 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **MATHEMATICS**

SECOND SEMESTER – **APRIL 2012**

# MT 2901 - MATHEMATICAL METHODS

Date : 28-04-2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**SECTION A**

Answer any **five** questions (5 x 4 = 20)

1. Find the equation of the line through the point and parallel to the line through the points and .
2. Suppose the fixed cost of production for a commodity is $20000; the variable cost is $15 per unit and the commodity sells for $20 per unit. What is the break-even quantity?
3. If the marginal revenue function is , determine the revenue and demand functions.
4. Evaluate if when .
5. Find the general solution of the differential equation .
6. If , find and .
7. If and , show that .

**SECTION B**

Answer any **four** questions (4 x 10 = 40)

1. Find the equation of the line that passes through the intersection of the lines and and is perpendicular to the line .
2. (i) Find the equation of the curve which has a slope of zero at the point , has a point of inflection at and for which .

(ii) Evaluate . (6+4)

1. Evaluate using partial fractions.
2. (i) Show that is a solution of where *c* is an arbitrary constant and find a particular solution that satisfies the condition when .

(ii) Solve the equation . (6+4)

1. Solve the difference equation , if and also calculate , , and .
2. If , . Find the least squares estimates for the regression equation .

**SECTION C**

Answer any **two** questions (2 x 20 = 40)

1. (i) What relation (parallel, perpendicular, coincident or intersecting) does the line have to the following lines?
2. (b) (c)

(d) (e) (f) .

(ii) Find the equation of the line which is parallel to the line through the points (5,6) and (7,8) and also passes through the intersection of the line having slope -2 through the point (-4,-6) and the line having slope 3 through the point (2,2).

(12+8)

1. (i) The quantity demanded and the corresponding price, under pure competition, are determined by the demand and supply functions and , respectively. Determine the corresponding consumer’s surplus and producer’s surplus. (ii) Evaluate (a) (b) (10+10)
2. (i) Solve the equation .

(ii) State the type, order and degree of the following equations

1. ; (b) .

(iii) Show that is a solution of and find a particular solution if ,,

(6+4+10)

1. (i) Write the difference equation in terms of lagged values of .

(ii) If , find .

(iii) If , and then show that . (8+4+8)