WAY TO SUCCESS

Leads to Success

10th Standard

Maths

SECOND REVISION TEST - 2023

Various District

Question Paper Collection

CLASS : 10 **SECOND REVISION EXAMINATION, FEBRUARY-2023** Register Number 100066

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

PART – A

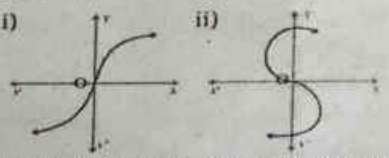
I. Choose the best answer of the following: 14x1=14

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) 3 (c) 4 (d) 8
2. If {(5, 1), (6, b)} represents an constant function, then the value of b is
   (a) 5 (b) 6 (c) 7 (d) 1
3. $7^{4k} \equiv$ (mod 100)
   (a) 1 (b) 2 (c) 3 (d) 4
4. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots\ldots$ is
   (a) $\frac{1}{24}$ (b) $\frac{1}{27}$ (c) $\frac{2}{3}$ (d) $\frac{1}{81}$
5. The system three of linear equation in three variables is inconsistent if their plane is
   (a) intersect only at a point (b) Intersect in a line
   (c) Coincide with each other (d) Do not intersect
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 graph of the quadratic equation is always ---------
   (a) hyperbola (b) Straight line (c) Circle (d) Parabola
8. In ΔLMN, $\angle L = 60^\circ$, $\angle M = 50^\circ$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is
   (a) 40° (b) 70° (c) 30° (d) 110°
9. If slope of the line PQ is $1/\sqrt{3}$ then slope of the perpendicular bisector of PQ is
   (a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $1/\sqrt{3}$ (d) 0
10. $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
    (a) $\sec\theta$ (b) $\cot^2\theta$ (c) $\sin\theta$ (d) $\cot\theta$
11. The angle of elevation of a cloud from the a point h meters above a lake is β. The angle of depression of its reflection in the lake is 45°, the height of loaction 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) $h\tan(45^\circ-\beta)$ (d) none of these
12. If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of origanal cylinder is
    (a) 1:2 (b) 1:4 (c) 1:6 (d) 1:8
13. Variance of first 20 natural numbers is
    (a) 32.25 (b) 44.25 (c) 33.25 (d) 30
14. Probability of the sure event is
    (a) 1 (b) 0 (c) -1 (d) 2

PART - B

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

15. Let A = {3, 4,7, 8} and B = {1,7,10}. Which of the following sets are relations from A to B?
    i) $R_1 = \{(3, 7), (4, 7), (7, 10), (8, 1)\}$ ii) $R_2 = \{(3,1), (4,12)\}$
16. Determine whether the graph given below represent functions. Give reason for your answers concerning each graph.



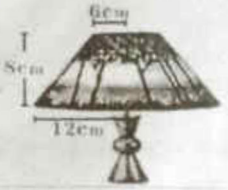
17. Find the greastest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.
18. If $1^3 + 2^3 + 3^3 + \ldots\ldots + k^3 = 44100$ then find $1 + 2 + 3 + \ldots\ldots + k$.

19. Find the LCM of $5x - 10$, $8x^3 - 20$
20. If a matrix has 20 elements, what are the possible orders it can have? What if it has 8 elements
21. A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point?
22. Show that the given points are collinear: (-3, -4), (7,2) and (12,5)
23. A kite is flying at a height of 75m above the ground. The string attached to the kite temporarily tied to a point on the ground. The inclination of the string with the ground is 60. Find the lenght of the string, assuming that there is no slck in the string
24. Find the volume of a cylinder whose height is 2m and whose base area is 250 m^2.
25. If the total surface srea of a cone of radius 7 cm is 704 cm^2, then find its slant height.
26. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.
27. 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.
28. Find the intercepts made by the line $4x - 9y + 36=0$ on the coordinate axes

