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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR

(AUTONOMOUS)

B Tech II Year I Semester Supplementary Examinations Nov-2020

ENGINEERING MATHEMATICS - III

(Common to all Branches)

Time: 3 hours Max. Marks: 60M

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

UNIT-I

1 a If $f(z)$ is analytic function of z prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)\log|f(z)|=0$. **5 M**

b Find the analytic function $f(z)=u+iv$ whose real part is $e^x(x\sin y+y\cos y)$. **7 M**

OR

2 a Evaluate $\int_c \frac{\cos z-\sin z}{(z+i)^3}dz$, where $c=|z|=2$ using Cauchy's integral formula. **6 M**

b Evaluate $\int_c \frac{3z^2+z}{z^2-1}dz$ where c is the circle $|z-1|=1$. **6 M**

UNIT-II

3 Use Cauchy's residue theorem to evaluate $\int_{-\pi}^{\pi} \frac{1}{5+4\sin\theta}d\theta$. **12 M**

OR

4 a Find the bilinear transformation which maps the points $(0,\ 1,\ i)$ in to the points $(1+i,\ -i,\ 2-i)$. **6 M**

b Prove that the transformation $w=\sin z$ maps the families of lines $x=y=$ constant into two families of confocal central conics. **6 M**

UNIT-III

5 Compute the real root of the equation $xe^x=2$ by using Regula-false method. **12 M**

OR

6 a Compute the value of $f(x)$ when $x=1.4$ from the given table of values. **6 M**

x	1.1	1.3	1.5	1.7	1.9
$f(x)$	0.21	0.69	1.25	1.89	2.61

by using Newton's forward interpolation formula.

b Using Lagrange's interpolation formula, find the parabola equation passing through the points (0, 1), (1, 3) and (3, 55). **6 M**

UNIT-IV

7 a Fit the curve of the form $y = a\ x^b$ for the given data. **7 M**

x	1	2	3	4	5	6
y	2.98	4.26	5.21	6.10	6.80	7.50

b Evaluate $\int_0^1 e^{-x^2}\,dx$ taking $h = 0.2$ by Simpson's $\frac{1}{3}$ rule. **5 M**

OR

8 a Fit the curve of the form $y = a\ e^{bx}$ for the give data **5 M**

x	2	3	4	5		6
y	8.3	15.4	33.1	65.2		127.4

b Evaluate $\int_0^1 \sqrt{1+x^3}\,dx$ taking h =0.1 using Trapezoidal rule. **7 M**

UNIT-V

9 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 Solve $\frac{dy}{dx} = \frac{y-x}{y+x}$ with initial condition $y(0) = 1$ by Picard's method and compute the value of $y(0.1)$. **6 M**

OR

10 Write Runge-Kutta 4thorder formulae and use it to evaluate $y(0.1)$, $y(0.2)$ and $y(0.3)$ given $y' = 1 + x\,y$ with initial condition $y(0) = 2$. **12 M**

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