10th Standard

Maths

First Revision 2023

Various District
Question Paper Collection

10215

FIRST REVISION EXAM - 2023

STD - X
TIME : 3.00 Hrs

MATHS

MARKS : 100

PART - I

I. Answer all the questions.

14 x 1 = 14

1. $A = \{ a, b, p \}$, $B = \{ 2, 3 \}$, $C = \{ p, q, r, s \}$ then $n [(A \cup C) \times B]$ is

   a) 8   b) 20   c) 12   d) 16

2. If $f(x) = 2x^2$ and $g(x) = \dfrac{1}{3x}$, then fog is

   a) $\dfrac{3}{2x^2}$ b) $\dfrac{2}{3x^2}$ c) $\dfrac{2}{9x^2}$ d) $\dfrac{1}{6x^2}$

3. 3, x, 6.75 are consecutive terms of a G.P then x is ....

   a) 2.25   b) 9.75   c) 4.5   d) 1.5

4. The value of $(1^3 + 2^3 + 3^3 + ... + 15^3) - (1 + 2 + 3 + ... + 15)$ is

   a) 14400   b) 14200   c) 14280   d) 14520

5. $\dfrac{x}{x^2 - 25} - \dfrac{8}{x^2 + 6x + 5}$ gives

   a) $\dfrac{x^2 - 7x + 40}{(x-5)(x+5)}$ b) $\dfrac{x^2 + 7x + 40}{(x-5)(x+5)(x+1)}$ c) $\dfrac{x^2 - 7x + 40}{(x^2 - 25)(x+1)}$ d) $\dfrac{x^2 + 10}{(x^2 - 25)(x+1)}$

6. Find the matrix x if $2x + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$

   a) $\begin{pmatrix} 2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

7. If in $\triangle ABC$ DE $\|$ BC, AB = 3.6cm, AC = 2.4cm and AD = 2.1cm then the length of AE is ....

   a) 1.4 cm   b) 1.8 cm   c) 1.2 cm   d) 1.05 cm

8. A tangent is perpendicular to the radius at the

   a) Centre   b) point of contact   c) infinity   d) chord

9. If slope of the line PQ is $\dfrac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is

   a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\dfrac{1}{\sqrt{3}}$ d) 0

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10. The condition of two straight lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ where the co-efficients are non-zero, are perpendicular if and only if

a) $a_1b_2 - a_2b_1 = 0$ 　　b) $a_1b_2 + a_2b_1 = 0$ 　　c) $a_1a_2 + b_1b_2 = 0$ 　　d) $a_1a_2 - b_1b_2 = 0$

11. $\tan\theta \operatorname{Cosec}^2\theta - \tan\theta$ is equal to

a) $\operatorname{Sec}\theta$ 　　b) $\operatorname{Cot}^2\theta$ 　　c) $\sin\theta$ 　 d) $\cot\theta$

12. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is

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

13. Father of Indian statistics was........

a) Srinivasha Ramanujam 　　　　　b) Sagundala Devi

c) Prasanta chandra Mahalanobis 　　d) Kaprekar

14. Which of the following is incorrect >

a) $p(A) > 1$ 　　b) $0 \le p(A) \le 1$ 　　c) $p(\phi) = 0$ 　　d) $p(A) + p(\bar{A}) = 1$

PART - II

Answer any Ten Questions. Q.No. 28 is compulsory 　　　　　　　　$10 \times 2 = 20$

15. Let A = { 1, 2, 3 } and B = { x/x is a prime number lessthan 10 }. Find A x B and B x A.

16. Find k, if $f \bullet f(k) = 5$, where f(k) = 2k - 1

17. Today is Tuesday, My uncle will come after 45 days. In which day my uncle will be coming?

18. Find the number of terms in the A.P. 3, 6, 9, 12 111

19. Simplify : $\dfrac{x^3}{x-y} + \dfrac{y^3}{y-x}$

20. Determine the nature of roots for the quadratic equation $9x^2 - 24x + 16 = 0$.

21. If $\triangle ABC$ is similar to $\triangle DEF$ such that BC = 3 cm EF = 4 cm and area of $\triangle ABC$ = 54 cm². Find the area of $\triangle DEF$.

22. In two concentric circles, a chord of length 16cm of larger circle becomes a tangent to the smaller circle whose radius is 6 cm. Find the radius of the larger circle.

23. The line through the points (-2, a) and (a, 3) has slope -1 / 2. Find the value of a.

24. Find the equation of a line whose intercepts on the x and y axes are -5, 3 / 4.

25. Prove that $\dfrac{\sec\theta}{\sin\theta} - \dfrac{\sin\theta}{\cos\theta} = \cot\theta$.

26. A solid sphere and a solid hemisphere have equal total surface area. Prove that the ratio of their volume is $3\sqrt{3} : 4$.

27. What is the probability that a leapyear selected at random will contain 53 saturdays.

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28. The mean and Variant of the 10th standard students of a school is 155cm and 72.25 cm² respectively. Find the co-efficient of variation.

PART - III

Answer any Ten Questions. Q.No. 42 is compulsory   10 x 5 = 50

29. If $A = \{ x \in N / x < 2 \}$, $B = \{ x \in N / 1 < x \leq 4 \}$ and $C = \{ 3, 15 \}$ then verify
   $A*(B \cap C) = (A*B) \cap (A*C)$.

30. If the function $f : R \to R$ is defined by $f(x) = \begin{cases} 2x+7; x < -2 \\ x^2 - 2; -2 \leq x < 3 \\ 3x - 2; x \geq 3 \end{cases}$ then find the value of

   (i) $f(4)$ (ii) $f(-2)$ (iii) $f(4) + 2f(1)$ (iv) $\dfrac{f(1) - 3f(4)}{f(-3)}$

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

32. If a, b, c are three consecutive terms of an A.P and x, y, z are three consecutive terms of a G.P. then P.T. $x^{b-c} \times y^{c-a} \times z^{a-b} = 1$.

33. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square. Find the values of a and b.

34. If α, β are the roots of $7x^2 + ax + 2 = 0$ and if $\beta - \alpha = -13/7$. Find the values of 'a'.

35. P and Q are the mid-points of the sides CA and CB respectively of a $\triangle ABC$,

   right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$.

36. Find the value of k, if the area of a quadrilateral is 28 sq. units, whose vertices are

   , $(-4, -2), (-3, k), (3, -2)$ and $(2, 3)$.

37. Find the equation of a line passing through the point of intersection of the lines

   $4x + 7y - 3 = 0$ and $2x - 3y + 1 = 0$ that has equal intercepts on the axies.

38. A building and statue are in opposite side of a street from each other 35m apart. From a point on the roof of building the angle of elevation of the top of statue is 24º and the angle of depression of base of the statue is 34º. Find the height of the statue. (tan 24º = 0.4452, tan 34º = 0.6745).

39. If the radius of the circular ends of a frustum which is 45cm high are 28cm and 7cm, find the volume of the frustum.

40. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. if the length of the entire capsule is 12mm and the diameter of the capsule is 3mm, how much medicine it can hold?

41. Two dice are rolled once, Find the probability of getting an even number on the first die or a total of face sum 8.

42. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ show that $(AB)^T = B^T A^T$.

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$\dfrac{7}{4}$

PART - IV

Answer all the Questions.   2 x 8 = 16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to 7 / 4 of the corresponding sides of the triangle PQR (Scale factor 7 / 4 > 1)

(OR)

b) Construct a $\triangle$ PQR such that QR = 6.5 cm, $\angle P = 60^0$ and the altitude from P to QR is of length 4.5cm.

44. a) A bus is travelling at a uniform speed of 50 km/hr. Draw the distance - time graph and hence find

   (i)   the constant of variation

   (ii)   how far will it travel in 90 minutes

   (iii) the time required to cover a distance of 300 km from the graph.

(OR)

b) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$

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Standard 10
MATHEMATICS

Time: 3.00 Hrs.   Marks: 100

PART - I

Note: i) Answer all the questions.   14×1=14
ii) Choose the recent appropriate answer from the given four alternatives and write the option code and the corresponding answer.

1) If A = {1, 2}, B = {1, 2, 3, 4}, C = {5, 6} and D = {5, 6, 7, 8}, then state which of the following statement is true?
   a) $(A×C) \subset (B×D)$ b) $(B×D) \subset (A×C)$ c) $(A×B) \subset (A×D)$ d) $(D×A) \subset (B×A)$

2) Let $f(x) = \sqrt{1+x^2}$ then
   a) $f(xy) = f(x) . f(y)$ b) $f(xy) \geq f(x) . f(y)$ c) $f(x, y) \leq f(x) . f(y)$ d) None of these

3) If the HCF of 65 and 117 is expressible in the form of 65m–117, then the value of m is
   a) 4   b) 2   c) 1   d) 3

4) The value of r, such that $1+r+r^2+r^3+......... = 3/4$ is
   a) 1/3   b) 2/3   c) –1/3   d) –2/3

5) If (x–6) is the H.C.F of $x^2–2x–24$ and $x^2–kx-6$ then the value of k is
   a) 3   b) 5   c) 6   d) 8

6) The number of points of intersection of the quadratic polynomial x^2+4x+4 with the x-axis
   a) 0   b) 1   c) 0 or 1   d) 2

7) If ΔABC is an isosceles triangle with ∠C = 90º and AC = 5 cm, then AB is
   a) 2.5 cm   b) 5 cm   c) 10 cm   d) $5\sqrt{2}$ cm

8) The two tangents from an external points P to a circle with centre at O are PA and PB. If ∠APB = 70º then the value of ∠AOB is
   a) 100º   b) 110º   c) 120º   d) 130º

9) The straight line given by the equation x = 11 is
   a) parallel to x-axis   b) parallel to y-axis
   c) passing through the origin $(\sqrt{3} = 1.732)$ d) passing through the point (0, 11)

10) When proving that a quadrilateral is a trapezium, it is necessary to show
    a) Two sides are parallel   b) Two parallel and two non-parallel sides
    c) Opposite sides are parallel   d) All sides are of equal length

11) If the points (a, 0), (0, c) and (1, 1) are collinear then the value of $\frac{1}{a}+\frac{1}{c}$ is
    a) 1   b) –1   c) 0   d) 2

12) If $(sin\alpha+cosec\alpha)^2 + (cos\alpha+sec\alpha)^2 = k+tan^2\alpha+cot^2\alpha$, then the value of k is equal to
    a) 9   b) 7   c) 5   d) 3

13) The volume (in cm^3) of the greatest sphere that can be cut off from a cylinderical log of wood of base radius 1 cm and height 5 cm is
    a) $\frac{4}{3}\pi$ b) $\frac{10}{3}\pi$ c) 5π d) $\frac{20}{3}\pi$

14) The probability of getting a job for a person is x/3, if the probability of not getting the job is 2/3 then the value of x is
    a) 2   b) 1   c) 3   d) 1.5

PART - II

Note: Answer any 10 questions. Question No. 28 is compulsory.   10×2=20

15) Find k if fof(k) = 5, where f(k) = 2k–1.

16) If n(A×B) = 10, n(A) = $\sqrt{9} + \sqrt{4}$, find the value of n(B).

17) Find the first four terms of the sequences whose n^{th} term is given by $a_n = 2n^2–6$.

18) Find the sum of $1^3+2^3+3^3+.........+16^3$.

19) Find the square root of $\frac{144 a^8b^{12}c^{16}}{81 f^{12}g^4h^{14}}$.

20) If $A - 2B = \begin{bmatrix} 1 & -2 \\ 3 & 0 \end{bmatrix}$ and $2A - 3B = \begin{bmatrix} -3 & 3 \\ 1 & -1 \end{bmatrix}$, find the matrix B.

