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

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

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR**

(AUTONOMOUS)

**B. Tech II Year I Semester Regular & Supplementary Examinations November 2018**

## Engineering Mathematics-III

**(Common to all branches)**

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5X12=60** Marks)

**UNIT-I**

**1** **a** Discuss the analyticity of the function $f(z)=z\,\bar{z}$. 5 M

**b** Obtain the analytic function $f(z)=u+iv$, if $2u+v=e^{x}(\cos y-\sin y)$ 7 M

**OR**

**2** **a** Evaluate $\int_{0}^{1+i}\left(x^{2}-iy\right)dz$ along the paths $(i)\ y=x$ $(ii)\ y=x^{2}$ 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 $(\infty,\ i,\ 0)$ in to the points $(-1,\ -1,\ 1)$. 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 $\sqrt{24}$. 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** Find the second degree polynomial equation $P(x)$ for an unequal interval data $P(1)=1,\ P(3)=27$ and $P(4)=64$ by using Lagrange's interpolation formula. 6 M

## UNIT-IV

**7** **a** Fit the curve of the form $y = ae^{bx}$ for the given data 7 M

| x | 77 | 100 | 185 | 239 | 285 |
|---|---|---|---|---|---|
| y | 2.4 | 3.4 | 7.0 | 11.1 | 19.6 |

**b** Using Simpson's $\frac{3}{8}$ rule to evaluate the value of $\int_0^6 \frac{1}{1+x^2}\,dx$ 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 $\int_0^2 e^{-x^2}dx$ taking h = 0.25 by using Simpson's $\frac{1}{3}$ 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** Calculate the values of $y(0.1)$ and $y(0.2)$. Given that $y' = 1 + xy,$ with $y(0) = 1$ using Picard's method. 6 M

**OR**

**10** **a** Solve $y' = y^2 + x$ with initial $y(0) = 1$ numerically by using Euler's method and also compute the values of $y(0.1)$ and $y(0.2)$. 6 M

**b** Write Runge-Kutta 4$^{th}$order formulae and use it to evaluate $y(0.1)$ and $y(0.2)$ given $y' = x^2 - y,$ with initial condition $y(0) = 1$. 6 M

*** END ***