PART - C

III. Answer any 10 questions only [Q.NO: 42 is compulsory] 10x5=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 $(A \cap B) \times C = (A \times C) \cap (B \times C)$
30. If $f(x) = 2x+3$, $g(x) = 1-2x$ and $h(x) = 3x$. Prove that $f \circ (g \circ h) = (f \circ g) \circ h$
31. If $p_1^{x1} \times p_2^{x2} \times p_3^{x3} \times p_4^{x4} = 113400$ where p_1, p_2, p_3, p_4 aer primes in 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 and x_1, x_2, x_3, x_4
32. The product of three consective terms of a Geometric Progression is 343 and their sum is $91/3$. Find the three terms.
33. 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 $(AB)^T = B^T A^T$.
34. Find the GCD of the polynomials x^3+x^2-x+2 and $2x^3-5x^2+5x-3$.
35. If one root of the equation $3x^2 + kx + 81=0$ (having real roots) is the square of the other then find k.
36. State and prove Basic proportionality Theorem (Thales Theorem).
37. Show that the given points form a parallelogram.
    A(2.5, 3.5), B(10, -4), C(2.5, -2.5) and D(-5, 5)
38. A mobile phone is put to use when the battery power is 100%. The percent of battery power 'y' (in decimal) remaining after using the mobile phone for x hours is assumed as $y = -0.25x + 1$.
    i) Find the number of hours elapsed if the battery power is 100%.
    ii) How much time does it take so that the battery has no power.
39. Porve that $\left(\frac{1 + \sin\theta - \cos\theta}{1 + \sin\theta + \cos\theta}\right)^2 = \frac{1 - \cos\theta}{1 + \cos\theta}$
40. The frustum shaped outer portion of the table lamp has to be painted including the top part. Find the total cost of painting the lamp if the cost of painting 1 sq. cm is ₹2.



41. In a study about viral fever, the number of people affected in a town were noted as Find its standard deviation.

Age in years	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of people affected	3	5	16	18	12	7	4

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 - D

IV. Answer the following questions. 2x8=16

43. 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 $y=x^2+x-2$ and hence solve $x^2+x-2=0$.
44. a) Construct a triangle similar to given triangle PQR with its sides equal to $7/3$ of the corresponding sides of the triangle PQR(scale factor $7/3 > 1$) **(OR)**

    b) Construct a triangle ΔPQR Such that QR = 5 cm, $\angle P = 30°$ and the altitude from P to QR is of length 4.2 cm.

DHARMAPURI – DT

SR-NKL

SECOND REVISION TEST - 2023

10 Std

Time: 3.00 Hrs

MATHEMATICS

Reg No. | | | | | | |

Marks : 100

PART - I

Answer All the questions. **14 X 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

   a) 3 b) 2 c) 4 d) 8

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

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

3. If 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 $(1^3+2^3+3^3+.....+15^3) - (1+2+3+.....+15)$

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

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 ΔLMN, $\angle L = 60^0$, $\angle M = 50^0$, If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is

   a) 40^0 b) 70^0 c) 30^0 d) 110^0

8. The area of triangle formed by points (-4, 0), (0,-4) and (4,0) is

   a) 0 sq.units b) 16 sq.units c) 4 sq units d) None of those

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. If $\sin\theta=\cos\theta$, then $2\tan^2\theta+\sin^2\theta-1$ is equal to

a) $\frac{-3}{2}$ b) $\frac{3}{2}$ c) $\frac{2}{3}$ d) $\frac{-2}{3}$

11. The curved surface area of a height circular cone of leight 15 cm and base diameter 16 cm is

a) 60 π cm² b) 68π cm ² c) 120π cm ² d) 136π cm ²

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. Variance of first 20 natural number is

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

14. which of the following is incorrect?

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

PART - II

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

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

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.

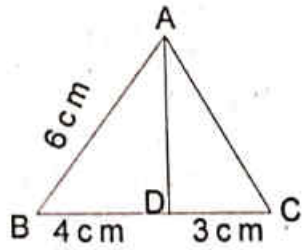
17. Solve $3x-2=0$ (mod 11).

18. Find the LCM of $(5x-10)$, $(5x^2-20)$.

19. Find the quaratic equation whose sum and product of roots are -9, 20

20. If $A=\begin{bmatrix}5 & 4 & 3\\ 1 & -7 & 9\\ 3 & 8 & 2\end{bmatrix}$ then find the transpose of A

21. In the Figure AD is the bisector of $\angle A$ If BD=4cm, DC=3cm AB=6cm, Find AC



22. If the three point (3,-1) (a,3) and (1,-3) are collinear. Find the value of a

23. Find the equation of a line passing throught the point (3,-4), and having slope $\frac{-5}{7}$

24. From the top of a rock $50\sqrt{3}$ m high Thes angle of depression of a car on the ground is observed to be 30^0. Find the distance of the car from the rock.

