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**C Reg. No. :**

**Question Paper Code: 51P01**

M.E. DEGREE EXAMINATION, NOV 2017

First Semester

Computer Science and Engineering

15PMA121- ADVANCED MATHEMATICS FOR COMPUTING

[Common to Computer Science and Engineering (With Specialization in Networks)]

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 1= 5 Marks)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | If  are n independent normal variates with mean then is a variate with \_\_\_\_\_\_\_\_\_\_ degrees of freedom | | | | CO1- R | | |
|  | (a) n+1 | | (b)n-1 | (c)N | (d)n+2 | | |
| 2. | Correlation value lies between | | | | CO2 -R | | |
|  | (a) | | (b) | (c) | (d) | | |
| 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. | . If  then is | | | | CO4 -R | | |
|  | (a)3 | | (b)4 | (c)5 | (d)1 | | |
| 5. | Choose the Planar graph | | | | CO5- R | | |
|  | (a) | | (b) | (c) | (d) | | |
|  | PART – B (5 x 3= 15Marks) | | | | | | |
| 6. | Two samples of Size 8 and 9 give the sum of squares of deviation from their respective mean equal to 160 in ches and 91 inches. cantheir as regarded as drawn from the same population? CO1-U | | | | | | |
| 7. | Variance X =9, Regression equations 8x -10y = -66, 40x -18y =214 Find the correlation coefficient between x and y and standard deviation of Y. CO2-U | | | | | | |
| 8. | Difference between the transportation problem and the assignment problem. CO3-U | | | | | | |
| 9. | Define Simulation. CO4-U | | | | | | |
| 10. | Define isomorphism on 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- U | (8) |
|  |  | (ii) In two large populations, there are 30 and 25 percent  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 -U | (8) |
|  |  | Or | | | |  |  |
|  | (b) | Two random samples gave the following results :   |  |  |  |  | | --- | --- | --- | --- | | Sample | Size | Sample Mean | Sum of squares of deviations from the mean | | 1 | 10 | 15 | 90 | | 2 | 12 | 14 | 108 |     Test whether the samples come from the same normal population at 5%level of significance. | | | | CO1- U | (16) |
|  |  |  | | | |  |  |
| 12. | (a) | Fit a Secord degree parabola   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 55 | 50 | 20 | 55 | 75 | 80 | 90 | 30 | 75 | 70 | | Y | 2 | 4 | 1 | 3 | 5 | 9 | 12 | 2 | 7 | 5 | | | | | CO2- U | (16) |
|  |  | Or | | | |  |  |
|  | (b) | (i) In random sample fromnormal populationN(μ,σ2). Find the maximum likelihood estimators for  (a) μ when σ2 is known (b) σ2  whenμ is known. | | | | CO2- U | (8) |
|  |  | (ii) Obtain M.LE for poisson distribution. | | | | CO2- U | (8) |
|  |  |  | | | |  |  |
| 13. | (a) | Use the penalty (Big-M) method to solve the following LP problem.  Maximize Z = 2x1 + x2 + 3x3  subject to the constraints  (i)x1 + x2 + 2x3 ≥ 5 (ii) 2x1 + 3x2 + 4x3 = 12 and x1, x2, x3 ≥ 0. | | | | CO3-App | (16) |
|  |  | Or | | | |  |  |
|  | (b) | Solve the following LP problem by using the two - phase simplex method.  Maximize Z = x1 + x2  subject to the constraints    (i) 2x1 + 4x2 ≥ 4, (ii) x1 + 7x2 ≥ 7 and x1, x2 ≥ 0. | | | | CO3-App | (16) |
|  |  |  | | | |  |  |
| 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) | 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  (i) What is the waiting time per customer?  (ii)What is the percentage idle time for the facility?  (Assume that the system starts at T =0) | | | | CO4 -U | (16) |
| 15. | (a) | Find the Maximum flow of the network. 20 CO5- Ana (16)    20    8  8    8 15  25  25 | | | | | |
|  |  | Or | | |  | |  |
|  | (b) | Find the maximum flow : | | | CO5-Ana | | (16) |
|  | 2 8  5    4  8  3    10  5    15 | | | | | | |