21) If ΔABC is similar to ΔDEF such that BC = 3 cm, EF = 4 cm and area of ΔABC = 54 cm^2. Find the area of ΔDEF.

22) In two concentric circles, a chord of length 16 cm of larger circle becomes a tangent to the smaller circle whose radius is 6 cm. Find the radius of the larger circle.

23) Find the slope of the line joining the points $(5, \sqrt{5})$ with the origin.

24) Show that (−3, −4), (7, 2) and (12, 5) collinear.

25) Prove that $\sqrt{\dfrac{1+\cos\theta}{1-\cos\theta}} = \text{cosec}\theta + \cot\theta$.

26) If the base area of a hemispherical solid is 1386 sq.metres, then find its total surface area.

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

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

PART - III

Note: Answer any 10 questions. Question No. 42 is compulsory.   **10×5=50**

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

30) Consider the function $f(x) = x-4$, $g(x) = x^2$ and $h(x) = 3x-5$ show that $(fog)oh = fo(goh)$.

31) In a G.P the product of three consecutive term is 27 and the sum of the product of two terms taken at a time is 57/2. Find the three terms.

32) Find the G.C.D. of (x^3+y^3), $(x^4+x^2y^2+y^4)$ whose L.C.M is (x^3+y^3) (x^2+xy+y^2).

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

34) State and prove Angle bisector theorem.

35) Find the area of the quadrilateral whose vertices are (−9, 0), (−8, 6), (−1, −2) and (−6, −3).

36) Find the equation of a line joining through the point of intersection of the lines $4x+7y-3 = 0$ and $2x-3y+1 = 0$ that has equal intercepts on the axes.

37) If $\text{cosec}\theta+\cot\theta = p$, then prove that $\cos\theta = \dfrac{p^2-1}{p^2+1}$.

38) The angles of elevation and depression of the top and bottom of a lamp post from the top of a 66m heigh apartment are 60° and 30° respectively. Find
   i)   The height of the lamp post.
   ii) The difference between height of the lamp post and the apartment.
   iii) The distance between the lamp post and the apartment. $\left(\sqrt{3} = 1.732\right)$

39) The radii of two circular ends of a frustum shaped bucket are 15 cm and 8 cm. If its depth is 63 cm, find the capacity of the bucket in litres. (Take π = 22/7)

40) A right circular cylinderical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cup. Find the number of cones needed to empty the container.

41) In a class of 35, students are numbered from 1 to 35. The ratio of boys to girls is 4:3. The roll numbers of students begin with boys and end with girls. Find the probability that a students selected is either a boy with prime roll numbers or a girl with composite roll numbers or an even roll numbers.

42) The rainfall recorded in various places of five districts in a week are given below. Find its standard deviation.

Rain fall (in mm)	45	50	55	60	65	70
Number of places	5	13	4	9	5	4

PART - IV

Note: Answer the following questions.   **2×8=16**

43) a) Draw a tangent to the circle from the point P having radius 3.6 cm and centre at O. Point P is at a distance 7.2 cm from the centre.   **(OR)**
    b) Draw ΔPQR such that PQ = 6.8 cm, vertical angle is 50° and the bisector of the vertical angle meets the base at D where PD = 5.2 cm.

44) a) Draw the graph of $y = x^2-4x+3$ and use it to solve $x^2-6x+9 = 0$.   **(OR)**
    b) A two wheeler parking zone near bus stand charges as below:

Time (in hours) (x)	4	8	12	24
Amount ₹ (y)	60	120	180	360

   Check if the amount charged are in direct variation or in inverse variation to the parking time. Graph the data. Also
   i) Find the amount to be paid when parking time is 6 hrs.
   ii) Find the parking duration when the amount paid is ₹ 150.

FIRST REVISION TEST - 2023

10 - Std

MATHEMATICS

Marks : 100

Time : 3.00 Hrs

I Choose the correct answer from the four alternative and write the option code and the corresponding answer. $14 \times 1 = 14$

1. If there are 1024 relations from a set A = {1, 2, 3, 4, 5} to a set B, then the number of elements in B is   a) 3   b) 2   c) 4   d) 8

2. If f : A ---> 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. $7^{4K} \equiv$ .... (mod 100)   a) 1   b) 2   c) 4   d) 3

4. If an A.P. is 3, 15, 27, 39, ... 171, then the 6th term from the last is
a) 99   b) 111   c) 100   d) 171

5. The solution of $(2x - 1)^2 = 9$ is equal to   a) −1, 2   b) −1   c) 3, 1   d) 2, 3

6. Find the matrix X if $2x + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$ a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

7. The sum of the roots for the quadratic equation is $3\left(x + \dfrac{2}{3}\right)^2 = 0$ is

a) $-\dfrac{4}{3}$ b) -4   c) $\dfrac{4}{3}$ d) $\dfrac{3}{4}$

8. The perimeters of two similar triangles ΔABC and ΔPQR are 36cm and 24cm respectively. If PQ = 10cm, then the length of AB is   a) $6\dfrac{2}{3}$ cm   b) $\dfrac{10\sqrt{6}}{3}$ cm   c) $66\dfrac{2}{3}$ cm   c) 15cm

9. The angle of inclination of a line which is parallel to y - axis is
a) 0°   b) 45°   c) 90°   d) Not defined

10. If $5x = \sec\theta$; $\dfrac{5}{x} \tan\theta$ then $x^2 - \dfrac{1}{x^2}$ is equal to   a) 25   b) 5   c) $\dfrac{1}{25}$ d) 1

11. The point of intersection of 3x - y = 4 and x + y = 8 is
a) (5, 3)   b) (2, 4)   c) (3, 5)   d) (4, 4)

12. The height of a right circular cone whose radius is 5cm and slant height is 13cm will be
a) 12 cm   b) 10 cm   c) 13 cm   d) 5 cm

13. If the standard deviation of x, y, z is p then the variation 3x + 5, 3y + 5, 3z + 5 is
a) 3p + 5   b) $p^2 + 5$ c) $9p^2$ d) 9p + 15

14. From a well shuffled pack of 52 cards one card is drawn at random, The probability of getting number card is   a) $\dfrac{9}{13}$ b) $\dfrac{3}{13}$ c) $\dfrac{1}{52}$ d) $\dfrac{9}{52}$

II **Answer any 10 questions Q.No. 28 is compulsory.** $10 \times 2 = 20$

15. If A = {1, 3, 5}, B = {2, 3} then find A x B and B x A.
16. If fof (K) = 5, f (K) = 2K - 1 then find the value of K.
17. Find the sum of Infinity of 9 + 3 + 1 + ...
18. If $13824 = 2^a + 3^b$ then find a and b.

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

20. Find the LCM of $p^2 - 3p + 2$; $p^2 - 4$.
21. A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point?

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22. If the points (2, 3), (4, a) and (6, −3) are collinear then find the value of a.
23. Find the equation of a straight line whose slope is −3 and x- Intercept is −5.
24. A tower stands vertically on the ground from a point on the ground, which is 48m away from the foot of the tower, the angle of elevation of the top of the tower is 30°. Find the height of the tower.
25. The volumes of two cones of same base radius are 3600cm³ and 5040cm³. Find the ratio of their heights.
26. A metallic sphere of radius 16cm is melted and recast into small spheres each of radius 2cm. How many small spheres can be obtained?
27. If the range and co-efficient of range of the data are 20 and 0.2 respectively, then find the largest and the smallest values of the data.
28. What is the probability that a leap year selected at random will contain 53 Saturdays?

III Answer any 10 questions. Q.No. 42 is compulsory.   10 X 5 = 50

29. Let A = {x ∈ N / x < 3}, B = {x ∈ W / 0 < x ≤ 3} and C = { 3, 5} verify that A X (B − C) = (A X B) - (A X C).
30. Find the sum to n terms of the series 5 + 55 + 555 + ...
31. Rekha has 12 square colour papers of sizes 12cm, 13cm, 14cm, ... 23cm. How much area can be decorated with these colour papers?
32. Solve : 3x − 2y + z = 2; 2x + 3y − z = 5 ; x + y + z = 6.
33. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b.
34. If α and β are the roots of the equation $x^2 − 3x + 1 = 0$, then find the quadratic equation whose roots are $1/{\alpha+\beta}$ and $1/{\alpha\beta}$.
35. If $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$ verify that $(AB)^T = B^T A^T$.
36. State and prove Angle Bisector theorem.
37. Find the value of k, if the area of a quadrilateral is 43 sq.units, whose vertices are (1, 2), (−3, 4) (−5, −6) and (4, k).
38. From the top of a tower 50m high, the angles of depression of the top and bottom of a tree are observed to be 30° and 45° respectively. Find the height of the tree.
39. A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25cm. Find the total surface area of the toy if its common diameter is 12cm.
40. The radius of a conical tent is 7m and the height is 24m. Calculate the length of the canvas used to make the tent of the width of the rectangular canvas is 4m?
41. In a class of 50 students, 28 opted fro NCC, 30 opted for NSS and 18 opted both NCC and NSS, one of the students is selected at random. Find the probability that
    i) The student opted for NCC but not NSS. ii) The student opted for NSS but Not NCC.
    iii) The student opted for exactly one of them.
42. Let A = (1, 2, 3, 4) and {2, 5, 8, 11, 14} be two sets. Let f : A --> B be a function given by f (x) = 3x − 1. Represent this function. i) By arrow diagram ii) in a table form
    iii) As a set of ordered pairs iv) In a graphical form

IV Answer both the questions choosing either of the alternatives.   2 x 8 = 16

43. a) Construct a triangle similar to given triangle LMN with its sides equal to ⁴/₅ of the corresponding sides of the triangle LMN. (Scale factor.4/5) *(OR)* b)Construct a triangle ΔPQR such that QR = 5cm ∠P = 30° and the altitude from P to QR is of length 4.2cm.
44. a) Draw the graph of y = x² − 5x − 6 and hence solve x² − 5x − 14 = 0. *(OR)*
    b) A company initially started with 40 workers to complete the work by 150 days. Later it decided to fasten up the work increasing the number of workers as shown below.

Number of workers (x)	40	50	60	75
Number of days (y)	150	120	100	80

    i) Graph the above data and identify the type of variation.
    ii) From the graph, find the number of days required to complete the work if the company decides to got for 120 workers? iii) If the work has to be completed by 30 days, howmany workers are required?

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Salem

FRS
X - Std

FIRST REVISION TEST - 2023
MATHS
Salem (Dt)

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, x²)/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 → 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
   d) 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) $30, 10\sqrt{3}$

FRS 10 EM Maths Page - 1

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

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 :- $10 \times 2 = 20$

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.
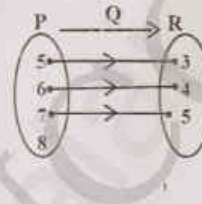
16. Determine whether the graphs given below represent functions :

   (i)

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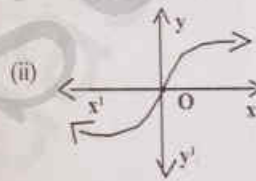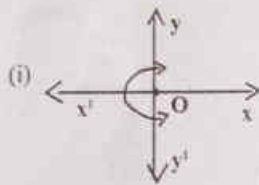
17. Find the first four terms of the sequence $a_n = n^3 - 2$.

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

19. If $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ 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 :- $\hspace{2cm}$ $10 \times 5 = 50$

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 $(A \cap B) \times C = (A \times C) \cap (B \times C)$.

