



**BRAINWARE UNIVERSITY**

**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 x 1 = 10

1. **Choose the correct alternative from the following:**

- (i) A vertex of degree 1 is called
- |                    |                   |
|--------------------|-------------------|
| a. Isolated vertex | b. Pendant vertex |
| c. Even vertex     | d. None of these  |
- (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 |
- (iii) If a graph has 6 vertices and 15 edges, then the size of its adjacency matrix is
- |         |          |
|---------|----------|
| a. 6x15 | b. 15x6  |
| c. 6x6  | d. 15x15 |
- (iv) If G is a binary tree with 11 vertices, then the number of pendant vertices of G are
- |      |      |
|------|------|
| a. 3 | b. 4 |
| c. 5 | d. 6 |
- (v) If an edge of a tree is deleted, then it becomes
- |                       |                  |
|-----------------------|------------------|
| 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                |



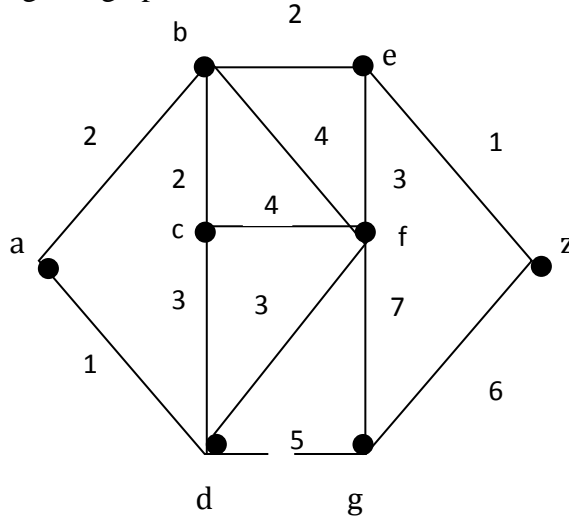
**Group – C**

(Long Answer Type Questions)

3 x 15 = 45

**Answer any three from the following:**

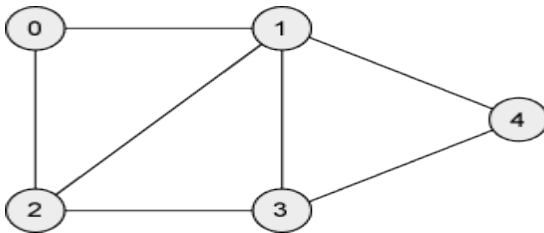
7. (a) Apply Dijkstra’s method to find the shortest path and distance between the two vertices **a** & **z** in the given graph. [8]



- (b) Calculate the mean and median of the frequency distribution given below. Hence calculate the mode using the empirical relation between the three. [7]

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

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

9. (a) In the following data, two class frequencies are missing. [6]

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

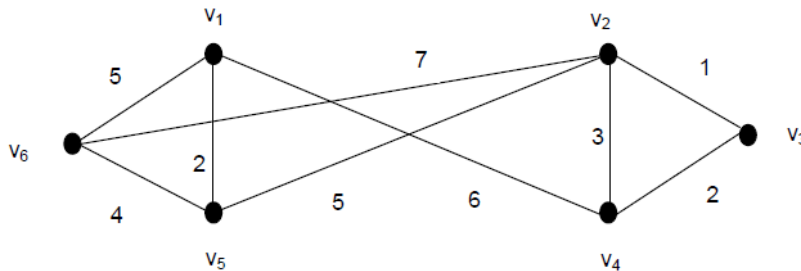
However it is possible to ascertain that total number of frequencies was 150 and median has been correctly found out as 146.15. Find the missing frequencies

- (b) If A and B are two events associated with the same experiment E, then prove that [5]  
 $P(A+B)=P(A)+P(B)-P(A.B)$

- (c) [4]
- $$\begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \end{bmatrix}$$
- Draw the graph from the following matrix:

10. (a) Prove that for a ‘p-regular’ graph with n number of vertices, the number of edges should be exactly  $\frac{np}{2}$ . [4]

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



- (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 units. If three of the observations are 1,2 and 6, find the other two. [5]

- (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? [5]

- (c) Prove that the number of pendent vertices in a binary tree is  $\frac{1}{2}(n+1)$ , [5]  
 where n is the number of vertices in the binary tree.