B.Sc. DEGREE EXAMINATION, APRIL 2018.

I YEAR II SEMESTER

Core Major - Paper III - CLASSICAL ALGEBRA

Time : 3 Hours Max. Marks : 75

SECTION A – (10 × 2 = 20 marks)

Answer any *TEN* questions

1. Write down the expansion of
2. Show that,
3. Form the rational cubic equation whose two of the roots are 1, 3 -.
4. Solve whose roots are in Arithmetic Progression.
5. What is receiprocal equation.
6. Show that, the equation can be transformed into a reciprocal equation by diminishing the roots by unity.
7. Define Hermitian matrix with an example.
8. State Cayley-Hamilton theorem.
9. Find the number of divisors of 480.
10. State Fermat's theorem.
11. Find the eigen values of
12. When do you say two integers a and b are congruent with respect to modulo m?

SECTION B – (5 × 5 = 25 marks)

Answer any *FIVE* questions

1. Sum the series to infinity:
2. Solve the equation whose roots are in Harmonic Progression.
3. Remove the fractional coefficients from the equation x - 1 = 0
4. Show that, any real square matrix A may be uniquely written as the sum of symmetric and skew-symmetric matrices.
5. Find the smallest integers with 18 divisors.

[P.T.O.]

1. Show that, = 3 log 2 - 1.
2. Find the eigen values and eigen vectors of the matrix

SECTION C – (3 × 10 = 30 marks)

Answer any *THREE* questions

1. Show that, + … ∞ = e ( e - 1 ).
2. Solve the equation, given that two of its roots are equal in magnitude and opposite in sign.
3. Solve the reciprocal equation
4. Verify Cayley-Hamilton theorem for A = and hence find its inverse.
5. (i) Show that, 8th power of any number is of the form 17m or 17m ± 1.

(ii) Show that, (18)! + 1 is divisible by 437.