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**Reg. No. :**

**Question Paper Code: 51P06**

M.E. DEGREE EXAMINATION, NOV 2017

First Semester

Power Electronics and Drives

15PMA126 – APPLIED MATHEMATICS FOR ELECTRICAL ENGINEERS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 1= 5 Marks)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | Every matrix of order m x n can be factor into two product of Q having vectors of its columns and matrix R | | | | | CO1- R | | | |
|  | (a) | | | (b) Lower triangular | | | | | |
|  | (c) Orthogonal | | | (d) Equivalent | | | | |
| 2. | Total number of allotment in transportation problem for m rows and n columns | | | | | CO2 -R | | | |
|  | (a) m+n | | (b) m+n-1 | | (c) m+n-2 | (d) m-n | | | |
| 3. | A continuous random variable x has a PDF f(x) = kx2e-x, find k | | | | | CO3- R | | | |
|  | (a) 1 | | (b) 0 | | (c) 1/2 | (d) 3/2 | | | |
| 4. | What is the classification of? | | | | | CO4 -R | | | |
|  | (a) Parabolic | | | (b) Ellipse | | | | | |
|  | (c) Hyperbolic | | | (d) None of these | | | | |
| 5. | f(x, y) then it is called | | | | | CO5- R | | | |
|  | (a) Laplace | | | (b) Poisson | | | | | |
|  | (c) One dimensional heat equation | | | (d) None of these | | | | | |
|  | PART – B (5 x 3= 15Marks) | | | | | | | | |
| 6. | Define Topeplitz matrix with example. CO1-U | | | | | | | | |
| 7. | Define Feasible Solution. CO2-U | | | | | | | | |
| 8. | If X has the pdf CO3-U  Find the value of c and cumulative distribution of X. | | | | | | | | |
| 9. | State convergence of the series. CO4-U | | | | | | | | |
| 10. | Write down the SFPF for solving Laplace equation. CO5-U | | | | | | | | |
|  | PART – C (5 x 16= 80Marks) | | | | | | | | |
| 11. | (a) | Construct a QR decomposition for the matrix  A= | | | | | CO1- Ana | (16) | |
|  |  | Or | | | | |  |  | |
|  | (b) | Find the Pseudo inverse of the matrix | | | | | CO1- Ana | (16) | |
|  |  |  | | | | |  |  | |
| 12. | (a) | Use Two Phase method, Solve max  Z =5x1 + 8x2 s.to 3x1+2x2 ≥ 3, x1+x2 ≥ 4, x1+x2 ≤ 5, x1,x2 ≥ 0. | | | | | CO2- Ana | (16) | |
|  |  | Or | | | | |  |  | |
|  | (b) | Use Two Big - M method, Solve | | | | | CO2- Ana | (16) | |
|  |  |  | | | | |  |  | |
| 13. | (a) | (i) Find the M.G.F of Poisson distribution and hence find mean  and variance | | | | | CO3-U | (8) | |
|  |  | (ii) Find the M.G.F of Exponential distribution and hence find  mean and variance | | | | | CO3 -U | (8) | |
|  |  | Or | | | | |  |  | |
|  | (b) | (i) If X has the distribution function    Find (a) p.d.f (b) P(2<x<6), (c) Variance of X | | | | | CO3- U | (8) | |
|  |  | (ii) The density function of a r.v X is given by  Find the value of K, mean, variance | | | | | CO3- U | (8) | |
|  |  |  | | | | |  |  | |
| 14. | (a) | Find the eigen values and eigen functions of  *y’’ + λy =* 0, 0 *< x <* 1, *y*(0) *=* 0, *y*(1) *+ y’*(1) *=* 0. | | | | | CO4 -Ana | (16) | |
|  |  | Or | | | | |  |  | |
|  | (b) | Find the DFT of the four point sequence {x(k)}={1, 1, 0, 0} and then calculate inverse DFT of the points. | | | | | CO4 -Ana | (16) | |
| 15. | (a) | Solve the Poisson equation *∇2u =* -10(*x2  + y2 +* 10) over the square mesh with sides *x =* 0 *= y, x =* 3 *= y* with *u =* 0 on the boundary and mesh length is 1. | | | | | CO4 -Ana | (16) | |
|  |  | Or | | | | |  |  | |
|  | (b) | Find the solution of , when *u(0, t) =* 0 *= u*(4, *t*), *u(x*, 0*) = x(*4 *– x)*. Assume *h =* 1 and find the values upto *t =* 5 using Bender - Schmidt’s method. | | | | | CO5-Ana | (16) | |
|  |  | | | | | | | | |