MCA / Sem-II (CBSGS) / Data Structure / May-2017

Q.P. Code :07829

[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 four from remaining six questions

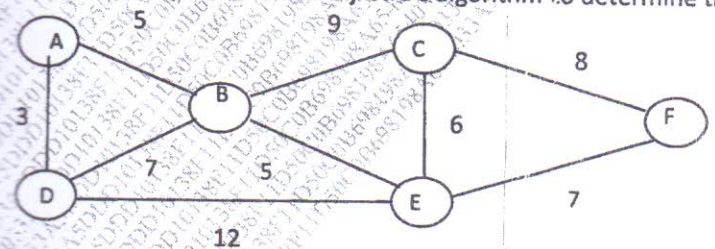
Q1 a. What is the difference between singly linked list and doubly linked list? Write algorithms to 10
   i. Insert a node in double linked list
   ii. Find a node in doubly linked list
   b. Define a graph. What is the difference between a graph and tree? Explain graph storage structures-adjacency matrix and adjacency list- with an example. 10

Q2 a. Define stack. Explain any two stack applications with example. 08
   b. Define max heap. Construct a valid max heap using the following: 22, 15, 7, 30, 9, 8, 45, 22, 19, and 97. 07

Q3 a. What is a circular queue? Give algorithms to 08
   i. Insert an element in a circular queue
   ii. Delete an element from the circular queue
   b. Define Binary tree. What is the difference between a general tree and a binary tree? Reconstruct the binary tree using following traversal 07
   In order: D B E A C G F H
   Preorder: A B D E C F G H

Q4 a. What is an AVL Tree? Give suitable examples to show the left and right rotations of the tree. Give the algorithm for AVL Rotate Left. 08
   b. Define B-tree and B* tree. Build a B-tree of order 5 by inserting the following data arriving in the sequence 55 43 33 60 95 36 29 88 46 2 19 32 75 49 55. 07

Q5 a. Describe the binary search tree data structure. Write algorithms to 08
   i. Insert a node in a BST
   ii. Find the smallest node in a BST
   b. Explain the shortest path problem. Use Dijkstra's algorithm to determine the shortest path from node A. 07



Q6 a. Explain the process of selection sort with an example. Give the algorithm. 08
   b. An array contains the elements 20 55 60 80 85 90. 07
   Using the binary search algorithm, trace the steps to find the element 60. At each loop interation, show the contents of first, last & mid.

Q7 a. Explain the concept of complecity of an algorithm. Explain the Big-O notation. Explain the techniques of backtracking and divide and conquer. 08

b. Define Expression tree? Draw an expression tree for the following expression A* (B/C)+(D-E) and also determine its prefix and postfix traversal. 07

MCA / sem-II / CBSGS / OS May-17

Q.P. Code :11761

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

Please check whether you have got the right question paper.

N.B:
1. **Question No.1 is compulsory.**
2. **Figures** to the **right** indicate **maximums marks.**
3. **Attempt any four questions from Question No.2 to 7.**
4. **Answers to the sub question should be answered together.**

Q.1 A) How paging is implemented in operating system? Explain in detail. 10

B) Why page size is always power of 2? Explain 05

C) Write a short note on absolute loader and re-locatable loader. 05

Q.2 A) What is deadlock? Explain in brief deadlock prevention methods. 08

B) What is page fault? Given references to the followings pages by a program 1,2,4,0,1,2,4,1,2,5,1,3,4,2,5 Using FIFO, LRU and Optimal page replacement policy. How many page faults will occur if the program has assigned three page frames? 07

Q.3 A) What is capability and access list? Explain the features needed in a system for efficient capability manipulation. And justify whether it can be used in memory protection. 08

B) What are the disk scheduling criteria? 07

Suppose the head of a moving hard disk with 200 tracks (numbered from 0 to 199) is having disk read write head at tracks 50. Assuming the arm is moving towards track number 0. If the queue of requests in FIFO order is 88, 185, 35, 121, 12, 122, 62, 67.

