

MCA- SEM II (CBAs)  
Data Structure

10/5/16

QP Code : 26676

(3 Hours)

[Total Marks : 80

- Note: - 1) Question no. 1 is compulsory  
2) Attempt any four from remaining Q.no.2 to 7

1.

(a). Define an AVL tree. What is the need of balancing a binary search tree? Write an algorithm to rotate AVL tree Left and illustrate with the help of example. [10]

(b). Give the algorithm for quick sort and explain the algorithm for following data:

81, 94, 11, 96, 12, 35, 17, 95, 28, 58, 41, 75, 15

[10]

2.

(a). What is a Stack? Explain working of stack with suitable example and give the algorithms for push, pop, stack full and empty. [08]

(b). What is Algorithm analysis? Explain the concept of Big-O Notation. [07]

3.

(a). What is a doubly linked list? Write algorithms for [08]

- Adding a node in doubly linked list
- Searching a node in doubly linked list

(b). Define an expression tree? Write an algorithm to convert an infix expression to postfix expression. [07]

4.

(a). What is a Heap tree? Construct heap tree and apply heap sort for the following data values. [08]

49 6 46 82 9 55 4 90 12 2

(b). Define Binary Search tree. Write the algorithms for: [07]

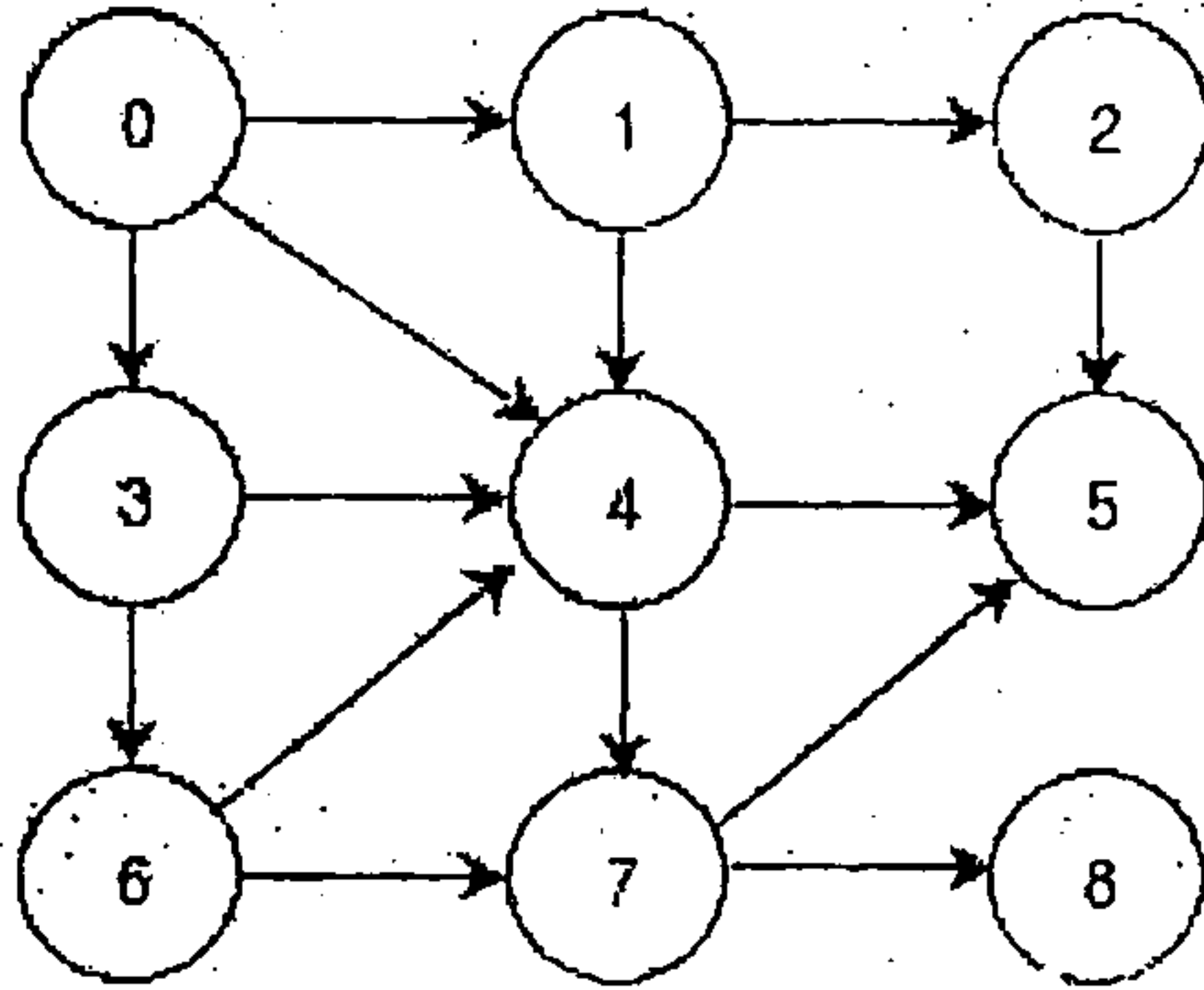
- Inserting an element in BST
- Finding the maximum element from the BST.

