Mathematics Assignment

Class – XI

1. If A and B are two sets such that n(A) = 35, n(B) = 30 and n(U) = 50, then find
   i. The greatest value of n(A U B) ii. The least value of (A ∩ B)

2. In a town of 10,000 families it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% families buy newspaper C. 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all three newspapers, find the number of families which buy:

   i. A only ii. B only iii. None of A, B and C

3. Out of 280 students in Class XII of a school, 135 play hockey, 110 play football, 80 play volleyball, 35 of these play hockey and football, 30 play volleyball and hockey, 20 play football and volleyball. Also each student plays at least one of the three games. How many students play all.

4. In a survey twice as many people said they read both the sport and TV pages but not the headlines, as read the TV page only. 4 more people read the headline only as the sport only. 12 people read the TV pages only. 2 more people read the headlines only as read both the headlines and TV pages but not the sports. One more person reads both the headlines and the sport as read all 3, 66 people do not reads the headlines and 112 do not read the Tv pages. 34 people read the headlines only. How many people read all three sections?

5. If A, B and C are any three sets, then

   i. A U (B ∩ C) = (A U B) ∩ (A U C)

   ii. A ∩ (B U C) = (A ∩ B) U (A ∩ C)

6. If A, B and C are any three sets, then

   i. (A U B) U C = A U (B U C)

   ii. A ∩ (B ∩ C) = (A ∩ B) ∩ C

7. Express A = {(a, b) : 2a + b = 5, a, b ϵ w} as the set of ordered pairs.

8. let A = {1, 2, 3, 4} and R = {(a, b) : a ϵ A, b ϵ A, a divides b} Wrik R explicity.

9. Let A be a non empty set such that A×B = A×C. Show that B = C.

10. Find the domain for which the functions $f(x) = 2x^2 - 1$ and $g(x) = 1 - 3x$ are equal.

11. Express the function $f : x \rightarrow R$ given by $f(x) = x^3 + 1$ as set of ordered pairs, where

    X = {-1, 0, 3, 9, 7}

12. Find the domain and range of the relation R given by $R = \{(x,y) : y = x + \frac{6}{x}$, where x, y ϵ N and $x < 6\}$

13. Let R be the relation on Z defined by

R = {(a,b) : a, b ϵ Z, a - b is an integer}

14. Is the following relation a function? Justify your answer

i. R = {(2, 3), $\left(\frac{1}{2}, 0\right)$, (2, 7), (-4, 6)}

ii. R = {(1, 5), (2, 9), (3, 1)}

iii. R = {$\left(n, \frac{1}{n}\right)$: n is a positive integer}

15. Draw the graph of modulus function and signum function?

16. Find the range of following functions:

i. f(x) = $\frac{1}{4-x2}$ ii. f(x) = $\frac{x2}{1+x2}$ iii. f(x) = -|x - 2|

17. If f(x) = x^2 + 7 and g(x) = 3x + 5, find each of the following:

i. f(3) + g(-5) ii. f$\left(\frac{1}{2}\right)$ × g(14) iii. f(-2) + g(-1)

iv. f(t) – f(-2) v. $\frac{f(t)-f(5)}{t-5}$ if t ≠ 5

18. If $\frac{a+bx}{a-bx} = \frac{b+cx}{b-cx} = \frac{c+dx}{c-dx}$ (x ≠ 0), then show that a, b, c and d are in G.P.

19. The sum of the first four terms of an AP is 56. The sum of the last four terms is 112. If its first term is 11, then find the number of terms.

20. If the sum of n terms of an AP is nP + $\frac{1}{2}$n(n – 1)Q, where P and Q are constants, find the Common difference.

21. If the sum of first P terms of an AP is equal to the sum of first Q terms, then find the sum of the first (P + Q) terms.

22. If a, b, c, d and p are different real numbers such that (a^2 + b^2 + c^2)p^2 – 2(ab + bc + cd)p + (b^2 + c^2 + d^2) ≤ 0, then show that a, b, c and d are in GP.

23. Find the sum of the GP 1, -a, a^2, -a^3, …….. to n terms.

24. A GP consists of an even number of terms. If the sum of all the terms is 5 times the sum of terms occupying odd places, then find its common ratio.

25. Find the sum of the sequence:

0.9 + 0.99 + 0.999 + 0.9999 + ……. to n terms.

26. Find the sum to infinity of the GP

$\frac{-3}{4}, \frac{3}{16}, \frac{-3}{64}$, …… .

27. Prove that: $6^{1/2} \cdot 6^{1/4} \cdot 6^{1/8} \ldots\ldots\ldots\ldots = 6$

28. Find the sum to infinity of the series:

$$\frac{1}{3} + \frac{1}{5^2} + \frac{1}{3^3} + \frac{1}{5^4} + \frac{1}{3^5} + \frac{1}{5^6} + \ldots\ldots\ldots\ldots\ldots\ldots$$

29. Find the rational number having the decimal expansion 0.999

30. Two cars start together in the same direction from the same place. The first goes with uniform speed of 10km/h. the second goes at a speed of 8km/h in the first hour and increases the speed by ½ km each succeeding hour. After how many hours will the second car overtake the first car if both cars go non-stop?