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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) |