Q.P. Code: 18HS0831 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July-2021

MATHEMATICS-II

(Common to All)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	a	Find the integrating factor of x log x $\frac{dy}{dx}$ + y = 2 log x	**2M**
	b	Write the formula for Bessel's function J_n (x).	**2M**
	c	Evaluate $\int_0^1 \int_0^1 \frac{dx\ dy}{\sqrt{1-x^2}\sqrt{1-y^2}}$	**2M**
	d	Write Cauchy's Riemann Equations in polar form.	**2M**
	e	Find the residue of f(z) = $\frac{e^z}{z^5}$	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	a	Solve (x+1) $\frac{dy}{dx}$ – y = e^{3x} (x+1)^2	**5M**
	b	solve $\frac{dy}{dx}$ + 2xy = e^{-x^2}	**5M**

OR

3	a	solve y = 2 px + p^n	**5M**
	b	solve y = 2px + y^2 p^3	**5M**

UNIT-II

4	a	Solve (D^2 - 5 D +6) y = xe^{4x}	**5M**
	b	solve (D^2 - 2 D) y = e^x sin x by method of variation of parameters.	**5M**

OR

5	a	Using Rodrigue's formula, prove that $\int_{-1}^{1} x^m P$ (x) dx =0 if m<n.	**5M**
	b	Express J_4 (x) in terms of J_0 (x) & J_1 (x)	**5M**

UNIT-III

6	a	Evaluate $\int \int (x^2 + y^2)$ dx dy in the positive quadrant for which x+y ≤ 1.	**5M**
	b	Evaluate $\int_0^a \int_0^{\sqrt{a^2-y^2}} (x^2 + y^2)$ dy dx.	**5M**

OR

7 Evaluate $\int_0^a \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dx\ dy\ dz}{\sqrt{1-x^2-y^2-z^2}}$ **10M**

UNIT-IV

8 **a** Show that $u = \frac{1}{2}\log(x^2 + y^2)$ is Harmonic. **6M**

b Find an analytic function whose real part is e^{-x} (x sin y – y cos y). **4M**

OR

9 **a** Show that the function $w = \frac{4}{z}$ transforms the straight line x =c in the z- plane into a circle in the W- plane. **5M**

b Find the bilinear transformation which maps the points $(\infty, i, 0)$ into the points (-1, -1, +1) in w- plane. **5M**

UNIT-V

10 **a** Evaluate $\int \frac{\sin^6 z}{(z-\frac{\pi}{2})^3}$ dz by using Cauchy's integral formula around the circle C : $|z| = 1$ **5M**

b Expand f (z) = log z in Taylor's series about z = 1 **5M**

OR

11 Show that $\int_0^{2\pi} \frac{d\theta}{1+a^2-2a\cos\theta} = \frac{2\pi}{1-a^2}$, $0 < a < 1$. **10M**

END