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YQ-Con. 7164-16.

5.

(a). Define a graph. Give the breadth first traversal for following graph. Also write the algorithm for the same. [08]



(b). Define a minimum spanning tree. Explain Prim's algorithm with suitable example. [07]

6.

(a). Explain the following:

- i) Backtracking
- ii) Priority queue

(b). Define B-tree. Build a B-tree of order 5 by inserting the following data in sequence: 80 21 4 6 5 17 1 20 13 15 16 75 [07]

7. Explain the following terms: [15]

- a. Mid Square Method
- b. Binary Search Technique
- c. B\* Tree

## Note:

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

1. a) Explain different File Allocation Techniques. 10
- b) What is deadlock? What are the necessary conditions for deadlock? Explain the techniques for handling deadlock? 10
2. a) Differentiate between the following: 8
  - 1) Monolithic kernel & Microkernel
  - 2) User level Thread & Kernel Level Thread.
- b) Explain the concept of Demand paging? On a simple paging system with 64 entries of 11 bits(including valid/invalid bit) each, and a page size of 512 bytes. 7
  - a) How many bits in a logical address specify offset?
  - b) How many bits in a logical address specify page number?
  - c) How many bits in a physical address specify frame number?
3. a) Consider the following set of processes. 8

Process	Arrival Time	Burst Time
A	0.0000	4
B	1.0001	3
C	2.0001	3
D	3.0001	5

Draw a Gantt Chart, and find average waiting time and average turnaround time for following process scheduling algorithm.

  - (a) FCFS First come first served
  - (b) Shortest Job first ( preemptive)
  - (c) Round robin (quantum =2)
- b) Explain the Domain structure and Access control Matrix for protection of the system. 7
4. a) What is Semaphore? How semaphores are used to solve the Producer Consumer problem? 8
- b) Explain different types of thread models. 7

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5. a) Given the disk has 200 (0-199) cylinders. Suppose the disk queue contains the request for I/O to blocks on the cylinder in following order:

55, 58, 39, 18, 90, 160, 150, 38, 184

The head of the disk drive is currently at cylinder at 100, previous request served was 130. What are the total head movements for the following algorithms?

a) FIFO    b) SSTF    c) SCAN    d) CSCAN

- b) Explain Direct Memory Access in detail.

