

**TEEGALA KRISHNA REDDY ENGINEERING COLLEGE**

(UGC – AUTONOMOUS)

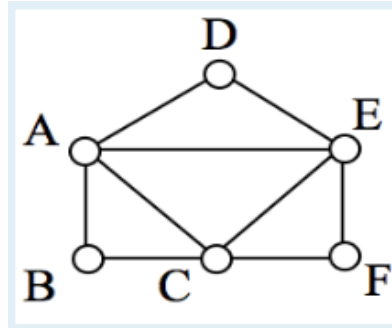
M Tech I Semester Examinations, July 2021

**Mathematical Foundations of Computer Science****Time : 3 Hours****Max. Marks : 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

- 1.a) X is a Gaussian random variable with  $E[X] = 0$  and  $P[|X| \leq 10] = 0.1$ . What is the standard deviation  $\sigma_X$ ?
- b) Write short note on Random Number Table?
- c) Discuss the concept of multivariate probability analysis
- d) Determine whether the given graph is a Euler circuit and explain the concept of Euler circuit



- e) Mention different phases of Software Development Life Cycle and illustrate each phase

**PART-B**

- 2.(i) I toss a coin twice. Let X be the number of observed heads. Find the Cumulative Distribution Function of X [10]

**OR**

- (ii) Let X be a discrete random variable with range  $R_X = \{1, 2, 3, \dots\}$ . Suppose the PMF of X is given by [10]

$$P_X(k) = 1/2^k \text{ for } k=1, 2, 3, \dots$$

- a. Find  $P(2 < X \leq 5)$ .
- b. Find  $P(X > 4)$

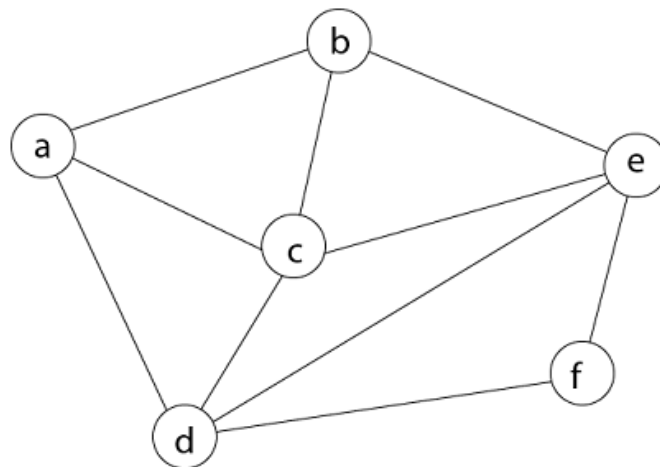
- 3 (i) Illustrate the concept of principal components analysis and write about sampling distributor of estimators? [10]

**OR**

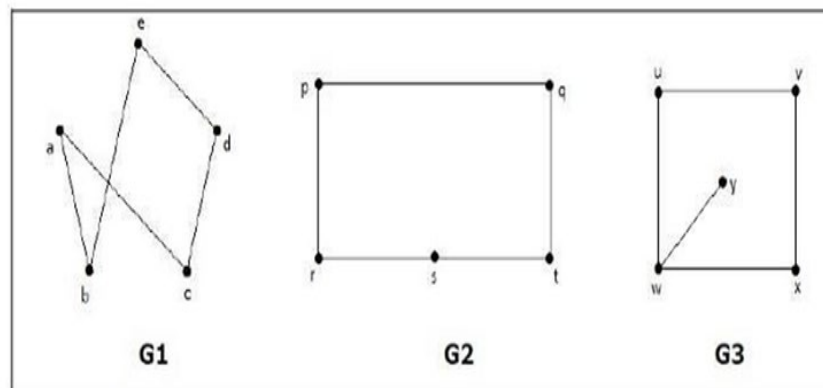
- (ii) For the following random samples, find the likelihood function: [10]
1.  $X_i \sim \text{Binomial}(3, \theta)$ , and we have observed  $(x_1, x_2, x_3, x_4) = (1, 3, 2, 2)$ .
  2.  $X_i \sim \text{Exponential}(\theta)$  and we have observed  $(x_1, x_2, x_3, x_4) = (1.23, 3.32, 1.98, 2.12)$
4. (i) What are multivariate statistical models and explain, how does SPSS calculate composite variable for Multivariate multiple regression? [10]

**OR**

- (ii) Analyze different Overfit Models and how we can detect these Over fitting problems and mention steps to Avoid Over fitting Models? [10]
5. (i) a) Consider a graph  $G = (V, E)$  shown in below fig. we have to find a Hamiltonian circuit using backtracking method [6]



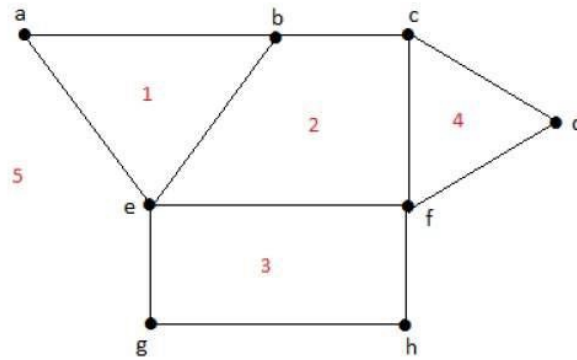
- b) Show that the graphs  $G = (V, E)$  and  $H = (W, F)$  are isomorphic. [4]



OR

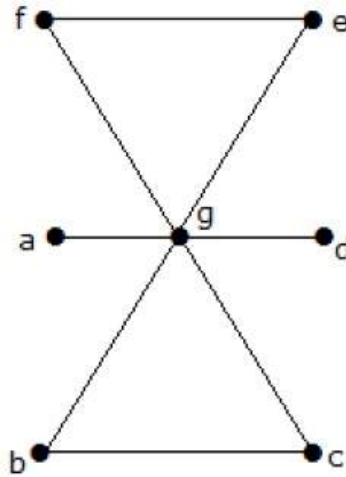
(ii) a) Analyze about Graph Isomorphism? Mention the degree of planar graph.

[6]



b) What is the line covering number for the following graph?

[4]



6. (i) a) Explain the concept of Memory Management in Operating systems

[6]

b) Analyze any 4 Differences between TCP and UDP

[4]

OR

(ii) a) Examine the concept of waterfall model in software engineering and write their advantages and disadvantages

[5]

b) Discuss various classification techniques and rules in data mining

[5]

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