Exam Code: 0002
Sub. Code: 0147

2071

B.A./B.Sc. (General) Second Semester

Mathematics

Paper – III: Theory of Equations

Time allowed: 3 Hours

Max. Marks: 30

***NOTE:** Attempt <u>five</u> questions in all, selecting atleast two questions each Unit.*

x-x-x

UNIT – I

I. a) Find g.c.d. of $f(x) = x^3 + 2x^2 + 5$, $g(x) = x^4 - 3x^2 + 2x + 1$ and express the g.c.d. in the form $a(x)\,f(x) + b(x)\,g(x)$

b) Find the common roots of the equations $x^4 - 3x^3 - 7x^2 + 27x - 18 = 0$, $x^4 - 5x^2 + 4 = 0$, hence solve them completely. (2x3)

II. a) Solve the equation $x^4 - 6x^3 - 3x^2 - 24x - 28 = 0$ given that one root is purely imaginary.

b) If reciprocal of every root of $x^3 + x^2 + ax + b = 0$ is also a root, then prove $a = b = 1$ or $a = b = -1$. (2x3)

III. a) Reduce the equation $2x^3 - 3x^2 + 10x - 4 = 0$ in the form in which 2nd term is missing.

b) If α, β, γ are roots of the equation $x^3 - 3x - 2 = 0$. Find an equation having roots $(\beta + \gamma)^2, (\gamma + \alpha)^2, (\alpha + \beta)^2$. (2x3)

IV. a) Prove equation $x^5 + 2x^3 + 3x - 1 = 0$ has no -ve root. Also find the n/ of +ve and imaginary roots.

b) If α, β, γ are roots of $x^3 + 6x + 2 = 0$, then form a cubic equation having roots $(\alpha - \beta)^2, (\beta - \gamma)^2, (\gamma - \alpha)^2$. (2x3)

P.T.O.

UNIT – II

V. a) Show that the real roots of equation $x^4 - 2x^3 - 2x^2 + 10x - 3 = 0$ lie between -2 and 4.

b) Use Newton's method of divisors to find the integral roots of equation $3x^4 - 23x^3 + 35x^2 + 31x - 30 = 0$. (2x3)

VI. a) Solve the equation $x^3 - 6x^2 - 6x - 7 = 0$ by Cardon's method.

b) Show that the equation $x^3 + x^2 - 2x - 1 = 0$ has three real and distinct roots. (2x3)

VII. a) Solve $x^4 - 6x^3 + 3x^2 + 22x - 6 = 0$ by Descartes' method.

b) Solve $x^4 + 12x - 5 = 0$ by Ferrari's method. (2x3)

VIII. a) Use trigonometric method to solve the cubic $x^3 + 3Hx + G = 0$, $G^2 + 4H^3 < 0$, $G.H \in R$.

b) Use Newton's method to approximate upto 3 places of decimal the cube root of 6. (2x3)

x-x-x