6. a) Given reference string to the following pages by a program:

0, 9, 0, 1, 8, 1, 8, 7, 8, 7, 1, 2, 8, 2, 7 8, 2, 3, 8, 3

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

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

- b) Explain Linker and Loader

7. Write short notes on: (Any Three)

- a) Monitors  
b) Android OS  
c) Context Switch  
d) Translation Look aside buffer  
e) Thrashing

8

7

8

7

8

15



**QP Code : 26682****(3 Hours)****[Total Marks : 80**

Note :

- a) Question No. 1 is compulsory
- b) Attempt **any four** from the remaining six questions
- c) Assumptions should be made whenever required and should be clearly stated
- d) Answers to sub questions should be answered together
- e) Illustrate answers with diagrams wherever necessary

- |    |   |   |    |
|----|---|---|----|
| Q1 | A | What is congestion? Explain Congestion Control in TCP?  | 10 |
|    | B | Explain in Brief Multiprotocol Label Switch(MPLS)   | 10 |
| Q2 | A | Differentiate between CSMA CSMA/CD and CSMA/CA  | 8  |
|    | B | Explain various Framing Technique used by Data Link Layer?  | 7  |
| Q3 | A | Differentiate between<br>a. Go back N and Selective Repeat<br>b. Intranet ,Internet and Extranet  | 8  |
|    | B | Explain DHCP in detail? What is the advantage of DHCP over bootstrap?   | 7  |
| Q4 | A | An ISP is granted the block 16.12.64.0/20. The ISP need to allocate address for eight organization ,each with 256 address<br>a. Find the number and range of address in the ISP block<br>b. Show the outline of address distribution<br>c. Find the range of address for each organization and the range of unallocated address | 8  |
|    | B | Given Data Word 101001111 and divisor 10111 show the generation of CRC code word? Comment on the performance of CRC?  | 7  |
| Q5 | A | Why do routers need queuing algorithm? Explain M/M/1 model?   | 8  |
|    | B | What is QoS? What are the method used to provide QoS?   | 7  |
| Q6 | A | Explain the concept of Network Address Translation (NAT)  | 8  |
|    | B | What is inter Domain Routing? Explain BGP routing Protocol in detail?   | 7  |
| Q7 | A | Write Short note on<br>a. SMTP<br>b. DNS<br>c. Intermediate Devices   | 15 |

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**YQ-Con. 7170-16.**

20/5/16.

M.C.A. Sem-II (CBGS)  
Financial Accounting

QP Code : 26689

(3 Hours)

[ Total Marks : 80

- 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.

1. (a) What is ratio analysis? What are its advantages and limitations of ratio analysis? 10
- (b) Following is the Trial balance and adjustments of M/s Dhariya and Co. 10  
 for the year ended 31st March, 2016. Prepare trading A/c and profit & loss A/c for the year ended 31st March 2016 and Balance sheet as on that date.

Trial Balance

Particulars	Debit Balance (Rs.)	Particulars	Credit Balance (Rs.)
Opening Stock	32,000	Bills Payable	4,000
Drawings	15,000	Return Outward	2,000
Purchases	1,00,000	Capital	3,50,000
Return Inward	8,000	Sales	2,70,000
Debtors	50,000	Discount Received	3,000
Carriage Inward	4,700	Commission Received	4,000
Import Duty	2,500	Creditors	37,000
Wages	33,400		
Factory Insurance	3,800		
Salaries	41,400		
Printing and Stationary	5,000		
Postage	200		
Legal Expenses	20,000		
Cash at Bank	16,300		
Plant & Machinery	2,00,000		
Land & Building	1,26,000		
Cash in Hand	11,700		
<b>Total</b>	<b><u>6,70,000</u></b>	<b>Total</b>	<b><u>6,70,000</u></b>

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**Adjustments : -**

1. Closing Stock was valued at Rs. 40,000.
2. Depreciate Plant & Machinery at 5% and Land & Building at 10%
3. Outstanding Salary Rs. 4,000/-
4. Commission of Rs. 500 accrued but not received.