25. Find the diameter of a sphere whose surface area is 154 m^2.

26. It the lange and the smallest value of a set of data area are 36.8 and 13.4 respectively, then find the largest value.

27. Two dice are rolled together Find the probability of getting a doublet?

PART - III

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

29. Let A = { $x \in w / x < 2$ }, B = { $x \in N / 1 < x \leq 4$} and C={ 3, 5 } verify Ax(BnC)=(AxB)n(AxC)

30. If f(x)=x^2,g(x)=2x and h(x)=x+4 slow that (fog) oh = (fo)(goh)

31. In a G.P the 9th term is 32805 and 6th term is 1215. Find the 12th term

32. Rekha has 15 square colour papers of size 10 cm , 11 cm, 12 cm.....24cm. How much area can be decorated with these colour papers ?

33. If $36x^4-60x^3+61x^2-mx+n$ is a perfect square Find the values of m and n

34. If $A=\begin{pmatrix}1 & 1\\ -1 & 3\end{pmatrix}, B=\begin{pmatrix}1 & 2\\ -4 & 2\end{pmatrix}, C=\begin{pmatrix}-7 & 6\\ 3 & 2\end{pmatrix}$ verify that A(B+C)=AB+AC .

35. State and prove angle bisecetor theroram .

36. A triangular slaped glass of with vertices at A=(-5,-4), B=(1, 6) and C = (7, -4) has to be painted. It one bucket of paint covers 6 square feet, how many buckels of paint will be required to paint the whole glass if only one coat of paint is applied.

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

38. If $\sin\theta(1+\sin^2\theta)=\cos^2\theta$ then prove that $\cos^6\theta-4\cos^4+8\cos^2\theta=4$

39. The radius and height of cylinder are in the ratio 5 :7 and its curred surface area is 5500 sq cm Find its radius and height

40. A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm, then find the thickness of the cylinder

41. 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.

42. There unbiased coins are tossed once. Find the probability of getting at must 2 tails or atleast 2 heads.

PART - IV

Answer the following. **2 X 8 = 16**

43.a) Construct a $\triangle PQR$ such that QR = 5cm $\angle P = 30^0$ and the altitude from P to QR of length 4.2 cm

(OR)

b) Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the tangents PA and PB to the circle and measure their lengths.

44. a) Draw the graph of $y = x^2 - 4$ and hence solve $x^2 - x - 12 = 0$

(OR)

b) Graph the following linear function $y = \frac{1}{2}x$ Identify the constant of variation and verifty it with the graph. Also find y when $x = 9$

ii) find x when y = 7.5

MAYILADUTHURAI DISTRICT - Common Revision Test - 2 (2023)195

10 - Mathematics - District Level Revision Test -2 (2023)

10th Standard

Maths

Date : 06-Feb-23

Draw Diagrams whenever necessary
Rough Works may be done at the bottom of answer sheets

Reg.No. : ☐☐☐☐☐☐

Exam Time : 03:15:00 Hrs

Total Marks : 100

Choose The Best Answer 14 x 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) The probability of an impossible event is _____

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) Not exists

3) 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°

4) 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

5) If x = a tanθ and y = b secθ then

(a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ (b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$

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 (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

8) Sum of deviations of a variable from its mean is always _____

(a) 0 (b) 1 (c) 2 (d) 5

9) If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is

(a) 1:2 (b) 1:4 (c) 1:6 (d) 1:8

10) Let f and g be two functions given by
f = {(0,1), (2,0), (3,-4), (4,2), (5,7)}
g = {(0,2), (1,0), (2,4), (-4,2), (7,0)} then the range of f o g is

(a) {0,2,3,4,5} (b) {–4,1,0,2,7} (c) {1,2,3,4,5} (d) {0,1,2}

11) If $\triangle ABC$ is an isosceles triangle with $\angle C = 90^\circ$ and AC = 5 cm, then AB is

(a) 2.5 cm (b) 5 cm (c) 10 cm (d) $5\sqrt{2}$cm

12) An A.P. consists of 31 terms. If its 16^{th} term is m, then the sum of all the terms of this A.P. is

