* U A - 3 5 2 4 *

# UA-3524

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

### March / April – 2012

### Quantitative Methods : Paper - I

Time : Hours] [Total Marks :

**Instrutions :**

(1)

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

Name of the Examination :

☛ **F. Y. B. B. A. (SEM. 2) (ATKT)**

Name of the Subject :

☛ **QUANTITATIVE METHODS : PAPER - 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 the right indicate full marks.
(5) Use of one simple calculator is allowed.

**1** Answer the following questions : **10**

(i) If $A=\{p,q,r,s,t\}$ then power set of A has how many subsets ?

(ii) Define Demand function.

(iii) Evaluate $\begin{vmatrix} 6 & 1 \\ 9 & 2 \end{vmatrix}$

(iv) If $A=\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}, B=\begin{bmatrix} 3 & -1 \\ 2 & 0 \end{bmatrix}, C=\begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix}$ then find A-B+C.

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

(vi) If $y=\log x^2$ then find $\frac{dy}{dx}$

(vii) If $y=x^3+2x^2-3x+1$ then find $\frac{d^2y}{dx^2}$.

(viii) Evaluate $\int (x+7)^{17}\,dx$

(ix) If marginal revenue of a function is $MR=5x^4-3x$ then find total revenue function.

(x) If $A=\begin{bmatrix}1 & 2 & 3\\ 1 & 4 & 5\\ 0 & 2 & 1\end{bmatrix}$ then find $A^T$.

**2** (a) For two real numbers a and b, prove that $\left|\frac{a}{b}\right|=\frac{|a|}{|b|}$. **4**

(b) If $A=\left\{p/p^2\le 16, P\in N\right\}, B=\left\{q/|q-1|\le 2, q\in z\right\}$ **4**

$C=\left\{r/|r|\le 3, r\in N\right\}$ then verify that

$A-(B\cap C)=(A-B)\cup(A-C)$.

(c) A garment manufacture finds that the production cost of each dress in Rs. 30 and the fixed cost is Rs. 50,000. If each dress can be sold at Rs. 45 then find the number of dresses to be produced for no profit - no loss. **4**

**OR**

**2** (a) In usual notation prove that $(A\cap B)'=A'\cup B'$. **4**

(b) Out of 100 students who appeared in F.Y. BBA Examination, 70 secured first class marks in quantitative methods and 60 secured first class marks in Accountancy. Find the number of students who secured first class marks in **4**

(i) Both the subjects

(ii) Quantitative methods only

(c) If $f(x)=\frac{2x}{1-x^2}$, then find the value of $f(0)+f(e)+f(3)$ **4**

**3** (a) Prove that $\begin{vmatrix}1 & a & a^2\\ 1 & b & b^2\\ 1 & c & c^2\end{vmatrix}=(a-b)(b-c)(c-a)$. **4**

(b) Solve the following equations using cramer's rule **3**

$3x+5y+6z=4,\ x+2y+3z=2,\ 2x+4y+5z=3$.

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

**OR**

**3** (a) Solve the following equations using inverse matrix method. **4**

$6x+y-3z=5,\ x+3y-2z=5,\ 2x+y+4z=8$

(b) If $A=\begin{bmatrix}2 & 1 & 2\\ 1 & 4 & 1\\ 1 & 3 & 2\end{bmatrix}$ then calculate $A^2+2A-31$ **4**

(c) Prove that $\begin{vmatrix}(a-1)^2 & (b-1)^2 & (c-1)^2\\ 1 & 1 & 1\\ a+1 & b+1 & c+1\end{vmatrix}=(a-b)(b-c)(c-a)$ **4**

**4** (a) Evaluate **4**

(i) $\lim\limits_{x\to 0}\left(1-\frac{3x}{5}\right)^{4/x}$ (ii) $\lim\limits_{x\to a}\frac{x^5-a^5}{x^7-a^7}$

(b) Find $\frac{dy}{dx}$ if $y=\frac{x^{3/2}(1-4x)^7}{(5-x)^{7/2}(15-7x)^{1/2}}$ **4**

(c) Total cost of producing TV sets is given by **4**
$c(x)=x^3-250x^2+20,000x+8000$. If $x$ is number of units produced find act how many TV sets should the manufacturer produce to minimize the cost.

**OR**

**4** (a) Evaluate : **4**

(i) $\lim\limits_{x\to 0}\frac{e^{7x}-e^{3x}}{x}$ (ii) $\lim\limits_{x\to 3}\frac{1-\sqrt{x-3}}{x-4}$

(b) Find $\frac{dy}{dx}$ if (1) $y=x^3(\log x)^2$ (2) $y=x\cdot 2^x$.

(c) Revenue function of a firm which produces $x$ units in a day is $R=800x-4x^2$. How much units should be produced for maximum profit and also find the maximum Revenue. **4**

**5** (a) Evaluate $\int(4x+2)\sqrt{x^2+x+1}\,dx$ **4**

(b) Evaluate $\int_2^4\frac{1}{x+2}\,dx$ **4**

(c) If marginal revenue function is $MR=12-8x+x^2$ **4**
Determine revenue and demand function. $x$ denotes units of output sold. It is given that $R(0)=0$.

**OR**

**5** (a) $\int \left(x^3 + \frac{1}{x^3}\right)^2 dx$ **4**

(b) Evaluate $\int_1^2 e^{4x}\, dx$ **4**

(c) Marginal cost of units of product produced $x$ is given by $MC = 1.064 - 0.005x$. Find the total cost and average cost functions if fixed cost is 16.3. **4**

**6** Attempt any two : **12**

(a) Solve the following LPP using graphical mathod

minimize $z = 3x + 2y$

Subject to $5x + y \geq 10$

constraints $x + y \geq 6$

$x + 4y \geq 12$

$x_1\ y \geq 0$

(b) Solve the following assignment problem to maximize the total profit.

| | $D_1$ | $D_2$ | $D_3$ | $D_4$ |
|---|---|---|---|---|
| $O_1$ | 3 | 4 | 11 | 9 |
| $O_2$ | 5 | 7 | 8 | 9 |
| $O_3$ | 5 | 6 | 6 | 7 |
| $O_4$ | 4 | 6 | 8 | 8 |

(c) Find the optimal solution to the given transportation problem

| | *Market* | | | | *Availability* |
|---|---|---|---|---|---|
| | $W_1$ | $W_2$ | $W_3$ | $W_4$ | |
| $F_1$ | 11 | 20 | 7 | 8 | 50 |
| $F_2$ | 21 | 16 | 10 | 12 | 40 |
| $F_3$ | 8 | 12 | 18 | 9 | 70 |
| | 30 | 25 | 35 | 40 | |