

Marks: 100

Time: 3 hours

- Note:
- Question 1 is compulsory
  - Answer any 4 from the remaining 6 questions
  - All questions carry equal marks

- Q1 a) For a singly linked list, write algorithms to
- i) Count the number of nodes in the list
  - ii) Delete a node in the list
- (10)

- b) Given the set of symbols and corresponding frequency table as below, explain the steps to find the Huffman Code

Symbol	A	B	C	D	E	F	G	H	I
Frequency	3	2	8	10	5	1	14	3	6

(10)

- Q2 a) Define an AVL Tree. What is the advantage of using AVL Trees? Create an AVL Tree using the following data entered as a sequential set. Show the Balance Factors.  
11, 13, 7, 10, 33, 26, 90, 65, 70
- (10)
- b) Define and explain the stack data structure with a suitable example. Give algorithms for the Push, Pop, StackFull, Peek and StackEmpty functions
- (10)

- Q3 a) What is hashing? Explain the terms synonym, collision and home address. Using digit extraction (1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup>) method for hashing and linear probing method for collision resolution; store the keys given below in an array of 19 elements. How many collisions occurred? Determine the density of the list.  
224562, 137456, 214562, 140145, 214576, 162145
- (10)
- b) Define the efficiency of an algorithm. Explain the process of analysis of an algorithm as well as the notations used (Big O,  $\Omega$ ,  $\theta$ )
- (10)

- Q4 a) What is a heap? Give the algorithm for Reheap Up.  
Construct a Max Heap for the following data values arriving in sequence 26, 41, 15, 2, 75, 54, 92, 22.
- (10)
- b) For a circular linked list write algorithms to
- i) Insert an element in the list
  - ii) Search for an element in the list
- (10)

- Q5 a) What is sorting? Sort the following elements using Quick Sort method 55, 12, 3, 90, 16, 42, 70, 19. Also give the algorithm and efficiency for the same.
- (10)
- b) Define a Priority Queue. Write an algorithm to
- (10)

**[ TURN OVER**

QP Code : 19302

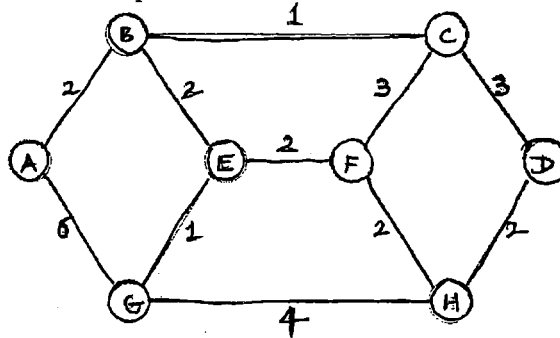
2 →

- i) Insert an element in the priority queue.
- ii) Delete an element from the priority queue

Q6 a) What is a Binary Search Tree. Give algorithms to  
 i) Insert a node in the BST  
 ii) Find the smallest node in the BST (10)

b) Define a B Tree. Construct a B Tree of order 3 for the following data values arriving in sequence 67, 32, 18, 29, 93, 89, 97, 91, 34, 55, 83. (10)

- Q7 a) i) Find the minimum spanning tree using Prim's algorithm  
 ii) Find the shortest path from vertex B to all other nodes using Dijkstra's algorithm



(10)

- b) Explain the differences between  
 i) Tree and a graph  
 ii) Ordinary queue and circular queue (10)

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(3 hours)

Marks: 100

- N.B. (1) Question No. 1 is compulsory.  
(2) Figures to the right indicate maximum marks.  
(3) Attempt any four questions from Question No 2 to 7

- Q.1 A) For the processes listed in the table, draw a Gantt chart & find their average turnaround time and average waiting time using :- 12
- First Come First Serve
  - Shortest job first ( both preemptive & non preemptive)
  - Round Robin(quantum=2ms)