(a) 16 m (b) 62 m (c) 31 m (d) $\frac{31}{2}$ m

13) A straight line has equation 8y = 4x + 21. Which of the following is true

(a) The slope is 0.5 and the y intercept is 2.6

(b) The slope is 5 and the y intercept is 1.6

(c) The slope is 0.5 and the y intercept is 1.6

(d) The slope is 5 and the y intercept is 2.6

14) The total surface area of a cylinder whose radius is $\frac{1}{3}$ of its height is

(a) $\frac{9\pi h^2}{8}$ sq.units (b) $24\pi h^2$ sq.units (c) $\frac{8\pi h^2}{9}$ sq.units (d) $\frac{56\pi h^2}{9}$ sq.units

Answer any 10 10 x 2 = 20

Question Number 28 is Compulsory

15) Check whether AD is bisector $\angle A$ of $\triangle ABC$ in each of the following AB = 5cm, AC = 10cm, BD = 1.5cm and CD = 3.5cm

16) Determine the quadratic equations, whose sum and product of roots are -9, 20

17) A man has 532 flower pots. He wants to arrange them in rows such that each row contains 21 flower pots. Find the number of completed rows and how many flower pots are left over.

18) 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 $10\sqrt{3}m$

19) Write the sample space for selecting two balls from a bag containing 6 balls numbered 1 to 6 (using tree diagram).

20) Represent the function f = {(1,2),(2,2),(3,2),(4,3),(5,4)} through
(i) an arrow diagram
(ii) a table form
(iii) a graph

21) If P(A).= 0.37, P(B).= 0.42, $P(A \cap B)$ = 0.09 then find P(AUB).

22) What is the remainder when $3^{209} + 5^9$ is divided by 8?

23) Find the sum of the following
3,7,11....up to 40 terms

24) What happens to the volume of the cylinder with radius r and height h, when its
(a) radius is halved (b) height is halved

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

26) The length of a tangent from a point ar a distance of 5 cm from the center of the circle is 4 cm. Find the radius of the circle

27) Find the equation of a straight line passing through the mid-point of a line segment joining the points (1, -5), (4, 2) and parallel to: X axis

28) Let f{(x, y) | x, y ∈ N and y = 2x}. be a relation on ℕ. Find the domain, co-domain and range. Is this relation a function?

Answer any 10 10 x 5 = 50

Question Number 42 is Compulsory

29) Find the GCD of the following by division algorithm $2x^4 + 13x^3 + 27x^2+23x + 7$, $x^3 + 3x^2 + 3x + 1$, $x^2 + 2x + 1$

30) State and Prove - Angle Bisector Theorem

31) From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree.($\sqrt{3}$ = 1.732)

32) Final the probability of choosing a spade or a heart card from a deck of cards.

33) Find the equation of a straight line Passing through (1, -4) and has intercepts which are in the ratio 2:5

34) Find the value of k, such that f o g = g o f
f(x) = 3x + 2, g(x) = 6x - k

35) A company has four categories of employees given by Assistants (A), Clerks (C), Managers (M) and an Executive Officer (E). The company provides Rs.10,000, Rs.25,000, Rs.50,000 and Rs.1,00,000 as salaries to the people who work in the categories A, C, M and E respectively. If A_1, A_2, A_3, A_4 and A_5 were Assistants; C_1, C_2, C_3, C_4 were Clerks; M_1, M_2, M_3 were managers and E_1, E_2 were Executive officers and if the relation R is defined by xRy, where x is the salary given to person y, express the relation R through an ordered pair and an arrow diagram.

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

37) Priya earned Rs.15,000 in the first month. Thereafter her salary increased by Rs 1500 per year. Her expenses are Rs.13,000 during the first year and the expenses increases by Rs.900 per year. How long will it take for her to save Rs.20,000 per month

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

39) Show that the given points form a parallelogram : A(2.5, 3.5) , B(10, - 4), C(2.5, -2.5) and D(-5, 5)

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

41) Two dice are numbered 1,2,3,4,5,6 and 1,1,2,2,3,3 respectively. They are rolled and the sum of the numbers on them is noted. Find the probability of getting each sum from 2 to 9 separately.

42) The frustum shaped outer portion of the table lamp has to be painted including the top part. Find the total cost of painting the lamp if the cost of painting 1 sq.cm is Rs.2.

Answer the Follwoing 2 x 8 = 16

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

(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 is Rs.2500.

