MCA / SEM-II (CBSGS) / Data Structure / NOV-16

QP CODE : 514300

(3 hours) **Total marks:80**

Note:

1. **Q1 is compulsory**
2. **Attempt any four from remaining six questions**

Q1: **(a)** For a singly linked list write algorithms to 10

1. Append two list together
2. Count the number of nodes in the list

(b) Define max heap. Construct a valid max heap using following 10

18 ,15 ,6 ,20, 9, 7, 35 , 22 ,12,98

Q. 2 (a) Explain in brief threaded Binary tree 8

(b) Write an algorithm for selection sort. Show the tracing of selection sort for following array 7
22, 13, 18, 15, 37, 35, 20.

Q3: **(a)** Define stack. Write algorithms to implement push and pop algorithms. 8

(b) Define Binary tree? Reconstruct the binary tree using following traversal 7
Inorder: D B F E G H A C
Preorder: A B D E F G H C

Q4: **(a)** Define Graph? Explain the structures which are use to store a graph. 8

(b) An array contains the elements shown below. Using binary search algorithm, trace the trace the steps to search element 13. 7
8, 13, 26, 35, 65, 108, 139

Q5: **(a)** What is binary search tree.Give algorithms to 8

i) Delete a node from BST

ii) Find largest node in the BST

(b) What is hashing? Why is it used? For the following data set implement the technique of modulo division for hashing and linear probing for collision resolution and store the data in an array of size 12.

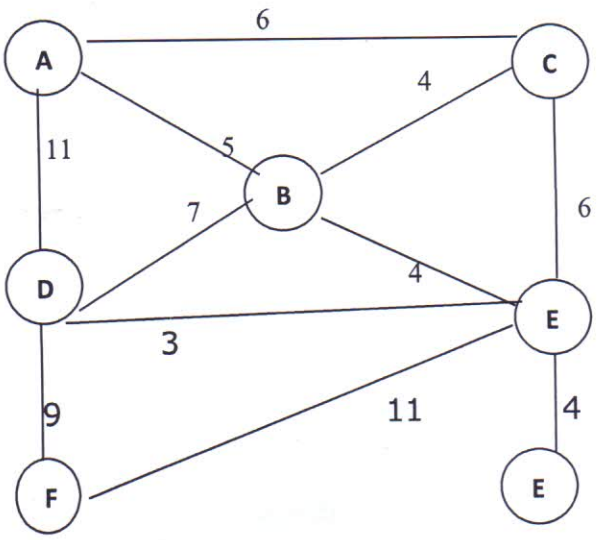
123, 536, 895, 661, 406, 193, 786, 805, 222, 100. 7

(TURN OVER)

Q.6 a) Define an expression tree. Consider following infix expression. Draw the expression tree and find prefix and postfix expressions:

(A*B)+(C*D) / (X-Y)+Z 8

(b) Define Minimum spanning tree.Give minimum spanning tree using Prim's algorithm for the given graph 7



Q7: **(a)** Explain the concept of complexity of an algorithm. Explain the Big-O notation. Explain the techniques of backtracking and divide and conquer. 8

(b) Define B-tree and B+ tree. Build a B-tree of order 3 by inserting the data in the sequence 7

95 36 29 88 46 2 19 32 75 49 55 62 5

--------X---------

M.C.A - I YR Sem II (CBSGS) Nov '16

Q.P. Code : 514400

OPERATING SYSTEM

(3 hours) **Total marks: 80**

Note:

1. Q1 is compulsory
2. Attempt any four from remaining six questions

1 a) Explain dining philosopher and bounded buffer problem with the help of example. 10

b) Explain File Allocation Techniques. 10

2 a) Consider the head of disk having 0-299 cylinders and currently on track 99. Request queue is 120,150,170, 36, 225, 260, 35. What are the total head movements required for the following algorithms? 8
a) SSTF b) SCAN c) CSCAN d) FCFS

b) Define External and internal fragmentations? Explain the technique to overcome that with the help of an example 7