30. If the function f is defined by $f(x) = \begin{cases} x+2 & ; & x > 1 \\ 2 & ; & -1 \leq x \leq 1 \\ x-1 & ; & -3 < x < -1 \end{cases}$ 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. $\left(\sqrt{3} = 1.732\right)$

FRS 10 EM Maths Page - 3

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)
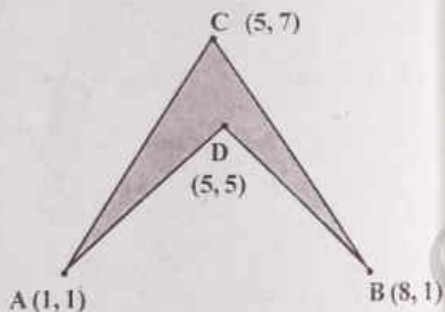
PART - IV

Answer all the questions :- $2 \times 8 = 16$

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 $x^2 + x - 2 = 0$.

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COMMON FIRST REVISION TEST - 2023
Standard X
MATHEMATICS
Part - I

Time: 3.00 hours

Reg No. ☐☐☐☐☐☐

Marks: 100

I Choose the correct answer

14 x 1 = 14

1. Let $n(A) = m$ and $n(B) = n$ then total number of non-empty relations that can be defined from A to B is
   a) m^n
   b) n^m
   c) $2^{mn} - 1$
   d) 2^{mn}

2. The quotient and remainder when 21 is divided by -4 are
   a) $5, -1$
   b) $-5, 1$
   c) $-5, -1$
   d) $5, 1$

3. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \cdots$ is
   a) $\frac{1}{24}$
   b) $\frac{1}{27}$
   c) $\frac{2}{3}$
   d) $\frac{1}{81}$

4. The solution of $(2x - 1)^2 = 9$ is equal to
   a) -1
   b) 2
   c) $-1, 2$
   d) none of these

5. Transpose of a column matrix is
   a) unit matrix
   b) diagonal matrix
   c) column matrix
   d) row matrix

6. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?
   a) 13 m
   b) 14 m
   c) 15 m
   d) 12.8 m

7. The area of triangle formed by the points $(0,0)$, $(0,2)$ and $(2,0)$ is
   a) 0 sq.units
   b) 2 sq.units
   c) 4 sq.units
   d) 1 sq.unit

8. When proving that a quadrilateral is a trapezium, it is necessary to show
   a) two sides are parallel
   b) two parallel and two non-parallel sides
   c) opposite sides are parallel
   d) all the sides are of equal length

9. $\tan\theta \, \csc^2\theta - \tan\theta$ is equal to
   a) $\sec\theta$
   b) $\cot^2\theta$
   c) $\sin\theta$
   d) $\cot\theta$

10. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}:1$, then the angle of elevation of the sun has measure
    a) 45°
    b) 30°
    c) 90°
    d) 60°

11. The length of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
    a) 12 cm
    b) 10 cm
    c) 13 cm
    d) 5 cm

12. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is
    a) $2:1$
    b) $1:2$
    c) $4:1$
    d) $1:4$

13. The range of the data $8,8,8,8,\ldots$ is
    a) 0
    b) 1
    c) 8
    d) 3

14. Which of the following is incorrect? (2)

x Math

a) $P(A) = 1$ b) $0 \leq P(A) \leq 1$ c) $P(\phi) = 0$ d) $P(A) - P(\bar{A}) = 1$

Part - II

II. Answer any 10 questions. (Q.No.28 is compulsory) 10 x 2 = 20

15. If A x B = {(3,2), (3,4), (5,2), (5,4)} then find A and B.

16. If A = {1,2,3}, B = {4,5,6,7} and f = {(1,4), (2,5), (3,6)} be a function from A to B. Show that f is one-one but not onto function.

17. Solve : $3x - 2 = 0$ (mod 11)

18. In a G.P. 729, 243, 81, ... find t_7

19. Determine the nature of the roots for the quadratic equation $x^2 - x - 1 = 0$

20. A vertical stick of length 6 m casts a shadow 400 cm long on the ground and at the same time a tower casts a shadow 28 m long. Using similarity, find the height of the tower.

21. Find the slope of a line joining the given points (-6,1) and (-3,2)

22. If the straight lines $12y = -(p+3)x + 12$, $12x - 7y = 16$ are perpendicular then find 'p'.

23. Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$

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

25. Find the diameter of a sphere whose surface area is 154 m².

26. The volume of solid right circular cone is 11088 cm³. If its height is 24 cm, then find the radius of the cone.

27. Find the range and coefficient of range of the data 63, 89, 98, 125, 79, 108, 117, 68

28. If P(A) = 0.37, P(B) = 0.42, P(A∩B) = 0.09, then find P(A∪B)

Part - III

III. Answer any 10 questions. (Q.No.42 is compulsory) 10 x 5 = 50

29. Let A = {1,2,3,7} and B = {3,0,-1,7}, which of the following are relation from A to B?

i) R_1 = {(2,1), (7,1)}

ii) R_2 = {(-1,1)}

iii) R_3 = {(2,-1), (7,7), (1,3)}

iv) R_4 = {(7,-1), (0,3), (3,3), (0,7)}

30. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$, prove that (fog)oh = fo(goh)

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

32. Find the sum of n terms of the series 0.4 + 0.44 + 0.444 + ... to n terms

33. There are 12 pieces of five, ten and twenty rupee currencies whose total value is ₹105. When first 2 sorts are interchanged in their numbers its value will be increased by ₹20. Find the number of currencies in each sort.

34. State and prove Basic Proportionality Theorem.

35. Find the value of k, if the area of a quadrilateral is 28 sq units, whose vertices are taken in the order (-4,-2), (-3,k), (3,-2) and (2,3)

(3)

36. Find equation of a straight line through the intersection of lines $5x - 6y = 2$, $3x + 2y = 10$ and perpendicular to the line $4x - 7y + 13 = 0$.

37. From the top of a 12 m high building, the angle of elevation of the top of a cable tower is $60°$ and the angle of depression of its foot is $30°$. Determine the height of the tower.

38. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and base is hollowed out. Find the total surface area of the remaining solid.

39. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?

40. Find the mean and variance of the first n natural numbers.

41. Three fair coins are tossed together. Find the probability of getting
    i) all heads
    ii) at least one tail
    iii) atmost one head
    iv) at most two tails

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

Part - IV

IV. Answer all the questions. $2 \times 8 = 16$

43. a) Construct a traingle similar to a given triangle ABC with its sides equal to $\frac{6}{5}$ of the corresponding sides of the triangle ABC.

(OR)

    b) Draw a triangle ABC of base BC = 5.6 cm, $\angle A = 40°$ and the bisector of $\angle A$ meets BC at D such that CD = 4 cm.

44. a) Draw the graph of xy = 24, x, y > 0 using the graph find
    i) y when x = 3 and
    ii) x when y = 6

(OR)

    b) Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$

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SCHOOL EDUCATION DEPARTMENT-VIRUDHUNAGAR DISTRICT

PREPARATARY TEST – II

Class : 10   Date: 11.01.2023   Subject : Mathematics

Duration : $1\frac{1}{2}$ hours   Max.marks : 50

I. Choose the best answer   (7 x 1 = 7)

1) If A is a 2 x 3 matrix and B is a 3 x 4 matrix, how many columns does AB have

(a) 3   (b) 4   (c) 2   (d) 5

2) If the number of Rows and Columns are equal in a matrix, then it is said to be a

(a) Row matrix   (b) Rectangular matrix   (c) Square matrix   (d) Column matrix

3) Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?

(a) 13 m   (b) 14 m   (c) 15 m   (d) 12.8 m

4) A tower is 60 m height. Its shadow is x meters shorter when the Sun's altitude is 45^0 than when it has been 30^0, then x is equal to

(a) 41.92 m   (b) 43.92 m   (c) 43 m   (d) 45.6 m

5) The ratio of the volumes of a Cylinder, a Cone and a Sphere, if each has the same diameter and same height is

(a) 1 : 2 : 3   (b) 2 : 1 : 3   (c) 1 : 3 : 2   (d) 3 : 1 : 2

6) Variance of first 20 natural numbers is

(a) 32.25   (b) 44.25   (c) 33.25   (d) 30

7) $P(A) + P(\bar{A}) = _____$

(a) 0   (b) 1   (c) –1   (d) 0.5

II) Answer any four questions (Question number 14 is compulsory)   (5 x 2 = 10)

8) If $A = \begin{pmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{pmatrix}$ then find the transpose of $-A$.

9) A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point ?

10) Find the range and coefficient of range of the data

63, 89, 98, 125, 79, 108, 117, 68

11) The volume of a solid right circular cone is 11088 cm³. If its height is 24 cm then find the radius of the cone.

12) Find the diameter of a sphere whose surface area is 154 m².

13) A coin is tossed thrice. What is the probability of getting two consecutive tails?

14) A tower stands vertically on the ground. From a point on the ground, which is 48 m away from the foot of the tower, the angle of elevation of the top of the tower is 30^0. Find the height of the tower.

III) Answer any four questions (Question number 21 is compulsory)   (5 x 5 = 25)

15) If the radii of the circular ends of a frustum which is 45 cm height are 28 cm and 7 cm, find the volume of the frustum.

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

17) From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30^0 and 60^0. If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m .

18) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.

19) Show that in a triangle, the medians are concurrent.

20) From a well-shuffled pack of 52 cards, a card is drawn at random. Find the probability of it being either a red king or a black queen.

21) A toy in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25 cm. Find the total surface area of the toy if its common diameter is 12 cm.

IV) Answer any one question   (1 x 8 = 8)

22) Draw a tangent at any point R on the circle of radius 3.4 cm and centre at P.

23) Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$

TVL.10M

Time: 3.00 Hrs

Standard 10
MATHEMATICS

Marks : 100

PART - I

I. Choose the correct answer: $14 \times 1 = 14$

1) If f : A →B is a bijective function and if n(B) = 7, then n(A) is equal to _____
   a) 7   b) 49   c) 1   d) 14

2) The order pairs of (a–11, 6) (–5, 3a–b) are equal then (a, b) is
   a) (6, –12)   b) (–6, –12)   c) (6, 12)   d) (–6, 12)

3) Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is _____
   a) 3   b) 5   c) 8   d) 11

4) The value of $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$ is
   a) 14400   b) 14200   c) 14280   d) 14520

5) Graph of a linear equation is a _____
   a) straight line   b) circle   c) parabola   d) hyperbola

6) If α and β are the zeros of the polynomial $x^2 - 5x + 6$ then $\frac{1}{\alpha} + \frac{1}{\beta}$ is equal to _____
   a) $-\frac{5}{6}$ b) $-\frac{6}{5}$ c) $\frac{6}{5}$ d) $\frac{5}{6}$

7) If in ∆ABC, DE || BC. AB = 3.6 cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is
   a) 1.4 cm   b) 1.8 cm   c) 1.2 cm   d) 1.05 cm

8) A tangent is perpendicular to the radius at the _____.
   a) centre   b) point of contact   c) infinity   d) chord

9) If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is _____.
   a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\frac{1}{\sqrt{3}}$ d) 0

10) $\tan\theta \, \csc^2\theta - \tan\theta$ is equal to _____.
    a) $\sec\theta$ b) $\cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$

11) If the ratio of the height of a tower and the length of its shadow is $\sqrt{3} : 1$, then the angle of elevation of the sum has measure.
    a) 45°   b) 30°   c) 90°   d) 60°

12) The total surface area of a hemi-sphere is how much times the square of its radius
    a) π   b) 4π   c) 3π   d) 2π

13) The range of the data 8, 8, 8, 8, 8, ... 8 is
    a) 0   b) 1   c) 8   d) 3

14) Which of the following is incorrect?
    a) P(A) > 1   b) 0 ≤ P(A) ≤ 1   c) P(ϕ) = 0   d) $P(A) + P(\bar{A}) = 1$

PART - II

II. Answer any ten questions. Question No. 28 is compulsory: $10 \times 2 = 20$

15) Let A = {1, 2, 3} and B = {x/x is a prime number less than 10}. Find A×B and B×A.

