



B. P. COLLEGE OF BUSINESS ADMINISTRATION

(A Constituent college of Kadi Sarva Vishwavidyalaya)

MID SEM Examination – September – October 2013

Date: 01/10/13

BBA SEM – I

Total marks: 60

Roll No.....

SUB: Business Mathematics (BBA 03) Duration: 3 hrs

Q.1(a) Define Set and explain types of set with an example. (06)

Q.1(b) A leading cosmetic Manufacturer advertises its products in three Magazines: Cosmopolitan, Filmfare and Women's Era. A survey of 500 Customers by the manufacturer reveals the following information:

180 learned of its products from Cosmopolitan, 200 learned of its products from Filmfare, 192 learned of its products from Women's Era, 84 learned its products from Cosmopolitan and Filmfare, 52 learned of its products from Cosmopolitan and Women's Era, 64 learned of its products from Filmfare and Women's Era and 38 learned its products from all three magazines. How many Customers saw the manufacturers' advertisement in:

- (a) At least one Magazine?
- (b) Exactly one Magazine? (06)

Q.2 (a) **Fill in the blanks: (Attempt all)** (06)

(1) $f: R \rightarrow R$ $f(x) = 8$ is an example of _____ function.

- (a) Constant
- (b) one – to – one
- (c) one – to – many
- (d) many – to – one

(2) $f: A \rightarrow R$ $A = \{1,2,3,4\}$ $f(x) = |x - 3|$ then, Range of a function is _____

- (a) $\{2,4,6,8\}$
- (b) $\{0,1,2\}$
- (c) $\{2,4,8,16\}$
- (d) $\{1,2,3,4\}$

(3) $f: R \rightarrow R$ $f(x) = x^2 = 2x - 1$, $x \in R$ is an example of _____ function.

- (a) Constant
- (b) one – to – one
- (c) one – to – many
- (d) many – to – one

(4) $U = \{1,2,3,4,5,6,7,8,9,10\}$ and $A = \{2,4,6,8,10\}$ then $A^c =$ _____

- (a) $\{2,4,6,8,10\}$
- (b) $\{1,3,5,7,9\}$
- (c) $\{2,4\}$
- (d) A

(5) If the Revenue function of the commodity is $R(x) = 125x - \frac{3x^2}{2}$, then the revenue for demand $x = 20$ is _____.

- (a) 1900
- (b) 1800
- (c) 2000
- (d) 2200

(6) $x \lim_{x \rightarrow 3} f(x) = 4$, then $x \lim_{x \rightarrow 3} (f(x))^2 =$ _____

- (a) 4
- (b) 9
- (c) 16
- (d) B & C Both

Q.2 (b) Let $A = \{1, 2, 3\}$, $B = \{3, 5\}$ and $C = \{2, 3, 5\}$, Find (06)

- (i) $A \times (B \cup C)$
- (ii) $A \times (B \cap C)$
- (iii) $(A \times B) \cup (A \times C)$
- (iv) $(A \times B) \cap (A \times C)$

OR

Q.2 (b) If $U = \{1,2,3,4,5,6\}$, $A = \{2,3,6\}$, $B = \{3,5,6\}$ then verify that: (06)

- (i) $(A \cup B)' = A' \cap B'$
- (ii) $(A \cap B)' = A' \cup B'$

Q.3 Evaluate the following limits: (Any Four) (12)

(i) $X \rightarrow 1 \frac{x^3 - 2x^2 + 2x - 1}{x - 1}$ (ii) $X \rightarrow 3 \frac{\sqrt{x+2} - \sqrt{5}}{x - 3}$ (iii) $X \rightarrow 1 \frac{1}{x} \left(\frac{2x+3}{3x-5} + \frac{3}{5} \right)$

(iv) $X \rightarrow 1 \frac{x^7 - 1}{x - 1}$ (v) $X \rightarrow \infty \frac{x^2 - x + 3}{2x^3 + 1}$ (vi) $X \rightarrow \infty \frac{\sum n}{(n+1)(n+2)}$

OR

Q.3 Evaluate the following limits: (Any Four) (12)

(i) $X \rightarrow 1 \frac{x^2 - x - 2}{2x^2 - x - 3}$ (ii) $X \rightarrow 2 \frac{x^2 - 5x + 6}{x^2 - 4}$ (iii) $X \rightarrow 1 \frac{x^{1/7} - 1}{x^{1/2} - 1}$

(iv) $X \rightarrow 3 \frac{\sqrt{x+2} - \sqrt{5}}{\sqrt{x+1} - 2}$ (v) $X \rightarrow -1 \frac{x^{24} - 1}{x^{21} + 1}$ (vi) $X \rightarrow 1 \frac{x^3 - 2x^2 + 2x - 1}{x - 1}$

- Q.4 (a) Define Function and explain types of function with an examples. **(04)**
- Q.4 (b) A manufacturer of toothbrush has a monthly fixed cost of Rs. 20,000, a production cost of Rs. 20 per unit, and a selling price of Rs. 30 per unit. Find Cost function, Revenue function and Profit function and also find:
 (a) Break-even Point,
 (b) If 4000 toothbrush is manufactured then find out the total cost, total revenue and total profit. **(04)**
- Q.4 (c) If $f(x) = \frac{ax+b}{bx+a}$ then prove that $f(x) \cdot f\left(\frac{1}{x}\right) = 1$ **(04)**

OR

- Q.4 (a) Define Linear function and explain Cost function, Revenue function, Profit function and Break – Even function with reference to linear function. **(04)**
- Q.4 (b) If $f(x) = x(x+1)(2x+1)$. Prove that $f(x) - f(x-1) = 6x^2$ **(04)**
- Q.4 (c) If $f(x) = x^2 + x - 1$, simplify $f(x+1) - 3f(x) + 2f(x-1)$. **(04)**

- Q.5 (a) In a survey of 200 households regarding the ownership of desktop and laptop computers the following information was obtained:
 120 households own only desktop computers.
 10 households own only laptop computers.
 40 households own neither desktop nor laptop computers.
 How many households own both desktop and laptop computers? **(04)**

- Q.5 (b) *Prove that* : $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ **(04)**
- Q.5 (c) If $\{x|x \in N, x \leq 10\}$, $A = \{x|x \in N, x^2 < 10\}$, $B = \{2,4,6\}$ and $C = \{x|x^3 - 3x^2 - 4x = 0\}$ then, verify that
 (i) $A \cap (B - C) = (A \cap B) - (A \cap C)$ (ii) $A' - B' = B - A$ **(04)**

OR

- Q.5 (a) In a survey of 120 consumers conducted in a shopping mall, 80 consumers indicated that they buy brand A of certain product, 68 buy brand B and 42 buy both brands. How many consumers participating in the survey buy.
 (a) At least one of these brands?
 (b) Exactly one of these brands? **(04)**
- Q.5 (b) Prove that : $A - (B \cup C) = (A - B) \cap (A - C)$ **(04)**
- Q.5 (c) If $A = \{x|x \in N, |x^3 - 2| \leq 25\}$, $B = \{y|y \in N, 1 < y < 5\}$ and $C = \{z|z \in N, z^4 = 81\}$ then, verify that: $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ **(04)**