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**A Reg. No. :**

**Question Paper Code: 52002**

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

Second Semester

Civil Engineering

15UMA202 - ENGINEERING MATHEMATICS − II

(Common to ALL branches)

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | The PI of is | | | | | | CO1- R | |
|  | (a) | | (b) | | (c) - | | (d) - | |
| 2. | The Wronskian value of is | | | | | | CO1- R | |
|  | (a) 1 | | (b) -1 | | (c) | | (d) -a | |
| 3. | The angle between the normal’s in the surface at the points  (1, 4, 2) and (- 3, -3, 3) is | | | | | | CO2- R | |
|  | (a) | | | (b) | (c) | | (d) | |
| 4. | For a given , the value of over the rectangular parallelepiped is | | | | | | CO2-R | |
|  | (a) 33 | | (b) 36 | | (c) 35 | | (d) 38 | |
| 5. | Which of the following function is harmonic | | | | | | CO3- R | |
|  | (a) | | (b) | | (c) | | (d) | |
| 6. | The invariant points of the transformation  are | | | | | | CO3- R | |
|  | (a) | | (b) (2, -3 ) | | (c) (1, - 6 ) | | (d) (1, 6) | |
| 7. | The value of the integral , where C is the curve | | | | | | CO4- R | |
|  | (a) | | (b) | | (c) | | (d) | |
| 8. | The nature of the singularity is | | | | | | CO4- R | |
|  | (a) | | (b) | | (c) Pole | | (d) None | |
| 9. |  | | | | | | CO5- R | |
|  | (a) | | (b) | | (c) | | (d) | |
| 10. |  | | | | | | CO5- R | |
|  | (a) | | (b) | | (c) | | (d) | |
|  | PART – B (5 x 2= 10Marks) | | | | | | | |
| 11. | Find the PI of  CO1- App | | | | | | | |
| 12. | Find the directional derivative of at (1, -2, 1) in the direction CO2- App  of? | | | | | | | |
| 13. | Find the regular function whose imaginary part is? CO3- App | | | | | | | |
| 14. | Expand at *z = 1* in Taylor’s series. CO4- U | | | | | | | |
| 15. | Find  CO5- App | | | | | | | |
|  | PART – C (5 x 16= 80Marks) | | | | | | | |
|  |  |  | | | |  | |  |
| 16. | (a) | (i) Solve | | | | CO1- App | | (8) |
|  |  | (ii) Solve by method of variation of  parameters | | | | CO1- App | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) Solve | | | | CO1- App | | (8) |
|  |  | (ii) Solve | | | | CO1- App | | (8) |
|  |  |  | | | |  | |  |
| 17. | (a) | (i) Prove that  is irrotational and hence find its scalar potential. | | | | CO2- App | | (8) |
|  |  | (ii) Verify Stoke’s theorem for taken around  the rectangle bounded by the lines *x = ± a, y=0* and *y=b.* | | | | CO2- App | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | Verify Gauss Divergence theorem for the vector over the cube | | | | CO2- Ana | | (16) |
|  |  |  | | | |  | |  |
| 18. | (a) | (i) Prove that | | | | CO-3 App | | (8) |
|  |  | (ii) Find the bilinear transformation those maps into  points respectively. What are the invariant points  of the transformation? | | | | CO-3 App | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) If , find the corresponding analytic  function *f(z)* | | | | CO-3 App | | (8) |
|  |  | (ii) Find the image of the infinite strip  under the  transformation | | | | CO-3 App | | (8) |
|  |  |  | | | |  | |  |
| 19. | (a) | (i) Evaluate  , where C is the circle using  Cauchy’s Residue theorem | | | | CO4-E | | (8) |
|  |  | (ii) Evaluate | | | | CO4-E | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) Evaluate | | | | CO4- E | | (8) |
|  |  | (ii) Find the Laurent’s series expansion of  in the region | | | | CO4- App | | (8) |
|  |  |  | | | |  | |  |
| 20. | (a) | (i) Find the Laplace Transform of the periodic function  and | | | | CO5-App | | (8) |
|  |  | (ii) Find using convolution theorem. | | | | CO5-App | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) Find the Laplace transform of | | | | CO5-App | | (4) |
|  |  | (ii) Verify Initial value theorem for | | | | CO5-App | | (4) |
|  |  | (iii) Solve the differential equation with  using Laplace transform | | | | CO5-App | | (8) |