



Date: 02-11-2018
Time: 09:00-12:00

Dept. No.

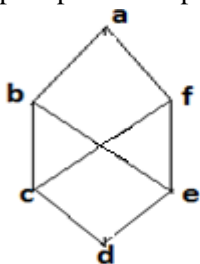
Max. : 100 Marks

PART A

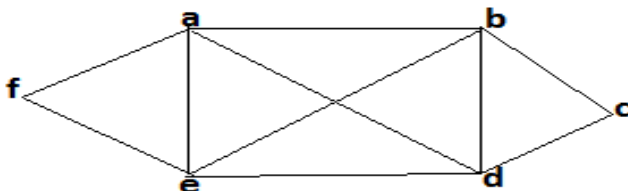
Answer ALL the questions:

(10 x 2 = 20 marks)

1. Define Symmetric matrix with example.
2. Show that the matrix $A = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$ is an Orthogonal matrix.
3. Define population.
4. Write the formula for Standard Deviation.
5. Define : Complete Graph
6. What is a bridge in a graph? Give example.
7. Is the following Graph a planar Graph? If yes, draw the Graph.



8. Is the following graph, an Euler or a Hamiltonian? If so, how?



9. For the given equation $x^3 - 4x + 1 = 0$, the root lies between ____ and ____.
10. Write the formula of Newton's Forward Interpolation method.

PART B

Answer ALL the questions

(5 x 8 = 40 marks)

- 11 a. Find whether the given equations are consistent and find the values of x, y and z.

$$\begin{aligned} x+y+z &= 9 \\ 2x+5y+7z &= 52 \\ 2x+y-z &= 0. \end{aligned}$$

(OR)

- b. Find the Eigen values and Eigen Vectors of the matrix $A = \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$

- 12 a. Find the sample variance for the given data:

A: 1, 2, 5, 6, 6

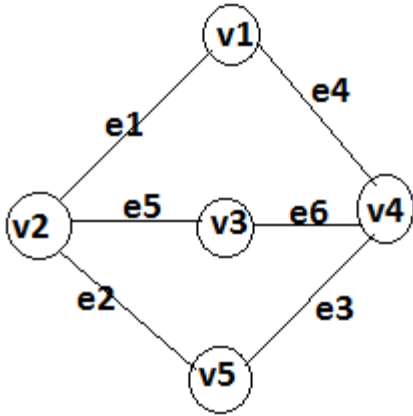
(OR)

- b. The following data give the number of car thefts that occurred in a city during the past 12 days.

6, 3, 7, 11, 4, 3, 8, 7, 2, 6, 9, 15.

Find the Mean, Median, Mode and Range.

13a. Find the Adjacency Matrix and Incidence Matrix for the given Graph.



(OR)

b. Prove that if G is not connected, then \bar{G} is connected.

- 14 a. i) Prove that every connected graph has a spanning tree.
 ii) Compare Tree and Forest.

(OR)

b. Explain Eulerian graph and Hamiltonian graph with suitable example.

15 a Find the appropriate root of $x^2 + x - 5 = 0$ by using Newton Raphson Method.

(OR)

b. Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Simpsons $\frac{3}{8}$ rule with $n=6$.

PART C

Answer any TWO questions:

(2 x 20 = 40 marks)

16 a. Verify that $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ satisfies its own characteristic equation and hence find A^{-1} .

b. i. Write the properties of Correlation Co-efficient. (7 Marks)

ii. The scores for students are 40,45,49,53,61,65,71,79,85,91.

What is the percentile for score 71? (3 Marks)

17 a. i) Explain the operations of graph with suitable examples.(8 Marks)

ii) Define Isomorphism with example (2 Marks)

b. Prove that the maximum number of lines among all p point graphs with no triangles is $\lfloor \frac{p^2}{4} \rfloor$

18 a. Evaluate Trapezoidal rule and Simpson's 1/3 rd rule with the given data.

X	2	3	4	5	6	7
Y=f(x)	1/2	1/3	1/4	1/5	1/6	1/7

b. Estimate $f(4.12)$ using Newton's backward interpolation method.

x	0	1	2	3	4	5
y	1	2	4	8	16	32
