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BCA (Part-III) Examination, 2022

THEORETICAL FOUNDATION OF COMPUTER SCIENCE

[Differential Equation and Fourier Series (Part-II)]

Time Allowed : Three Hours

Maximum Marks : 50

Minimum Passing Marks : 17

Note : Attempt **any five** questions. **One** question form each unit is **compulsory**. **All** questions carry equal marks.

UNIT–I

1. Solve : [10]

$$\frac{dy}{dx} = \frac{x - y + 3}{2x - 2y + 5}$$

OR

Solve :

$$(y-x)\frac{dy}{dx} = a\left(y^2 + \frac{dy}{dx}\right)$$

UNIT– II

2. Solve : [10]

$$\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = \cos 3x$$

OR

Solve :

$$\frac{d^2y}{dx^2} + a^2 y = \sec ax$$

UNIT– III

3. Solve : [10]

$$x^2 p + y^2 q = nxy$$

OR

Solve :

$$r + a^2 t = 0$$

UNIT– IV

4. Obtain Fourier's series in the interval $(-\pi, n)$ for the function [10]

$$f(x) = x \cos x$$

OR

Obtain the Fourier series for

$$f(x) = e^{-x}$$

in the interval $0 < x < 2\pi$

UNIT– V

5. Write short notes on : [10]

(a) Periodic Function

(b) Gibbs Phenomenon

OR

Solve two dimensional Laplace equation which depends only on :

$$r = \sqrt{x^2 + y^2}$$

-----x-----