16) Find k if fof(k) = 5 where f(k) = 2k–1.

17) Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.

18) Find the sum $3 + 1 + \frac{1}{3} + \dots \infty$.

19) Simplify: $\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$

20) Find the value of a, b, c, d from the equation $\begin{pmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$.

21) The length of the tangent to a circle from a point P, which is 25 cm away from the centre is 24 cm. What is the radius of the circle?

22) i) What is the slope of a line whose inclination is 30°?
    ii) What is the inclination of a line whose slope is $\sqrt{3}$?

23) Prove that $\dfrac{\sec\theta}{\sin\theta} - \dfrac{\sin\theta}{\cos\theta} = \cot\theta$.

24) Find the angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of a tower of height $10\sqrt{3}$ m.

25) The curved surface area of a right circular cylinder of height 14 cm is 88 cm². Find the diameter of the cylinder.

26) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.

27) What is the probability of drawing either a king or queen in a single draw from a well shuffled pack of 52 cards?

28) Show that the straight lines $x-2y+3 = 0$ and $6x+3y+8 = 0$ are perpendicular.

PART - III

III. Answer any ten questions. Question No. 42 is compulsory: **10×5=50**

29) Let A = {x∈ W/x<2}, B = {x∈ N/1<x≤4} and C = {3, 5}. Verify that A×(B∩C) = (A×B)∩(A×C).

30) If the function f : R→R is defined by $f(x) = \begin{cases} 2x+7; & x < -2 \\ x^2-2; & -2 \le x < 3 \\ 3x-2; & x \ge 3 \end{cases}$, then find the values

of (i) f(4) (ii) f(-2) (iii) f(4)+2f(1) (iv) $\dfrac{f(1)-3f(4)}{f(-3)}$.

31) Find the HCF of 396, 504, 636.

32) In a G.P the product of three consecutive terms is 27 and the sum of the product of two terms taken at a time is 57/2. Find the three terms.

33) If $A = \dfrac{2x+1}{2x-1}$, $B = \dfrac{2x-1}{2x+1}$ find $\dfrac{1}{A-B} - \dfrac{2B}{A^2-B^2}$.

34) If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ show that $A^2-5A+7I_2 = 0$.

35) State and prove Pythagoras theorem.

36) Find the value of k, if the area of a quadrilateral is 28 sq.units. Whose vertices are taken in the order $(-4, -2)$, $(-\frac{7}{4}, k)$, $(3, -2)$ and $(2, 3)$.

37) If $\dfrac{\cos\theta}{1+\sin\theta} = \dfrac{1}{a}$, then prove that $\dfrac{a^2-1}{a^2+1} = \sin\theta$.

38) From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60°. If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\dfrac{4h}{\sqrt{3}}$ m.

39) 4 persons live in a conical tent whose slant height is 19m. If each person require 22m² of the floor area, then find the height of the tent.

40) Marks of the students in a particular subject of a class are given below. Find its standard deviation.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	8	12	17	14	9	7	4

41) Two unbiased dice are rolled once. Find the probability of getting.
(i) a doublet   (ii) the product as a prime number   (iii) the sum as a prime number (iv) the sum as 1.

42) A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?

PART - IV

IV. Answer all the questions: **2×8=16**

43) a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4} > 1$).

(OR)

b) Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.

44) a) Draw the graph of xy = 24, x, y > 0. Using the graph find (i) y when x = 3 and (ii) x when y = 6.   **(OR)**

CLASS : 10 | **REVISION EXAMINATION, JANUARY - 2023**

MATHEMATICS

Time Allowed : 3.00 Hours] [Max. Marks : 100

PART – A

I. Choose the correct answer from the given four alternatives and write the option code and the corresponding answer. 14x1=14

1. The range of the relation R = {(x, x²)/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. Let A = {1, 2, 3, 4}, B = {4, 8, 9, 10}. A function f: A → B given by f= {(1, 4), (2, 8), (3, 9), (4, 10)} is a ————
   (a) many - one function (b) one - to - one function
   (c) Identity function (d) Into function

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. Find the Sum of 1 + 3+ 5+ .... + to 40 term
   (a) 1600 (b) 1060 (c) 1640 (d) 1460

5. If (x – 6) is the H.C.F of x² – 2x – 24 and x² – kx – 6 then the value of K is ————
   (a) 3 (b) 5 (c) 6 (d) 8

6. The square root of 361 x⁴y² is ————
   (a) 17 x⁴y² (b) 29 x²y (c) 19 x²y (d) 19 x⁴y⁴

7. For the given matrix A = $\begin{bmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{bmatrix}$ the order of matrix A^T is ————
   (a) 3 x 4 (b) 4 x 3 (c) 3 x 2 (d) 2 x 3

8. If ΔABC is an isosceles triangle with ∠C = 90° and AC = 5cm then AB is ————
   (a) 2.5 cm (b) 5 cm (c) 10 cm (d) $5\sqrt{2}$ cm

9. If the slope of the line PQ is $1/\sqrt{3}$ then the slope of the perpendicular bisector of PQ is ————
   (a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $1/\sqrt{3}$ (d) 0

10. tanθ cosec²θ – tanθ is equal to ————
    (a) secθ (b) cot²θ (c) sinθ (d) cotθ

11. A solid sphere of radius x cm is melted and cast into a shape of solid cone of same radius. The height of the cone is ————
    (a) 3x cm (b) x cm (c) 4x cm (d) 2x cm

12. If the height is 2m and the base area is 250m² then the volume of cylinder = ————
    (a) 125 m³ (b) 500 m³ (c) 500 π m³ (d) 125 π m³

13. If the sum of 10 data value is 265 then their mean is ————
    (a) 275 (b) 26.5 (c) 255 (d) 2650

14. What will be the probability that a leap year will have 53 saturdays?
    (a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{5}{7}$

PART - B

II. Answer any 10 questions. [Question No. 28 is compulsory]. 10x2=20

15. If A = B = {p, q} find A x B, B x A [2]

16. Compute x such that 10⁴ = x (mod19)

17. Which term of an A.P 16, 11, 6, 1,......... is -54.

18. Simplify $\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$ [2]

19. Construct a 3 x 3 matrix whose elements are give by aij = |i – 2j| [2]

20. What length of ladder is needed to reach a height of 7 ft along the wall when the base of the ladder is 4ft from the wall. [2]

CP/10/Mat/1

21. Prove that: $\sqrt{\dfrac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$ [2]

22. Show that point P (-1.5, 3), Q (6, -2) and R (-3, 2) are collinear [2]

23. The standard deviation and mean of a data are 6.5 and 12.5 respectively. Find the co-efficient of variation [½]

24. If the total surface area of a cone of radius 7 cm is 704 cm², then find its height [2]

25. A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and the coin shows a head.

26. Write the sample space for tossing three coins using tree diagram [2]

27. Find the equation of a straight line which is parallel to the line 3x - 7y = 12 and passing through the point (6, 4)

28. Solve: $x^2 + 2x - 2 = 0$ by formula method.

PART - C

III. Answer any 10 questions only [Q.NO: 42 is compulsory] 30+9 = 39

10x5=50

29. Let A = {x ∈ w / x < 2}, B = {x ∈ N, -1 < x ≤ 4}, C = {3, 5} verify A × (B ∩ C) = (A × B) ∩ (A × c) [5]

30. f(x) = x - 4, g(x) = x2, h(x) = 3x - 5, then show that (f o g) o h = f o (g o h) [5]

31. Find the sum to n terms of the series 5 + 55 + 555 + ... n terms [5]

32. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the value of a and b [5]

33. If $A = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$ show that $A^2 - 4A + 5I_2 = 0$ [8][2]

34. State and prove Angle bisector theorem. [5]

35. Find the area of the quadrilateral whose vertices are (9, 0), (-8, 6), (-1, -2) and (-6, -3) [5]

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

37. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and base [1] is hollowed. Out find the total surface area of the remaining solid.

38. Find then co-efficient of variation of the data 18, 20, 15, 12, 25.

39. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4 [5]

40. Find the LCM of the polynomial $a^2 + 4a - 12$, $a^2 - 5a + 6$ whose GCD is (a, -2)

41. A hypotenuse of a right triangle is 6 cm more than twice of the shortest side. If the third side is 2 m less than the hypotenuse, Find the sides of the triangle.

42. A line makes positive intercepts on co-ordinate axes whose sum is 7 and it passes through (-3, 8). Find its equation.

PART - D

IV. Answer the following questions. [2]

2x8=16

43. a) Draw a triangle ABC of base BC = 5.6 cm, ∠A = 40° and the bisector of ∠A meets BC at D such that CD= 4 cm.

(OR)

b) Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the length of the tangents.

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

(OR)

b) A two wheeler parking zone near bus stand charges as below.

Time (in hours) (x)	4	8	12	24
Amount ₹ (y)	60	120	180	360

Check if the amount change are in direct variation or in inverse variation to the parking time. Graph the data. Also

(i) Find the amount to be paid when parking time is 6 hr.

(ii) Find the parking duration when the amount paid is ₹ 150.

FIRST REVISION EXAM - 2023

STD - X

TIME : 3.00 Hrs

MATHS

MARKS : 100

PART - I

I. Answer all the questions.   14 x 1 = 14

1. A = { a, b, p }, B = { 2, 3}, C = { p, q, r, s } then n [(A $\cup$ C) x B] is
   a) 8   b) 20   c) 12   d) 16

2. If $f(x) = 2x^2$ and $g(x) = \dfrac{1}{3x}$, then fog is
   a) $\dfrac{3}{2x^2}$ b) $\dfrac{2}{3x^2}$ c) $\dfrac{2}{9x^2}$ d) $\dfrac{1}{6x^2}$

3. 3, x, 6.75 are consecutive terms of a G.P then x is ....
   a) 2.25   b) 9.75   c) 4.5   d) 1.5

4. The value of $(1^3 + 2^3 + 3^3 + ... + 15^3) - (1 + 2 + 3 + ... + 15)$ is
   a) 14400   b) 14200   c) 14280   d) 14520

5. $\dfrac{x}{x^2 - 25} - \dfrac{8}{x^2 + 6x + 5}$ gives
   a) $\dfrac{x^2 - 7x + 40}{(x-5)(x+5)}$ b) $\dfrac{x^2 + 7x + 40}{(x-5)(x+5)(x+1)}$ c) $\dfrac{x^2 - 7x + 40}{(x^2 - 25)(x+1)}$ d) $\dfrac{x^2 + 10}{(x^2 - 25)(x+1)}$

6. Find the matrix x if $2x + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$
   a) $\begin{pmatrix} 2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

7. If in $\triangle$ABC DE $\parallel$ BC, AB = 3.6cm, AC = 2.4cm and AD = 2.1cm then the length of AE is ....
   a) 1.4 cm   b) 1.8 cm   c) 1.2 cm   d) 1.05 cm

8. A tangent is perpendicular to the radius at the
   a) Centre   b) point of contact   c) infinity   d) chord

9. If slope of the line PQ is $\dfrac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is
   a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\dfrac{1}{\sqrt{3}}$ d) 0

10 - MATHS - PAGE 1

10. The condition of two straight lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ where the co-efficients are non-zero, are perpendicular if and only if

   a) $a_1b_2 - a_2b_1 = 0$ b) $a_1b_2 + a_2b_1 = 0$ c) $a_1a_2 + b_1b_2 = 0$ d) $a_1a_2 - b_1b_2 = 0$

11. $\tan\theta \, Cosec^2\theta - \tan\theta$ is equal to

   a) $Sec\,\theta$ b) $Cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$

12. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is

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

13. Father of Indian statistics was........

   a) Srinivasha Ramanujam   b) Sagundala Devi

   c) Prasanta chandra Mahalanobis   d) Kaprekar

14. Which of the following is incorrect >

   a) $p(A) > 1$ b) $0 \le p(A) \le 1$ c) $p(\phi) = 0$ d) $p(A) + p(\bar{A}) = 1$

PART - II

Answer any Ten Questions. Q.No. 28 is compulsory $10 \times 2 = 20$

15. Let A = { 1, 2, 3 } and B = { x/x is a prime number lessthan 10 }. Find A x B and B x A.

16. Find k, if $f \bullet f(k) = 5$, where f(k) = 2k - 1

17. Today is Tuesday, My uncle will come after 45 days. In which day my uncle will be coming?

18. Find the number of terms in the A.P. 3, 6, 9, 12 111

19. Simplify : $\dfrac{x^3}{x-y} + \dfrac{y^3}{y-x}$

20. Determine the nature of roots for the quadratic equation $9x^2 - 24x + 16 = 0$.

21. If $\triangle ABC$ is similar to $\triangle DEF$ such that BC = 3 cm EF = 4 cm and area of $\triangle ABC = 54$ cm². Find the area of $\triangle DEF$.

