Q.P. Code: 16HS612 **R16**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B Tech II Year I Semester (R16) Supplementary Examinations Nov / Dec 2019
ENGINEERING MATHEMATICS - III
(Common to All B.Tech Branches)

Time: 3 hours Max. Marks: 60M

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 **a** Determine p such that the function $f(z)=\frac{1}{2}\log\left(x^2+y^2\right)+i\,Tan^{-1}\left(\frac{px}{y}\right)$ is an analytic. **6 M**

b Obtain the analytic function $f(z)=u+iv$, if $u-v=e^x(\sin x-\cos y)$. **6 M**

OR

2 **a** Evaluate $\int_0^{1+3i}\left(x^2-iy\right)dz$ along the parabola $y=x^2$. **6 M**

b Evaluate $\int_c \frac{\cos z}{z\left(z^2+8\right)}dz$, where c denotes the boundary of the square whose sides lie along the lines $x=\pm 2,\ y=\pm 2$. **6 M**

UNIT-II

3 Show that $\int_0^{2\pi}\frac{\cos 2\theta}{1+2a\cos\theta+a^2}d\theta=\frac{2\pi a^2}{1-a^2},\ \left(a^2<1\right)$ by using residue theorem. **12 M**

OR

4 **a** Find the bilinear transformation which maps the points $(\infty,\ i,\ 0)$ in to the points $(0,\ i,\ \infty)$. **6 M**

b Obtain the image of the infinite strip $x=0$ and $x=\frac{\pi}{4}$ under the transformation $w=\cos z$. **6 M**

UNIT-III

5 Find an iterative formula for $\sqrt{N}$ (where N is a positive number) by Newton-Raphson method and hence compute the real root of $\sqrt{18}$. **12 M**

OR

6 From the following table values of x and $y=\tan x$ interpolate values of y when $x=0.12$ and $x=0.28$. **12 M**

x	0.1	0.15	0.2	0.25	3
$f(x)$	0.1003	0.1511	0.2027	0.2553	0.3093

UNIT-IV

7 **a** Fit the equation of the curve $y = a e^{bx}$ to the following data. **7 M**

x	1	2	3	4
y	7	11	17	27

b Using Simpson's $\frac{3}{8}$ rule to evaluate the value of $\int_0^6 \frac{1}{1+x}\,dx$ take h = 0.5. **5 M**

OR

8 **a** Fit a second-degree polynomial to the following data by the method of least squares **5 M**

x	0	1	2	3	4
y	1	5	10	22	38

b Evaluate $\int_0^4 e^x dx$ by using Simpson's $\frac{3}{8}$ rule with 10 sub divisions. **7 M**

UNIT-V

9 Using Taylor's series method find an approximate value of y at x = 0.2 for the differential equation $y' = 2y + 3e^x$, y (0) = 0. Compare the numerical solution obtained with exact solution. **12 M**

OR

10 **a** Solve $y' = x + y$, with $y(1) = 0$ by using Taylor's series method and calculate the values of $y(1.1)$ and $y(1.2)$. **6 M**

b b) Apply the fourth order R-K method to find $y(0.1)$ and $y(0.2)$, given $\frac{dy}{dx} = xy + y^2$ with $y(0) = 1$. **6 M**

*** END ***