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

Question Paper Code: 52002

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

Second Semester

Civil Engineering

15UMA202- ENGINEERING MATHEMATICS-II

(Common to All branches)

(Regulation 2015)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following Questions)

1. The PI of $(D^2+2D+1)y = e^{-x}\cos x$ is CO1- R

(a) $e^{-x}\cos x$ (b) $e^{-x}\sin x$ (a) $e^{-x}\cos x$ (b) $e^{-x}\sin x$

2. The particular integral of $(D^2+2)\ y = x^2$ CO1- R

(a) $\frac{x^2+1}{2}$ (b) $\frac{x^2}{2}$ (c) $\frac{x^2-1}{2}$ (d) $\frac{x}{2}$

3. A vector $\vec{F}$ is called solenoidal if CO2- R

(a) $\nabla\times\vec{F}\neq 0$ (b) $\nabla.\vec{F}\neq 0$ (c) $\nabla.\vec{F}=0$ (d) $\nabla\times\vec{F}=0$

4. For a given $\bar{F}=(x^2-yz)\bar{i}+(y^2-xz)\bar{j}+(z^2-xy)\bar{k}$, the value of $\iiint_V \nabla.F dV$ over the rectangular parallelepiped $0\le x\le 1, 0\le y\le 2, 0\le z\le 3$ is CO2-R

(a) 33 (b) 36 (a) 33 (b) 36

5. The value of m such that $2x-x^2+my^2$ is harmonic CO3- R

(a) m = 0 (b) m = 1 (c) m = -1 (d) m = 2

6. The necessary condition for the analyticity of a function is CO3- R

(a) $u_x = v_y \,\&\, u_y = -v_x$ (b) $u_x = v_x \,\&\, u_y = -v_y$

(c) $u_x = -v_y \,\&\, u_y = v_x$ (d) $u_x = v_y \,\&\, u_y = v_x$

7. The point z = a is called a removable singularity of $f(z)$ if CO4- R

(a) $\lim_{z \to a} f(z)$ exists (b) $\lim_{z \to -a} f(z)$ exists (c) $\lim_{z \to 0} f(z)$ exists (d) None of these

8. The poles of tan z are CO4- R

(a) $z = n\frac{\pi}{2}$; n is odd (b) $z = \pm n\frac{\pi}{2}$; n is even

(c) $z = \pm n\frac{\pi}{2}$; n is odd (d) $z = n\frac{\pi}{2}$; n is even

9. $L\left[e^{-2t}\sin 3t\right] =$ CO5- R

(a) $\frac{s+2}{s^2+3^2}$ (b) $\frac{s}{s^2+3^2}$ (a) $\frac{s+2}{s^2+3^2}$ (b) $\frac{s}{s^2+3^2}$

10. $L^{-1}\left[\frac{1}{s^2+6s+13}\right]$ CO5- R

(a) $\frac{e^{-3t}\sin 3t}{3}$ (b) $-\frac{e^{-3t}\sin 3t}{3}$ (a) $\frac{e^{-3t}\sin 3t}{3}$ (b) $-\frac{e^{-3t}\sin 3t}{3}$

PART – C (3 x 8= 24 Marks)

(Answer any three of the following Questions)

11. Solve $(3x+2)^2\frac{d^2y}{dx^2} + 3(3x+2)\frac{dy}{dx} - 36y = 3x^2 + 4x + 1$ CO1- App (8)

12. Verify Green's theorem for CO2- E (8)

$\int_C (3x^2 - 8y^2)dx + (4y - 6xy)dy$, where C is the region bounded by the lines x = 0, y = 0, x + y = 1.

13. Find the bilinear transformation which maps the points $z = \infty, i, 0$ into $w = 0, i, \infty$ respectively. CO3- Ana (8)

14. Using Cauchy's integral formula evaluate CO4- Ana (8)

$\int_C \frac{2}{(z-1)(z+3)}dz$ where C is the circle | z -1| =2.

15. Find the Laplace Transform of the periodic function CO5- App (8)

$$f(t)=\begin{cases} t, & 0\le t\le a \\ 2a-t, & a\le t\le 2a \end{cases} \text{ and } f(t+2a)=f(t)$$