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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)$ Upper triangular$ | (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 $\frac{ ∂^{2}u}{∂x^{2}}-2\frac{∂u}{∂t}=0$ , 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) |
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