C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 51Z21

M.E. DEGREE EXAMINATION, NOV 2018

First Semester

Computer Science and Engineering

15PMA121- ADVANCED MATHEMATICS FOR COMPUTING

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 1= 5 Marks)

1. When do you say the sample is large, When n = ? CO1- R

   (a) <30 (b) >30 (c) >0 (d) None of the above

2. The regression coefficients are b_1 & b_2 Then the correlation coefficient is CO2 -R

   (a) $\frac{b_1}{b_2}$ (b) $\frac{b_2}{b_1}$ (c) $b_1 b_2$ (d) $\pm\sqrt{b_1 b_2}$

3. Total number of allotment in transportation problem for m rows and n columns CO3- R

   (a) m+n (b) m+n-1 (c) m+n-2 (d) m-n

4. The well known technique used in simulation is called CO4 -R

   (a) Simulation technique (b) Monte carlo

   (c) Queuing technique (d) Poisson distribution

5. The degree of vertex for any Euler graph is CO5- R

   (a) Odd (b) Multiple of three (c) Even (d) None of the above

PART – B (5 x 3= 15Marks)

6. State any two conditions for the validity of χ^2 test. CO1-U

7. Characteristics of Estimators. CO2-U

8. Define Slack and Surplus variables in a linear programming problem. CO3-U

9. What are the advantages and disadvantages of simulation techniques? CO4-U

10. Define the operations Intersection, Cross product in graphs. CO5-U

PART – C (5 x 16= 80Marks)

11. (a) (i) In a sample of 1, 000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance? CO1- E (8)

(ii) Before an increase in excise duty on tea, 800 persons out of a sample of 1,000 persons were found to be tea drinkers. After an increase in duty, 800 people were tea drinkers in a sample of 1,200 people. Using standard error of proportion, state whether there is a significant decrease in the consumption of tea after the increase in excise duty? CO1 -E (8)

Or

(b) (i) In two large populations, there are 30 and 25 per cent respectively of blue - eyed people. Is this difference likely to be hidden in samples of 1,200 and 900 respectively from the two populations? CO1- App (8)

(ii) The average hourly wage of a sample of 150 workers in a plant 'A' was Rs.2.56 with a standard deviation of Rs.1.08 the average hourly wage of a sample of 200 workers in plant 'B' was Rs.2.87 with a standard deviation of Rs. 2.87 with a standard deviation of Rs.1.28 can an applicant safely assume that the hourly wages paid by plant 'B' are higher than those paid by plant 'A' ? CO1- App (8)

12. (a) Find the correlation coefficient between X and Y for the given value. Find also the two regression lines. CO2- U (16)

X	1	2	3	4	5	6	7	8	9	10
Y	10	12	16	28	25	36	41	49	40	50

Or

(b) In random sample from normal population $N(\mu,\sigma^2)$. Find the maximum likelihood estimators for CO2- App (8)

(1) μ when σ^2 is known

(2) σ^2 when μ is known.

(ii) Obtain MLE of θ in $f(x, \theta)=(1+\theta)x^{\theta,}$ $0<x<1$, based on independent of size n. Examine whether this estimate is sufficient for θ. CO2- App (8)

13. (a) Use the penalty (Big -M) method to solve the following LP problem. CO3-E (16)

Maximize $Z = 2x_1 + x_2 + 3x_3$

subject to the constraints

(i) $x_1 + x_2 + 2x_3 \geq 5$

(ii) $2x_1 + 3x_2 + 4x_3 = 12$ and $x_1, x_2, x_3 \geq 0$.

Or

(b) Solve the following LP problem by using the two - phase simplex method. CO3-App (16)

Maximize $Z = x_1 + x_2$

subject to the constraints

(i) $2x_1 + 4x_2 \geq 4$,

(ii) $x_1 + 7x_2 \geq 7$ and $x_1, x_2 \geq 0$.

14. (a) (i) Explain Monte - Carlo method of simulation with suitable example. CO4 -U (8)

(ii) Explain simulation and give its applications to queuing theory. CO4 -U (8)

Or

(b) (i) Customer arrive at a milk booth for the required service. Assume that inter arrival and service time are constants and given by 1.5 and 4 minutes respectively. Simulate the system by hand computations for 14 minutes CO4 -U (8)

(1) What is the waiting time per customer?

(2) What is the percentage idle time for the facility? (Assume that the system starts at T =0

(ii) Suppose the sales of a particular item is Poisson with mean 5 , then generate for 10 days. Random Numbers are 49, 58, 89, 15, 12, 94, 85, 34, 7, 53 — CO4 -U — (8)

15. (a) (i) Prove that a given connected graph is Eulerian if and only if all the vertices of G are of even degree. — CO5-App — (8)

(ii) Give an example of a Graph which are — CO5-App — (8)

(i) Eluerian but not Hamiltonian

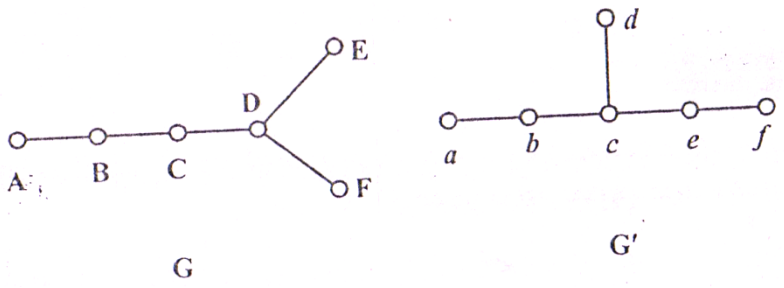
(ii) Hamiltonian but not Eulerian

(iii) Both Eulerian and Hamiltonian

(iv) Non Eulerian and non Hamiltonian

(Or)

(i) Verify that following are isomorphic graph are not — CO5-App — (8)



(ii) Define Complete Bipartite, Regular Graph, intersection and cross product of Graphs with Example — CO5-App — (8)