Process	Arrival time	Processing time (ms)
A	0	6
B	1	5
C	1	4
D	2	1

- B) Differentiate between the following 08
- Simple paging and simple segmentation
  - Counting semaphore and Binary Semaphore
- Q.2 A) What is deadlock? Explain in brief Deadlock prevention, avoidance and detection. 10
- B) What is page fault? Given references to the following pages by a program 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 Using FIFO, LRU and Optimal page replacement policy, how many page faults will occur if the program has assigned five page frames. 10
- Q.3 A) What is process scheduling? What is the difference between long term, medium term and short term scheduler? What are the criteria for short term scheduling? 10
- B) What are the features of LINUX operating system? What is shell? What are the different types of shell in LINUX? Explain each shell in brief. 10
- Q.4 A) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. 10
- 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?
- a. FCFS b. SSTF c. SCAN d. LOOK e. C-SCAN
- B) Define OS. What are the functions of Operating system? Explain different types of OS with suitable examples. 10
- Q.5 A) Explain in brief file allocation methods. 10
- B) What is a difference between passive and active security threats? List and briefly define the categories of passive and active security threats. 10

**2****QP Code : 19308**

- Q.6 A) What is the difference between internal and external fragmentation? Given 10  
memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each  
of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K,  
112K, and 426K (in order)? Which algorithm makes the most efficient use of  
memory?
- B) What is locality of reference? What is demand paging? 10  
Assume we have a demand-paged memory. The page table is held in registers. It  
takes 8 milliseconds to service a page fault if an empty page is available or the  
replaced page is not modified and 20 milliseconds if the replaced page is modified.  
Memory access time is 100 nanoseconds.  
Assume that the page to be replaced is modified 70 percent of the time. What is the  
maximum acceptable page-fault rate for an effective access time of no more than  
200 nanoseconds?
- Q.7 Write a short note on any four 20
1. Compiler
  2. Spooling and buffering
  3. Access matrix and capability list
  4. Context switching
  5. Direct Memory Access (DMA)
  6. Process Control Block (PCB)
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**M.C.A (Sem – II)**  
**Accounting and Financial**  
**Management**  
**April - 2015**

M.C.A.(Sem -II)

**QP Code : 19314**

April - 2015

(3 Hours)

**[ Total Marks : 100**

- N.B.:** (1) Question No.1 is compulsory.  
(2) Attempt any two questions from 2-4.  
(3) Attempt any two questions from 5-7.  
(4) Answer to the questions should be grouped and written together.  
(5) **Figures to the right** indicate full marks assigned to the question.

1. (a) What is main purpose of preparing cash flow statement and explain its significance. **10**  
(b) From the following Trial Balance of M/s. Ram & Sons, prepare trading and profit and loss account for the year ending on 31<sup>st</sup> March 2015 and the balance sheet as on the date: **10**

Trial Balance as on 31<sup>st</sup> March 2015

Particulars	Debit (Rs.)	Credit (Rs.)
Opening stock	5,000	
Purchases	16,750	
Discount allowed	1,300	
Wages	6,500	
Sales		30,000
Salaries	2,000	
Travelling expenses	400	
Commssion	425	
Carriage inward	275	
Administrative expenses	105	
Trade expenses	600	
Interest	250	
Building	5,000	
Furniture	200	
Debtors	4,250	
Creditors		2,100
Capital		13,000
Cash	2,045	
<b>Total</b>	<b><u>45,100</u></b>	<b><u>45,100</u></b>

Adjustment

- (i) Closing stock was Rs. 6,000

**QP Code : 19314**

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2. (a) Explain different methods of costing with an example. 10
- (b) Journalise the following transactions in the books of Ranganathan for the month of January 2013. 10

2013 Jan 1	Started business with cash Rs. 4,00,000, Furniture Rs. 10,000 and Office equipment Rs. 12,000.
Jan 2	Purchased goods from M/s Kundan and Bros on credit Rs. 1,00,000 at 10% Trade discount.
Jan 3	Purchased goods from M/s Gupta and Sons in cash worth Rs. 2,00,000 at 10% Trade discount and 20% cash discount.
Jan 4	Paid salaries to employees Rs. 12,000
Jan 19	Opened on A/c with SBI by depositing Rs. 50,000
Jan 21	Withdrawn cash from business Rs. 10,000
Jan 22	Withdrawn cash from SBI Rs. 10,000 for office use.
Jan 25	Goods distributed as free sample Rs. 10,000
Jan 28	Cash sales Rs. 1,00,000
Jan 31	Deposited Rs. 30,000 in SBI.

