SSTF
- iii. SCAN
- iv. CSCAN

B) Define semaphores and monitors? Explain their significance for concurrency control. 10

3 A) What do you understand by the term real time systems? Explain any one real time scheduling algorithms. 10

[TURN OVER]

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B) Consider the following page reference string: 10
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.
How many page faults would occur for the following replacement algorithms, assuming four frames?
Remember that all frames are initially empty, so your first unique pages will cost one fault each.

i. LRU
ii. FIFO
iii. Optimal Page Replacement

4 A) Explain various file allocation techniques. 10

B) The following processes are being scheduled using a **preemptive, round robin scheduling algorithm**. Each process is assigned a numerical priority, with a higher number indicating a higher relative priority. In addition to the processes listed below, the system also has an idle task (which consumes no CPU resources and is identified as P_{idle}). This task has priority 0 and is scheduled whenever the system has no other available processes to run. The length of a time quantum is 10 units. 10
If a process is preempted by a higher-priority process, the preempted process is placed at the end of the queue.

Process	Arrival Time	Processing Time	Priority
P1	40	20	0
P2	30	25	25
P3	30	25	30
P4	35	15	60
P5	5	10	100
P6	10	10	105

i. Show the scheduling order of the processes using a Gantt chart.
ii. What is the turnaround time for each process?
iii. What is the waiting time for each process?

5 A) Define kernel of operating system. Explain different types of kernels in detail. 10

B) Define Protection? Explain the concept of access matrix with the help of an example? 10

6 Write short notes on any four - 20

i. Race condition
ii. Swap-space management
iii. Context switch
iv. Belady's Anomaly
v. Program threats
vi. Linux OS

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MCA / Sem -II / [Choice Base] / T8632/T2536 FINANCIAL ACCOUNTING & MANAGEMENT / MAY- 2017

Q.P. Code :10691

[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B: 1. Question.No.1 is compulsory.
2. Attempt any 3 question no 2-6
3. Figure to the right indicate full marks

Q.1 a) From the following trial balance prepare trading profit and loss Account Of M/s Anil Ltd for the year ended 31st march 2017 and balance sheet as on that date **10**

Particulars	Debit (Rs)	Credit (Rs)
Machinery	90,000	
Building	50,000	
Stock (1-4-2016)	10,200	
Purchases	30,800	
Wages and salaries	17,000	
Carriage outward	3,000	
Rent	59,100	
Sundry debtors	50,000	
General expenses	1,700	
Bad debts	650	
Income tax	600	
Legal charges	800	
Anil's drawings	18,000	
Cash- in- hand	24,000	
Cash at bank	18,000	
Anil's capital		1,20,200
Sundry creditors		18,000
Bills payable		23,000
Return outwards		1,800
Interest		3,300
Sales		2,07,550
	3,73,850	**3,73,850**

1) Stock on 31-3-2017 was Rs 70,000 valued at cost and market price Rs.82,000
2) Depreciate machinery at 10% building at 5%
3) Rent outstanding Rs.800

b) Explain over –capitalization and under –capitalization **10**

Q.2 a) Journalise the following transactions in the books of shri Mohan 2017 **10**
1 April Shri Mohan started business with cash Rs 1,50,000
2 April purchased gods from Mr. singh Rs 30,000
3 April deposited cash into bank Rs 4,000
4 April sold goods to Gujar Rs 2,500
5 April purchased furniture of Rs 2,500 from furniture and co
6 April paid to Mr. singh by cheque Rs 1,000

[P.T.O]

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Q.P. Code :10691

7 April received cheque from Mr. Gujar Rs 1,200
8 April paid interest Rs 450
9 withdrew cash Rs 3,000 for personal use
10 April returned goods to Mr. singh Rs 500

b) Explain any five accounting concept **10**

Q.3 a) A company expects to have Rs 25000 in cash on 1st may 2017 and requires you to prepare an estimate of cash budget during 3 months – May , June and July 2017 **10**

