LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **CHEMISTRY**

THIRD SEMESTER – **NOVEMBER 2012**

# MT 3103 - MATHEMATICS FOR CHEMISTRY

Date : 07/11/2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**Section A**

**Answer ALL the questions: (10 × 2 = 20)**

1. Differentiate with respect to *x*.
2. If , find .
3. Evaluate .
4. Solve .
5. Write the binomial expansion for
6. Prove that .
7. Solve .
8. Prove that .
9. Show that .
10. What is the chance that the leap year selected at random will contain 53 Sundays?

**Section B**

**Answer any FIVE questions: (5 × 8 = 40)**

1. (a) If , find .

(b) Find the differential coefficient of .

1. Find the angle of intersection of the cardioids

and .

1. Evaluate .
2. Prove that .
3. Sum the series to infinity
4. Express in series of powers of
5. Solve .
6. A car hire firm has two cars, which it hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days on which (i) neither car is used, and (ii) the proportion of days on which some demand is refused.

**Section C**

**Answer any TWO questions: (2 × 20 = 40)**

19. a) Find the equation of the tangent and normal to the curve , at .

b) Find the maxima and minima of the function .

(10 + 10)

20. a) Integrate with respect to *x*.

b) Solve . (12 + 8)

21.a) Expand in a series of cosines multiples of

.

b) Show that

(10 + 10)

22. a) Show that in the interval . Also deduce that

b) An insurance company insures 4,000 people against loss of both eyes in a car accident. Based on previous data, the rates were computed on the assumption that on the average 10 persons in 1,00,000 will have car accident each year that result in this type of injury. What is the probability that more than 3 of the insured will collect on their policy in a given year?

( 12 + 8)

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