3. (a) What is bank Reconciliation statement and give reasons for differences in bank balance. 10
- (b) What are different types of Account ? Explain them with example. 10
4. (a) Name any five balance sheet ratios. Why are they called static ratios ? 10
- (b) Prepare triple column cash book with cash Bank and discount columns from the following information in the books of Sunil. 10

2013 Jan 1	Cash balance Rs. 12,000 and bank balance Rs. 5,000
Jan 2	Bank Charged Rs. 10 as cheque book charges
Jan 3	Cash sales Rs. 2,000
Jan 5	Deposited Rs. 1,000 into bank
Jan 15	Paid electricity of Rs. 150 by cheque
Jan 27	Cash purchases Rs. 1,800
Jan 28	Paid Anita Rs. 980 in full settlement of her Account of Rs. 1,000
Jan 30	Salaries paid by cheque Rs. 1,000
Jan 31	Sold goods on cash worth Rs. 5,000

**QP Code : 19314**

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5. (a) Explain Accounting Process in detail. 10  
 (b) Calculate Current Ratio and liquid ratio from the following extracts of balance sheet. 10

	2010	2011
Proprietors fund	3,55,000	3,40,000
Fixed assets less depreciation	1,95,000	225000
<b>Current assets</b>		
Cash on hand	250	350
Stock on hand	1,28,200	1,30,200
Debtors	1,25,050	1,20,000
Prepaid expenses	1,500	--
<b>Current liabilities</b>		
Bank overdraft	38,000	--
Sundry creditors	26,000	35,000
Provision for taxation	9,250	12,000
Proposed dividend	15,000	12,000
Outstanding expenses	6,750	5,000

6. (a) Prepare a cash budget from the following information for April, May and June. 10

Month	Credit sales (Rs.)	Credit purchase (Rs.)	Office expenses (Rs.)
February	45,000	30,000	8,000
March	55,000	25,000	7,000
April	60,000	20,000	7,000
May	60,000	40,000	9,000
June	65,000	40,000	9,000

Other information :-

1. Opening cash balance Rs. 5,000
2. Credit allowed by suppliers is two month
3. Credit allowed to customers is one month
4. Office expenses are payable in the same month
5. Dividend Rs. 1,000 is receivable in April
6. Interest payable in May Rs. 1800

- (b) What is Ledger ? Explain necessity of ledger. 10

7. (a) What is budgetary control ? Why it is needed? 10  
 (b) Explain different types of working capital with an example. 10

**(3 Hours)**

**[Total Marks : 100**

- N.B.
- i) Question No. 1 is Compulsory.
  - ii) Attempt any four from question nos. 2 to 7.
  - iii) Figures to the right indicate marks.
- Q.1 (a) Explain the Cohen Sutherland line clipping algorithm with the help of an example. 10
- (b) Apply the shearing transformation to square with A(0,0), B(1,0), C(1,1), D(0,1) as given below – 10
- 1. Shear parameter value of 0.5 relative to the line  $Y_{ref}=-1$
  - 2. Shear parameter value of 0.5 relative to the line  $X_{ref}=-1$
- Q.2 (a) Derive and write the Generalized Bresenham's line drawing algorithm. 10
- (b) Rasterise the ellipse having  $r_x=8$  and  $r_y=6$  in first quadrant. 10
- Q.3 (a) Explain and write the Z buffer Algorithm along with its advantages and disadvantages. 10
- (b) Find out the final co-ordinates of a figure bounded by the co-ordinates (1,1), (3,4), (5,7), (10,3) when rotated about a point (8,8) by  $30^\circ$  in clockwise direction and scaled by two units in x-direction and three units in y-direction. 10
- Q.4 (a) What are Display Files? Explain with examples, how are polygons and characters represented in display file. 10
- (b) Construct the Bezier curve of order three and with four polygon vertices A(1,1), B(2,3), C(4,3) and D(6,4). 10
- Q.5 (a) What are projections? How are they useful? Explain different types of projections with examples. 10
- (b) Compare and contrast B-Spline and Bezier curves. 10
- Q.6 (a) Discuss various colour models used in graphics system. 10
- (b) Find a normalization transformation from the window whose lower left corner is at (1,1) and upper right corner is at (3,5) onto the viewport with lower left corner at (0,0) and upper right corner at (1/2, 1/2). 10
- Q.7 Write short note **any four** of the following: 20
- (a) Diffuse Illumination
  - (b) Computer Animation
  - (c) Inverse Transformations
  - (d) Frame Buffer
  - (e) DVST



**M.C.A (Sem – II)**  
**Probability and Statistics**  
**April - 2015**

M.C.A.(Sem -II)

**QP Code : 19310**

April - 2015

100 Marks

N.B 1. Question No.1 is compulsory

2. Attempt any four questions out of the remaining six questions
3. Figures to the right indicate marks
4. Use of scientific calculator is allowed

Q1.