22. In two concentric circles, a chord of length 16cm of larger circle becomes a tangent to the smaller circle whose radius is 6 cm. Find the radius of the larger circle.

23. The line through the points (-2, a) and (a, 3) has slope -1 / 2. Find the value of a.

24. Find the equation of a line whose intercepts on the x and y axes are -5, 3 / 4.

25. Prove that $\dfrac{sec\theta}{\sin\theta} - \dfrac{\sin\theta}{\cos\theta} = \cot\theta$.

26. A solid sphere and a solid hemisphere have equal total surface area. Prove that the ratio of their volume is $3\sqrt{3} : 4$.

27. What is the probability that a leapyear selected at random will contain 53 saturdays.

28. The mean and Variant of the 10th standard students of a school is 155cm and 72.25 cm² respectively. Find the co-efficient of variation.

PART - III

Answer any Ten Questions. Q.No. 42 is compulsory   **10 x 5 = 50**

29. If A = { x ∈ N / x < 2 }, B = { x ∈ N / 1 < x ≤ 4 } and C = { 3, 15 } then verify
    A*(B ∩ C) = (A * B) ∩ (A * C).

30. If the function f : R → R is defined by $f(x)=\begin{cases} 2x+7; x<-2 \\ x^2-2; -2 \le x < 3 \\ 3x-2; x \ge 3 \end{cases}$ then find the value of

    (i) f (4)   (ii) f(-2)   (iii) f(4) + 2f(1)   (iv) $\dfrac{f(1)-3f(4)}{f(-3)}$

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

32. If a, b, c are three consecutive terms of an A.P and x, y, z are three consecutive terms of a G.P. then P.T. $x^{b-c} \times y^{c-a} \times z^{a-b} = 1$.

33. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square. Find the values of a and b.

34. If α, β are the roots of $7x^2 + ax + 2 = 0$ and if β – α = -13 / 7. Find the values of 'a'.

35. P and Q are the mid-points of the sides CA and CB respectively of a Δ ABC,

    right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$.

36. Find the value of k, if the area of a quadrilateral is 28 sq. units, whose vertices are

    , (-4, -2), (-3, k), (3, -2) and (2, 3).

37. Find the equation of a line passing through the point of intersection of the lines

    $4x + 7y - 3 = 0$ and $2x - 3y + 1 = 0$ that has equal intercepts on the axies.

38. A building and statue are in opposite side of a street from each other 35m apart. From a point on the roof of building the angle of elevation of the top of statue is 24⁰ and the angle of depression of base of the statue is 34⁰. Find the height of the statue. (tan 24⁰ = 0.4452, tan 34⁰ = 0.6745).

39. If the radius of the circular ends of a frustum which is 45cm high are 28cm and 7cm, find the volume of the frustum.

40. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. if the length of the entire capsule is 12mm and the diameter of the capsule is 3mm, how much medicine it can hold?

41. Two dice are rolled once, Find the probabilityof getting an even number on the first die or a total of face sum 8.

42. If $A=\begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B=\begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ show that $(AB)^T = B^T A^T$.

10 - MATHS - PAGE 3

PART - IV

Answer all the Questions.   **2 x 8 = 16**

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to 7 / 4 of the corresponding sides of the triangle PQR (Scale factor 7 / 4 > 1)

(OR)

b) Construct a $\triangle$ PQR such that QR = 6.5 cm, $\angle P = 60^0$ and the altitude from P to QR is of length 4.5cm.

44. a) A bus is travelling at a uniform speed of 50 km/hr. Draw the distance - time graph and hence find

   (i)   the constant of variation

   (ii)   how far will it travel in 90 minutes

   (iii)   the time required to cover a distance of 300 km from the graph.

(OR)

b) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$

COMMON FIRST REVISION TEST – 2023

Standard X   Reg.No. :

MATHEMATICS

Time: 3.00 hrs.

Part - I

Marks: 100

I. Choose the correct answer: 14 x 1 = 14

1. If {(a,8), (6,6)} represents an identify function then the value of 'a' and 'b' are respectively
   a) (8,6)   b) (8,8)   c) (6,8)   • d) (6,6)

2. Let $f(x) = \sqrt{1 + x^2}$ then
   a) $f(xy) = f(x) \cdot f(y)$ b) $f(xy) \geq f(x) \cdot f(y)$
   c) $f(xy) \leq f(x) \cdot f(y)$ d) none of these

3. The sum of the elements of the prime factors in the prime factorization of 1729 is
   a) 1   b) 2   c) 3   d) 4

4. The solution $(2x – 1)^2 = 9$ is equal to
   a) –1   b) 2   c) –1,2   d) none of these

5. The non-diagonal elements if any unit matrix are _____.
   a) equal   b) zero   c) not equal   d) none of these

6. In the adjacent figure $\angle BAC = 90°$ and $AD \perp BC$ then
   a) $BD.CD = BC^2$ b) $AB.AC = BC^2$
   c) $BD.CD = AD^2$ d) $AB.AC = AD^2$
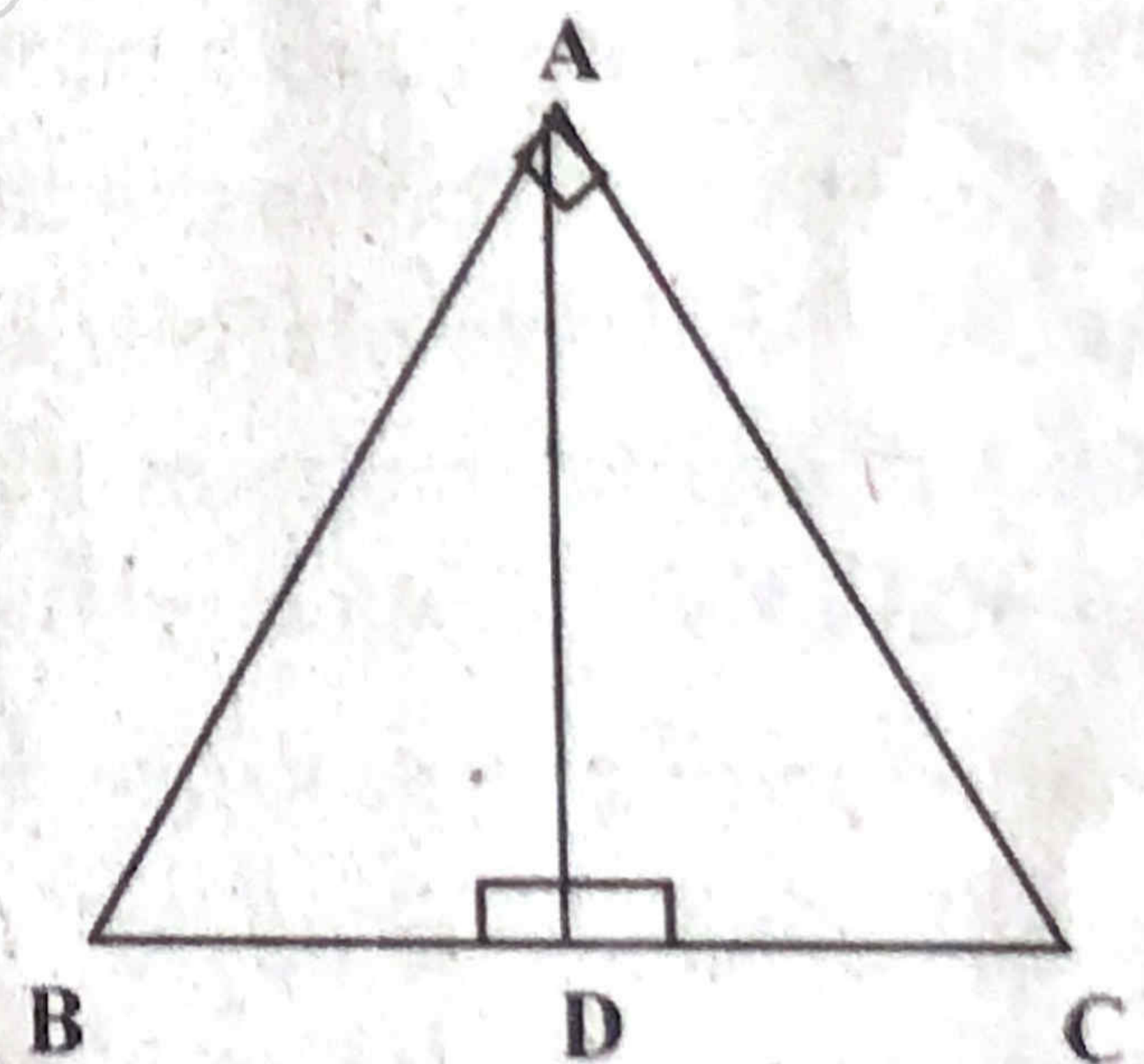
7. In $\triangle LMN$, $\angle L = 60°$, $\angle M = 50°$. If $\triangle LMN \sim \triangle PQR$, then the value of $\angle R$ is
   a) 40°   b) 70°   c) 30°   d) 110°

8. The equation of a line passing through the origin and perpendicular to the line $7x – 3y + 4 = 0$ is
   a) $7x – 3y + 4 = 0$ b) $3x – 7y + 4 = 0$ c) $3x + 7y = 0$ d) $7x – 3y = 0$

9. Find the equation of a straight line passing through (5,7) and is parallel to X axis
   a) $X = 0$ b) $X = 5$ c) $Y = 7$ d) $Y = 5$

10. If $5x = \sec\theta$ and $\dfrac{5}{x} = \tan\theta$, then $x^2 - \dfrac{1}{x^2}$ is equal to
    a) 25   b) $\dfrac{1}{25}$ c) 5   d) 1

11. The CSA of a right circular cone of height 15 cm and base diameter 16 cm is
    a) $60\pi \, cm^2$ b) $68\pi \, cm^2$ c) $120\pi \, cm^2$ d) $136\pi \, cm^2$

12. A solid sphere of radius 'x' cm is melted and cast into a shape of a solid cone of same radius. The height of the cone is

a) 3x cm   b) x cm   c) 4x cm   d) 2x cm

13. The range of the data 8,8,8,8,......8 is

a) 0   b) 1   c) 8   d) 3

14. Which of the following values cannot be a probability of an event?

a) 1.001   b) 0.5   c) 20%   d) 1

Part - II

II. Answer any 10 questions. (Q.No.28 is compulsory)   **10 x 2 = 20**

15. Let $f(x) = 2x + 5$. If $x \neq 0$ then find $\dfrac{f(x+2) - f(2)}{x}$

16. 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'.

