LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **PHYSICS**

FIRST SEMESTER – NOVEMBER 2012

# MT 1100 - MATHEMATICS FOR PHYSICS

Date : 03/11/2012 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

**SECTION A**

ANSWER **ALL** THE QUESTIONS: (**10x2 =20)**

1. Find the nth derivative of.
2. Write down the formula for subtangent and subnormal.
3. Prove that  .
4. Find the rank of the matrix.
5. Show that .
6. State the formula for Laplace transformation of a periodic function.
7. Write down the expansion for.
8. If Show that
9. What is the chance that a leap year selected at random will contain 53 Sundays?
10. Define Binomial distribution.

**SECTION B**

ANSWER ANY **FIVE** QUESTONS: (**5x8 =40)**

1. Find the angle of intersection of cardioids and.
2. Find the minimum and maximum value of the function.
3. Find the sum to infinity series.
4. Show that the system of equations



are consistent and solve them.

1. Find the L(f(t)) if 
2. Find a)  b) .
3. Prove that *cos8θ = 1- 32sin2 θ + 160sin4 θ-256sin6 θ+128 sin8 θ*.
4. Find the moment generating function for the Poisson distribution and hence find its

mean and variance.

**SECTION C**

ANSWER ANY **TWO** QUESTIONS: (**2x20 = 40)**

1. a) If then Prove that. b) Find the nth derivative of. (10+10)
2. If then

a) Find the characteristic value and characteristic vector of the matrix.

b) Verify Cayley Hamilton Theorem and find *A*-1. (10+10)

1. a) Express *cos5θ* *sin3θ* in terms of *sines* of multiples of *θ*.

b) Separate into real and imaginary parts of *tan-1(α+iβ).* (10+10)

1. a) Solve with  using Laplace transform.

b) An urn contains 6 white, 4 red and 9 black balls. If 3 balls are drawn at random, find the probability that: (i) two of the ball drawn is white; (ii) one is of each colour,

(iii) none is red.

(14+6)

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