(i) Printed Pages : 2 Roll No. .....

(ii) Questions : 8 Sub. Code : 0145

Exam. Code : 0002

B.A. /B.Sc. (General) 2nd Semester

1046

MATHEMATICS

Paper : III (Theory of Equations)

Time Allowed : Three Hours] **[Maximum Marks : 30**

Note :– Attempt **five** questions in all, selecting at least **two** questions from each unit. All questions carry equal marks.

UNIT–I

I. (a) Prove that complex roots of a real polynomial equation occurs in conjugate pairs. 3

(b) Explain Hornor's method of synthetic division to find the quotient and remainder of dividing a polynomial $f(x)=a_0+a_1x+a_2x^2+.....+a_nx^n, a_n\neq 0$, where $\alpha\in F$. 3

II. (a) State and prove Vieta's formula. 3

(b) Solve the equation $x^4+5x^3-30x^2-40x+64=0$, given that its roots are in G.P. 3

III. (a) Find the condition that the cubic $x^3+3px^2+3qx+r=0$ should have its roots in H.P. 2

(b) If a,b,c are roots of $2x^3+x^2+x+1=0$, form an equation whose roots are $\frac{1}{b^2}+\frac{1}{c^2}-\frac{1}{a^2}, \frac{1}{c^2}+\frac{1}{a^2}-\frac{1}{b^2}, \frac{1}{a^2}+\frac{1}{b^2}-\frac{1}{c^2}$. 4

IV. (a) Find the quation whose roots are squared difference of roots of equation $x^3+6x^2+9x+4=0$. 3

(b) State Descarte's rule of sign. Use it to find least number of imaginary roots of $2x^7-x^4+4x^3-5=0$. 1+2

UNIT–II

V. (a) Solve $x^4-8x^2-24x+7=0$ by Descarte's method. 3

(b) Apply Fortran's method to solve the equation :

$$x^4-10x^3+35x^2-50x+24=0.$$ 3

VI. (a) Use Cordon's method to solve $x^3-15x^2-33x+847=0$. 3

(b) Apply Newton's method of divisors to find integral roots of equation $x^3-5x^2-2x+24=0$. 3

VII. (a) For the equation $x^3-6x^2-6x-14=0$, find G^2+4H^3 and hence discuss the nature of its roots. 3

(b) Find the interval in which roots lie in the equation :

$x^4-44x^2+112x-384=0$ by method of grouping. 3

VIII. (a) Apply trigonometric method to solve equation $x^3-3x+1=0$. 4

(b) Reduce the equation $2x^3-9x^2+13x-6=0$ into which second term is missing. 2