I a) The age of student is normally distributed with mean of 12 years and standard deviation of 4 years. Find the probability that

- i) age of student is at least 20 years
- ii) Age of student is between 0 and 12 years.

[Given  $p(0 \leq z \leq 2) = 0.4772, p(0 \leq z \leq 3) = 0.49865$ ] (5)

b) In a frequency distribution of 100 families given below, the number of families corresponding to expenditure group 20-40 and 60-80 are missing from the table. However the median is known to be 50. Find out the missing frequencies

Expenditure	0-20	20-40	40-60	60-80	80-100
No of families	14	?	27	?	15

(5)

II

- a) prove that  $E(ax+b) = aE(x)+b$  and  $V(ax+b) = a^2V(x)$  (5)
- b) The mean and standard deviation of 300 items are found to be 50 and 20 respectively. At the time of calculation two items were wrongly taken as 7 and 52 instead of 15 and 26. Find the correct mean and standard deviation. (5)

Q2.

a) The joint probability density function of a two dimensional random variable (X,Y) is given by  
 $f(x,y) = 2, 0 < x < 1, 0 < y < x$   
 $= 0, \text{ otherwise}$

Find the marginal density functions of x and y. Conditional density functions of y given X=x and conditional density function of x given Y=y (10)

b)

**[ TURN OVER**

**EN-Con. : 10274-15.**

2

QP Code : 19310

i) Calculate Bowley's coefficient of skewness for the following distribution

Class	30-35	35-40	40-45	45-50	50-55	55-60
Frequency	5	10	30	35	15	5

(5)

ii)

The following data gives the number of car accidents in the city during a random week. Test whether these accidents are uniformly distributed or not [Value of Chi square at 5% level of significance for degrees of freedom 6 is 12.595]

Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
No of accidents	10	17	11	13	17	14	16

(5)

Q3.

a)

i) if "m" things are distributed among 'a' men and 'b' women show that the probability that the number of things received by men is odd is

$$1/2 [(b+a)^m - (b-a)^m / (b+a)^m] \quad (5)$$

ii) A binomial variable X satisfies the relation  $9P(X=4) = P(X=2)$ , when  $n=6$  find the value of parameter P (5)

b) Ten competitors in a beauty contest are ranked by three judges in the following order

I judge	1	6	5	10	3	2	4	9	7	8
II judge	3	5	8	4	7	10	2	1	6	9
III judge	6	4	9	8	1	2	3	10	5	7

Use Spearman's rank correlation co-efficient to determine which pair of judges has the nearest approach to common tastes in beauty (10)

Q4.

a)

i) Find the co-efficient of variation for the following data (5)

[ TURN OVER

3

QP Code : 19310

X	20-40	40-60	60-80	80-100	100-120	120-140
f	7	12	16	13	13	4

ii) A continuous random variable has p.d.f.

(5)

$$f(x) = k(2-x) \quad , 0 \leq x < 2$$

$$= kx(x-2) \quad , 2 \leq x < 3$$

$$= 0 \quad \text{otherwise.}$$

Find k.

b)

i) A petrol pump is supplied with petrol once a day. If its daily volume X of sale in thousands of liters is distributed by  $f(x) = 5(1-x)^4$   $0 \leq x \leq 1$ . What must be the capacity of the tank such that its daily supply will be exhausted in a given day shall be 0.01

(5)

ii) The ages of husband and wives in seven couple were as follows

Age of husband	45	44	50	53	66	30	48
Age of wife	42	40	41	42	56	30	43

Find the Pearsonian co-efficient of correlation between their age

(5)

Q5.

a)

i) The life in hours (x) of a certain electronic component is a continuous random variable with pdf

$$f(x) = 150/x^2, \quad x \geq 150$$

$$= 0, \text{ otherwise}$$

Determine the form of the distribution function F(x). Also find the probability that a component would last for more than 200 hours but less than 500 hrs

(5)

ii) Prove that geometric distribution is memory less

(5)

b)

i) Calculate median from the following data

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	05	08	15	16	06

(5)

ii) Calculate Karl-Pearson's co-efficient of skewness from the following data

Marks less than	10	20	30	40	50
No of students	5	12	32	44	50

(5)

Q6.

