

2020
MATHEMATICS - GENERAL (Semester-2)

PAPER : CC2/GE2

Full Marks : 20

Email ID-mathsnc@gmail.com

Time : 30 Mins.

Answer the following question : 2x5=10

1. (a) State the cauchy's general principle of convergence in sequence of real numbers.

(b) Find the angle between the vectors

$$\left(\hat{i} - 2\hat{j} - 2\hat{k} \right) \text{ and } \left(2\hat{i} + \hat{j} - 2\hat{k} \right)$$

(c) Find the particular Integral of the differential equation;

$$\frac{d^2y}{dx^2} - 4y = \text{Sin}3x.$$

(d) State the D-Alembert's Ratio test, in series.

(e) Obtain the partial differential equation by eliminating a, b from the relation -

$$Z = (x+a)(y+b)$$

Answer any two from the following questions. 5x2=10

2. (a) Find the $\lim_{x \rightarrow 0} \frac{\tan x - x}{x - \text{Sin}x}$

(b) Solve by method of variation of parameters.

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 4y = e^{3x}$$

(c) Find the volume of a Tetrahedron, whose vertices are given by the vectors ;

$$-3\hat{i} + 7\hat{j} + 5\hat{k}, 5\hat{i} + 7\hat{j} - 3\hat{k}, 7\hat{i} - 5\hat{j} - 3\hat{k}$$

(d) Solve the P.d.e. by Lagrange method :

$$\frac{y^2z}{x} p + xzq = y^2$$

(e) State and prove the Division algorithm.