17. Find the sum of infinity of $9 + 3 + 1 + \ldots$

18. Reduce $\dfrac{x^2 - 1}{x^2 + x}$ to its lowest form.

19. If a matrix has 18 elements, what are the possible order It can have? What if it has 6 elements?

20. The length of tangent to a circle from a point P, which is 25 cm away from the centre is 24 cm. What is the radius of the circle?

21. What is the inclination of a line whose slope is $\sqrt{3}$?

22. Find the intercepts made by the line $4x + 3y + 12 = 0$ on the co-ordinate axes.

23. Prove that $\sec\theta - \cos\theta = \tan\theta \sin\theta$

24. From the top of a rock $50\sqrt{3}$ 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.

25. If the total surface area of a cone of radius 7 cm is 704 cm², then find its slant height.

26. If the range of the smallest value of a set of data 36.8 and 13.4 respectively. Find the largest value.

27. A and B are two events such that P(A) = 0.42, P(B) = 0.48 and P(A∩B) = 0.16, find P(A or B)

28. Determine the nature of roots for $9x^2 - 24x + 16 = 0$

Part - III

III. Answer any 10 questions. (Q.No.42 is compulsory)   **10 x 5 = 50**

29. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number.

Verify that A x (B – C) = (A x B) – (A x C)

30. Find X if gff(x) = fgg(x), given f(x) = 3x + 1, g(x) = x + 3

31. Find the sum to n terms of the series $7 + 77 + 777 + \ldots$

32. Find the GCD of $x^4 + 3x^3 - x - 3$, $x^3 + x^2 - 5x + 3$

33. If α, β are the roots of the equation $3x^2 + 7x - 2 = 0$. Find the value of

    i) $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha}$ ii) $\dfrac{\alpha^2}{\beta} + \dfrac{\beta^2}{\alpha}$

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. State and prove Angle Bisector Theorem.

36. Show that in a triangle, the medians are concurrent.

37. Find the area of the quadrilateral whose vertices are $(-9, -2)$, $(-8, -4)$, $(2, 2)$ and $(1, -3)$

38. An aeroplane at an altitude of 1800 m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two boats.

39. The internal and external diameter of a hollow hemispherical shell or 6 cm and 10 cm respectively. If it is melted and recast into a solid cylinder of diameter 14 cm, then find the height of the cylinder.

40. The number of televisions sold in each day of a week are 13, 8, 4, 9, 7, 12, 10. Find its standard deviation.

41. From a well-shuffled pack of 52 cards, a card drawn random. Find the probability of its 'being either red king or a black queen'

42. Find the equation of a straight line parallel to y axis passing through the point of intersection of the lines $4x + 5y = 13$ and $x - 8y + 9 = 0$

Part - IV

IV. Answer all the questions.   **2 x 8 = 16**

43. a)   Construct a triangle similar to given triangle PQR with its sides equal to $\dfrac{3}{5}$ of the corresponding sides of the triangle PQR. (scale factor $\dfrac{3}{5} < 1$)

(OR)

    b)   Draw $\triangle PQR$ such that PQ = 6.8 cm, vertical angle is 50° and the bisector of the vertical angle meets the base at D where PD = 5.2 cm.

44. a)   Draw the graph of $xy = 24$, $x, y > 0$. Using the graph, find

      i)   y when x = 3 and   ii) x when y = 6

(OR)

    b)   Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$

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COMMON FIRST REVISION TEST – 2023

Standard X   Reg.No. : 1 0 3 1 8 ⊢

MATHEMATICS

Time: 3.00 hrs.   Part - I   Marks: 100

I. Choose the correct answer: 14 x 1 = 14

1. If the ordered pairs (a+2, 4) and (5, 2a+b) are equal then (a, b) is
   a) (2,–2)
   b) (5,1)
   c) (2,3)
   d) (3,–2)

2. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then fog is
   a) $\frac{3}{2x^2}$
   b) $\frac{2}{3x^2}$
   c) $\frac{2}{9x^2}$
   d) $\frac{1}{6x^2}$

3. The sum of the exponents of the prime factors in the prime factorization of 1729 is
   a) 1
   b) 2
   c) 3
   d) 4

4. If 6 times of 6th term of an A.P is equal to 7 times of the 7th term, then the 13th term of the A.P is
   a) 0
   b) 6
   c) 7
   d) 13

5. Which of the following should be added to make $x^4 + 64$ a perfect square?
   a) $4x^2$
   b) $16x^2$
   c) $8x^2$
   d) $-8x^2$

6. If number of columns and rows are not equal in a matrix then it is said to be a
   a) diagonal matrix
   b) rectangular matrix
   c) square matrix
   d) identity matrix

7. In a ∆ABC, AD is the bisector of ∠BAC. If AB = 8 cm, BD = 6 cm and DC = 3 cm. The length of the side AC is
   a) 6 cm
   b) 4 cm
   c) 3 cm
   d) 8 cm

8. The fourth vertex of a parallelogram ABCD whose three vertices are A(–2,5), B(6,7), C(8,3)
   a) (0,1)
   b) (0,–1)
   c) (–1,0)
   d) (1,0)

9. The equation of a line passing through the origin and perpendicular to the line $7x - 3y + 4 = 0$ is
   a) $7x - 3y + 4 = 0$
   b) $3x - 7y + 4 = 0$
   c) $3x + 7y = 0$
   d) $7x - 3y = 0$

10. The angle of elevation of a cloud from a point h metres above a lake is β. The angle of depression of its reflection in the lake is 45°. The height of location of the cloud from the lake is
    a) $\frac{h(1 + \tan\beta)}{1 - \tan\beta}$
    b) $\frac{h(1 - \tan\beta)}{1 - \tan\beta}$
    c) $h\tan(45° - \beta)$
    d) none of these

11. The total surface area of a hemi-sphere is how much times the square of its radius
    a) π
    b) 4π
    c) 3π
    d) 2π

12. Find the slant height if the frustum of height 15 cm and having its diameters as 24 cm and 8 cm.
    a) 17 cm
    b) 16 cm
    c) 9 cm
    d) 7 cm

13. Variance of first 20 natural numbers is
    a) 32.25
    b) 44.25
    c) 33.25
    d) 30

14. In a family of 3 children the probability of having atleast one boy is
    a) $\frac{1}{3}$
    b) $\frac{2}{3}$
    c) $\frac{1}{8}$
    d) $\frac{7}{8}$

(2)   X Mathematics

Part - II

II. Answer any 10 questions: (Q.No.28 is compulsory) $10 \times 2 = 20$

15. Let A = {1,2,3,4, ..., 45} and R be the relation defined as "is a square of" on A. Write R as a subset of A x A. Also, find the domain and range of R.

16. Define "onto function".

17. What is the time 100 hours after 7 a.m.?

18. Find the sum $3 + 1 + \dfrac{1}{3} + \ldots\ldots\ldots\infty$

19. if α and β are the roots of $x^2 + 7x + 10 = 0$, find the value of $\alpha^2 + \beta^2$.

20. In the figure, if $BD \perp AC$ and $CE \perp AB$, prove that $\triangle AEC \sim \triangle ADB$.
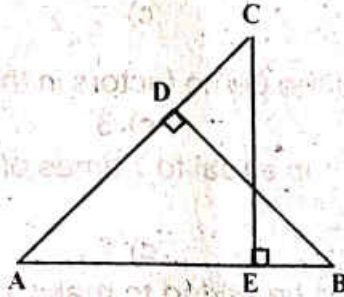
21. A cat is located at the point (−6,−4) in xy plane. A bottle of milk is kept at (5,11). The cat wish to consume the milk travelling through shortest possible distance. Find the equation of the path it needs to take its milk.

22. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}$ m.

23. A player sitting on the top of a tower of height 20 m observes the angle of depression of a ball lying on the ground is 60°. Find the distance between the foot of the tower and the ball. $\left(\sqrt{3} = 1.732\right)$.

24. If the ratio of the radii of two spheres is 4 : 7, find the ratio of their volumes.

25. A cone of height 24 cm is made up of modelling clay. A child reshapes it in the form of a cylinder of same radius as cone. Find the height of the cylinder.

26. The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.

27. If A is an event of a random experiment such that $P(A) : P(\overline{A}) = 17 : 15$ and $n(S) = 640$ then find $P(\overline{A})$.

28. $A = \begin{pmatrix} 8 & 3 & 2 \\ 5 & 9 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -1 \\ 3 & 0 \end{pmatrix}$. Find if A + B exists.

Part - III

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

29. If the function f : R→R is defined by $f(x) = \begin{cases} 2x + 7 & \text{if } x < -2 \\ x^2 - 2 & \text{if } -2 \le x < 3 \\ 3x - 2 & \text{if } x \ge 3 \end{cases}$

then the values of   (i) $f(4) + 2f(1)$ ii) $\dfrac{f(1) - 3f(4)}{f(-3)}$

30. The sum of first n, 2n and 3n terms of an A.P are S_1, S_2 and S_3 respectively. Prove that $S_3 = 3(S_2 - S_1)$

31. The product of three consecutive terms of a G.P is 1 and their sum is $\frac{39}{10}$. Find the three terms.

32. Find the GCD of the polynomials $x^4 + 3x^3 - x - 3$ and $x^3 + x^2 - 5x + 3$

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

34. Given that $A = \begin{pmatrix} 1 & 3 \\ 5 & -1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{pmatrix}$, $C = \begin{pmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{pmatrix}$,

    verify that $A(B + C) = AB + AC$

35. Show that in a triangle, the medians are concurrent.

36. A triangular shaped glass with vertices at A(–5,–4), B(1,6) and C(7,–4) has to be painted. If one bucket of paint covers 6 sq.ft, how many buckets of paint will be required to paint the whole glass, if only one coat of paint is applied.

37. Without using Pythagoras theorem, show that the points (1,–4), (2,–3) and (4,–7) form a right angled triangle.

38. If $\sqrt{3} \sin\theta - \cos\theta = 0$, then show that $\tan 3\theta = \dfrac{3\tan\theta - \tan^3\theta}{1 - 3\tan^2\theta}$

39. The radius of a conical tent is 7 cm and the height is 24 m. Calculate the length of the canvas used to make the tent if the width of the rectangular Canvas is 4 m.

40. Find the coefficient of variation 24, 26, 33, 37, 29, 31

41. Two dice are rolled once. find the probability of getting an even number on the first die or total of face sum 8.

42. Given that A = {x / x is a prime factor of 42}, B = {x / 0 ≤ x < 2, x∈W}, C = {1,4,5}. Verify that the distributive property of cartesian product over union.

Part - IV

IV. Answer both the questions choosing either of the alternatives: 2 x 8 = 16

43. a) Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{6}{5}$ of the corresponding sides of the triangle ABC. (scale factor $\frac{6}{5} > 1$)

    (OR)

    b) Construct a △PQR in which QR = 5 cm, ∠P = 40° and the median PG from P to QR is 4.4 cm. Find the length of the altitude from P to QR.