3 a) Define Protection. Explain the concept of access matrix with the help of an example . 8

b) What is page fault? How to deal with it? 7

4 a) What are semaphore and monitors? How they are used for concurrency control, explain with the help of an example? 8

b) For the process listed in table , draw a Gantt chart and find their average waiting time and average turnaround time using 7
I) Round Robin (quantum=3)
ii) FCFS
ii) SJF(both preemptive and non-preemptive)

Process	Arrival Time	Processing Time
A	0	4
B	2	6
C	2	8
D	6	10

5 a) Explain various deadlock prevention and recovery techniques. 8

b) Define thread. Explain different kinds of thread. 7

6 a) Given a reference string to the following pages by a program 8
0,9,0,1,8,3,4,8,6,3,7,8,4,6,7,8,2,5,8,6,7,
How many page faults will occur for the following page replacement algorithm assuming three frames
a) Optimal Replacement
b)FIFO
c) LRU

b) What do you mean by CPU Scheduling? Explain the term process context switching with the help of an example. 7

7 Write notes on any three 15
a) Thrashing
b) Deadlock
c) Process Control Block
d) DMA

CA / Sem - II (CBSGS) / Computer Network / NOV - 16

QP CODE : 514500

(3 Hours) [Total Marks: 80]

N.B: (1) Question **No.1** is compulsory.
(2) Answer any **four** from remaining **six** questions.
(3) Assumptions should be made whenever required and should be clearly stated
(4) Answers to sub questions should be answered together
(5) Illustrate answers with diagrams whenever necessary

1. (a) Explain the TCP/IP communication model. Compare it with the OSI Model [10]

   (b) Differentiate between the various types of networks [10]

2. (a) What are the duties of the transport layer? Explain how TCP handles congestion [08]

   (b) Analyze the protocol used to provide Email service at the application layer [07]

3. (a) What is multicasting? Explain the role of IGMP and OSPF in multicasting [08]

   (b) Discuss the Token Ring IEEE 802.5 [07]

4. (a) An organization is given the site Address as 141.20.1.16 /21. Find the following [08]
   a. Subnet mask in dotted decimal
   b. Number of networks & Number of hosts
   c. Subnet address
   d. First usable host & Last usable host
   e. Broadcast address

   (b) Explain the various error detection mechanisms with suitable examples [07]

5. (a) Analyze the various methods used for providing Quality of service, [08]

   (b) Discuss the various intermediate devices used at the various layers of the communication model [07]

6. (a) What are the drawbacks for Traditional IP and ATM networks? Explain how MPLS eliminates the problems [08]

   (b) Explain the wired communication medium used for data communication [07]

7. Write short notes on any three of the following [15]
   (i) PPP (ii) IP over ATM
   (iii) Storage Area Networks (iv) M/M/1 Model for QOS

Sem - III (CBSGS) / Probability & statistics / Nov. 16

QP Code :514601

(3 hours) [Total Marks:80]

N.B.: (1) Q1. is compulsory, attempt any 4 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

Q1 a) The figures in the table relate to the size of the Profit of companies (08)

Profit in Lakhs Rs.	0 - 10	10 – 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of Companies	11	25	61	97	70	61	25

Find i) Median size of capital ii) Bowley's coefficient of Skewness
iii) Coefficient of Quartile Deviation iv) Coefficient of Range

b) Prove that mean, median and mode of a Normal distribution coincide (07)

c) Find the mode for the following distribution: (05)

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Frequency	20	30	70	50	90	60	30

Q2 a) If hens of a certain breed lays eggs on 5 days a week on an average, find on how many days during the season of 100 days, a poultry keeper with 5 hens of this breed, will expect to receive at least 4 eggs. (05)

b) The size, mean and standard deviation of three samples is shown in the table below Find the combined mean and combined standard deviation. (05)

Sample -->	**Sample1**	**Sample2**	**Sample3**
Sample size	75	150	25
Mean	20	25	30
Standard Deviation	5	7	6

c) Prove that exponential distribution is memory less (05)

Q3 a) Subway trains on a certain line run every half hour between midnight and six in the morning. What is the probability that a man entering a station at random time during this period will have to wait at least twenty minutes? (04)

b) The mean weekly sales of soap bars in departmental stores was 146·3 bars per store. After an advertising campaign the mean weekly sales in 22 stores for a typical week increased to 153·7 and showed a standard deviation of 17·2. Was the advertising campaign successful? (t at 21 df. at 5% level of significance for single-tailed test is 1·72.) (04)