44) a) Construct a ΔABC such that AB = 5.5 cm, $\angle C = 25^\circ$ and the altitude from C to AB is 4 cm.

(OR)

b) Draw a circle of radius 3 cm. Take a point P on this circle and draw a tangent at P.

---All the Best---

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COMMON SECOND REVISION TEST - 2023

Ranipet District

Standard X

Reg.No. | | | | | | |

MATHEMATICS

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

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

1. The range of the relation R = {(x, x^2 / x is a prime number less than 13) is
   a) {2,3,5,7} b) {2,3,5,7,11} c) {4,9,25,49,121} d) {1,4,9,25,49,121}
2. If $f(x) = 2x^2$ 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. 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. The LCM of a^k, a^{k+3}, a^{k+5} where $k \in N$ is _____.
   a) a^{k+9} b) a^k c) a^{k+6} d) a^{k+5}
6. Which of the following can be calculated from the given matrices?

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

   i) A^2 ii) B^2 iii) AB iv) BA
   a) (i) and (ii) only b) (ii) and (iii) only c) (ii) and (iv) only d) all of these
7. The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70^\circ$ then the value of $\angle AOB$ is
   a) 100° b) 110° c) 120° d) 130°
8. 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)
9. When proving that a quadrilateral is a parallelogram by using slopes you must find
   a) the slopes of two sides
   b) the slopes of two pair of opposite sides
   c) the lengths of all sides
   d) both the lengths and slopes of two sides
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 height 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 Which of the following is not a measure of dispersion?
a) range b) standard deviation
c) arithmetic mean d) variance

14 The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$. Then the value of x is
a) 2 b) 1 c) 3 d) 1.5

Part - II

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

15 If B x A = {(−2,3), (−2,4), (0,3), (0,4), (3,3), (3,4)}, find A and B.

16 Represent the function f = {(1,2), (2,2), (3,2), (4,3), (5,4)} through
i) an arrow diagram ii) a table form iii) a graph

17 Find the next three terms of the sequence : 8, 24, 72, ...

18 Find the sum of 1 + 3 + 5 + ... + 55

19 Reduce the rational expressions to its lowest form: $\frac{x-3}{x^2-9}$

20 If $A \begin{vmatrix} 5 & 4 & 3 \\ 1 & 7 & 9 \\ 3 & 8 & 2 \end{vmatrix}$ then find the transpose of A.

21 Find the length of the tangent drawn from a point whose distance from the centre of a circle is 5 cm and radius of the circle is 3 cm.

22 Find the slope of the straight line 5y − 3 = 0

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

24 If the base area of a hemispherical solid is 154 sq metres, then find its total surface area.

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

26 Find the range and the coefficient of range of the following data :
16, 18, 20, 22, 24, 26, 28

27 Two coins are tossed together. What is the probability of getting different faces on the coins?

28 Show that the points P(−1.5, 3), Q(6, −2), R(−3, 4) are collinear.

Part - III

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

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

30 If f(x) = 3x − 2, g(x) = 2x + k and if fog = gof, then find the value of k.

31 Find the HCF of 396, 504, 636

32 Find the sum to n terms of the series 3 + 33 + 333 + ... to n terms.

33. Find the square root of the polynomials by division method : $37x^2 - 28x^3 + 4x^4 + 42x + 9$

34. 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 $(AB)^T = B^T A^T$

35. State and prove Angle Bisector Theorem.

36. Find the area of the quadrilateral whose vertices are at (–9,–2), (–8,–4), (2,2) and (1,–3)

37. Find the equation of the straight line which passes through the point of intersection of the lines $5x - 6y = 1$ and $3x + 2y + 5 = 0$ and is perpendicular to the straight line $3x - 5y + 11 = 0$

38. Two ships are sailing in the sea on either sides of a Lighthouse. The angle of elevation of the top of the Lighthouse as observed from the ships are 30° and 45° respectively. If the Lighthouse is 200 m high, find the distance between the two ships. $(\sqrt{3} = 1.732)$

39. The internal and external diameter of a hollow hemispherical shell are 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 amount of rainfall in a particular season for 6 days are given as 17.8 cm, 19.2 cm, 16.3 cm, 12.5 cm, 12.8 cm and 11.4 cm. Find its standard deviation.

41. Three unbiased coins are tossed once, find the probability of getting atmost 2 tails or atleast 2 heads.

42. An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10 cm and 4 m and whose height is 4 m. Find the curved and total surface area of the bucket.

