(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FIRST SEMESTER [BBA] DECEMBER 2013

Paper Code: BBA/BBA(TTM)-105 **Subject: Business Mathematics**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt all questions. All question carry equal marks.

Q.1 (a) Solve by Cramer's rule: (5)

$$x - 3y + z = 2$$
$$3x + y + z = 6$$
$$5x + y + 3z = 3$$

(b) Solve by Matrix Inversion method: (5)

$$3x - 2y + 4z = 7$$
$$2x + y + z = 4$$
$$x + 3y + 5z = 2$$

(c) Prove $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc\,(a+b+c)^3$ (5)

Q.2 Given below is the transaction matrix for two industries I and II .From the gross output of each Industry if the final demand is 80 and 40 units respectively.

Industry	Input to I	Input to II	Domestic Demand	Total Output
I	30	40	50	120
II	20	10	30	60

Also test the Hawkins Simon Conditions. (15)

Q.3 (a) Solve $dy/dx = (2x - y + 3) / (x + 2y + 4)$ (5)

(b) Solve $dy/dx = (3x + 4)^2 (2x - 3)^3$ (5)

(c) A stone is dropped in a quiet lake and waves move in a circle at a speed of 3.5cm/sec.At the instant when the radius of the circular wave is 7.5 cm. How fast is the enclosed area increasing? (5)

Q.4 Use Lagrangian multiplier method to find the stationary value of $z = f(x,y)$ Subject to constraint $x + y = 3$. (15)

Q.5 (a) Integrate : $(\cos x) / \{(1-\sin x)^3(2+\sin x)\}$ (5)

(b) Integrate (10)

(i) $\sec^3 x\,dx$

(ii) $\tan^{-1} x\,dx$

Q.6 (a) A company manufacturing T.V. sets determines that its production facility is following a learning curve of the form $f(x) = 1400\,x^{-0.3}$ after producing 100 T.V. sets where f(x) denotes the rate of lobour hours. How many total labour hours are required to produce 200 additional units. (10)

(b) Solve the differential equation $(x^2 - y^2)dx + 2xy\,dy = 0$ (5)

Q.7 Prove by Induction : $10^n + 3.4^{n+2} + 5$ is divisible by 9. (15)

Q.8 (a) A question paper contains 10 questions divided into two groups of 5 questions each. In how many ways can a examinee answer 6 questions taking at least 2 questions from each group? (10)

(b) Find the value of r if ${}^{20}C_r = {}^{20}C_{r+2}$ (5)

****