END TERM EXAMINATION

FIRST SEMESTER [BBA] DECEMBER-2015

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

Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions. All questions carry equal marks.

Q1 (a) Prove by induction, the following

$$1.3 + 2.3^2 + 3.3^3 + ... + n.3^n = \frac{(2n-1)3^{n+1} + 3}{4} \forall n \in Z^+.$$

(b) Find the value of r if $^{56}P_{r+6} : ^{54}P_{r+3} = 30800 : 1$.

Q2 (a) A question paper contains ten questions divided into two groups of five questions each. In how many ways can an examinee answer six questions taking atleast two questions from each group?

(b) Three numbers are in G.P. Their product is 64 and sum is $\frac{124}{5}$. Find these numbers.

Q3 A man invested Rs. 30,000/- into three different investments. The rates of interest 2%, 3% and 4% per annum respectively. The total annum income is Rs. 1000. If the income from the first and second investments is Rs. 50 more than the income from third, find the amount of each investment by using matrix algebra.

Q4 A firm purchases two machines costing Rs 10,000 and Rs. 20,000 respectively each having useful life of 4 years. Both have Rs. 5000 as salvage value at the end of four years. Find depreciation of each machine for each year using matrix algebra if
(a) Both are depreciated by sum of years digit method.
(b) First is depreciated by sum of years digit method and second by Straight line method.

Q5 A firms total cost function is $C(x) = \frac{1}{3}x^3 - 5x^2 + 30x + 10$ where x is output and price under perfect competition is Rs. 6 per unit. Find for what values of x, the profit is maximum.

Q6 The demand function of two commodities X_1 and X_2 are given below:

$x_1 = 72 - \frac{1}{2}P_1$ and $x_2 = 120 - P_2$.

Where P_1 and P_2 are price per unit of X_1 and X_2 respectively. The Joint cost function is $C = x_1^2 + x_1 x_2 + x_2^2 + 35$ and the maximum joint product is 40 i.e. $x_1 + x_2 = 40$, find the profit maximizing level of output and the maximum profit.

Q7 (a) Find the consumer's surplus when P=4 if the demand function for a commodity is given by $P = 100 - 8x$.

(b) Solve $(x+1)\frac{dy}{dx} = 2xy$.

Q8 A company manufacturing T.V. sets determines that its production facility is following a learning curve of the form $f(x) = 1400x^{-0.3}$ after producing 100 T.V. sets where $f(x)$ denotes the rate of labour hours. How many total labour hours are required to produce 200 additional units?

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