MC-3518

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

September / October - 2013

Quantitative Methods : Paper - II

Time : 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 :
☛ F. Y. B. B. A. (Sem.-II) (CBCS)

Name of the Subject :
☛ Quantitative Methods : Paper - II

☛ Subject Code No. : 3 5 1 8 ☛ 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 : **10**

(1) If $f(x)=2x^3+7x^2+x+2$ find $f(2)$ and $f(-3)$.

(2) $\lim_{x\to -4}\frac{x^2-16}{x+4}=$ _____.

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

(4) Find $\frac{dy}{dx}$ if $y=3\sqrt{x}+2$.

(5) $\int\frac{x^3-7x}{x}dx$.

2 (a) Define : **4**
(i) Intersection of two sets
(ii) Complementary set.

(b) $U = \{2, 4, 6, 8, 10, 12, 14\}$, $A = \{2, , 4, 6, 8\}$, $B = \{6, 8, 10\}$ 4

$C' = \{2, 6, 10\}$ then verify that :

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

(ii) $(A \cup B)' = A' \cap B'$.

(c) If A, B and C are the sets of students playing Cricket, Tennis and Bedminton then Survey report of 60 students in a Particular Class discloses the following information. 4

$n(A) = 24, n(B) = 27, n(c) = 31$

$n(A \cap B) = 9, n(B \cap C) = 8, n(C \cap A) = 10$ and $n(A \cap B \cap C) = 5$

(1) How many students play exactly one game ?

(2) How many students play exactly two game ?

OR

2 (a) Define : 4

(i) Union of two sets

(ii) Proper subset.

(b) If U = {2, 4, 6, 8, 10, 12, 14}, A = {2, 4, 8}, B = {6, 8, 10} and C = {2, 6, 10} then verify that 4

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

(c) In a class of 42 students, each play at least one of the three games Chess, Table Tennis, Archary. It is found that 14 play chess, 20 play Table Tennis and 24 play Archary, 3 Play both chess and Archary, 2 Play both Table Tennis and Archary. None play all three games. Find the number of students who play chess but not Table Tennis. 4

3 (a) If $f(x) = \dfrac{x^2 + 1}{x^3 - x + 1}$ find $f(1)$, $f(0)$. 4

(b) If $f(x) = 2x^2 + (3x - 4)$, Prove that $f(a) - f(-a) = 6a$. 4

(c) The demand function of a commodity is given by $d = \sqrt{5000 - 4p}$ 4

(i) Find the demand if the price of a commodity is Rs. 350.

(ii) What should be the price of a commodity if the demand is of 50 sets ?

(iii) At what price there will be no demand ?

OR

3 (a) If $f(x) = \dfrac{ax + b}{bx + a}$, find $f(1) - f(-1)$. 4

(b) If $f(x)=x^2(x-1)^2$, prove that $f(x+1)-f(x)=4x^3$. 4

(c) The fixed cost of a factory producing Ledger - books is Rs. 2500 and the variable cost per book is Rs. 11. The tax on each book is Rs. 1 and the selling price per book is Rs. 22/- (i) Find the number of books to be produced for no profit no loss (iii) If 300 books are produced, Find the Profit (iii) If the loss is Rs. 500 then find the number of books produced. 4

4 Evaluate following limit :

(a) $\lim_{x\to 4}\frac{\sqrt{x}-2}{x-4}$. 4

(b) $\lim_{x\to\infty}\frac{(1-x)(3+x)(2+x)}{x^3+1}$. 4

(c) $\lim_{x\to -2}\frac{x^3+6x^2+11x+6}{5x^2+10x}$. 4

OR

4 (a) $\lim_{x\to 0}\frac{2^x-3^x}{3^x-5^x}$. 4

(b) $\lim_{x\to 1}\left[\log_x+\frac{1-x}{1-\sqrt{x}}\right]$. 4

(c) $\lim_{x\to\infty}\left(1+\frac{2}{3n}\right)^n$. 4

5 (a) Find $\frac{dy}{dx}$: 4

(i) $x^y=y^x$

(ii) $y=\left(x+\frac{2x+3}{x+2}\right)\left(x+\frac{4x+10}{x+3}\right)$.

(b) If $y=\frac{x^n+1}{x^n-1}$ then prove that $\frac{dy}{dx}=\frac{-2n\,x^{n-1}}{\left(x^n-1\right)^2}$. 4

(c) Let the demand function and the cost function are respectively given by $x=400-2p$ and $C=\frac{x^2+360x}{60}$. 4

Find x to get maximum profit.

OR

5 (a) Find dy/dx : 4

(i) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.

(ii) $x=\frac{3t}{1+t^2}, y=\frac{3t^2}{1+t^2}$.

(b) If $y=\left(\frac{x+1}{x+2}\right)^{-1}$ then prove that $\frac{dy}{dx}=-\frac{1}{(x+1)^2}$. 4

(c) The total cost function of a commodity with output x units is $C=x^2+4x+4$. Find (i) Average cost (ii) Marginal cost (iii) the output for which marginal cost equals average cost. 4

6 (a) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}}dx$. 4

(b) $\int_{-1}^{1}\left(x^4+x^2+9\right)dx$. 4

(c) The marginal cost function for x toys is $0.4x+13$ and the marginal revenue function is $125-\frac{10}{3}x$. The fixed cost of production is Rs. 500. Find : (i) cost function (ii) Revenue function (iii) number of toys to be produced to get maximum profit (iv) Price of each toy for maximum profit (v) maximum profit. 4

OR

6 (a) $\int_{0}^{1} 2x^3 e^{x^2}\,dx$. 4

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

(c) The marginal cost and the marginal revenue functions of the production of x units of a commodity are given by $\frac{dc}{dx}=x^2-200$ and $\frac{dR}{dx}=98x$ respectively. Also given that $C(0)=50$ and $R(0)=0$. Find the number of units to be produced S_0, that the profit of the company will be maximum. 4