44. a) Nishanth is the winner in a Marathon race of 12 km distance. He ran at the uniform speed of 12 km/hr and reached the destination in 1 hour. He was followed by Aradhana, Ponmozhi, Jeyanth, Sathya and Swetha with their respective speed of 6 km/hr, 4 km/hr, 3 km/hr and 2 km/hr. And, they covered the distance in 2 hrs, 3 hrs, 4 hrs and 6 hrs respectively. Draw the speed-time graph and use it to find the time taken to Kaushik with his speed of 2.4 km/hr.

    (OR)

    b) Draw the graph of $y = x^2 + 3x + 2$ and use it to solve $x^2 + 2x + 1 = 0$

COMMON FIRST REVISION TEST - 2023

| T |

Standard X

Reg.No. ☐☐☐☐☐☐

MATHEMATICS

Time : 3.00 hrs   **Marks : 100**

Part - I

I. Choose the correct answer: 14 x 1 = 14

1. 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

2. In an A.P, the first term is 1 and the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?
   a) 6   b) 7   c) 8   d) 9

3. The value of $(1^3 + 2^3 + 3^3 + ... + 15^3) - (1 + 2 + 3 + ... + 15)$ is
   a) 14400   b) 14200   c) 14280   d) 14520

4. Which of the following should be added to make $x^4 + 64$ a perfect square
   a) $4x^2$ b) $16x^2$ c) $8x^2$ d) $-8x^2$

5. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis is
   a) 0   b) 1   c) 0 or 1   d) 2

6. A tangent is perpendicular to the radius at the
   a) centre   b) point of contact   c) infinity   d) chord

7. The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70°$, then the value of $\angle AOB$ is
   a) 100°   b) 110°   c) 120°   d) 130°

8. A man walks near a wall, such that the distance between him and the wall is 10 units. Consider the wall to be the Y axis. The path travelled by the man is
   a) x = 10   b) y = 10   c) x = 0   d) y = 0

9. The slope of the line joining (12, 3), (4, a) is $\frac{1}{8}$. The value of 'a' is
   a) 1   b) 4   c) -5   d) 2

10. If $\sin\theta + \cos\theta = a$ and $\sec\theta + \text{cosec}\theta = b$, then the value of $b(a^2 - 1)$ is equal to
    a) 2a   b) 3a   c) 0   d) 2ab

11. A frustum of a right circular cone is of height 16 cm with radii of its ends as 8 cm and 20 cm. Then, the volume of the frustum is
    a) 3328π cm^3 b) 3228π cm^3 c) 3240π cm^3 d) 3340π cm^3

12. The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_2 : h_1 = 1 : 2$, then $r_2 : r_1$ is
    a) 1 : 3   b) 1 : 2   c) 2 : 1   d) 3 : 1

13. Variance of first 20 natural numbers is
    a) 32.25   b) 44.25   c) 33.25   d) 30

14. If a letter is chosen at random from the English alphabets {a,b,...., z} then the probability that the letter chosen precedes z
    a) $\frac{12}{13}$ b) $\frac{1}{13}$ c) $\frac{23}{26}$ d) $\frac{3}{26}$

Part - II

II. **Answer any 10 questions: (Q.No.28 is compulsory)**

15. A Relation R is given by the set $\{(x.y) / y = x + 3 / x \in \{0.1, 2.3, 4.5\}\}$. Determine its domain and range.

16. Let $X = \{3, 4, 6, 8\}$. Determine whether the relation $R = \{(x, f(x) \backslash x \in X, f(x) = x^2 + 1\}$ is a function from X to N?

17. Let f be a function from R to R defined by $f(x) = 3x - 5$. Find the values of a and b given that $(a, 4)$ and $(1, b)$ belong to f.

18. When the positive integers a, b and c are divided by 13, the respective remainders are 9,7 and 10. Show that $a + b + c$ is divisible by 13.

19. Compute x, such that $10^4 \equiv x \pmod{19}$

20. Find the nth term (general term) of an A.P. given by 3, 15, 27, 39, ...

21. Simplify : $\dfrac{x^2}{x - y} + \dfrac{y^2}{y - x}$

22. If α, β are the roots of $7x^2 + ax + 2 = 0$ and $3 - \alpha = \dfrac{-13}{7}$. Find the values of a.

23. Find the value of a, b, c, d, x, y from the following matrix equation.

$$\begin{pmatrix} d & 8 \\ 3b & a \end{pmatrix} + \begin{pmatrix} 3 & a \\ -2 & -4 \end{pmatrix} = \begin{pmatrix} 2 & 2a \\ b & 4c \end{pmatrix} + \begin{pmatrix} 0 & 1 \\ -5 & 0 \end{pmatrix}$$

24. AD is the bisector of $\angle 4$. If BD = 4cm, DC = 3cm and AB = 6 cm, find AC.
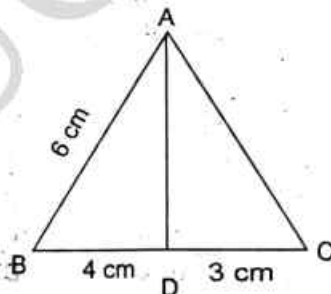
25. Calculate the slope and y intercept of the straight line $8x - 7y + 6 = 0$

26. The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.

27. The mean of a data is 25.6 and its coefficient of variation is 18.75, Find the standard deviation.

28. Prove that $\dfrac{\sec \theta}{\sin \theta} - \dfrac{\sin \theta}{\cos \theta} = \cot \theta$

(OR)

The radius of a sphere increases by 25%. Find the percentage increase in its surface area.

Part - III

III. **Answer any 10 questions: (Q.No.42 is compulsory)**

29. Given $A = \{1,2,3\}$, $B = \{2,3,5\}$, $C = \{3,4\}$ and $D = \{1,3,5\}$, check if $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$ is true?

30. Rekha has 15 square colour papers of sizes 19 cm, 11 cm, 12 cm,..., 24 cm. How much area can be decorated with these colour papers?

31. Find the GCD of the polynomials $x^3 + x^2 - x + 2$ and $2x^3 - 5x^2 + 5x - 3$

32. If $9x^4 \, 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b.

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

34. State and Prove Basic proportionality theorem or Thales theorem

35. Find the area of the quadrilateral whose vertices are $(-9, -2)$, $(-8, -4)$, $(2, 2)$ and $(1, -3)$

36. $A(-3,0)$ $B(10,-2)$ and $C(12,3)$ are the vertices of $\triangle ABC$. Find the equation of the altitude through A and B.

37. If $\dfrac{\cos\theta}{1+\sin\theta} = \dfrac{1}{a}$, then prove that $\dfrac{a^2 - 1}{a^2 + 1} = \sin\theta$

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

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

40. The marks scored by 10 students in a class test are 25, 29, 30, 33, 35, 37, 38, 40, 44, 48. Find the standard deviation.

41. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that
   i) The student opted for NCC but not NSS.
   ii) The student opted for NSS but not NCC.
   iii) The student opted for exactly one of them.

42. From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are @ and 6, respectively. Show that the height of the opposite house is

   $h\left(1 + \dfrac{\cot\theta_2}{\cot\theta_1}\right)$ *(OR)*

   Calculate the weight of a hollow brass sphere if the inner diameter is 14 cm and thickness is 1 mm, and whose density is 17.3 g/cm³

Part - IV

IV. **Answer all the questions:**   **2 x 8 = 16**

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3}$). *(OR)*
   b) Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents.

44. a) Draw the graph of xy = 24, x, y > 0. Using the graph find,
   (i) y when x = 3 and (ii) x when y = 6.   *(OR)*
   b) Graph the $x^2 - 9x + 20 = 0$ quadratic equation and state the nature of solution.

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Tenkasi

25-01-2023   **Standard 10**

Time: 3.00 Hours   **MATHEMATICS**   Marks: 100
PART - I

Note : 1. Answer all the 14 questions. $14 \times 1 = 14$
       2. Choose the most suitable answer from the given four alternatives.

1) Let $f(x) = \sqrt{1+x^2}$ then
    a) $f(xy) = f(x).f(y)$ b) $f(xy) \ge f(x).f(y)$ c) $f(xy) \le f(x).f(y)$ d) None of these

2) If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is
    a) 4   b) 2   c) 1   d) 3

3) An A.P consists of 31 terms. If its 16th term is m, then the sum of all the terms of this A.P is
    a) 16m   b) 62m   c) 31m   d) $\frac{31}{2}$m

4) If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of K is
    a) 3   b) 5   c) 6   d) 8

5) Graph of a linear polynomial is a
    a) Circle   b) Parabola   c) straight line   d) Hyperbola

6) The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis is
    a) 2   b) 0   c) 0 or 1   d) 1

7) The perimeters of two similar triangles $\triangle ABC$ of $\triangle PQR$ are 36cm and 24cm respectively, If PQ = 10cm, then the length of AB is
    a) $6\frac{2}{3}$cm   b) $\frac{10\sqrt{6}}{3}$ cm   c) $66\frac{2}{3}$cm   d) 15cm

8) Two poles of heights 6m & 11 m stand vertically on a play ground. If the distance between their feet is 12m, what is the distance between their tops?
    a) 13m   b) 14m   c) 12.8m   d) 15m

9) The area of triangle formed by the points $(-5,0)$, $(0,-5)$ and $(5,0)$ is
    a) 25 sq.units   b) 5 sq.units   c) 0 sq.units   d) None of these

10) If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is
    a) 0   b) $-\sqrt{3}$ c) $\frac{1}{\sqrt{3}}$ d) $\sqrt{3}$

11) A tower is 60m high. Its shadow is x metres shorter when the sun's altitude is $45°$ then when it has been $30°$, then x is equal to
    a) 43 m   b) 43.92m   c) 45.6 m   d) 41.92 m

12) The total surface area of a cyclinder whose radius is $\frac{1}{3}$ of its height is .... sq.units.
    a) $24\pi h^2$ b) $\frac{56\pi h^2}{9}$ c) $\frac{9\pi h^2}{8}$ d) $\frac{8\pi h^2}{9}$

13) When we divide surface area of a sphere by the sphere's volume, we got the answer as $\frac{1}{3}$, What is the radius of the sphere?
    a) 54cm   b) 12cm   c) 9cm   d) 24cm

14) If the standard deviation of x, y, z is P then the standard deviation of $3x + 5$, $3y + 5$, $3z + 5$ is
    a) P + 5   b) 3p + 5   c) 9p + 15   d) 3P

PART - II
Answer any 10 questions: [Qn.No: 28 is compulsory] $10 \times 2 = 20$

15) Let A = {1, 2, 3} and B = {x / x is a prime no. less than 10} Find A × B and B × A.

16) Given $f(x) = 2x - x^2$, find (i) $f(1)$ (ii) $f(x+1)$

17) If $P_1^{x_1} \times P_2^{x_2} \times P_3^{x_3} \times P_4^{x_4} = 113400$ where P_1, P_2, P_3, P_4 are primes is ascending order and x_1, x_2, x_3, x_4 are integers, find the value of P_1, P_2, P_3, P_4 & x_1, x_2, x_3, x_4.

18) Find the sum $3 + 1 + \frac{1}{3} + \ldots \infty$

19) Reduce the expression $\frac{9x^2 + 81x}{x^3 + 8x^2 - 9x}$ to its lowest form

20) In $\triangle ABC$, D and E are points on the sides AB and AC respectively. Show that DE || BC if AB = 12cm, AD = 8cm, AE = 12cm and AC = 18cm

Ts10M

21) The line P passes through the points (3,–2) (12, 4) and the line q passes through the points (6,–2) and (12, 2). Is P Parallel to q?

