Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

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A Constituent Institution of Manipal University

III SEMESTER B.TECH.

END SEMESTER EXAMINATIONS, NOV/DEC 2017

SUBJECT: ENGINEERING MATHEMATICS-III [MAT 2106]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A. Find the standard deviation and mode for the following data. **4**

Class	70- 80	80 – 82	82 – 84	84 – 86	86-88	88 - 90
Frequency	3	15	26	23	9	4

1B. Obtain the half range cosine series for the function $f(x)=\begin{cases}\frac{\pi}{3}, 0<x<\frac{\pi}{3}\\ 0\,,\ \frac{\pi}{3}<x<\frac{2\pi}{3}\\ -\frac{\pi}{3},\ \frac{2\pi}{3}<x<\pi\end{cases}$ **3**

1C Find the directional derivative of $\varphi = x^2yz - 4xyz^2$ at $(1,3,1)$ in the direction of $2\hat{\imath}-\hat{\jmath}-2\hat{k}$. **3**

2A. Compute the coefficient of skewness based on the quartiles. **4**

Class	100-104	104 -108	108-112	112-116	116-120	120-124
Frequency	6	14	18	20	10	2

2B. A fluid motion is given by V= (y + z) iIs this + (z + x) j + (x + y) k .Is this motion irrotational? If so, find the scalar potential. **3**

2C. Suppose the force field is given by F =(2x –y +z) i +(x + y – z^2) j + (3x – 2y +4z) k . Find the work done in moving a particle once round a circle C in the xy – plane with its centre at the origin and a radius of 3. **3**

3A. Verify Green's theorem in the plane for $\oint (xy+y^2)dx+x^2\,dy$ where C is the closed curve of the region bounded by y = x and $y = x^2$. **4**

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3B. Fit a straight line for the following data using least square method. **3**

X	20	25	30	35	40
Y	23.10	26.20	30.60	35.80	42.90

3C. Form the partial differential equation by eliminating the arbitrary functions: **3**

$z = f(x + ct) + g(x - ct)$.

4A. Obtain the constant term and the coefficients of sinθ and sin2θ in the Fourier expansion of y **4**

x^o	0	60	120	180	240	300
Y	9	18	24	28	26	20

4B. Compute mean deviation from mean for the following distribution **3**

Class	40 - 60	60 - 80	80 –100	100 –120	120-140	140- 160
Frequency	12	47	31	8	2	3

4C. Solve by the method of separation of variables $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ where $u(0,y) = 8e^{-3y}$. **3**

5A. Solve $U_{xx} + 2U_{xy} + U_{yy} = 0$ given v = x and $z = x - y$. **4**

5B. Find the missing values in the following distribution, given that the mean and median are 64.6 and 62. **3**

10 – 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
1	4	a	8	b	32	39	42

5C. Obtain the fourier series for the function $f(x) = \begin{cases} -\pi, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$ **3**