

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

I. Answer the following :

- a) Write a short note on Fourier Series.
- b) Find Laplace Transform of $2\sin(3t) + 3\cos(5t)$.
- c) Find inverse Laplace Transform of $\frac{1}{s}\cos\left(\frac{1}{s}\right)$.
- d) Find the differential equation from $y = c(x - c)^2$, where c is arbitrary constant.
- e) Write complementary function of the equation $\frac{d^3y}{dx^3} + y = 0$.
- f) Write Legendre'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 $\sum_{m=0}^{\infty} \frac{1}{2m}(x-1)^{2m}$.
- 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 $-\pi \leq x \leq 0$
 $= -x$, if $0 \leq x \leq \pi$
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 $P_{2n}(0) = (-1)^n \frac{1.3.5\dots(2n-1)}{2.4.6\dots 2n} = \frac{2n!}{(n!)^2(2^n)^2}$. 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.