Part - IV

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

42. a) Construct a triangle $\triangle PQR$ such that QR = 5 cm, $\angle P = 30°$ and the altitude from P to QR is of length 4.2 cm.

(OR)

b) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from the point.

44. 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) Graph the quadratic equation and state their nature of solutions.
$x^2 - 6x + 9 = 0$

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Now, I am working in
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& Sri Rajalakshmi Tuition
Centre, Arni (TVM)

Sivagangai

COMMON SECOND 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 there are 1024 relations from a set to 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. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is
   a) linear b) cubic c) reciprocal d) quadratic
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 $(1^3 + 2^3 + 3^3 + \ldots\ldots + 15^3) - (1 + 2 + 3 + \ldots\ldots + 15)$ is
   a) 14400 b) 14200 c) 14280 d) 14520
5. The solution of $(2x - 1)^2 = 9$ is equal to
   a) –1 b) 2 c) –1,2 d) none of these
6. $\frac{x^3}{x-y} + \frac{y^3}{y-x} =$
   a) $x^3 + y^3$ b) $x^2 - y^2$ c) $x^2 + xy + y^2$ d) $x^2 - xy + y^2$
7. How many tangents can be drawn to the circle from a exterior point?
   a) one b) two c) infinite d) zero
8. The area of triangle formed by the points (–5,0), (0,–5) and (5,0) is
   a) 0 sq.units b) 25 sq.units c) 5 sq.units d) none of these
9. (2,1) is the point of intersection of two lines
   a) $x - y - 3 = 0$; $3x - y - 7 = 0$ b) $x + y = 3$; $3x + y = 7$
   c) $3x + y = 3$; $x + y = 7$ d) $x + 3y - 3 = 0$; $x - y - 7 = 0$
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 total surface area of a cylinder whose radius is $\frac{1}{3}$ of its height is
    a) $\frac{9\pi h^2}{8}$ sq.units b) $24\pi h^2$ sq.units
    c) $\frac{8\pi h^2}{9}$ sq.units d) $\frac{56\pi h^2}{8}$ sq.units
12. The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$, then the value of x is
    a) 2 b) 1 c) 3 d) 1.5

13. Variance of first 20 natural number is

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

14. The ratio of the volumes of cylinder, a cone and a sphere, if each has the same radius and same height is

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

Part - II

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

15. Let X = {1,2,3,4} and Y = {2,4,6,8,10} and R = {(1,2), (2,4), (3,6), (4,8)}. Show that R in a function and find its domain, co-domain and range.
16. Find k if fof(k) = 5 where f(k) = 2k – 1
17. If $13824 = 2^a \times 3^b$ then find a and b
18. Find the sum of $1^3 + 2^3 + 3^3 + \ldots\ldots + 16^3$
19. If $A = \begin{bmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{bmatrix}$, then find the transpose of A.
20. Find the length of the tangent drawn from a point whose distance from the centre of a circle is 5 cm and the radius of the circle is 3 cm.
21. Show that the given points are collinear : (–3,–4), (7,2) and (12,5)
22. Find the equation of a straight line passing through (5,–3) and (7,–4)
23. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$
24. Find the top of a rock $50\sqrt{3}$ m high, angle of depression of a car on the grouped is observed to be 30°. Find the distance of the car from the rock.
25. The radius of a sphere increase by 25%. Find the percentage increase in its surface area.
26. If the circumference of a conical wooden piece 484 cm, then find its volume when its height is 105 cm.
27. What is the probability that a leap year selected at random will contain 53 Saturdays.
28. Find LCM : $x^3 - 27$, $(x-3)^2$, $x^2 - 9$

Part - III

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

29. Let A = {$x \in W / x < 2$}, B = {$x \in N / 1 < x \leq 4$} and C = {3,5}, verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$
30. Let f : A→B be a function defined by $f(x) = \frac{x}{2} = 1$, where A = {2,4,6,10,12}, B = {0,1,2,4,5,9} represent by (i) set of ordered pairs ; (ii) a table (iii) an arrow diagram (iv) a graph
31. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
32. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm .... 24 cm. How much area can be decorated with these colour papers?

33. $ax^4 + bx^3 + 361x^2 + 220x + 100$ is a perfect square, find the values of a and b.

