Reg. No. : | | | | | | | | | | |

Question Paper Code: 42002

B.E. / B.Tech. DEGREE EXAMINATION, AUGUST 2021

Second Semester

Civil Engineering

14UMA202 - ENGINEERING MATHEMATICS – II

(Common to ALL Branches)

(Regulation 2014)

Duration: 1:45 hour Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. Find the particular integral of $(D^2 + 4)y = \pi$.
2. Transform $[(2x+3)^2 D^2 - 2(2x+3)D - 12]\, y = 0$ into an ordinary differential equation.
3. State Green's theorem.
4. Find 'a' such that $\vec{F} = (x+3y)\vec{i} + (y-2z)\vec{j} + (x+az)\vec{k}$ is solenoidal.
5. Test the analyticity of the function $f(z) = \bar{z}$.
6. Prove that an analytic function with constant real part is constant.
7. State Cauchy's integral formula for first derivative of an analytic function.
8. Expand $\dfrac{1}{z-2}$ at $z = 1$ in a Taylor's series.
9. Find the Laplace transform of 2^t.
10. Find the inverse Laplace transform of $\frac{1}{s(s+3)}$

11. Find the fixed points of $w = \dfrac{3z-4}{z-1}$.

12. Find the residue of $f(z) = \frac{z^2}{(z-1)^2(z-2)}$ $at\ z = 2$.

13. Expand $\dfrac{1}{z-2}$ at $z = 1$ in a Taylor's series.

14. State and prove the shifting property in Laplace Transform.

15. Define singular point.

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

16. Solve $(D^2+1)y = \sin x \sin 2x$. (10)

17. Verify Stoke's theorem for $\vec{F} = (2x-y)\vec{\imath} - yz^2\vec{\jmath} - y^2z\vec{k}$ where S is the upper half surface of the sphere $(x^2+y^2+z^2) = 1$ and C is the circular boundary on Z = 0 plane. (10)

18. Find the analytic function *f(z)* = *u* + *iv* whose real part is

$$u = \frac{\sin 2x}{\cosh 2y + \cos 2x}$$ (10)

19. Evaluate $\int_0^{2\pi} \frac{d\theta}{2+cos\theta}$ by contour integration. (10)

20. Find the Laplace transform of $e^{-t}\int_0^t \frac{\sin t}{t}dt$ (10)