2. (a) Journalize the following transactions in the books of M/s Archana & Co. 10

1 Apr	Started business with cash Rs. 50,000/-, Machine worth Rs. 10,000/-, Furniture Rs. 15,000/- and computer worth Rs. 25,000.
4	Bought from Rajaram goods worth 60,000 off 20% T. D.
7	Sold half of the goods bought from Rajaram to Sitaram at 20% profit.
10	Withdrew from Bank Rs. 5,000 for self use.
16	Insured Goods worth Rs. 10,000 were lost by fire. Company admitted 50% claim.
19	Received the amount due from Sitaram by cheque after deducting 5% cash discount.
22	Paid advertisement charges Rs. 5,000.
23	Received Commission Rs. 500.
28	Old Machinery of Rs. 1,00,000 was sold at a loss of Rs. 50,000/- for cash
30	Paid salary Rs. 20,000

- (b) How do you differentiate trade discount and cash discount? 5
3. (a) What is cash book? Why we use triple column cash book? Why cash book is called journal as well as ledger? 10
- (b) What is the procedure of issuing Accounting Standard in India? 5

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4. (a) Prepare a Three column cash book with Cash, Bank & Discount columns from the following transactions of Mr. Jagmohan 10

1	Cash in hand Rs. 35,000 and cash at Bank Rs. 15,000.
2	Deposited into Bank Rs. 1,500.
4	Bought furniture and issued cheque of Rs. 2,500.
7	Purchased goods for cash Rs. 2,000.
12	Bank has sent an advice informing the deduction of Rs. 500 as bank charges.
14	Sold goods of Rs. 4,000 for cash at 5% Cash Discount.
20	Withdrew from Bank for Private expenses Rs. 800.
23	Received Crossed Cheque from Ganesh Rs. 3,000.
27	Viraj deposited Rs. 5,000 directly on our account.
30	Paid rent by cheque Rs. 1,000.

- (b) Enlist different Accounting Concepts. Explain any two in detail: 5

5. (a) From the following information calculate the following ratios. 10
1. Current Ratio
  2. Gross Profit Ratio
  3. Net Profit Ratio
  4. Stock Turnover Ratio
  5. Debtors Turnover Ratio.

Particulars	Rs.	Particulars	Rs.
Opening Stock	1,45,000	Share Capital	7,00,000
Closing Stock	1,55,000	Reserves	50,000
Purchases	6,10,000	Bank Overdraft	35,000
Sales	7,50,000	Creditors	1,50,000
Gross Profit	1,50,000	Land & Building	5,50,000
Net Profit	70,000	Debtors	1,80,000
Sundry Expenses	80,000	Cash in Hand	1,20,000

- (b) What are the advantages cash budget? 5

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6. (a) From the following data prepare cash budget for 3 months, April to June of Amruta Industries Ltd. 10  
 Opening cash balance for the month of April is expected to be Rs. 25,000/-

Months (Rs.)	Sales (Rs.)	Purchase (Rs.)	Wages (Rs.)	Production Overhead (Rs.)	Selling Overhead (Rs.)
February	70,000	50,000	9,000	5,000	2,500
March	80,000	60,000	7,000	6,000	3,500
April	1,00,000	70,000	6,000	7,000	4,000
May	1,20,000	80,000	8,000	9,000	5,000
June	1,10,000	70,000	10,000	8,000	5,500

Additional Information :

1. Credit Period allowed by suppliers - 1 month.
  2. Credit period allowed to customers - 2 month. 50% sale is on cash basis.
  3. Delay in payment of wages is -  $\frac{1}{2}$  month.
  4. Overheads have 1 month delay in payment.
  5. Machinery of Rs. 50,000/- is to be purchased. Make equal provision in May and June. 5
- (b) Explain the importance of ledger. Draw and Explain the format of ledger account. 10
7. (a) What is meant by operating, Investing and Financing Activities in Cash Flow Statement? 5
- (b) Explain the term Capital Gearing in ratio analysis.

MCA sem-II  
Probability & statistics

(CBAS)

18/5/16

601  
2015/16

QP Code : 26685

(3 Hours)

[Total Marks : 80

- N.B (1) Question No1 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.