What is the total head movement under following scheduling algorithms?

a) FCFS
b) SSTF
c) SCAN

Q.4 A) What are the process scheduling criteria? For the processes listed in the following table draw a Gantt chart illustrating their execution using First Come First Serve (FCFS), shortest Job First (SJF) Preemptive and Round Robin (RR) (quantum =2ms) Find turnaround time of each process for the above scheduling algorithms 08

Process	Arrival Time	Burst Time
A	0	5
B	1	2
C	2	2
D	4	1

B) What is process? What are process states? Explain five state process model with the help of neat diagram. 07

Q.5 A) Consider a system with a following current resource allocation State: 08

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			

Using Banker's Algorithm

a) What is the content of matrix need?
b) Is the system in safe state? Give the sequence.
c) If the request from P2 arrives for (0, 0, 1), can the request be granted immediately?

B) What criteria is important in choosing a file organization? List and briefly explain any three file organizations. 07

Q.6 Differentiate between the following 15
a) User level threads and kernel level threads.
b) Fixed partitioning and Dynamic partitioning
c) Semaphore and Monitor

Q.7 Write a short note on **any three** 15
a) Android OS architecture
b) Race condition
c) Multi-tasking , Multiprogramming and Multiprocessing OS
d) Buddy system
e) Protection in OS

MCA / Sem - II (CBSGS) / Computer Networks / May - 17

Q.P. Code :06229

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

Please check whether you have got the right question paper.

N.B:
a. Question No 1 is compulsory.
b. Attempt any four out of remaining six questions.
c. Each question carries equal marks.
d. Figures to right indicate marks.
e. Use of Calculator is permitted.

Q.1 A. Explain the OSI model used for data communication and compare it with the TCP communication Model. **10**

B. Explain and differentiate between the various types of networks. **10**

Q.2 A. Discuss HTTP as an application layer protocol. **08**

B. a) Calculate the VRC for the following **07**
1100001 1010101 1011110 1001111
b) Calculate the CRC for 01111010110 using divisor 1011.

Q.3 A. Explain the wired communication medium used for data communication. **08**

B. Discuss the Token Ring IEEE 802.5. **07**

Q.4 A. Explain the connection establishment and termination in the TCP. **08**

B. Discuss the internal working of a router. **07**

Q.5 A. What is multicasting? Discuss the protocols used for multicasting. **08**

B. What are the drawbacks for Traditional IP and ATM networks? Explain how MPLS eliminates the problems. **07**

Q.6 A. An organization is given the site Address as 176.18.1.16/21. Find the following **08**
a. Subnet mask in dotted
b. Number of networks & Number of hosts
c. Subnet address
d. First usable host & Last usable host
e. Broadcast address

B. Discuss the methods used for providing Quality of service using feedback. **07**

Q.7 A. Write Short notes on any three of the following **15**
a. NAT
b. DHCP
c. IEEE 802.3
d. ARP

MCA / Sem-II [CBSGS] / T8622 / T0203 PROBABILITY & STATISTICS / MAY-2017

Q.P. Code :09926

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

Please check whether you have got the right question paper.

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

Q.1 a) Find the coefficient of mean deviation about median and about Mode for the following data. **10**

Marks	0-10	10-20	20-30	30-40	40-50
No.of students	20	36	52	36	20

b) A lot of transistors contain 0.6% defective. Each transistor is subjected to a test that correctly identifies a defective but also misidentifies as defective about 2 in every 100 good transistors. Given that a randomly chosen is declared defective by tester, compute the probability that it is actually defective. **05**

c) Let X be a random variable for which E(X) =5 and V(X) =9. Find the values of a and b such that Y = aX-b has expectation 10 and variance 81 **05**

Q.2 a) Find the Karl Pearsons coefficient of skewness for the following data **08**

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	15	15	23	22	25	10	5	10

b) In Manufacturing c certain component, two types of defects are likely to occur with respective probabilities 0.05 and 0.1 What is the probability that a randomly selected component **07**

a) Does not have either kind of defect b) defective?
c) Has one kind of defect, given that it is found to be defective?

