Mid Term Examination
Title : Mathematics - II

Full marks: 25

Dept. CSE

Semester : Fall '19
Code : MAT 121

Time : 01 hour 30 min

CTs : All

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*Answer **any 5** questions. Figures in the right margin indicate marks.*

Q. No . 1 (answer any one)

(i). Find v_y, v_z, v_x, v_{zy}, V_{zyx} if $v = xyz + \frac{x}{y} + \frac{y}{z} + \frac{z}{x}$. **5**

(ii). $U = (x^2 + y^2 + z^2)^{1/2}$, then express $U_{xx} + U_{yy} + U_{zz}$ in terms of U. **5**

Q. No . 2 **2+2+1**

$$y = 4x^3 - 15x^2 + 12x - 2$$

Find : **(i).** extrema of y ; **(ii).** Inflexion point of y ; **(iii).** Draw a graph of y.

Q. No . 3

(a). Evaluate: **(i).** $\int_0^{\pi/2} 5 \sin^9 t \cos^{11} t \, dt$ **(ii).** $\int_0^1 16 \, x^7 (1-x)^9 \, dx$. **2+2**

(b). Compute $\Gamma(\frac{10}{3})$ if given that $\Gamma(\frac{1}{3}) = \frac{2679}{1000}$. **1**

Q. No . 4

(a). Write $-11 - 32\,i$ in **(i)** exponential form and **(ii)** polar form. **2**

(b). Express $17\, e^{3.5i} - (16, 150^0)$ in algebraic form. **3**

Q. No . 5

Evaluate (any one): **5**

(i). $\int_0^1 \int_1^{1-y} \int_2^x 22\, xyz \, dz\, dx\, dy$ (ii). $\int_2^3 \int_1^2 \int_0^1 (3x^2y - 4yz^2) \, dy\, dz\, dx$

Q. No . 6 **4 +1**

(a). Express M as the sum of a symmetric matrix & a skew-symmetric matrix where

$$M = \begin{bmatrix} -5 & 3 & 0 & 9 \\ 0 & 4 & 4 & -3 \\ -7 & 1 & 5 & 0 \\ 2 & 0 & 8 & -4 \end{bmatrix}.$$

(b). Give an example of a 7x7 matrix which is symmetric & skew-symmetric also.

: The end :