TEE/BCA204(BL/OLD) /BCAC204(BL/OLD) /BCS203(BL/OLD) /

BCSC203(BL/OLD) / 2018 - 19



Term End Examination 2018 - 19

Programme –Bachelor of Computer Applications/Bachelor of Science (Honours) in Computer Science

Course Name - Mathematics-II

Course Code - BCA204/BCAC204/BCS203/BCSC203

(Semester - 2)

Time allotted: 3 Hours Full Marks: 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in

their own words as far as practicable.]

Group -A

(Multiple Choice Type Questions) $10 \times 1 = 10$ 1. Choose the correct alternative from the following: A vertex of degree 1 is called (i) a. Isolated vertex b. Pendant vertex d. None of these c. Even vertex (ii) If a path is considered as a sub graph, then the degree of the intermediate vertices is a. 0 b. 1 c. 2 d. 3 If a graph has 6 vertices and 15 edges, then the size of its adjacency matrix is (iii) a. 6x15 b. 15x6 c. 6x6 d. 15x15 If G is a binary tree with 11 vertices, then the number of pendant vertices of G are (iv) a. 3 b. 4 c. 5 d. 6 If an edge of a tree is deleted, then it becomes (v) a. disconnected b. binary tree c. spanning sub graph d. None of these (vi) If P(A)=0.2, P(B)=0.4, P(A+B)=0.6, then the events A,B are a. independent b. mutually exhaustive c. mutually exclusive d. none

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(vii) The mode of the frequency distribution is:

X	0	1	2	3
f	8	24	36	10
a. 0			b.	1

c. 2

- d. 3
- (viii) Condition for independence of two events A and B is
 - a. $P(A \cap B) = P(A) \cdot P(B)$
- b. P(A+B) = P(A).P(B)
- c. P(A-B) = P(A).P(B)
- d. $P(A \cap B) = P(A) \cdot P(B/A)$
- (ix) If $P(A+B) = \frac{2}{7}$ then $P(\overline{A}.\overline{B}) = ?$
 - a. $\frac{1}{7}$

b. $\frac{2}{7}$

c. $\frac{5}{7}$

- d. None of these
- (x) Using Depth First Search (DFS) procedure or Breadth First Search (BFS) procedure, we find a
 - a. Spanning Tree

b. Binary tree

c. Rooted tree

d. None of these

Group - B

(Short Answer Type Questions)

 $3 \times 5 = 15$

Answer any three from the following:

- 2. If \overline{x}_1 be the mean of n_1 observations, \overline{x}_2 be the mean of n_2 observations and \overline{x}_3 [5] be the mean of n_3 observations then prove that the mean \overline{x} of the composite group of $n_1+n_2+n_3$ observations will be $\overline{x} = \frac{n_1\overline{x}_1 + n_2\overline{x}_2 + n_3\overline{x}_3}{n_1 + n_2 + n_3}$
- 3. Find the mean deviation from the mean of the following distribution.

Variate(x)	6	9	10	11	12
Frequency(f)	1	2	3	2	2

4. Write a short note on "Seven bridge problem"

[5]

[5]

- 5. Define "Bipartite graph" and "Complement of a graph" with examples. [2+3]
- 6. Show that the probability of occurrence of only one of the events A and B is P(A)+P(B)-2P(AB)

Group - C

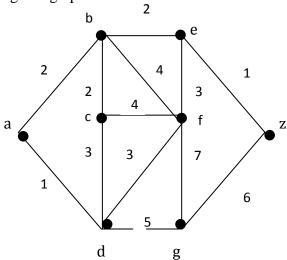
(Long Answer Type Questions)

 $3 \times 15 = 45$

[7]

Answer any three from the following:

7. (a) Apply Dijkstra's method to find the shortest path and distance between the two vertices **a** & **z** in the given graph. [8]



(b) Calculate the mean and median of the frequency distribution given below. Hence calculate the mode using the empirical relation between the three.

Class	130-	135-	140-	145-	150-	155-	160-
limit	134	139	144	149	154	159	164
Frequency	5	15	28	24	17	10	1

8. (a) 0 1 [7]

Find the degree of each vertex of the given undirected graph. Hence show that sum of degrees of the vertices is twice the number of edge.

(b) If
$$P(A) = 1/2$$
, $P(B) = 1/3$, $P(AB) = 1/4$, then [6+2]

- i. find the following probabilities: $P(A^C),\,P(A+B),\,P(A\,/\,B),\,P(A^C\,B),\,P(A^C\,B^C),\,P(A^C+B)$
- ii. State whether the events A and B are mutually exclusive, exhaustive, equally likely and independent.

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[6]

[5]

9. (a) In the following data, two class frequencies are missing.

Class	100	110	120	130	140	150	160	170	180	190
	-	-	-	-	-	-	-	-	-	-
	110	120	130	140	150	160	170	180	190	200
Frequency	4	7	15	?	40	?	16	10	6	3

However it is possible to ascertain that total number of frequencies was 150 and median has been correctly found out as 146.15. Find the missing frequencies

(b) If A and B are two events associated with the same experiment E, then prove that

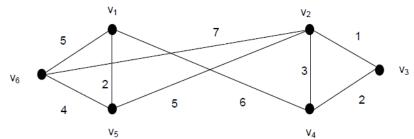
$$P(A+B)=P(A)+P(B)-P(A.B)$$

10.

Draw the graph from the following matrix: $\begin{vmatrix} 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{vmatrix}$

(a) Prove that for a 'p-regular' graph with n number of vertices, the number of edges should be exactly
$$\frac{np}{2}$$
.

(b) Find the minimal spanning tree from the following graph using Prim's [6] algorithm.



(c) Find the mean and S.D of the first n natural numbers [5]

11. (a) The mean of five observations is 4.4 and the variance is 8.24 in suitable [5] units. If three of the observations are 1,2 and 6, find the other two.

(b) There are three identical urns containing white and black balls. The first urn contains 3 white and 4 black balls, the second urn contains 4 white and 5 black balls and third urn contains 2 white and 3 black balls. An urn is chosen at random and a ball is drawn from it. If the drawn ball is white, what is the probability that the second urn is chosen?

Prove that the number of pendent vertices in a binary tree is $\frac{1}{2}(n+1)$, where n is the number of vertices in the binary tree.
