FRS

X - Std

FIRST REVISION TEST - 2023
MATHS

Time : 3.00 Hrs

Marks : 100

PART - I

(i) Answer all the 14 questions. (ii) Choose the most suitable answer from the given four alternatives and write the option code :-

14 X 1 = 14

1. The range of the relation $R = \{(x, x^2)/x$ is a prime number less than 13$\}$ is

   a) $\{2, 3, 5, 7\}$
   b) $\{2, 3, 5, 7, 11\}$
   c) $\{4, 9, 25, 49, 121\}$
   d) $\{1, 4, 9, 25, 49, 121\}$

2. If $f : A \to B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to

   a) 7
   b) 49
   c) 1
   d) 14

3. If 6 times of 6th term of an A.P. is equal to 7 times the 7th term, then the 13th term of the A.P. is

   a) 0
   b) 6
   c) 7
   d) 13

4. The HCF of the least prime number and the least composite number is.

   a) 1
   b) 2
   c) 3
   d) 4

5. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the x axis is

   c) 0
   b) 1
   c) 0 or 1
   d) 2

6. For the matrix $A = \begin{bmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{bmatrix}$ the order of the matrix A^T is

   a) 2 X 3
   b) 3 X 2
   c) 3 X 4
   d) 4 X 3

7. In a $\triangle ABC$, AD is the bisector of $\lfloor BAC$. If AB = 8cm, BD = 6cm and DC = 3cm, then the length of the side AC is

   a) 6cm
   b) 4cm
   c) 3cm
   d) 8cm

8. If (5, 7), (3, P) and (6, 6) are collinear, then the value of P is

   a) 3
   b) 6
   c) 9
   d) 12

9. The equation of the straight line passing through the point (5, 3) and parallel to y-axis is

   a) y = 5
   b) y = 3
   c) x = 5
   d) x = 3

10. If $(\sin\alpha + \cos ec\alpha)^2 + (\cos\alpha + \sec\alpha)^2 = k + \tan^2\alpha + \cot^2\alpha$, then the value of k is equal to

    a) 9
    b) 7
    c) 5
    d) 3

11. The angle of depression of the top and bottom of 20m tall building from the top of a multistoried building are 30° and 60° respectively. The height of the multistoried building and the distance between the two buildings (in meters) is

    a) $20, 10\sqrt{3}$
    b) $30, 5\sqrt{3}$
    c) $20, 10$
    d) $30, 10\sqrt{3}$

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12. If two solid hemispheres of same base radius r units are joined together along their bases, then C.S.A. of this new solid is

a) $4\pi r^2$ sq. units   b) $6\pi r^2$ sq. units   c) $3\pi r^2$ sq. units   d) $8\pi r^2$ sq. units

13. The volume (in cm3) of the greatest sphere that can be cut off from a cylinderical log of wood of base radius 1cm and height 5cm is

a) $\dfrac{4}{3}\pi$ b) $\dfrac{10}{3}\pi$ c) 5π d) $\dfrac{20}{3}\pi$

14. If the mean and C.V. of a data are 4 and 87.5% then the standard deviation is

a) 3.5   b) 3   c) 4.5   d) 2.5

PART - II

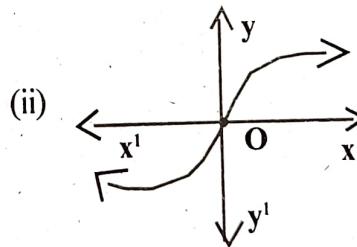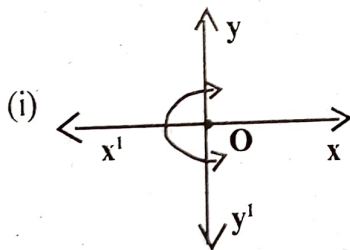Answer any 10 questions. Q.No. 28 is compulsory :-   10 X 2 = 20

15. The arrow diagram shows a relationship between the sets P and Q
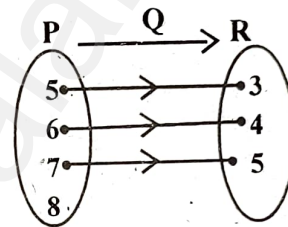
     (i) Write the relation in Roster form

     (ii) What is the domain and range of R.

16. Determine whether the graphs given below represent functions :

17. Find the first four terms of the sequence $a_n = n^3 - 2$.

18. Find the sum of $2 + 4 + 6 + \dots\dots + 80$.

19. If $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \dfrac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify that $(A^T)^T = A$.

