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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- Appof? |
| 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) |