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

END TERM EXAMINATION

FIRST SEMESTER [BBA/BBA(TTM)] DECEMBER-2011

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

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

Note: Attempt all questions. Internal choice is indicated.

Q1 Answer **any three** of the following:-

(a) Find the sum of first terms of a G.P. given by 3,9,27,81...

(b) Find rank of the matrix A, where $A = \begin{vmatrix} 1 & 0 & 1 \\ 1 & 0 & 1 \\ 1 & 0 & 1 \end{vmatrix}$.

(c) For a given demand functions P=30-2Q, where P is the price and Q is the quantity demanded, find the marginal revenue.

(d) Evaluate $\int_{-1}^{1} |x| dx$.

(e) If ${}^{n}C_9 = {}^{n}C_8$, then find ${}^{n}C_{17}$. **(3x5=15)**

Q2 (a) Find the sum of all numbers between 200 and 400 which are divisible by 7. **(5)**

(b) A manufacturer reckons that the value of a machine which costs him Rs.18750 will depreciate each year by 20%. Find the estimated value at the end of 5 years. **(5)**

(c) Find the number of ways in which a cricket team consisting of 11 players can be selected from 14 players. Also, find out how many of these will include the captain. **(5)**

OR

(a) Out of 10 consonants and 4 vowels, how many words can be formed each containing 6 consonants and 3 vowels. **(4)**

(b) If ${}^{n}C_8 = {}^{n}C_{12}$, then find ${}^{n}C_{17}$. **(6)**

(c) If $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P. then prove that a^2, b^2, c^2 are also in A.P. **(5)**

Q3 (a) From the inter-industry transaction demand table:-

Sector of Origin	Sector of Destination			Final Demand	Total Demand
	1	2	3		
1	20	60	10	50	140
2	50	10	80	10	150
3	40	30	20	40	130
Value added	30	50	20		
Gross production	140	150	130		

Find the new level of total demand, if the final demand is 70 in industry 1, 25 in industry 2 and 50 in industry 3. **(9)**

(b) Find the rank of the matrix $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 3 & -2 & 1 \\ 2 & 0 & -3 & 1 \\ 3 & 3 & 0 & 3 \end{bmatrix}$. **(6)**

OR

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(a) If the matrix of technical coefficients A and the final demand B are $A=\begin{bmatrix}0.3 & 0.4 & 0.1\\ 0.5 & 0.2 & 0.6\\ 0.1 & 0.3 & 0.1\end{bmatrix}, B=\begin{bmatrix}20\\ 10\\ 30\end{bmatrix}$ then find the total demand for the industries I_1, I_2 and I_3. **(7)**

(b) Define rank of a matrix. Find the rank of the matrix $A=\begin{bmatrix}5 & 3 & 14 & 4\\ 0 & 1 & 2 & 1\\ 1 & -1 & 2 & 0\end{bmatrix}$. **(8)**

Q4 (a) Use Lagrange multipliers to optimize $z=4x^2-2xy+6y^2$. subject to $x+y=72$. **(8)**

(b) For the demand function $3p+x=48$, find the level of output for which the total revenue is maximized. Also, if the average cost functions is given by $AC=x^2-2x+10$, then fixed the level of output which minimizes marginal costs. **(7)**

OR

(a) Show that $M.R.=A.R\left(1-\frac{1}{e}\right)$, where e is the price elasticity of demand. **(4)**

(b) For the curve $xp^n=c$, where p and n are constants, show that the price elasticity of demand is constant. **(3)**

(c) Use Lagrange multipliers to optimize $Z=26x-3x^2+5xy-6y^2+12y$ subject to $3x+y=170$. **(8)**

Q5 (a) If the marginal revenue is given by $M.R=15-2x-x^2$, then find the total revenue and the demand function. Also, find the maximum revenue. **(8)**

(b) Solve (i) $y(1-x)-x\frac{dy}{dx}=0$ (ii) $(x+y)+(y-x)\frac{dy}{dx}=0$. **(7)**

OR

(a) The marginal cost of production is given by M.C=3x+4. If the initial cost is Rs. 1000 then find the total cost function. Also, if the price is fixed at Rs.4000 per unit. Then find the revenue function and the maximum profit. **(8)**

(b) Solve (i) $y-x\frac{dy}{dx}=x+y\frac{dy}{dx}$ (ii) $\frac{dy}{dx}=e^{x-y}+x^2e^{-y}$. **(7)**

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