R18

Reg. No:

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

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 60

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

1	**a**	Define Symmetric & Skew-symmetric matrices.	**2M**
	b	Define Beta and Gamma functions	**2M**
	c	Define Total differential Coefficient	**2M**
	d	Define Power Series	**2M**
	e	Define half range sine-series	**2M**

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

UNIT-I

2　**a**　Find the rank of A= $\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$　　**5M**

　b　Find whether the following equations are consistent, if so solve them $x+y+2z=4$, **5M**
$2x-y+3z=9$, $3x-y-z=2$

OR

3　Find the Eigen values and Eigen vectors of the matrix　$A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$　**10M**

UNIT-II

4　**a**　Find the Surface area of Sphere of radius 'a'　**5M**
　b　Verify Lagrange's mean value theorem for f(x) = x³ – x² -5x + 3 on [0,4]　**5M**

OR

5　**a**　Expand $\log_e x$ in power of (x-1) and hence evaluate log 1.1 correct to 4 decimal places using Taylor's theorem.　**5M**

　b　Evaluate $\int_0^\infty \sqrt{x}\, e^{-x^2}\, dx$　**5M**

UNIT-III

6　Examine the function for extreme values　$f(x, y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$ **10M**
(x>0,y>0)

OR

7　**a**　Find $curl\, \bar{f}$ for $\bar{f} = grad(x^3 + y^3 + z^3 - 3xyz)$　**6M**

　b　Find the directional derivative of $f = 2xy + z^2$ at (1,−1, 3) in the direction of the vector $\bar{i} + 2\bar{j} + 3\bar{k}$.　**4M**

UNIT-IV

8 Show that the series $1 + r + r^2 + r^3 + \ldots$
i) Convergent if $|r| < 1$ ii) Divergent if $r \geq 1$ iii) Oscillates if $r \leq -1$ **10M**

OR

9 **a** Test for Convergence of the series $\sum\limits_{n=1}^{\infty} \dfrac{1}{\sqrt{n} + \sqrt{n+1}}$ **5M**

b Test for Convergence of the series $\sum \dfrac{1}{\sqrt{n}} \tan \dfrac{1}{n}$ **5M**

UNIT-V

10 Obtain the Fourier series expansion of $f(x)$ given that $f(x) = (\pi - x)^2$ in $0 < x < 2\pi$
and hence deduce the value of $\dfrac{1}{1^2} + \dfrac{1}{2^2} + \dfrac{1}{3^2} + \ldots = \dfrac{\pi^2}{6}$.   **10M**

OR

11 Find Half range Fourier sine series of $f(x) = x(\pi - x)$ in $0 \leq x \leq \pi$ and hence
deduce $\dfrac{1}{1^3} - \dfrac{1}{3^3} + \dfrac{1}{5^3} - \dfrac{1}{7^3} + \ldots = \dfrac{\pi^3}{32}$ **10M**

END