Month	Sales	Purchases	Wages	Office expenses	Factory expenses	Selling expenses
March	50,000	30,000	6,000	4,000	5,000	3,000
April	56,000	32,000	6,500	4,000	5,500	3,000
May	60,000	35,000	7,000	4,000	6,000	3,500
June	80,000	40,000	9,000	4,000	7,500	4,500
July	90,000	40,000	9,500	4,000	5,000	4,500

Other information

1) 20% sales are in cash remaining amount collected in month of sales.
2) Suppliers supply goods at 2 months credit.
3) Wages and all other expenses are paid in the month following the month in which they were incurred.
4) The company pays dividend to shareholders and bonus to workers of Rs 10,000 and Rs 15,000 in the month of May.
5) Plant has been ordered and is expected to be received in month of June it will cost Rs 8,000 to be paid in June.
6) Income tax Rs 5,000 is payable in the month of July.

b) Explain the concept of cash discount and trade discount. **10**

Q.4 a) The summarized final accounts of company X and Y ltd are as follows **10**

Liabilities	X Ltd	Y Ltd	Assets	X Ltd	Y Ltd
Share capital	88,000	88,000	Fixed Assets	1,21,000	96,800
Reserves	42,900	35,200	Current Assets	1,25,400	1,03,400
8% Debentures	22,000	22,000	Less current liabilities	(93,500)	(55,000)
	1,52,900	1,45,200		1,52,900	1,45,200

CALCULATE :

1) Proprietary Radio
2) Capital gearing Ratio

b) Distinguish between fund flow and cash flow statement **10**

Q.P. Code :10691

Q.5 a) Calculate NPV USING Risk Adjusted discount Rate for investment project having the following cash flow **10**

Year	1	2	3	4	5
Cash inflows	80,000	70,000	85,000	60,000	50,000

Initial investment is Rs. 20000
Risk free return is 7% risk adjusted rate is 10%

b) What do you mean by window dressing? Why does a trader do window dressing? **10**

Q.6 a) Explain classification of Accounts? **10**
b) What are golden rules for personal, real and nominal A/c? **10**

MCA / Sem-II / T8632/ T2537 / DECISION MAKING & MATHEMATICAL MODELLING / MAY-2017
[Choice Base]

Q.P. Code :09903

[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
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) If A = {1,2,3,6,12,18} and the partial order relation R is the divides relation i.e alb aRb iff (a divides b). **10**

i) Draw the Hasse diagram for the poset (A,R)
ii) Find the minimal elements, maximal elements, least & greatest elements if exists.
iii) If B= {6,12,18} and find all the lower bounds and upper bounds of B and LUB and GLB of B

Q.1 b) Without using truth table prove $(P \rightarrow Q) \wedge (R \rightarrow Q) \equiv (P \vee R) \rightarrow Q$ **05**

Q.1 c) What are the characteristics of a complex business problem, explain any two. **05**

Q.2 a) The board of directors have to choose a leader for a company whose founder is about to retire. There are three competing candidates TOM, DICK & HARRY and four competing criteria Experience Education, Charisma and Age. Use AHP to choose the most suitable candidate. **15**
(The CMI, consistency index and consistency Ratio need not be calculated)

The comparison matrix for pair wise Criteria is given below

CRITERIA	EXPERIENCE	EDUCATION	CHARISMA	AGE
EXPERIENCE	1	4	3	7
EDUCATION	1/4	1	1/3	3
CHARISMA	1/3	3	1	5
AGE	1/7	1/3	1/5	1

Also, the Relative criteria for alternatives is

EXPERIENCE	TOM	DICK	HARRY
TOM	1.00	1/4	4.00
DICK	4.00	1.00	9.00
HARRY	1/4	1/9	1.00

EXPERIENCE	TOM	DICK	HARRY
TOM	1.00	3	1/5
DICK	1/3	1.00	1/7
HARRY	5	7	1.00

CHARISMA	TOM	DICK	HARRY
TOM	1.00	5	9.00
DICK	1/5	1.00	4.00
HARRY	1/9	1/4	1.00

AGE	TOM	DICK	HARRY
TOM	1.00	1/3	5.00
DICK	3.00	1.00	9.00
HARRY	1/5	1/9	1.00

Q.2 b) Use Mathematical induction to prove the property P(n) **05**
P(n): 3^n+2n-1 is divisible by 4 $\forall$ n $\in$ N

TURN OVER

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Q.P. Code :09903

Q.3 a) Use SAW method to determine the best car. The beneficiary criteria are Durability in years and Resale value others are non beneficiary criteria.

