

(4) Code No. : C-392

Roll No.....

Total No. of Sections : 03

Total No. of Printed Pages : 04

OR

Obtain Fourier sine series of the following function :

where a is a constant.

Q.5 Show that the following functions , satisfy the Laplace equation :

(i) $u = x^3 - 3xy^2$

(ii) $u = \frac{x}{(x^2 + y^2)}$

OR

Prove that $u = \frac{a}{r} + b$ is a solution of in the form of r

where and a and b are constants.

---x---

Code No. : C-392

Annual Examination - 2018

BCA - III

BCA - 301

CALCULUS, DIFFERENTIAL EQUATION AND COMPUTER ARCHITECTURE

Paper - II

DIFFERENTIAL EQUATION

AND FOURIER SERIES

Max.Marks : 50

Min.Marks : 20

Time : 3 Hrs.

Section 'A', containing 10 very short-answer-type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.

Section - 'A'

Answer the following very short-answer-type questions in one or two sentences : (1 x 10=10)

Q.1 What is the degree of differential equation ?

Q.2 What is the integrating factor of linear differential equation $x \frac{dy}{dx} - 2y = x^2$?

Q.3 What is the differential equation of the system of circles touching the y-axis at the origin?

P.T.O.

(2)

Code No. : C-392

- Q.4 What is the complementary function of given differential equation ?
- Q.5 Obtain the partial differential equation by eliminating the arbitrary functions for u :
- Q.6 Define full Range Fourier series.
- Q.7 Define Periodic functions.
- Q.8 Define Orthogonal Trajectories.
- Q.9 Write the statement of term by term differentiation of Fourier series.
- Q.10 Define Harmonic function.

Section - 'B'

Solve the following questions : (3 5=15)

- Q.1 Find the differential equation by the family of curves where c_1 and c_2 are arbitrary constants.

OR

Solve the Differential equation $\frac{dy}{dx} = \frac{x(2\log x + 1)}{\sin y + y \cos y}$

- Q.2 Find the equation of the curve through the origin which satisfies the differential equation $\frac{dy}{dx} = (x - y)^2$

OR

Solve : $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 4y = 0$

- Q.3 Find the partial differential equation by eliminating a and b from the relation

(3)

Code No. : C-392

OR

Find the complete and general solution :

- Q.4 Find the Fourier coefficients a_0 and a_n of the function in

OR

Explain Half Range Fourier Series.

- Q.5 Explain convergence on Fourier Series.

OR

Explain operations of Fourier Series.

Section - 'C'

Solve the following questions : (5 5=25)

- Q.1 Solve :

OR

$$\frac{d^2y}{dx^2} - 13\frac{dy}{dx} + 44y = 9 \sin^{-1} \left(\frac{y-3}{16} \right) dx = (\tan^{-1} y - x) dy$$

- Q.2 Find the orthogonal trajectories of the family of curves $y = ax^2$

OR

Solve : $\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 9y = 40 \sin 5x$

- Q.3 Solve : $(y + z)p + (z + x)q = x + y$

OR

Find the complete and singular solution

- Q.4 Find the Fourier series of the function $f(x) = x^2$ in

Hence deduce that

P.T.O.