Q.3 a) For the following probability distribution **08**

X	0	1	2	3	4	5	6
P(X)	0.02	0.07	0.09	0.12	0.2	0.2	0.3

Find i) Expectation and Variance of X
ii) Expectation and Variance of Y=2x-3

b) The lifetime of certain kind of electronic devices have mean life of 300 hours and standard deviation of 25 hours. Assuming that the distribution is normal **07**

i. What is the probability that the electronic devices will have lifetime of more than 350 hours
ii. what percentage will have life time between 275 and 325 hours
iii. What percentage will have lifetime of more than 300 hours

For percentage normal variate Z, $P(0 \leq Z \leq 1)=0.3413$, $P(0 \leq Z \leq 2)=0.4772$,

Q.P. Code :09926

Q.4 a) Find the Spearman's Rank Correlation coefficient for the following data **08**

Marks in Statistics	15	20	28	12	40	60	20	80
Marks in COA	40	30	50	30	20	10	30	60

b) Consider an experiment that "four coins are tossed". Let the random variable X represent the 'number of heads'.Find **07**

i) the probability mass function of X.
ii) the distribution function of X.
iii) the probability of getting exactly 2 heads
iv) the probability of getting more than 2 heads
v) the probability of getting less than 2 heads
vi) the probability of getting less than 4 but more than 1 head
vii) the probability of not getting more than 3 heads

Q.5 a) Show that the various of Beta Distribution of first kind is **08**

$$\frac{mn}{(m+n)^2\ (m+n+1)}$$

b) Find the variance and Coefficient of variation for the data given below **07**

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	82	100	115	117	130	140	160	156

Q.6 a) An incomplete frequency distribution is given below. The total of frequencies is 150. If the median of the distribution is 6.35 find the missing frequencies **05**

Class Interval	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
Frequency	1	4	10	14	?	60	?	10	6

b) Prove that geometric distribution is memory less **05**

c) The following table gives the number of car accidents in Uttar Pradesh for 8 days, D1 to D8 Find whether they are uniformly distributed. **05**

Days	D1	D2	D3	D4	D5	D6	D7	D8
No of Accidents	20	14	16	12	11	15	16	10

Given for 7 degrees of freedom at 5% LOS the critical value of $\chi^2 = 14.0671$

Q.P. Code :09926

Q.7 a) A toothpaste manufacturing company was distributing a particular brand of toothpaste through large number of retail shops. Before a heavy advertising campaign the mean sales per week per shop was found to be 70 dozen. After the campaign the sample of 26 shops was taken and the mean sale was found to be 75 dozen with standard deviation of 16. Can you consider the advertisement effective? Given the value of t_α at 5% level of significance for 25 degrees of freedom is 2.0595 **05**

b) The probability of a bomb hitting a target is 1/10. Two bombs are enough to destroy the bridge. If ten bombs are aimed at a bridge, find the probability that the bridge is destroyed. **05**

c) The joint probability density function of the two dimensional random variable (X,Y) is given by **05**

$$f(X,Y) = \frac{x^3y^3}{16}, \quad 0 \le x \le 2, 0 \le y \le 2,$$
$$= 0 \text{ otherwise}$$

Find the marginal density function of X and Y

Q.P. Code :03945

[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 four questions out of the remaining.
3. Answer to the questions should be grouped and written together.
4. Figures to the right indicate full marks assigned to the question.

Q1 A What is main purpose of preparing cash flow statement and explain its significance. **10**

B From the following Trial Balance of M/s. Bharat & Sons, prepare trading and profit and loss account for the year ending on 31 st March 2016 and the balance sheet as on the date: **10**

Trial Balance as on 31 st March 2016

Particulars	Debit Rs.	Particulars	Credit Rs.
Purchases	5,40,000	Sales	10,40,000
Salaries& wages	3,50,000	Return outward	12,000
Office expenses	4,000	Discount received	6,000
Trading expenses	8,000	Interest received	3,000
Factory expenses	11,000	Capital	1,78,000
Carriage inward	8,000		
Returns inward	12,000		
Discount allowed	4,000		
Commission	2,000		
Stock	60,000		
Income tax	40,000		
Cash in hand	2,00,000		
	12,39,000		**12,39,000**

Closing Stock is valued at Rs.1, 35,000.

