



UA-3518

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

March / April - 2012

Quantitative Methods : Paper-II

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृष्टांतव \blackleftarrow निशान्तीवाणी विगतो उत्तरवकी पर अवश्य वचवी. Fillup strictly the details of \blackleftarrow signs on your answer book.		Seat No. :
Name of the Examination :		<input type="text"/>
\blackleftarrow FIRST YEAR B. B. A. (SEM. II) (CBCS)		<input type="text"/>
Name of the Subject :		<input type="text"/>
\blackleftarrow Quantitative Methods : Paper-II		<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"/>	Section No. (1, 2,.....) :
		<input type="text" value="Nil"/>
		Student's Signature

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

1 Answer the following :

10

- (1) If $f(x) = x^2 + 2x + 7$ then find $f(a)$.
- (2) If $A = \{x | x \in N, x \leq 6\}$ and $B = \{x | x \in N, 3 \leq x \leq 9\}$ then find $A \cap B$.
- (3) $\lim_{x \rightarrow 3} \frac{x^2 + 2x - 5}{x^2 - 9}$, find the limit of the given function.
- (4) Find $\frac{dy}{dx}$ of $y = \frac{x^2 + 2x}{\sqrt{x}}$.
- (5) Evaluate $\int xe^x dx$.

2 (a) Define :

4

- (1) Empty set
- (2) Equal set

(b) If $U = \{x \in N | 1 \leq x < 10\}$, $A = \{x \in N | x^2 < 10\}$, 4

$B = \{x \in N | x - 1 < 4\}$ then verify that

(1) $A \cup B' = (A \cap B)'$

(2) $A' \cap B' = (A \cup B)'$

(c) A post graduate business management college is 4
offering dual specialization. The strength of the college is
of 500 students. All the students have to opt atleast one
out of marketing and finance as specialization 300 have
taken marketing and 250 have taken finance as
specialization. How many of them have taken dual
specialization ?

OR

2 (a) State and prove D'morgen's Law. 4

(b) If $A = \{2, 3, 4\}$, $B = \{1, 3, 4\}$, $S = \{1, 2, 3\}$, $T = \{1, 3, 5\}$ 4

verify that $(A \times B) \cap (S \times T) = (A \cap S) \times (B \cap T)$.

(c) In a city of Kolcutta 42 school children, each play at 4
least one of the three games :

Cricket, Hockey and Foot ball. It is found that 14 play
cricket, 20 play Hockey and 24 play Foot ball, 3 play
both cricket and Foot ball, 2 play both Hockey and
Football. None play all the three games. Find the
number of students who play cricket but not Hockey.

3 (a) If $f(x) = 3x^2 + mx + 5$ and $f'(3) = 89$ then find the value 4
of m . Also find $f(1)$.

(b) If $f(x) = 2x + 3$ then prove that $f(2x) - 2f(x) + 3 = 0$. 4

(c) A publishing house finds that the production cost 4
directly attributed to each book is Rs. 40 and the fixed
cost is Rs. 30,000. If each of x books can be sold for
Rs. 60, then determine.

(i) cost function

(ii) the revenue function

(iii) the break-even point

OR

3 (a) If $f(x) = 1 - \left[\frac{1}{x} + \frac{1}{x^2} \right]$, find the value of $f(-1)$ and $f(2)$. 4

(b) If $f(x) = \frac{1}{x+1}$ then prove that $f(-x) - f(x) = \frac{2x}{1-x^2}$. 4

- (c) A manufacturer earns Rs. 4500 in the first month and 4 Rs. 6000 in the second month. The manufacturer observes that a linear function may fit the data
- Find the linear function that fit the data and
 - Make the prediction of the earning for the third month

4 Evaluate the following limit :

(a) $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2}{x^2}$ 4

(b) $\lim_{x \rightarrow -3} \frac{2 - \sqrt{1-x}}{3+x}$ 4

(c) $\lim_{x \rightarrow \infty} \frac{\sum n}{n^2 + 1}$ 4

OR

4 Evaluate the following limit :

(a) $\lim_{x \rightarrow \infty} \left(\frac{n+4}{n} \right)^n$ 4

(b) $\lim_{x \rightarrow 0} \frac{a^{5x} + a^{2x} - 2}{x}$ 4

(c) $\lim_{x \rightarrow 1} \frac{x^{7/5} - 1}{x^{3/5} - 1}$ 4

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

(i) $x^{2/3} + y^{2/3} = a^{2/3}$ 2

(ii) $Y = \frac{1-t}{1+t}, X = \frac{t}{1+t}$ 2

(b) If $y = \sqrt{x+1} - \sqrt{x-1}$ then prove that 4

$$(x^2 - 1) \frac{d^2 y}{dx^2} + x \frac{dy}{dx} - \frac{y}{4} = 0.$$

(c) The demand function faced by a firm is $P = 500 - 0.2x$ 4
and its cost function is $C = 25x + 10,000$. Find the output at which the profit of the firm is maximum. Also find the price it will charge.

OR

- 5 (a) Find $\frac{dy}{dx}$
- (i) $y = (\log x)^x$ 2
- (ii) $y = \frac{x^{3/2}(1-4x)^7}{(5-x)^{7/2}(15-7x)^{1/2}}$ 2
- (b) If $y^{1/m} + y^{-1/m} = 2x$ then show that $(x^2 - 1)\left(\frac{dy}{dx}\right)^2 = m^2 y^2$. 4
- (c) For the demand function $x = 280 - 7p$, find the price elasticity and marginal revenue when the price per unit of a product is Rs. 30. 4

- 6 (a) $\int \left(2^x + \frac{e^{-x}}{2} + \frac{4}{x} - \frac{1}{\sqrt[3]{x}} \right) dx$ 4
- (b) $\int \frac{e^{2x}}{\sqrt{e^{2x} + 1}} dx$ 4
- (c) If the marginal cost function is $3x^2 + 2x - 1$, then determine the cost function and average cost function given that $C(0) = 0$. 4

OR.

- 6 (a) $\int_0^1 \frac{dx}{(2x+5)^3}$. 4
- (b) $\int \frac{dx}{9-4x^2}$. 4
- (c) If the marginal revenue and the marginal cost for an output x of a commodity are given as $MR = 25 - 5x - 2x^2$, $MC = 15 - 2x - x^2$ then find the profit maximising output and the total profit at that point. 4