

DH-106

December-2013

F.Y. B.B.A. Sem.-I

CC-107 : Basics of Mathematics

Time : 3 Hours]

[Max. Marks : 70

1. (a) Define the following terms :

- (1) Many one function
- (2) Equal function
- (3) Domain of a function
- (4) Range of a function

OR

X. Ltd. has set up a manufacturing unit involving fixed cost of ₹ 50,000 and the additional cost i.e. variable cost for producing units is ₹ 150 per unit. Each unit can be sold at ₹ 500. What would be the profit when 400 units are sold. Also determine

- (a) Cost function
- (b) Revenue function
- (c) Profit function
- (d) Break Even point

(b) If $f(x) = 2x^2 - 5x + 14$ for what values of x is $2f(x) = f(2x)$.

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OR

If $f(x) = x^3 - 2x + \frac{1}{x}$ then find the value of $f(x) + f(-x)$.

(c) Evaluate the following limits :

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(1)
$$\lim_{x \rightarrow 0} \frac{3^x - 1}{5^x - 1}$$

(2)
$$\lim_{n \rightarrow \infty} \frac{1^2 + 2^2 + \dots + n^2}{(2n - 1)(3n^2 + 2)}$$

(3)
$$\lim_{x \rightarrow 2} \frac{\sqrt{x+4} - \sqrt{6}}{x-2}$$

OR

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

(2) $\lim_{x \rightarrow 2} \frac{4x^2 - 3x - 15}{x^2 - 10x + 26}$

(3) $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{2n}\right)^n$

2. (a) Solve the following equation :
Find r if $10P_{r+1} : 11P_r = 30 : 11$.

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OR

If the ratio ${}^{2n}C_3 : {}^nC_3 = 11 : 1$, find n .

- (b) How many words can be formed out of the letters of the word Daughter so that the vowels always occurs together ?

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OR

How many five digits number can be formed with the digits 2, 3, 5, 7, 9 which are greater than 30,000 ?

- (c) From 7 gent principals and 4 lady principles a committee of 5 is to be formed. In how many ways can this be done so as to include atleast one lady principal ?

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OR

From a coaching camp of 20 probable, a Cricket team of 14 players is to be selected for the forthcoming Sharjah Cup. These include 2 wicket-keeper, 8 batsmen, 8 bowlers and 2 all rounder.

In how many ways team can be selected, so that it may include one wicket-keeper, 5 batsman, 6 bowlers and both the all-rounder ?

3. (a) The sum of three members in A.P. is 12 and the sum of their cubes is 408. Find the numbers.

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OR

Find the sum up to n terms of
 $3 + 33 + 333 + 3333 + \dots$

- (b) A man repay a loan of 3250 by paying ₹ 20 in the first month and then increase the payment by ₹ 15 every month. How long will it take to clear his loan ?

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OR

Find the equation of line passing through (3, 1) and the point of intersection of $4x + 5y + 7 = 0$ and $3x - 2y - 12 = 0$.

- (c) For what values of K the lines $3x - (3K + 2)y + 2 = 0$ and $2x - (K - 3)y - 1 = 0$ are perpendicular.

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OR

Find the equation of lines passing through the intersection of $4x - 3y - 1 = 0$ and $2x - 5y + 3 = 0$ and parallel to $4x + 5y = 6$.

4. (a) Define : 4
- (1) Finite Set
 - (2) Null Set
 - (3) Intersection of two sets
 - (4) Singleton set

OR

If A, B and C are any three sets prove that

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

- (b) If $A = \{a, b\}$, $B = \{b, c\}$, $C = \{d\}$, then show that 4
- (i) $A \times (B \cup C) = (A \times B) \cup (A \times C)$
 - (ii) $(A - B) \cup (A - C)$

OR

$$\text{If } A = \{x \mid x^2 - 17x + 60 = 0\}$$

$$B = \{x \mid x^2 - 7x + 12 = 0\}$$

Find $A \cup B$ and $A \cap B$.

- (c) In a survey of 500 students in a college, 180 were listed as drinking tea, 275 as drinking coffee and 95 were listed as both drinking tea as well as coffee. Find how many students were drinking neither tea nor coffee. 6

OR

A college awarded 38 medals in Football, 15 in Basket ball and 20 in Cricket. If these medals went to a total of 58 men and only three of these men got medals in all the three sports, how many received medals in exactly two of the three sports.

5. Answer the following : 14

- (1) $f(x) = x^6, x \in \mathbb{Z} - \{0\}$ is a _____ function.
- (2) If $A = \{a, b, c, d, e\}$ and $B = \{x^2 : x \in A\}$, then $n(A)$ and $n(B)$ are _____.
- (3) Find the value of the following ${}^{11}P_3 =$ _____.
- (4) Find the value of the following ${}^{12}C_6 =$ _____.
- (5) Find the equation of a line joining points A(3, 5) and B(6, 4).
- (6) Find the slopes of the lines joining the following pairs of points (-2, -3), (-4, -11).
- (7) If $A = \{-1, 2\}$ $B = \{3, 8\}$ and $C = \{8, 9\}$ then $A \times (B \cap C) =$ _____.

- (8) Find the equation of a line with slope 3 and passing through (2, 5).
- (9) What is the formula for finding sum of infinite G – P ?
- (10) Find the required term of the following series 59, 56, 53, 50,..... 17th term.
- (11) For G.P. 1, $\sqrt{2}$, 2, $2\sqrt{2}$,..... 15th terms then $T_{15} =$ _____.
- (12) The third term of a G.P. is 3 and its seventh term is 243. Find its first term and the common ratio.
- (13) If $A = \{-1, -2, -3\}$ $B = \{-2, -4, -6\}$ and $C = \{-4, -6, -7\}$ then find $A \cup (B \cap C)$.
- (14) $\lim_{n \rightarrow 4} \frac{x^2 - 16}{x - 4} =$ _____.