Q2 A Journalize following transaction in the books of Ankita Enterprises. **10**

2016

Jan1 Started business with cash Rs.90,000

Jan2 Bought goods for cashRs.10,000

Jan3 Received from Nishant Rs.15,000

Jan4 Commission received by cheque of Rs. 10,000

Jan5 Sold furniture for Rs. 15,000

Jan6 Purchased goods of Rs.10,000@ 10% cash Discount

Jan7 Issued cheque of Rs.5,000 to Roshani Enterprises

Jan8 Paid Insurance Premium of Rs.10,000 by cheque

Jan9 Salaries paid Rs.10,000

Jan10 Paid Rent Rs.10, 000 by cheque.

Q.P. Code :03945

B Explain the Separate Entity Concepts with example

Q3 A Explain advantage and disadvantages of ratio analysis.

B Why contra entries are passed in cash book?

Q4 A Prepare Triple Column Cash Book with cash, bank& discount column from the following transactions and balance the same. Sept 2016.

Sep1	Cash in hand Rs.1,15,000 Bank balance Rs.35,000
Sep 2	Paid into Bank Rs.10,000
Sep 3	Purchased machinery by cheque Rs.10,000
Sep 7	Received from Mudgha Rs.3,560 and allowed discount Rs.40
Sep 9	Paid to Soham by cheque Rs.5,970 in full settlement of his account for Rs.6,000
Sep 12	Withdraw Rs.5, 000 for bank for personal use.
Sep 14	Received cheque from Medha for Rs.4,970 in full statement of her account Rs.5,000
Sep16	Medha's Cheque deposited into bank.
Sep 18	Sold goods for cash Rs.5,000
Sep 20	Salaries paid by cheque Rs.10,000

B What is Trial Balance?

Q5 A Explain with example three golden rules of Accounting.

B Explain different types of discount with examples.

Q6 A From the following Profit and Loss Account and the Balance sheet of Praj Company.

Profit and Loss Account as on 31st March 2016

Particulars	Rs.	Particulars	Rs.
To opening stock	3,000	By Gross Sales 2,00,000	
To Purchases	1,20,000	Less: Sales return 5,000	1,95,000
To Direct Wages	7,000	By Closing stock	5,000
To Gross Profit C/fd	70,000		
	2,00,000		**2,00,000**
To administrative expenses	15,000	By Gross Profit b/d	70,000
To selling and distribution expenses	20,000	By dividend received	10,000
To Loss on sale of Fixed asset	5,000		
To Net Profit C/fd	40,000		
	80,000		**80,000**

Q.P. Code :03945

Balance sheet as on 31st march 2016

Liabilities	Amount (Rs.)	Assets	Amount (Rs.)
Equity share capital	5,00,000	Land	1,50,000
General Reserve	50,000	Building	2,75,000
Profit and Loss A/C	40,000	Plant and Machinery	2,00,000
Sundry Creditors	1,10,000	Stock	5,000
		Debtors	50,000
		Bank Balance	20,000
	7,00,000		**7,00,000**

Compute following ratios

1. Current ratio
2. Liquid ratio
3. Operating Profit Ratio
4. Gross Profit ratio

B What is Ledger explain with example. **05**

Q7 A From the following information prepare cash Budget for three months January February and March 2016. **10**

Month	Credit Sales (Rs.)	Credit purchases (Rs.)	Wages (Rs.)	Other expenses (Rs.)
November	1,89,000	1,72,000	12,000	5,000
December	12,500	1,28,000	9,000	4,000
January	1,68,000	95,000	8,000	5,000
February	79,000	1,28,000	9,000	7,000
March	1,20,000	1,29,000	8,000	6,000
April	1,48,000	1,40,000	10,000	2,000

Other information:

1) Cash balance by as on 1st January is Rs.10, 000.
2) Credit allowed by supplier is two month.
3) Credit allowed to customer is one month.
4) Delay in payment of wages and other expenses are on month.
5) Dividend received Rs.5, 000 in the month of February.
6) Interest paid Rs.3, 000 in the month of January.

B Write Scope of accounting. **05**