# Home Assignment

## Sub: Mathematics (RC/HG-2016)

## Class: B.A. 2nd Semester

## Full Marks: 20

1. Answer any four of the following: $4 \times 5 = 20$

(a) State De Moivre's theorem completely and prove it for positive integral index.

(b) Find a relation among the coefficient of the equation $ax^3+3bx^2+3cx+d=0$ , if its roots are in geometric progression (GP).

(c) If $\alpha, \beta, \gamma$ are the roots of the equation $x^3+px^2+qx+r=0$ then find the value of $\sum(\alpha + \beta - \gamma)^3$ .

(d) If $\alpha, \beta, \gamma$ are the roots of the equation $x^3+qx+r=0$ then form the equation whose roots are $\dfrac{\beta\gamma}{\alpha}, \dfrac{\gamma\alpha}{\beta}$ & $\dfrac{\alpha\beta}{\gamma}$ .

(e) Find the rank of the following matrix by reducing it to Echelon form:
$$A = \begin{bmatrix} 1 & 2 & -1 & 0 \\ 3 & 1 & 4 & 2 \\ 1 & -3 & 6 & 2 \end{bmatrix}$$

(f) Find the eigenvalues and eigenvectors of the following matrix:
$$A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$$

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