The measures for different criteria are given in the table below

Type of Car	MAINTANCE COST in Rs.	Purchase PRICE IN Rs.	DURABILITY IN YEARS	RESALE VALUE in Rs.
CAR1	800	350000	6.5	100000
CAR2	1000	1000000	10	450000
CAR3	1250	650000	10	290000

The weights for different criteria are

Type of car	MAINTANCE COST in Rs.	Purchase PRICE IN Rs.	DURABILITY IN YEARS	RESALE VALUE in Rs.
Weight	0.15	0.4	0.25	0.2

Q.3 b) In a screening test for a disease. The frequency of the disease in a population is 0.5%. The test is highly accurate with 5% false positive rate and 10% false negative rate. A person takes the test and it comes positive. Construct a decision tree and use Baye's theorem to determine the probability that he has a disease?

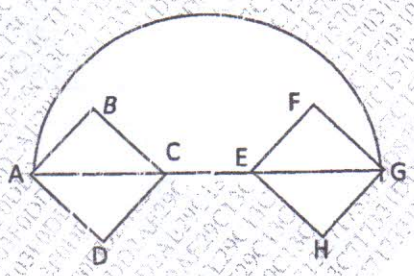
Q.4 a) State the "Tower's of Hanoi' problem and obtain the recurrence relation for the same.

Q.4 b) Write the truth table for α and find the principal CNF & Principal DNF of α

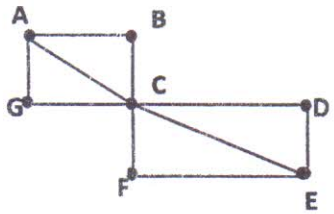
$\alpha = (\sim P \vee \sim Q) \rightarrow (P \leftrightarrow Q)$

Q.5 a) The solution of the Recurrence relation $C_0a_n + C_1a_{n-1} + C_2a_{n-2} = f(n)$ is 2^n+3^n+5, find C_0, C_1, C_2,

Q.5 b) Find the Euler Path and Euler Circuit in the following graphs if they exists



GRAPH G1



GRAPH G2

Q.6 a) A={a,b,c,d,e}, R={(a,a), (a,d),(b,b),(c,d),(c,e),(d,a),(e,b),(e,e)}
Determine the R^{∞} relation using Warshall's Algorithm.

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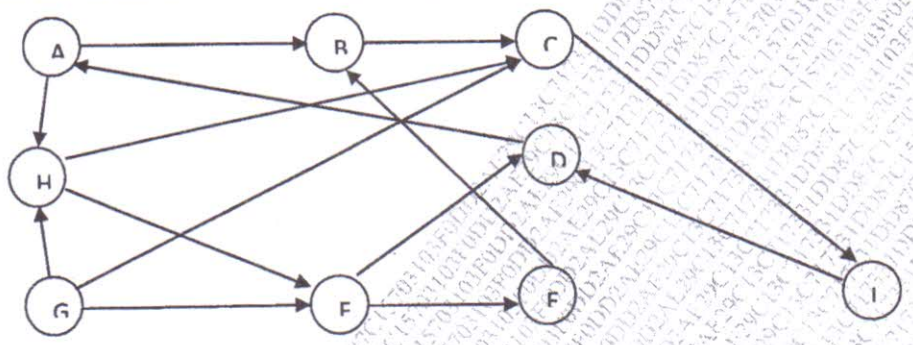
Q.P. Code :09903

5 **b)** Determine whether the relation R on the set A is reflective, irreflective, symmetric, asymmetric, antisymmetric, transitive, identity relation. Give the necessary explanation to your answer. A=Set of Real numbers and aRb iff $|a-b| \leq 2$ **05**

Q.6 c) Find the particular solution of the recurrence relation **05**

$a_n - 2a_{n-1} = 3X2^n$

Q.6 d) Find the Adjacency Matrix and Adjacency list for the following graph Vertices are shown in circles **05**



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