22) The equation of a straight line is 2(x – y) + 5= 0. Find its slope, inclination and intercept on the y axis.

23) Matrix A has 'a' rows and 'a+6' columns and matrix B has 'b' rows and '8 – b' columns and if both products AB and BA exists find a & b.

24) Prove the identity $\dfrac{\cos\theta}{1+\sin\theta}$ = Sec θ – Tan θ

25) If the total surface area of a cone of radius 7cm is 704cm², the n find its slant height.

26) Find the maximum volume of a cone that can be carved out of a solid hemisphere of radius 'r' units.

27) If P(A) = $\dfrac{2}{3}$, P(B) = $\dfrac{2}{5}$, P(A∪B) = $\dfrac{1}{3}$ then find P(A∩B).

28) The number of volleyball games that must be scheduled in a league with n teams is G(n) = $\dfrac{n^2-n}{2}$ where each team plays with every other team exactly once. A league schedules 15 games. How many teams are in the league?

PART - III

Answer any 10 questions: [Qn.No: 42 is compulsory]   **10 × 5 = 50**

29) Let A = The set of all natural numbers less than 8, B = The set of all Prime numbers less than 8, C = The set of even Prime number. Verify that A×(B – C) = (A×B) – (A×C)

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

31) Find the sum of the series (2³–1³) + (4³–3³) + (6³–5³) + . . . to (i) n terms (ii) 8 terms

32) Find the GCD of the Polynomials 6x³ – 30x²+60x–48 and 3x³ –12x² +21x–18.

33) If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ then, Show that A² - (a+d) A = (bc – ad) I₂

34) If α,β are the roots of the equation 2x²–x–1 = 0, then form the equation whose roots are
    (i) α²β, β²α   (ii) 2α+β, 2β + α

35) State and prove Angle bisector theorem (ABT)

36) P and Q are the mid points of the sides CA and CB respectively of a ΔABC, right angled at C, Prove that 4(AQ² + BP²) = 5AB².

37) Find the value of K, if the area of a quadrilateral is 28 sq.units, whose vertices are taken in the order (–4,–2) , (–3, k) (3, –2) and (2, 3)

38) If the angle of elevation of a cloud from a point 'h' metres above a lake is θ₁ and the angle of depression of its reflection in the lake is θ₂, Prove that the height that the cloud is located from the ground is $\dfrac{h(\tan\theta_1 + \tan\theta_2)}{\tan\theta_2 - \tan\theta_1}$

39) Nathan, an engineering student was asked to make a model shaped like a cylinder with two cones attached at its two ends. The diameter of the model is 3cm and its length is 12cm. If each cone has a height of 2cm, find the volume of the model that Nathan made.

40) A right circular cyclindrical container of base radius 6cm and height 15cm is full of ice cream. The ice cream is to be filled in cones of height 9cm and base radius 3cm, having a hemispherical cap. Find the number of cones needed to empty the container.

41) Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.

42) Find the equation of a straight line through the intersection of lines 5x – 6y = 2, 3x + 2y = 10 and perpendicular to the line 4x – 7y + 13 = 0.

SIVAKUMAR. M, Sri Ram ~~PART - IV~~ Matric Hss, vallam- 627809

PART - IV

Answer both the questions.   **2 × 8 = 16**

43) a) Construct a triangle ΔPQR such that QR = 5cm, ∠P =30° and the altitude from P to QR is of length 4.2 cm   **(OR)**

    b) Draw the two tangents from a point which is 10cm away from the centre of a circle of radius 5cm. Also, measure the lengths of the tangents.

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

          (OR)

    b) Graph the quadratic equation x² – 6x +9 = 0 and state its nature of solutions.

V   Vellore

FIRST REVISION TEST - 2023
STANDARD X
Maths

Time: 3.00 Hours   Part - I   **Marks:100**

Answer all the questions: $14×1=14$

1) If $A = \{1, 2\}$, $B = \{1, 2, 3, 4\}$, $C = \{5, 6\}$ and $D = \{5, 6, 7, 8\}$ then state which of the following statement is true ....
   a) $(A × C) \subset (B × D)$
   b) $(B × D) \subset (A × C)$
   c) $(A × B) \subset (A × D)$
   d) $(D × A) \subset (B × A)$

2) If the ordered pairs $(a + 2, 4)$ and $(5, 2a + b)$ are equal then (a, b) is
   a) $(2, -2)$
   b) $(5, 1)$
   c) (2)
   d) $(3, -2)$

3) If $f(x) = 2x^2$ and $g(x) = 1/3x$, then fog is
   a) $3/2x^2$
   b) $2/3x^2$
   c) $2/9x^2$
   d) $1/6x^2$

4) If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are
   a) $(-1, 2)$
   b) $(2, -1)$
   c) $(-1, -2)$
   d) $(1, 2)$

5) If the HCF of 65 and 117 is expressible in the form of $65 m- 117$, then the value of m is
   a) 4
   b) 2
   c) 1
   d) 3

6) The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
   a) 2025
   b) 5220
   c) 5025
   d) 2520

7) The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.
   a) 4551
   b) 10091
   c) 7881
   d) 13531

8) $y^2 + 1/y^2$ is not equal to
   a) $y^2 + \dfrac{1}{y^2}$
   b) $\left(y + \dfrac{1}{y}\right)^2$
   c) $\left(y - \dfrac{1}{y}\right)^2 + 2$
   d) $\left(y + \dfrac{1}{y}\right)^2 - 2$

9) The values of a and b if $4x^4 - 24x^3 + 76 x^2 + ax + b$ is a perfect square are
   a) 100, 120
   b) 10, 12
   c) -120, 100
   d) 12, 10

10) Graph of a linear polynomial is a _____
    a) Straight line   b) circle
    c) parabola   d) hyperbola

11) Transpose of a column matrix is
    a) unit matrix   b) diagonal matrix
    c) column matrix   d) row matrix

12) If $\triangle$ ABC is an isosceles triangle with $\angle C = 90°$ and AC = 5 cm, then AB is
    a) 2.5 cm   b) 5 cm
    c) 10 cn   d) $5\sqrt{2}$ cm

13) In a $\triangle$ABC, AD is the bisector $\angle$BAC. If AB = 8 cm, BD = 6 cm and DC = 3 cm. The length of the side AC is
    a) 6 cm   b) 4 cm
    c) 3 cm   d) 8 cm

14) The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70°$ then the value of $\angle AOB$ is
    a) 100°   b) 110°
    c) 120°   d) 130°

Part - II

Answer any 10 Questions. Question No.28 is compulsory.   10×2=20

15) Let A={ 1, 2, 3 } and B = {x| x is a prime number less than 10}. Find A × B and B × A.

16) If A= {−2, −1, 0, 1, 2 } and f: A → B is an onto function defined by $f(x) = x^2 + x + 1$ then find B.

17) If the ordered pairs $(x^2 - 3x, y^2 + 4y)$ and $(-2, 5)$ are equal, then find x and y.

18) Using the functions f and g given below, find f o g and g o f. Check whether f o g = g o f $f(x) = \frac{x+6}{3}$, g(x) =3−x

19) Show that the square of an odd integer is of the form 4q + 1, for some integer q.

20) For what values of natural number n, 4^n can end with the digit 6?

21) Solve $5x \equiv 4 \pmod 6$

22) Check whether the following sequences are in A.P.
    a − 3, a − 5, a− 7 ....

23) In a G.P. 729, 243, 81 ...... find t_7.

24) Simplify

$$\frac{x(x+1)}{x-2} + \frac{x(1-x)}{x-2}$$

25) Find the square root of the following

$4x^2 + 20x + 25$

26) Find the value of a, b, c, d from the following matrix equation.

$$\begin{bmatrix} d & 8 \\ 3b & a \end{bmatrix} + \begin{bmatrix} 3 & a \\ -2 & -4 \end{bmatrix} = \begin{bmatrix} 2 & 2a \\ b & 4c \end{bmatrix} + \begin{bmatrix} 0 & -1 \\ -5 & 0 \end{bmatrix}$$

27 Δ LMN is a right - angled triangle with L = 90°. A circle is inscribed in it. The lengths of the side containing the right angle are 6 cm and 8 cm. Find the radius of the circle.

28) In two concentric circles, a chord of length 16 cm of larger circle becomes a tangent to the smaller circle whose radius is 6 cm. Find the radius of the larger circle.

Part - III

Answer any 10 Questions. Question No.42 is compulsory.   10×5=50

29) Given A = { 1,2, 3 }, B = { 2, 3, 5 }, C = {3, 4 } and D = { 1, 3, 5 }, check if (A ∩ C) × (B ∩ D) = (A × B) ∩ (C × D) is true?

30) The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by t(C) = F where $F = \frac{9}{5}C + 32$. Find,

(i) t (0) (ii) t(28) (iii) t(–10) (iv) the value of C when t(C) = 212.

(v) the temperature when the Celsius value is equal to the Fahren heit value.

31) Let f: A → B be a function defined by f(x) = x/2 – 1, where A = { 2, 4, 6, 10, 12 }, B = { 0, 1, 2, 4, 5, 9 }. Represent f by

(i) set of ordered pairs (ii) a table (iii) an arrow diagram (iv) a graph.

32) Find the value of k, such that f o g = g o f f(x) = 2 – k, g(x) = 4x+ 5.

33) If d is the Highest Common of 32 and 60, find x and y satisfying d = 32x + 60y.

34) Find the remainder when 2^{61} is divided by 17.

35) A mother divides Rs. 207 into three parts such that the amount are in A.P. and gives it to her three children. The product of the two least amounts that the children had Rs.4623. Find the amount received by each child.

36) Find the sum of the following series $10^3 + 11^3 =+ 12^3 + ... +20^3$.

37) Find the square root of $64^4 - 16^3 + 17x^2 - 2x + 1$

38) The hypotenuse of a right angled triangle is 25 cm and its perimeter 56 cm. Find the length of the smallest side.

39) Given that $A = \begin{bmatrix} 1 & 3 \\ 5 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{bmatrix}$, $C = \begin{bmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{bmatrix}$

verify that $A(B+C) = AB + AC$.

40) A boy of height 90 cm is walking away from the base of a lamp post at a speed of 1.2m/sec. If the lamp post is 3.6 m above the ground, find the lenth of his shadow cast after 4 seconds.

41) 5 m long ladder is placed leaning towards a vertical wall such that it reaches the wall at a point 4m high. If the foot of the ladder is moved 1.6m towards the wall, then find the distance by which the top of the ladder would slide upwards on the wall.

42) Basic Proportionally Theorem (BPT) or Thales theorem?

Part - IV

Answer all the questions.

2×8=16

43) a) A company initially started with 40 workers to complete the work by 150 days. Later, it decided to fasten up the work increasing the number of workers as shown below.

Number of workers	(x)	40	50	60	75
Number of days	(y)	150	120	100	80

(i) Graph the above data and identify the type of variation.

(ii) From the graph, find the number of days required to complete the work if the company decides to opt for 120 workers?

(iii) If the work has to be completed by 200 days, how many workers are required?

[or]

b) A garment shop announces a flat 50% discount on every purchase of items for their customers. Draw the graph for the relation between the Marked Price and the Discount. Hence find

(i) the marked price when a customer gets a discount of Rs.3250 (from graph)

(ii) the discount when the marked price Rs.2500.

44) a) Construct a △PQR such that QR = 6.5 cm, ∠P = 60° and the altitude from P to QR is of length 4.5 cm.

[or]

b) Construct a triangle similar to a given triangle PQR with its sides equal to $3/5$ of the corresponding sides of the triangle PQR (scale factor $3/5 < 1$)

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