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**Reg. No. :**

**Question Paper Code: 32002**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Second Semester

Civil Engineering

01UMA202 - ENGINEERING MATHEMATICS − II

(Common to ALL branches)

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. | Find the particular integral of . CO1- App | | | |
| 2. | Transform *[(2x+3)2 D2 -2(2x+3)D -12 ] y = 0* into an ordinary differential equation.  CO1- App | | | |
| 3. | Find the unit normal to the surface CO2- App | | | |
| 4. | Find ‘a’ such that  is solenoidal. CO2- App | | | |
| 5. | Test the analyticity of the function  CO3- U | | | |
| 6. | Prove that an analytic function with constant real part is constant. CO4- Ana | | | |
| 7. | Show that is harmonic. CO4- U | | | |
| 8. | State and prove the shifting property in Laplace Transform. CO4- U | | | |
| 9. | Find the Laplace transform of . CO5- App | | | |
| 10. | Define singular point. CO5- U | | | |
|  | PART – C (5 x 16= 80 Marks) | | | |
|  |  |  |  |  |
| 11. | (a) | (i) Solve by method of variation of  parameters | CO1- App | (8) |
|  |  | (ii) Solve. | CO1- App | (8) |
|  |  | Or |  |  |
|  | (b) | (i) Solve . | CO1- App | (8) |
|  |  | (ii) Solve ( . | CO1- App | (8) |
|  |  |  |  |  |
| 12. | (a) | Verify Gauss divergence theorem for  over the cube bounded by  *x = 0, x = 2, y = 0, y = 2, z = 0* and *z = 2*. | CO2- Ana | (16) |
|  |  | Or |  |  |
|  | (b) | (i) Verify Stoke’s theorem for ( taken  around the rectangle bounded by the lines x= ±a, y=0, y=b. | CO2- Ana | (8) |
|  |  | (ii) Find and hence deduce  where r = and | CO2- Ana | (8) |
|  |  |  |  |  |
| 13. | (a) | (i) Find the bilinear mapping which maps the points  *Z =* of the *Z*-plane onto  of the *W*-plane. | CO-3 App | (8) |
|  |  | (ii) Construct the analytic function given that  *2u - 3v =* | CO-3 App | (8) |
|  |  | Or |  |  |
|  | (b) | (i) Prove that  is harmonic and determine its  harmonic conjugate. | CO3- Ana | (8) |
|  |  | (ii) Prove that the analytic function with constant modulus is  also constant. | CO3- Ana | (8) |
|  |  |  |  |  |
| 14. | (a) | (i) Evaluate where C is by using  cauchy’s Integral formula. | CO4-E | (8) |
|  |  | (ii) Evaluate using contour  integration. | CO4-E | (8) |
|  |  | Or |  |  |
|  | (b) | (i) Obtain Laurent’s series expansion for  *f(z)* =  in the region *| z | < 2*. | CO4- E | (8) |
|  |  | (ii) Evaluate, using Contour integration in the  complex plane. | CO4- E | (8) |
|  |  |  |  |  |
| 15. | (a) | (i) Using convolution theorem, find | CO5-App | (8) |
|  |  | (ii) Using Laplace transform, solve  givenand  when | CO5-App | (8) |
|  |  | Or |  |  |
|  | (b) | (i) Use convolution theorem to find inverse Laplace transform  of | CO5-App | (8) |
|  |  | (ii) Solve using Laplace transform given that and | CO5-App | (8) |