[Trun Over

Q3 c) Find kurtosis for the following data (07)

Class-Interval	0-2	2-4	4-6	6-8	8-10
frequencies	7	13	20	13	7

Q4 a) Theory predicts that the proportion of beans, in four groups A, B, C, D should be 9:3:3:1. In an experiment among 1,600 beans, the number in the four groups was 882, 313, 287 and 118. Does the experimental result support the theory? (tabulated value for $\chi 2$ for 3 d.f. at 5% LOS is 7.81) (04)

b) State and prove Bayes theorem. (04)

c) Fit a Poisson distribution to the following data which gives the number of doddens in a sample of clover seeds. Given: $e^{-1.972} = 0.1392$ (07)

No. Of Doddens(X)	0	1	2	3	4	5	6	7	8
Observed frequency (f)	56	156	132	92	37	22	4	0	1

Q5 a) Following table shows the marks in physics and statistics (08)

Marks in Physics (X)	2	6	6	5	8	4	3	9	1	5
Marks in Statistics (Y)	2	5	7	4	6	4	2	8	1	5

i) Obtain the two linear regression equations
ii) Determine the statistics marks when the marks in Physics are 7
iii) Determine the Physics marks when the marks in Statistics are 3
iv) Find the Karl-Pearson's correlation coefficient between X and Y

b) A market research firm is interested in surveying certain attitudes in a small community. There are 125 household broken down according to income, ownership of a telephone or ownership of a T.V. (07)

	Household with monthly income with Rs. 8000/- or less		Household with monthly income above Rs. 8000/-	
	Telephone Subscriber	No Telephone	Telephone Subscriber	No Telephone
Own T.V. Set	27	20	18	10
No. T.V. Set	18	10	12	10

i) What is the probability of obtaining of a T.V. owner in drawing at random
ii) If the household has a monthly income over Rs. 8,000/ and is a telephone subscriber, what is the probability that it has a T.V.?
iii) What is the conditional probability of drawing a household that owns a T.V. given that the household is a telephone subscriber.?
iv) Are the events 'Ownership of T.V. and 'telephone subscriber' statistically independent?

Q6 a) X and Y are two random variables taking values -1, 0 and 1 and having the joint probability distribution. (08)

X \ Y	-1	0	1
-1	0	0.2	0
0	0.1	0.2	0.1
1	0.1	0.2	0.1

Find

i) Marginal probabilities of X and Y
ii) Conditional probability distribution of X |Y and Y|X
iii) Test whether X and Y are uncorrelated
iv) Test the independence of X and Y

b) The following table represents the scores for psychological tests (X) and arithmetical ability (Y) of children. Determine the ranks and calculate Spearman's rank correlation coefficient. Use correction factor for repeated ranks. (07)

X	105	104	102	101	100	99	98	98	93	93
Y	101	100	100	98	95	96	104	92	97	94

Q7 a) If x and y are two random variables having joint density function (08)

$$f(x) = \begin{cases} \frac{1}{8}(6 - x - y); & 0 \le x < 2, \quad 2 \le y < 4 \\ 0, & otherwise \end{cases}$$

Find i) $P(X < 1 \cap Y < 3)$, ii)) $P(X + Y < 3)$, *and* (iii) $P(X < 1 \mid Y < 3)$

b) Two unbiased dice are rolled at random. Obtain the probability distribution of the X, where X denotes the sum of numbers on them. Also find the following (07)

i) Distribution Function of X
ii) Probability that the sum is less than 4 ,Probability that the sum is greater than 4, Probability that the sum is equal to 4
iii) Expectation of X and Variance of X

A/Sem-II(CBSGS)/Financial Accounting/Nov-16.

QP CODE : 514700

Total Marks: 80

(3 Hours)

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 indicates full marks assigned to the question.

