Reg. No: ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R16) Regular Examinations May/June 2017
ENGINEERING MATHEMATICS-II
(Common to All Branches)
(For Students admitted in 2016 only)

Time: **3 hours**   Max. Marks: **60**
(Answer all Five Units **5 X 12 = 60** Marks)

UNIT-I

1 a. Test for consistency and solve $2x-3y+7z=5;$ $3x+y-3z=13;$ 6M
$2x+19y-47z=32$.

  b. Define Rank of a matrix. Find the rank of the matrix $\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$ by   6M
using Echelon form

OR

2 Verify the Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$ and   12 M
hence find A^{-1}.

UNIT-II

3 a Find $divF$ and $curlF$, where $F=grad\left(x^3+y^3+z^3-3xyz\right)$ 8 M

  b Find a unit normal vector to the given surface $x^2y+2xz=4$ at the point   4M
$(2,-2,3)$

OR

4 Verify Greens theorem for $\int_C\left(\left(xy+y^2\right)dx+x^2dy\right)$, where C is bounded by   12M
$y=x$ and $y=x^2$.

UNIT-III

5 a. Expand the function $f(x)=x\sin x$ as a Fourier series in the interval   8M
$[0,2\pi]$

  b. Expand the function $f(x)=x^2$ in the interval $[-\pi,\pi]$ 4M

OR

6 a. Find half-range cosine series for $f(x) = (x-1)^2$ in $0 < x < 1$. 6M

b. Find half-range sine series for $f(x) = x$ in $0 < x < 2$. 6M

UNIT-IV

7 Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, & if \ |x| \le 1 \\ 0, & if \ |x| > 1 \end{cases}$. Hence evaluate

$\int\limits_0^\infty \dfrac{\sin x - x\cos x}{x^3} dx$ 12M

OR

8 Find the Fourier sine and cosine transforms of $f(x) = e^{-ax}, a > 0$ and

deduce the integrals $\int\limits_0^\infty \dfrac{\cos px}{a^2 + p^2} dp$ and $\int\limits_0^\infty \dfrac{p\sin px}{a^2 + p^2} dp$ 12M

UNIT-V

9 a Solve by the method of separation of variables $u_x = 2u_t + u$ where

$u(x,0) = 6e^{-3x}$ 6M

b Form the Partial Differential Equation by eliminating arbitrary function

$z = f(y+2x) + g(y-2x)$ 6M

OR

10 A tightly stretched string of length l with fixed ends is initially in equilibrium position. It is set vibrating by giving each point a

velocity $v_0 \sin^3\left(\dfrac{\pi x}{l}\right)$. Find the displacement $y(x,t)$. 12M

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