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

Total No. of Questions : 09

B.Tech(BME)/(ECE)/(EE/EEE)/(EIE) (Sem.–3)
ENGINEERING MATHEMATICS/APPLIED MATHEMATICS-III
Subject Code : AM-201
Paper ID : [A0303]

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

a) Write down the Drichlets conditions.

b) Write down the formulae for a_n and b_n for any function $f(x)$ in the interval $-1 < x < 1$.

c) Derive an expression for $\dfrac{dF(s)}{ds}$.

d) Evaluate $L^{-1}\left(\dfrac{s}{(s+\alpha)^2}\right)$

e) Prove that $P_n(1) = 1$ for any n

f) Find the differential equation of all the spheres whose center lies on z axis.

g) Solve the equation $(p - q)(z - px - qy) = 1$

h) Is $f(z) = z/|z|$ continuous at the origin?

i) Find $J_0(x)$.

j) State the second shift property of Laplace transforms.

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SECTION-B

2. Determine the residues at the poles for $f(z) = \dfrac{z+1}{(z^2 - 16)(z+2)}$

3. Solve the equation $z(z^2 + xy)(px - qy) = x^4$

4. Evaluate $L^{-1} \dfrac{s^2 + 2s + 3}{(s^2 + 2s + 2)(s^2 + 2s + 5)}$

5. Find the Fourier series expansion for the function $f(x) = x - x^3$ in the interval $-1 < x < 1$

6. State and prove the necessary and sufficient condition for a function to be analytic.

SECTION-C

7. Find the image of the region bounded by the lines $x = 1$, $y = 1$ and $x + y = 1$ under the transformation $w = z^2$

8. A string of length L is stretched and fastened to two fixed points. Find the solution of the wave equation $y_{tt} = a^2 y_{xx}$ when initial displacement $y(x, 0) = f(x) = b_0 \sin^3\left(\dfrac{\pi x}{L}\right)$.

9. Solve the differential equation $(1 - x^2) y'' - 2x\, y' + n(n + 1)y = 0$.