Code No. 2522/CBCS/BL

FACULTY OF ENGINEERING

B.E. III-Semester (CBCS)(Backlog) Examination, October 2020

Subject : Engineering Mathematics – III
(Except-IT)

Time : 2 Hours **Max. Marks: 70**

PART – A

Note: Answer any five questions. **(5x2 = 10 Marks)**

1 Find the limit of $\underset{x \to 2}{Lt}\,[3x - x^2]$

2 Define analytic function give one example of it.

3 Find the zeros and singular points of $f(z) = \dfrac{(z+1)(z-2)}{(z-3)(z+2)}$.

4 Write the statement of Residue theorem.

5 Write the fourier coefficients formulae on the interval $(-\pi, \pi)$.

6 Define half range sine series.

7 Form the partial differential equation by eliminating arbitrary constants from $Z = ax + by + a^4 + b^4$.

8 Solve $Z = p^2 + q^2$.

9 Define one dimensional heat equation.

10 Solve by separation of variables method $\dfrac{\partial u}{\partial x} = \dfrac{2\partial u}{\partial t} + u$ where $(x, 0) = 6e^{-3x}$.

PART – B

Note: Answer any four questions. **(4x15 = 60 Marks)**

11 (a) Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin, even though CR – equations are satisfied thereof.

(b) Use Cauchy's integral formula to evaluate $\oint_C \dfrac{\cos \pi z}{z^2 - 1}\,dz$ around a rectangle with vertices.

12 (a) Expand in Taylor series $f(z) = \dfrac{z-1}{z+1}$ about the point $z = 1$.

(b) Expand in Laurent series of $f(z) = \dfrac{z-1}{z^2}$ for $|z - 1| > |$.

13 Expand $f(x) = x \sin x$ as a fourier series in the interval $0 < x < 2\pi$.

14 (a) Use Charpits method to solve $q + xp = p^2$.
(b) Solve $x^2(y - z)p + y^2(z - x)q = z2(x - y)$.

15 A tightly stretched string of length 'ℓ' with fixed ends is initially in equilibrium position. It is set vibrating by giving each point a velocity $v_0 \sin^3\left(\dfrac{\pi x}{\ell}\right)$. Find the displacement of (x, t).

16 (a) Find the bilinear transformation which maps the points z = 1, i – 1, onto the points w = i, 0, - i. Find the image of | z | < |.

(b) Express f(x) = x as a half – range cosine series in $0 < x < 2$.

17 (a) Find the residues of $f(z) = \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)^2 (z-2)}$ at its poles.

(b) Prove that $\int_c (z-a)^n dz = 0$ [n, any integer ≠ -1] where C : | z – a | = r.

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