



K-3518

First Year B.B.A. (Sem. II) (CBCS) Examination
September / October – 2012
Quantitative Methods - II

Time : Hours]

[Total Marks : 70

Instructions :

(1)

नीचे दर्शायेव निशानीवाणी विगतो उत्तरवही पर अवश्य कपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
FIRST YEAR B.B.A. (CBCS) (SEM. 2)	<input type="text"/>
Name of the Subject :	<input type="text"/>
Quantitative Methods - 2	<input type="text"/>
Subject Code No. : <input type="text" value="3"/> <input type="text" value="5"/> <input type="text" value="1"/> <input type="text" value="8"/>	<input type="text"/>
Section No. (1, 2,...): <input type="text" value="Nil"/>	<input type="text"/>
	Student's Signature

- (2) All questions are compulsory.
- (3) Indicate your options clearly.
- (4) Figure to the right indicate full marks.
- (5) Use of simple calculator is allowed.

1 Answer the following :

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(i) If $f(x) = x^2 + 2x + 7$, find $f(5x)$.

(ii) If $A = \{3, 4, 5, 6, 7\}$ and $B = \{1, 2, 3, 4\}$ then find $A \cup B$ and $A \cap B$.

(iii) $\lim_{x \rightarrow 2} \frac{x^2 + x - 6}{x^2 + 3x - 10}$.

(iv) Find $\frac{dy}{dx}$, $y = (2x^2 + 5x)^3$.

(v) Evaluate $\int \left(\frac{2}{x} + 3e^x + 5\sqrt{x} \right) dx$.

- 2 (a) Define : 4
 (i) Null set
 (ii) Sub set
- (b) If $A = \{5, 7, 8, 10\}$, $B = \{6, 8, 9\}$ and $C = \{7, 9, 10\}$ then verify 4
 that $A \cap (B - C) = (A \cap B) - (A \cap C)$.
- (c) If A , B and C are the sets of students having hobby 4
 respectively dancing, music and painting in a college of
 performing arts then survey report of 60 students in a
 particular class discloses the following information :
 $n(A) = 24$, $n(B) = 27$, $n(C) = 31$, $n(A \cap B) = 9$, $n(B \cap C) = 8$,
 $n(C \cap A) = 10$ and $n(A \cap B \cap C) = 5$.
 (1) How many students having only one art as a
 hobby ?
 (2) How many students having exactly two arts as a
 hobby ?

OR

- 2 (a) State and prove D'morgen's Law. 4
 (b) If $A = \{1, 2, 3, 4, 5\}$, $B = \{3, 5, 6\}$ and $C = \{2, 3, 4\}$ verify that 4
 $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
 (c) From a survey of 100 respondents, a marketing 4
 research company found that 75 respondents owned
 digital Camera, 45 owned Camcoder and 35 owned
 Camera and Camcoder both. Find that how many
 respondents owned either a Camera or a Camcoder.
- 3 (a) If $f(x) = 3x^2 + x + 5$ then find $f(-2) + f(1)$. 4
 (b) If $f(x) = 2x + 1$ and $f(x) \cdot f(x - 1) = 0$ then find the 4
 value of x .
 (c) The cost and total revenue of a company that produces 4
 and sell x units of a particular product are $C(x) = 5x + 350$
 and $R(x) = 50 - x^2$.
 Find :
 (i) break-even values
 (ii) the value of x that produce a profit
 (iii) the value of x that results in loss

OR

- 3 (a) If $f(x) = 2x^2 + 3x - 1$ then find $f(-1)$ and $f(5)$. 4
- (b) If $f(x) = \log x$ then prove that $f(xy) = f(x) + f(y)$ and 4
 $f\left(\frac{x}{y}\right) = f(x) - f(y)$.
- (c) A company manufactures a product with establishment 4
 cost Rs. 10,000 and the variable cost per unit is Rs. 5.
 If the product is sold for Rs. 7.5 per unit, find each of
 the following
- (i) The break-even point.
- (ii) The number of units that must be produced and
 sold to obtain a profit of Rs. 1000 per month.
- (iii) The loss when only 2000 units are produced and
 sold each month.

4 Evaluate the following limits :

- (a) $\lim_{x \rightarrow -2} \frac{x^3 - 7x - 6}{x^3 - 39x - 70}$
- (b) $\lim_{x \rightarrow 0} \frac{\sqrt{2+3x} - \sqrt{2-5x}}{4x}$
- (c) $\lim_{x \rightarrow \infty} \frac{\sqrt{n^4 - 3n + 8}}{n^2 + 7n - 1}$

OR

4 Evaluate the following limits :

- (a) $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^{2n+7}$ 4
- (b) $\lim_{x \rightarrow 0} \frac{2^{5x} - 5^{2x}}{3^{2x} - 2^{3x}}$ 4
- (c) $\lim_{x \rightarrow a} \frac{x^{-3} - a^{-3}}{x^{-2} - a^{-2}}$ 4

- 5 (a) Find $\frac{dy}{dx}$
- (i) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ 2
- (ii) $y = \frac{2t^3}{1+t^2}, x = \frac{2t^2}{1+t^2}$ 2

(b) $y = \log\left(x + \sqrt{1+x^2}\right)$, then show that $(1+x^2)y_2 - xy_1 = 0$. 4

(c) The demand and supply function of a commodity are as follows : 4

$$D : \{x+10\} \{p+20\} = 300, \quad S : x = 2p - 8.$$

Find equilibrium price and quantity.

OR

5 (a) Find $\frac{dy}{dx}$

(i) $Y = \left(x + \frac{2x+3}{x+2}\right) \left(x + \frac{4x+10}{x+3}\right)$ 2

(ii) $x^y = y^x$ 2

(b) If $y = 2e^{3x} + 3e^{-3x}$ prove that $\frac{d^2y}{dx^2} = 9y$. 4

(c) Find the elasticity of demand function $x = \sqrt{10-p^2}$ at $p = 2$. 4

6 (a) $\int \frac{dx}{\sqrt{2x+3} + \sqrt{2x-3}}$. 4

(b) $\int \frac{1}{x} \left(\frac{\log x}{4}\right)^4 dx$. 4

(c) The average cost of manufacturing 5000 pens is Rs. 70. The marginal cost function of the same is given by $MC = 20 - 0.04x$. Find the total cost function and the average cost function. 4

OR

6 (a) $\int_6^{10} \frac{x-2}{x+2} dx$. 4

(b) $\int \log x dx$. 4

(c) The marginal cost of production of a firm is given by $C'(x) = 5 + 0.13x$. Further, the marginal revenue $R'(x) = 18$. 4

Also it is given that $C(0) = \text{Rs. } 120$. Compute the maximum profit.