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**Reg. No. :**

**Question Paper Code: 42002**

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

Second Semester

Civil Engineering

14UMA202 - ENGINEERING MATHEMATICS − II

(Common to ALL branches)

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | Roots of the auxillary equation of are | | | | | | CO1- R | |
|  | (a) | | (b) | | (c) | | (d) | |
| 2. | The complimentary function of is | | | | | | CO1- R | |
|  | (a) | | (b) | | (c) | | (d) | |
| 3. | The directional derivative of *f = xyz at (*1, 1, 1*)* in the direction of | | | | | | CO2- R | |
|  | (a) 3 | | | (b) | (c) | | (d) | |
| 4. | If is constant,then is | | | | | | CO2-R | |
|  | (a) 2+ | | (b) -1 | | (c) 0 | | (d) 1 | |
| 5. | If w=(2z+6)/(z+7), the critical points of the bilinear mapping are | | | | | | CO3- R | |
|  | (a) | | (b) 7, -7 | | (c) -7, ∞ | | (d) | |
| 6. | The bilinear transformation that maps the points  onto  is | | | | | | CO3- R | |
|  | (a) | | (b) | | (c) | | (d) None of these | |
| 7. | The value of , where c is the circle is | | | | | | CO4- R | |
|  | (a) 11 | | (b) | | (c) | | (d) | |
| 8. | In the point z=1 is a pole of order | | | | | | CO4- R | |
|  | (a) | | (b) | | (c) | | (d) | |
| 9. | The value of is | | | | | | CO5- R | |
|  | (a) | | (b) | | (c) | | (d) | |
| 10. | Laplace transforms is an \_\_\_\_\_\_\_\_ transform. | | | | | | CO5- R | |
|  | (a) Discrete | | (b)Discrete time | | (c) Data independent | | (d) Integral | |
|  | PART – B (5 x 2= 10 Marks) | | | | | | | |
| 11. | Solve . CO1- App | | | | | | | |
| 12. | Prove that CO2- App | | | | | | | |
| 13. | Examine whether is harmonic. CO3- App | | | | | | | |
| 14. | State Cauchy’s integral formula. CO4- U | | | | | | | |
| 15. | Find the Laplace transform of. CO5- U | | | | | | | |
|  | PART – C (5 x 16= 80 Marks) | | | | | | | |
|  |  |  | | | |  | |  |
| 16. | (a) | (i) Solve the equation . | | | | CO1- App | | (8) |
|  |  | (ii) Solve the equation by Method of variation of parameter  . | | | | CO1- App | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) Solve | | | | CO1- App | | (8) |
|  |  | (ii) The number *N* of bacteria in a culture grew at a rate  proportional to *N*. The value of *N* was initially 100 and  increased to 332 in 1 hour. What was the value of *N* after  3/2 hours? | | | | CO1- App | | (8) |
|  |  |  | | | |  | |  |
| 17. | (a) | Verify Gauss divergence theorem for  over the cube | | | | CO2- App | | (16) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) Show that  is irrotational and find its Scalar potential. | | | | CO2- Ana | | (8) |
|  |  | (ii) Examine whether Green’s theorem is true in a plane for , where c is the  boundary of the region bounded by the lines  *x =0, y =0, x+y =1*. | | | | CO2- Ana | | (8) |
|  |  |  | | | |  | |  |
| 18. | (a) | (i) Find the analytic function *f(z) = u + iv* whose real part is | | | | CO-3 App | | (8) |
|  |  | (ii) Find the image of the circle *|z-2 i| = 2* under the map *w =* | | | | CO-3 App | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) Prove that both real and imaginary part of an analytic  function satisfy Laplace equation. | | | | CO-3 App | | (8) |
|  |  | (ii) Determine the analytic function if | | | | CO-3 App | | (8) |
|  |  |  | | | |  | |  |
| 19. | (a) | Evaluate  by contour integration. | | | | CO4-E | | (16) |
|  |  | Or | | | |  | |  |
|  | (b) | Evaluate  . | | | | CO4- E | | (16) |
|  |  |  | | | |  | |  |
| 20. | (a) | (i) Find the Laplace transform of the periodic function  with f(t + 2) = f(t). | | | | CO5-App | | (8) |
|  |  | (ii) Solve the differential equation given that . | | | | CO5-App | | (8) |
|  |  | Or | | | |  | |  |
|  | (b) | (i) Find using Convolution theorem. | | | | CO5-App | | (8) |
|  |  | (ii) Using Runge-Kutta method of 4th order, solve  with *y(0)=1 at x=0.2* | | | | CO5-App | | (8) |