Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SECOND SEMESTER B.TECH. (COMMON TO ALL BRANCHES)

END SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: ENGINEERING MATHEMATICS-II[MAT 1201]

REVISED CREDIT SYSTEM

16/04/2018

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Expand f(x, y) = sinxy in powers of $x-1$ and $y-{}^{\pi}/_{2}$ up to third degree terms.	**3M**
1B.	The period T of a simple pendulum is $T=2\pi\sqrt{\frac{l}{g}}$. Find the maximum error in T due to possible errors upto 1 % in l and 2 % in g.	**3M**
1C.	Find the volume of paraboloid of revolution $x^2+y^2=4z$ cut off by the plane z = 4.	**4M**
2A.	Find the extreme values of the function $f(x,y)=xy(a-x-y)$	**3M**
2B.	Find the area included between the cardioids $r=a(1+cos\theta)$ and $r=a(1-cos\theta)$.	**3M**
2C.	Solve $y''+5y'+6y=e^{-2t}$ given $y(0)=y'(0)=1$ by using Laplace transform.	**4M**
3A.	Evaluate (i) $\lim_{x\to 0}\frac{xe^x-\log(1+x)}{x^2}$ (ii) $\lim_{x\to 0}(1+\sin x)^{\cot x}$.	**3M**
3B.	Find the nature of the series $\frac{1}{1^2}+\frac{1+2}{1^2+2^2}+\frac{1+2+3}{1^2+2^2+3^2}+\ldots$	**3M**

3C.	Find the Laplace transform of *i*) $\left\{\frac{1-cost}{t}\right\}$ ii) $\int_0^t t\ e^{-t}\ sin4t\ dt$	**4M**
4A.	Change the order of integration and evaluate $\int_0^1 \int_{\sqrt{y}}^{2-y} xy\ dxdy$	**3M**
4B.	If $u = \log_e\left[\frac{x^4+y^4}{x+y}\right]$ then find the value of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$.	**3M**
4C.	Find $L^{-1}\left[\frac{3}{s} - 4\frac{e^{-s}}{s^2} + 4\frac{e^{-3s}}{s^2}\right]$ and sketch the graph of the function of t.	**4M**
5A.	Find the equation of a sphere whose great circle is $x^2 + y^2 + z^2 + 10y - 4z = 8$, $x + y + z = 3$.	**3M**
5B.	Prove that $\beta(m,n) = \frac{\Gamma m\ \Gamma n}{\Gamma(m+n)}$.	**3M**
5C.	Test the nature of the series $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} - \cdots$.	**4M**

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