Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
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III SEMESTER B.TECH.

END SEMESTER MAKE-UP EXAMINATIONS, DEC 2017

SUBJECT: ENGINEERING MATHEMATICS-III [PME - 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. Compute mean deviation from median for the following distribution **4**

Class	0 - 10	10 - 20	20 – 30	30 –40	40– 50	50– 60
Frequency	2	10	20	15	10	3

1B. Find the half range cosine series for $f(x) =$ 2x – 1 in 0 < x < 1 **3**

1C Form the partial differential equation by eliminating the arbitrary constants: $z = e^{ax+by} f(ax-by)$. **3**

2A. Express y as a Fourier cosine series upto the second harmonics **4**

x^o	0	60	120	180	240	300
Y	4	8	15	7	6	2

2B. Evaluate $\int \vec{F}.d\vec{r}$, where $\vec{F} = (2y+3)\hat{\imath} + xz\hat{\jmath} + (yz-x)\hat{k}$ along the straight line from $(0,0,0)$ to $(2,1,1)$. **3**

2C. The runs obtained by two cricketers A and B in 10 innings are given below. Determine which of the two cricketers is a better scorer on an average and who is more consistent ? **3**

A	31	48	13	51	38	43	50	36	47	82
B	51	5	12	83	37	112	42	18	79	20

3A. Fit a straight line for the following data using least square method. **4**

X	1	2	3	4	5	6	7	8
Y	2	5	9	5	2	17	18	20

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3B.	Evaluate $\iint_S F.n\,ds$ by divergence theorem, where F = 4xz i – y^2j +yz k and S is the surface of the cube bounded by x = 0 ,y = 0 , z = 0 , x = 1 , y = 1 , z = 1.	**3**
3C.	Solve by the method of separation of variables $3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$ where $u(x, 0) = 4e^{-x}$	**3**
4A.	Compute the coefficient of correlation between x and y. x: 218, 220, 236, 225, 220, 227, 228 y: 12.3, 12.7, 12, 12.2, 12.7, 12.1, 12	**4**
4B.	Using Green's theorem evaluate $\oint_C (3x - 8y^2)dx + (4y - 6xy)dy$,where C is the boundary of the region bounded by x = 0 , y = 0 and x + y = 1.	**3**
4C.	Solve the partial differential equation $U_{xx} + U_{xy} - 2U_{yy} = 0$ using the transformation v = x + y, z = 2x – y.	**3**
5A.	Calculate mean and mode for the given distribution. Class: 0 - 20, 20 - 30, 30 –40, 40 –50, 50-60, 60- 80, 80 - 100 Frequency: 12, 42, 61, 47, 21, 12, 4	**4**
5B.	Find the Fourier series expansion of $f(x) = x - x^2$ in $-\pi \le x \le \pi$ and hence prove that $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} \dots\dots\dots\dots\infty = \frac{\pi^2}{12}$. Given $f(x + 2\pi) = f(x)$.	**3**
5C.	Suppose A = $x^2 z^2$ i – $2y^2 z^2$ j + xy^2 z k .Find (i) $\Delta \times A$ and (ii) $\Delta . A$ at the point P = (1 , -1 ,1).	**3**