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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. I Year II Semester Supplementary Examinations Dec 2019

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 (I.F) of $x\log x\frac{dy}{dx}+y=2\log x.$	**2M**
	b	Solve $\frac{d^2x}{dt^2}+6\frac{dx}{dt}+9x=0.$	**2M**
	c	Change the order of integration in $\int_0^1\int_0^{2\sqrt{x}} f(x,y)dydx$.	**2M**
	d	Write Cauchy's Riemann equations in Cartesian 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 $\frac{dy}{dx}(x^2y^3+xy)=1$.	**5M**

OR

3		Solve $xy(1+xy^2)\frac{dy}{dx}=1.$	**10 M**

UNIT-II

4		Solve $(D^2-4D+4)y=8x^2e^{2x}\sin 2x.$	**10 M**

OR

5		Prove that $J_{5/2}(x)=\frac{3}{x}\left[\sqrt{\frac{2}{\pi x}}\left(\frac{\sin x}{x}-\cos x\right)\right]-\sqrt{\frac{2}{\pi x}}\sin x$.	**10 M**

UNIT-III

6	**a**	Evaluate $\int_0^a\int_0^{\sqrt{a^2-y^2}}(x^2+y^2)dydx$.	**5M**
	b	Evaluate $\int_0^\infty\int_0^\infty e^{-(x^2+y^2)}dxdy$ by converting to polar coordinates.	**5M**

OR

7		Find the volume of the ellipsoid $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1.$	**10 M**

UNIT-IV

8 Determine the analytic function $f(z)=u+iv,\ if u-v=\frac{\cos x+\sin x-e^{-y}}{2(\cos x-\cosh y)}$ *and* $f(\pi/2)=0.$ **10 M**

OR

9 **a** Find the bilinear transformation which maps the points $(\infty, i, 0)$ *i*n to the points $(-1, -1, 1)$ in w-plane. **5M**

b Find the bilinear transformation that maps the points $(1, i, -1)$ *i*n to the points $(2, i, -2)$ in w-plane. **5M**

UNIT-V

10 Verify Cauchy's theorem for the function $f(z)=3z^2+iz-4$, if c is the square with vertices at $1\pm i$ *and* $-1\pm i$. **10 M**

OR

11 Evaluate $\int_0^{2\pi}\frac{\cos 3\theta}{5-4\cos\theta}\,d\theta.$ **10 M**

END