

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 86
(For Candidates admitted during the academic year 2011 – 2012 & thereafter)

SUBJECT CODE: 11EC/PE/MM34

M.A. DEGREE EXAMINATION NOVEMBER 2014
BRANCH III – ECONOMICS
THIRD SEMESTER

COURSE : ELECTIVE
PAPER : MATHEMATICAL METHODS
TIME : 3 HOURS

MAX.MARKS : 100

SECTION – A

ANSWER ANY FIVE QUESTIONS. EACH ANSWER NOT TO EXCEED 300
WORDS: (5 X 8 = 40)

1. Find dy/dx , when
 - a. $x^2y^4 = 25$
 - b. $x^3 + x^2y - xy^2 + 3y^3 = 200$
2. Solve the differential equation : $y(1-x) - x dy/dx = 0$
3. Give the general structure of an input output model and show how the level of output is determined.
4. Solve the difference equation $3Y_{t+1} + 2Y_t = 44(0.8)^t$, given $Y^0 = 900$. Show that the solution stabilizes.
5. Use Cramer's rule for finding the equilibrium prices in two related markets:
 $7x_1 + x_2 = 60$
 $x_1 + 8x_2 = 78$
6. Given the demand function $P = 42 - 5Q - Q^2$. Evaluate the consumers's surplus, assuming that the Equilibrium price is 6.
7. If $y = (\log x)^2$, show that $x^2y'' - xy' - 2 = 0$

SECTION – B

ANSWER ANY THREE QUESTIONS: EACH ANSWER NOT TO EXCEED 1200
WORDS: (3 X 20 = 60)

8. Prove that $A^3 - 6A^2 + 9A - 4I = 0$, and hence find A^{-1} given :

$$A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$

..2..

9. Solve the following L.P.P

$$\text{Maximise } Z=30x_1 + 30x_2$$

$$\text{Subject to } 3x_1 + x_2 < 30,000$$

$$x_1 < 6000, x_2 < 12,000$$

$$x_1, x_2 > 0$$

10. Discuss the Cobweb model

11. Show how differential equations are applied in Harrod Domar growth model

12. Given the production function $Q = AK^\alpha L^\beta$, prove that :

a) It satisfies Euler's theorem

b) For constrained optimization, subject to the constraint $P_K K + P_L L = B$, the least cost input ratio is $K/L = \alpha P_L / \beta P_K$
