2020

COMPUTER APPLICATION (Honours)

Paper : DC-1

(Mathematics)

(CBCS)

Full Marks : 32 Time : Two Hours

The figures in the margin indicate full marks.

Group - A

Answer any *six* questions. 2×6=12

1. (a) Prove that the product of the eigen values of a square matrix A is det A.

(b) Find the general and principle value of $i^{\log(1+i)}$.

(c) If $^{n}P_{r} = 120 \times {}^{n}P_{r-1}$ then find the value of r.

(d) Show that for any variable mean deviation about mean is zero.

(e) Determine the value λ, for which the vector $\vec{a} = \lambda\vec{i} - 4\vec{j} + 3\vec{k}$ and $b = 3\vec{i} + \lambda\vec{j} - 2\vec{k}$ are perpendicular.

(f) Find the equation of a line making an angle 30° with the x-axis and passing through (1,2) .

(g) Find the vertex, focus and directrix of the Conic $y^2 + 4x + 2y - 8$.

Group - B

Answer any *two* questions : 10×2=20

2. (a) Prove that $\begin{vmatrix} 2bc-a^2 & c^2 & b^2 \\ c^2 & 2ca-b^2 & a^2 \\ b^2 & a^2 & 2ab-c^2 \end{vmatrix} = \left(a^3+b^3+c^3-3abc\right)^2$

(b) Solve the system of equations by Matrix method

$$x + y + z = 5$$

$$x - y = 0,$$

$$2x + y - x = 1$$

5+5

3. (a) Prove by vector method triangles the perpendicular drawn from the vertices to the opposite sides is concurrent.

(b) A coin is tossed $(m + n)$ times $(m > n)$. Show that the probability of exactly m consecutively heads is $\frac{(n+3)}{2^{m+2}}$. (5+5)=10

4. (a) Define eigen value and eigen vector of a matrix.

(b) Find the equation of parabola whose latus rectum is 6 and the axis and tangent at the vertex are the line $3x + 4y + 1 = 0$ and $4x - 3y = 0$.

(c) A candidate is selected for interview for 3 posts. For the first post there are 3 candidates, for the second post there are 4 candidates, for the last post there are 2. What are the chances of getting at least one post? (3+3+4)=10