20. In $\triangle ABC$, AD is the internal bisector of $\lfloor A$. If BD = 4cm, DC = 3cm and AB = 6cm, find AC.

21. State Pythagoras theorem.   *FRS 10 EM Maths Page - 2*

22. Find the slope of the line joining the points $(-6, 1)$ and $(-3, 2)$.

23. Show that the straight lines $2x + 3y - 8 = 0$, $4x + 6y + 18 = 0$.

24. Prove the identity $\sqrt{\dfrac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$.

25. From the top of a rock of $50\sqrt{3}$ m high, the angle of depression of a car on the ground is observed to be 30°. Find the distance of the car from the rock.

26. The C.S.A. of a right circular cylinder of height 14cm is 88cm². Find the diameter of the cylinder.

27. Find the standard deviation of first 21 natural numbers.

28. Find the quadratic equation whose roots are $3 + \sqrt{7}$ and $3 - \sqrt{7}$.

PART - III

Answer any 10 questions. Q.No. 42 is compulsory :- $10 \times 5 = 50$

29. Let A = The set of all natural numbers less than 8, B = The set of all prime number less than 8, C = The set of even prime number. Verify that $(A \cap B) \, X \, C = (A \, X \, C) \cap (B \, X \, C)$.

30. If the function f is defined by $f(x) = \begin{cases} x+2 & ; & x > 1 \\ 2 & ; & -1 \le x \le 1 \\ x-1 & ; & -3 < x < -1 \end{cases}$ find the value of

    (i) f(3)   (ii) f(0)   (iii) f(–1.5)   (iv) f(2) + f(–2).

31. The sum three consecutive terms that are in A.P. is 27 and their product is 288. Find the three term.

32. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.

33. Simplify : $\dfrac{1}{x^2 - 5x + 6} + \dfrac{1}{x^2 - 3x + 2} - \dfrac{1}{x^2 - 8x + 15}$

34. If $A = \begin{bmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{bmatrix}$ verify that $(AB)^T = B^T A^T$.

35. Show that the angle bisectors of a triangle are concurrent.

36. A line makes positive intercepts on coordinate axes whose sum is 7 and is passes through $(-3, 8)$. Find its equation.

37. From a point on the ground, the angles of elevation of the bottom and top of a tower fixed at the top of a 30m high building are 45° and 60° respectively. Find the height of the tower. $\left(\sqrt{3} = 1.732\right)$

38. If the radii of the circular ends of frustum which is 45cm high are 28cm and 7cm, find the volume of the frustum.

39. Water is flowing at the rate of 15km per hour through a pipe of diameter 14cm into a rectangular tank which is 50m long and 44m wide. Find the time in which the level of water in the tank will rise by 21cm.

40. The mean and standard deviation of 15 observations found to be 10 and 5 respectively on rechecking it was found that one of the observation with value 8 was incorrect. Calculate the correct mean and standard deviation if the correct observation value was 23?

41. A bag contains 5 red balls, 6 white balls, 7 green balls, 8 black balls. One ball is drawn at random from the bag. Find the probability that the ball drawn is (i) white (ii) black or red (iii) not white (iv) neither white nor black.

42. Find the area of the shaded region.

C (5, 7)

D
(5, 5)

A (1, 1)   B (8, 1)
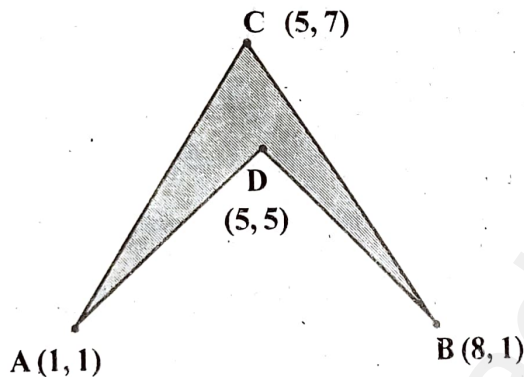
PART - IV

Answer all the questions :-   2 X 8 = 16

43. a) Construct a $\triangle PQR$ such that QR = 5cm, $\lfloor P = 30^0$ and the altitude from P to QR is of length 4.2 cm. **(OR)**

   b) Draw a circle of radius 4.5cm. Take a point on the circle. Draw the tangent at the point using the alternate segment theorem.

44. a) Graph the linear function $y = \dfrac{1}{2}x$. Identify the constant of variation and verify it with the graph. Also find (i) y when x = 9, (ii) x when y = 7.5. **(OR)**

   b) Draw the graph of $y = x^2 + x - 2$ and hence solve $x^2 + x - 2 = 0$.