1. (a) i) Find the value of k such that  
 $f(x) = kx^2(1-x^3), \quad 0 < x < 1$   
 $= 0$  otherwise  
Is a proper density function of a continuous variable 05

- ii) Calculate the modal marks for the following: 05

Marks	10-30	30-50	50-70	70-90	90-110	110-130
No:of students	4	10	14	12	8	6

- (b) i) The probability of occurrence of an event A is 0.7, the probability of non-occurrence of B is 0.5 and non-occurrence of at least one of A and B is 0.6. Find the probability that at least one of A and B occurs. 05

- ii) Let  $X_1$  and  $X_2$  be two stochastically independent random variables having variance k and 2 respectively. If variance of  $Y=3X_1-X_2$  is 25 find k. 05

2. (a) The joint probability density function of a two dimensional random variable (X,Y) is given by 08  
 $f(x,y) = 2 \quad 0 < x < 1, 0 < y < x$   
 $= 0$  elsewhere

- i) Find the marginal density functions of X and Y.

- ii) Find the conditional density function of Y given  $X=x$  and conditional density function of X given  $Y=y$ .

- (b) Assume that the number of messages input to a communication channel in an interval of duration t seconds is Poisson distributed with parameter 0.3 t. 07  
i) Compute the probability that exactly 3 messages will arrive during 10 seconds interval.  
ii) At most 20 messages arrive in a period of 20 seconds

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QP Code : 26685

3. (a) In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find 08  
 (1) How many students scored between 12 and 15?  
 (2) How many scored above 18?  
 (3) How many scored below 8?  
 (4) How many scored 16?  
 $P(0 \leq Z \leq 0.4) = 0.1554$ ,  $P(0 \leq Z \leq 0.8) = 0.2881$ ,  $P(0 \leq Z \leq 1.6) = 0.4452$ ,  
 $P(0 \leq Z \leq 2.4) = 0.4918$

- (b) In manufacturing a 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 chosen component has one kind of defect, given that it is found to be defective? 07

4. (a) The following are the marks obtained by 8 students in 2 subjects Computer Graphics (CG) and Probability and Statistics (PS). Calculate rank correlation coefficient. 08

Marks in CG	15	20	28	12	40	60	20	80
Marks in PS	40	30	50	30	20	10	30	60

- (b) The following table gives the number of accidents in a city during a week. Find whether the accidents are uniformly distributed over a week. 07

Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
No: of accidents	10	8	11	9	12	10	10

Given for 6 degrees of freedom at 5% level of significance the table value of  $\chi^2$  is 12.59.

5. (a) Calculate Bowley's coefficient of skewness for the following data: 08

Wages	1000-2000	2000-3000	3000-4000	4000-5000	5000-6000
No: of workers	7	12	18	8	5

- (b) A random variable X takes the values 1, 2, 3 and 4 such that  $4P(X=1) = 2P(X=2) = 3P(X=3) = P(X=4)$ . Find the probability distribution and cumulative distribution function of X. 07

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3

QP Code : 26685

A

6. (a) i) What is the probability that 4 A's come consecutively in the arrangement of the letters in the word 'MAHARASHTRA'? 04

ii) 04

Calculate the coefficient of variation for the following data

Daily wages(Rs)	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
No:of workers	17	27	42	61	72	65	47	34	22	13

(b) i) Given that  $n=9$ ,  $\sum x^2 = 285$ ,  $\sum y^2 = 1356$ ,  $\sum x = 45$ ,  $\sum y = 108$ ,  $\sum xy = 597$ . Calculate correlation coefficient 04

ii) If hens of a certain breed lay eggs on five days of a week on an average, find how many days during a season of 100 days, a poultry keeper with 5 hens of this breed, will expect to receive at least 4 eggs? 03

7. (a) i) Consider discrete random variables X and Y with joint p.m.f. as below:- 04

X\Y	1	2	3
1	2/16	2/16	1/16
2	3/16	2/16	1/16
3	2/16	1/16	2/16

Find the conditional distribution of X given Y=2.

ii) Find the mean deviation about mean for the following data 04

X	10	11	12	13	14
Frequency	3	12	18	12	3

(b) i) The mean of two samples of size 50 and 100 respectively are 54.1 and 50.3 and standard deviation are 8 and 7. Find the mean and standard deviation of the sample obtained by combining the two samples. 04

ii) Establish the lack of memory property of geometric distribution. 03

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