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

Question Paper Code: 42002

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020.

Second Semester

Civil Engineering

14UMA202 - ENGINEERING MATHEMATICS – II

(Common to ALL Branches)

(Regulation 2014)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The roots of $(D^2+2)y$ are

   (a) ± 2 (b) $\pm 2i$ (c) $\pm i\sqrt{2}$ (d) $\sqrt{2}$

2. The particular integral of $(4D^2 - 4D + 1)y = 4$ is

   (a) -4 (b) 4 (c) -2 (d) -3

3. The gradient of a scalar function is defined as

   (a) $\nabla/\emptyset$ (b) $\nabla * \emptyset$ (c) $\emptyset\nabla$ (d) $\nabla\emptyset$

4. By stokes theorem, $\int_c \vec{r}\, \overrightarrow{dr} =$ _____

   (a) π (b) 1 (c) 0 (d) None of these

5. The derivative of f(z) at z_0 is

   (a) l (b) f(z) (c) $f(z_0)$ (d) $f'(z_0)$

6. The invariant points of $w = \frac{2z-5}{z+4}$ are

   (a) $z = 2, -1$ (b) $z = -1 \pm 2i$ (c) $z = 0,1$ (d) $z = 2 \pm 3i$

7. Which of the following is not an analytic function?

(a) $\sin z$ (b) z (c) $\sinh z$ (d) $\bar{z}$

8. Conformal mapping is a mapping which preserves angle

(a) in magnitude (b) in sense

(c) both in magnitude and sense (d) Either in magnitude or in sense

9. $L^{-1}\left[\frac{1}{s^2+a^2}\right]=$

(a) $\frac{\sinh at}{a}$ (b) $\frac{\sin at}{a}$ (c) $\sinh at$ (d) $\sin at$

10. Laplace transforms is an _____ transform.

(a) Discrete (b) Discrete time

(c) Data independent (d) Integral

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Solve the equation $(1+2x)^2y'' - 6(1+2x)y' + 16y = 8(1+2x)^2$. (8)

12. 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. (8)

13. Find the Bilinear transformation that maps z= ∞, I, 0 in to the points w= 0, -i, ∞ respectively. Also find its fixed Points. (8)

14. Evaluate $\int_0^{2\pi} \frac{d\theta}{2+cos\theta}$ by contour integration. (8)

15. Find the Laplace Transform of the square-wave function of period 'a' given by

$$f(t) = \begin{cases} 1, & 0 < t < \frac{a}{2} \\ -1, & \frac{a}{2} < t < a \end{cases}$$ (8)