[ TURN OVER

EN-Con. : 10274-15.

4

QP Code : 19310

a)

i. The mean weekly sales of chocolate bar in candy 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? (5)

[ Given the table value of 't' at 5% level of significance for degrees of freedom 21 is 1.721]

ii)

In a railway reservation office two clerks are in checking reservation forms. On an average the first clerk checks 55% of the forms while the second does the remaining . The first clerk has an error rate 0.3 and the second has an error rate of 0.2. a reservation form is selected at random and is found to have an error . What is the probability that it was checked by the first clerk? (5)

b)

i)

Calculate the modal marks for the following:

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

(5)

ii) What is the probability that four "A" s come consecutively in the arrangement of letters in the word "MAHARASHTRA" (5)

Q7.

a)

i) For 8 observations the following results were calculated  $\sum X=59, \sum Y=40, \sum X^2=524, \sum Y^2=256, \sum XY=344$ . Find the regression equations of X on Y and Y on X (5)

ii) The probability distribution of a bivariate random variable(X,Y) is given below

Y \ X	1	2	3	Total
1	0.1	0.1	0.2	0.4
2	0.2	0.3	0.1	0.6
Total	0.3	0.4	0.3	1

Find  $E(X+Y)$  and  $E(XY)$

(5)

b)

[ TURN OVER

EN-Con. : 10274-15.

5

QP Code : 19310

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 occur.

(5)

ii) Calculate mean deviation from mean and its coefficient from the following data

Size of items	3-4	4-5	5-6	6-7	7-8	8-9	9-10
Frequency	3	7	22	60	85	32	8

(5)

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**M.C.A (Sem – II)**  
**Communication and Soft**  
**Skills**  
**April - 2015**

M.C.A.(Sem -II)

**QP Code : 19316** April - 2015

Total Marks : 100

Duration : 3 Hours

1. Question No.1 is compulsory.
2. Answer any 4 Questions of the remaining 6 Questions.
3. Answers to the Questions should be grouped and written together.
4. Figures to the right indicate full Marks assigned to the Questions.

**Q.1 A)** Define 'Personality' and elucidate personality types and also explain how do personalities differ? (10 Marks)

**Q.1 B)** Discuss the methods of communication with examples. (10 Marks)

**Q.2)** Briefly explain the following:

- a) Importance of Effective Listening in business communication (10 Marks)
- b) Principles of Business Correspondence with examples. (10 Marks)

**Q.3.A)** Explain the concept of 'Goal Setting' and impact of goals on work life balance. (10 Marks)

**Q.3.B)** Discuss the strategies to conduct successful business meetings. (10 Marks)

**Q.4.A)** Write short notes on any two of the following: (10 Marks)

- a) Downward Communication
- b) Physical Barriers to Communication
- c) E-mail Writing

**Q.4.B)** Discuss Presentation Techniques? (10 Marks)

**Q.5.A)** Differentiate the terms 'leaders' and 'managers'. Discuss various Leadership styles. (10 Marks)

**Q.5.B)** Write Short notes explaining any two of the following terms. (10 Marks)

- a. Power and Politics in Organizations
- b. Causes and symptoms of Stress
- c. Emotional Intelligence

**Q.6.A)** What are the essential elements of a Job Interview and give a detailed note on the Verbal and Non-verbal communication during interviews. (10 Marks)

**Q.6.B)** Draft a notice and agenda to call for a third quarterly meeting of Customer Service Committee of Bharat Bank which includes bank staff and members of the management committee relating to modernization of banking services. (10 Marks)

P.T.O

- 02 -

**QP Code : 19316**

**Q.7.A) Write Short Notes on any two of the following: (10 Marks)**

- a. Organizational Culture
- b. Technical Reports
- c. Skills needed to participate in a Group Discussion

**Q.7.B) List and explain the essential parts of an effective resume. (10 Marks)**

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