* K - 3 5 2 4 *

K-3524

First Year B.B.A. (Sem. II) Examination

October / November – 2012

Quantitative Methods : Paper-I

(Mathematics Oriented)

Time : **3** Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **FIRST YEAR B.B.A. (SEM. 2)**

Name of the Subject :

☛ **QUANTITATIVE METHODS : P-1**

☛ Subject Code No. : **3 5 2 4** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) All questions are compulsory.

(3) Indicate your options clearly.

(4) Figures to right indicate full marks.

(5) Use of one simple calculator is allowed.

1 Answer the following questions : **10**

(1) If $U = \{1, 2, ..., 6\}$, $A = \{1, 2, 3\}$, $B = \{2, 3, 4\}$ then find $A' \cap B'$.

(2) Define absolute value of a real number.

(3) Evaluate $\lim_{x \to 0} \frac{2^{3x} - 1}{x}$.

(4) If $y = \log 2x$ then find dy/dx.

(5) Define many - one function.

(6) If $A = \begin{bmatrix} 1 & 0 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 3 \\ 1 & 2 \end{bmatrix}$ then find $A^T + B^T$.

(7) If selling price is Rs. 10 and if cost function is $3x+1$ then find profit function.

(8) Evaluate $\int (ax+b)^2 \, dx$.

(9) If cost function is $5x^2 + 3x - 1$ then find marginal cost when $x = 2$.

(10) Define skew symmetric matrix.

2 (a) For two real numbers a and b prove that, **4**

$|a \cdot b| = |a| \, |b|$.

(b) The fixed cost of a factory is Rs. 80,000 and the variable cost per unit of production is Rs. 40. If the selling price per unit is Rs. 120 then find break even point. **4**

(c) If $U = \{x \mid x \in N, \ x \leq 10\}$ **4**

$A = \{x \mid x \in N, \ 1 < x \leq 6\}$

$B = \{x \mid x \in N, \ 2 < x < 6\}$

$C = \{x \mid x \in N, \ 3 < x < 8\}$

then find

(i) $A' \cup (B - C)$

(ii) $A - (B' - C')$

OR

2 (a) State and prove distributive law of intersection over union. **4**

(b) The demand function of book is $d = f(p) = \sqrt{7600 - 3p}$. **4**

Find demand for price Rs. 1700. At what price demand of book will be 40 ?

(c) In a college there are 700 students and of them 350 play cricket and 450 play football. How many of them play both the games ? All play at least one of the two games. How many play only football ? **4**

3 (a) Evaluate : **4**

(1) $\lim_{x \to 0} \left(\frac{5-x}{5+x} \right)^{1/x}$

(2) $\lim_{x \to 0} 4 + \frac{5}{7 + 9/x}$

(b) Find dy/dx if $y = \frac{x^n - 1}{x^n + 1}$. **4**

(c) Prove that $16x + 1/x^2$ is minimum at $x = 1/2$. **4**

OR

3 (a) Evaluate : **4**

(1) $\lim_{n\to\infty} \frac{\Sigma n^2}{n^3}$

(2) $\lim_{n\to\infty} \left(1+\frac{1}{n}\right)^{3n+1}$

(b) Find dy/dx if **4**

(1) $x^2 + y^2 = 2axy$

(2) $x = 1+t$ and $y = t^3$

(c) The total profit in rupees of a company from the manufacture and sale of x bottle is $\frac{-x^2}{900} + 2x - 180$. **4**

(1) How many bottles that company sell to achieve maximum profit ?

(2) What is the profit per bottle when the maximum profit is achieved ?

4 (a) $\int e^{x^3} \cdot x^2 \, dx$. **4**

(b) $\int_1^2 \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) dx$. **4**

(c) The marginal revenue function is $MR = 20 - 2x - \frac{3x^2}{2}$ **4**

then find total revenue function and demand function. Given that $R(0) = 0$.

OR

4 (a) Evaluate : $\int \frac{x^6 + x^4 + x^2 + x + x^{-4}}{x^3} dx$. **4**

(b) Evaluate : **4**

(1) $\int_1^3 \frac{x^2 - 2x + 1}{x - 1} dx$

(2) $\int_0^1 \left(3x^2 - 2x + 1\right) dx$.

(c) If the marginal revenue and marginal cost for an output x of commodity are given as $MR = 5 - 4x + 3x^2$, $MC = 3 + 2x$ and if the fixed cost is zero, then find profit function and profit when $x = 4$. **4**

5 (a) Solve the following equations using inverse matrix method : **4**

$x + 2y + 3z = 6,\ 3x + y + 2z = -6,\ 2x + 3y + z = 0$

(b) If $A = \begin{bmatrix} 1 & 2 & 7 \\ 0 & 3 & -4 \\ 1 & -2 & 0 \end{bmatrix}$ then find A^{-1}. **4**

(c) If $A = \begin{bmatrix} 1 & -3 & 2 \\ 2 & -1 & 3 \\ 3 & -1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 & 2 \\ 2 & 1 & 0 \\ 1 & 0 & 3 \end{bmatrix}$ then find **4**

AB and BA.

OR

5 (a) Show that $\begin{vmatrix} 1 & 1 & 1 \\ a & b & b \\ b & b & c \end{vmatrix} = (a-b)(b-c)$. **4**

(b) If $A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 4 & 5 \\ 3 & 6 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 0 & 5 \\ 2 & 6 & 8 \end{bmatrix}$ then verify that **4**

$(A+B)^T = A^T + B^T$.

(c) If $A = \begin{bmatrix} 2 & 0 & 4 \\ 1 & 3 & 8 \\ 6 & 2 & 4 \end{bmatrix}$ and $B = 4A,\ C = B + 3A - 6I$ then **4**

find matrix D such that $D = 3A + B - C$.

6 Attempt any two : **12**

(a) Obtain the optimal solution of the following transportation problem :

	1	2	3	4	*Supply*
A	21	16	25	13	11
B	17	18	14	23	13
C	32	27	18	41	19
Demand	6	10	12	15	

(b) Solve the following L.P.P. using graphical method :

Minimum $Z = 5x + 7y$

Subject to, $x + y \leq 4$

$3x + 8y \leq 24$

$5x + 2y \geq 10$

$x, y \geq 0$

(c) Solve the following assignment problem to maximize the profit :

Destination

Origin	D_1	D_2	D_3	D_4
O_1	4	5	12	10
O_2	6	8	9	10
O_3	6	7	7	8
O_4	5	7	9	9