Q1 a Explain the advantages and disadvantages of Ratio Analysis. (10)

b From the following trial balance prepare trading and profit and loss account and balance sheet as on 31st March 2016 (10)

Particulars	Debit Amount (Rs)	Particulars	Credit Amount (Rs)
Opening stock	17,000	Sales	60,000
Manufacturing wages	10,000	Creditors	20,000
Factory rent	2,000	Bills payable	10,000
Factory lighting	3,000	Capital	43,000
Purchases	30,000		
Carriage	3,000		
Salary	2,000		
Office rent	2,000		
Printing and stationary	1,000		
Bad debts	1,000		
Land	10,000		
Buildings	20,000		
Plant and machinery	15,000		
Furniture	5,000		
Depreciation	2,000		
Debtors	5,000		
Cash in hand	5,000		
	1,33,000		**1,33,000**

Closing stock was valued at Rs. 19,000

[TURN OVER]

Q2 a Journalize following transactions in the books of Narayani. (10)

2016

Jan 1 Started business with cash Rs.80,000.
Jan 2 Bought goods for cash Rs.10,000.
Jan 3 Received from Lalita Rs.10,000.
Jan 4 Commission received by cheque of Rs.10,000.
Jan 5 Sold furniture for Rs.25,000.
Jan 6 Purchased goods of Rs.20,000 @ 10 % Cash Discount.
Jan 7 Issued cheque of Rs 5,000 to Nandkumar and sons.
Jan 8 Paid Insurance Premium of Rs.12,000 by cheque.
Jan 9 Salaries paid Rs.10,000.
Jan 10 Paid Rent Rs.2,500 by cheque.

b Briefly explain the Separate Entity Concept with example. (05)

Q3 a "Ratio Analysis is an important tool for judgment of the financial health of any organization." Elaborate. (10)

b What do you mean by Assets? Classify the assets with suitable examples. (05)

Q4 a Prepare Triple Column Cash Book from the following transactions and balance the same. (10)

2015

Nov. 1 Cash in hand Rs. 40,000 and Bank balance Rs. 35,000.
Nov. 2 Deposited in the bank Rs. 5,000/-.
Nov. 3 Sold goods to Rajkumar for Rs. 15,000/- and cash discount allowed 2% and received cash for the balance.
Nov. 4 Insurance Premium paid Rs. 8,000 by cheque.
Nov. 7 Bought goods from Rajan for Rs. 5,000, cash discount received 2% and paid cheque for the balance.
Nov. 9 Salaries paid by cheque Rs. 10,000.
Nov. 14 Paid Rs. 2,400 to Joshi & Co., half by cash and half by cheque.
Nov. 16 Dividend collected by the Bank as per pass book Rs. 2,000.
Nov. 18 Sold goods for cash and deposited into the bank on the same day Rs. 5,000.
Nov. 20 Received from Radhika Rs. 9,800 in settlement of her account for Rs. 10,000

b Write short note on trial balance. (05)

Q5 a Explain Accounting process with examples. (10)

b Explain compound Journal entry with example. (05)

Q6 a Following information is given by a company from its books of accounts as on March 31, 2016: (10)

Particulars	Amount (Rs.)
Inventory	1,00,000
Total current assets	1,60,000
Shareholders Fund	4,00,000
13% debentures	3,00,000
Current liabilities	1,00,000
Net profit before tax	3,51,000
Cost of revenue from operations	5,00,000

Calculate:
i) Current Ratio ii) Liquid Ratio iii) Debt Equity Ratio
iv) Interest Coverage Ratio v) Inventory Turnover Ratio

b What is cash flow statement? (05)

Q7 a From the following information prepare cash Budget for three months October-December 2015 (10)

Month	Credit Sales (Rs.)	Credit Purchases (Rs.)	Administration Expenses (Rs.)	Manufacturing Expenses (Rs.)
July	1,10,000	82,000	7,000	4,000
August	84,000	68,000	6,000	4,000
September	72,000	39,000	6,500	7,000
October	1,25,000	68,000	8,500	6,000
November	94,000	89,000	5,500	6,000
December	69,000	70,000	7,500	2,000

Other information:
1) Opening Cash balance is Rs.25,000.
2) Credit allowed by supplier is one month.
3) Credit allowed to customer is two month.
4) Delay in payment of Administration and Manufacturing expenses are one month.
5) Machinery purchased Rs.15,000 in the month of November

b What is Ledger? Explain necessity of ledger. (05)
