Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐ **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. FT (2018 Batch) (Sem.–2)

MATHEMATICS-II

Subject Code : BTAM-206-18

M.Code : 76349

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION - B & C have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.**
4. **Select atleast TWO questions from SECTION - B & C.**

SECTION-A

l. Answer the following :

a) Write a short note on Fourier Series.

b) Find Laplace Transform of 2sin $(3t)$ + 3 cos $(5t)$.

c) Find inverse Laplace Transform of $\frac{1}{s}\cos\frac{1}{s}$

d) Find the differential equation from $y = c(x - c)^2$, where c is arbitrary constant.

e) Write complementary function of the equation $\frac{d^3y}{dx^3} \square y \square 0$.

f) Write Legender's equation of n order.

g) Eliminate the constants from the equation $z = (x + a)(y + b)$.

h) Solve $dx + x\,dy = e^{-y} \log(y)\,dy$.

i) Determine the radius of curvature of the power series $\sum_{m=0} \frac{1}{2m}(x \square 1)^{2m}$.

j) Write a short note on Ordinary differential equation.

SECTION-B

2. Evaluate Laplace Transformation of $te^{-t}\sin(3t)$.

3. Find the inverse Laplace Transform of $\frac{s}{(s-1)^2(s^2+1)}$.

4. Find the Fourier series of the function $f(x)$ given by :

   $f(x) = x$, if $-\pi < x < 0$

   $= -x$, if $0 < x < \pi$

5. Solve $\frac{d^2y}{dx^2} + y = x\sin(x) + (1+x^2)e^x$

SECTION-C

6. Find the solution of $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + \frac{1}{2}xy = 0$ in terms of Bessel's function.

7. Show that $P_{2n+1}(0) = 0$ and $P_{2n}(0) = (-1)^n \frac{1.3.5....(2n-1)}{2.4.6....2n} = \frac{2n!}{(n!)^2(2^n)^2}$. Where $P_n(x)$ is Legendre's function.

8. Solve $z(p-q) = z^2 + (x+y)^2$. Where $p = \frac{\partial z}{\partial x}$ & $q = \frac{\partial z}{\partial y}$

9. Solve by Charpit's method $pxy + pq + qy = yz$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.