34. $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, show that $A^2 - (a + d) A = (bc - ad) I_2$

35. State and prove Pythagoras theorem.

36. Let A(3,–4), B(9,–4), C(5,–7), D(7,–7). Show that ABCD is a trapezium.

37. Find the equation of a straight line joining the point of intersection of $3x + y + 2 = 0$ and $x - 2y - 4 = 0$ to the point of intersection of $7x - 3y = -12$ and $2y = x + 3$.

38. Prove that $\tan^2 A - \tan^2 B = \dfrac{\sin^2 A - \sin^2 B}{\cos^2 A \cos^2 B}$

39. Arul has to make arrangements for the accommodation of 150 persons for his family function. For this purpose, he plans to build a tent which is in the shape of cylinder surmounted by a cone. Each person occupies 4 sq.m of the space on ground and 40 cu.meter of air to breadthe. What should be the height of the conical part of the tent if the height of cylindrical par is 8 m?

40. The amount of rain fall in a particular season for 6 days are given as 17.8 cm, 19.2 cm, 16.3 cm, 12.5 cm, 12.8 cm and 11.4 cm. Find its standard deviation.

41. A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.

42. Two ships are sailing in the sea on either side of the Lighthouse. The angles of depression of two ships as observed from the top of the Lighthouse are 60° and 45° respectively. If the distance between the ship is $200\left(\dfrac{\sqrt{3}+1}{\sqrt{3}}\right)$ metres, find the height of the Lighthouse.

Part - IV

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

43. a) Construct a ΔPQR in which PQ = 8 cm, $\angle R = 60°$ and the median RG from R to PQ is 5.8 cm. Find the length of the altitude from R to PQ.

(OR)

b) Draw 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) A garments 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 Discount. Hence find

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

ii) the discount when the market prices ₹2500.

(OR)

b) Draw the graph of $y = x^2 - 4x + 3$ and use it to solve $x^2 - 6x + 9 = 0$

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Tenkasi

Ts10M **Tenkasi District Common Examinations**
Common Second Revision Examination - February 2023

20-02-2023

Standard 10
MATHS

Time: 3.00 Hours Marks: 100

PART - I **14×1=14**

Note : i) Answer all the questions.
ii) Choose the best answer

1) If {(a,8) (6, 6)} represents an identity function, then the value of *a* and *b* are repectively.
a) (8, 6) b) (8, 8) c) (6, 8) d) (6, 6)

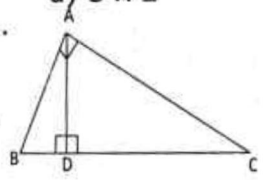
2) If 6 times of 6th term of an AP is equal to 7 times the 7th term, then the 13th term of the AP is
a) 6 b) 13 c) 0 d) 7

3) If the sequence $t_1, t_2, t_3, \ldots\ldots$ are in A.P then the sequence $t_6, t_{12}, t_{18}, \ldots\ldots$ is
a) neither an Arithmetic progression nor a Geometric progression.
b) an Arithmetic progresson
c) a constant sequence
d) a Geometric progression

4) A system of three linear equations in three variables is inconsistent if their planes
a) coincides with each other b) interest in a line
c) do not intersect d) intersect only at a point

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

6) In the given figure ∠BAC = 90° and AD ⊥ BC then .....
a) $AB.AC = AD^2$ b) $BD.CD = AD^2$
c) $AB.AC = BC^2$ d) $BD.CD = BC^2$



7) A tangent is prependicular to the radius at the .....
a) Point of contact b) Infinity
c) chord d) centre

8) The straight line given by the equation x = 11 is
a) Parallel to Y axis b) passing through the point (0,11)
c) Parallel to X axis d) Passing through the origin

9) If (5, 7) (3, P) and (6, 6) are collinear, then the value of P is .....
a) 6 b) 9 c) 3 d) 12

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

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

12) If the Total surface area of a solid right circular cylinder is 200π cm^2 and its radius is 5ck, then the sum of its height and radius is .....
a) 20 cm b) 25cm c) 30cm d) 15cm

13) If A and B are mutullay exclusive events then P(A∩B) is .....
a) 1 b) – 1 c) 0 d) 2

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

PART - II **10×2=20**

Answer any ten of the following. Question Number 28 is compulsory.

15) A Relation R is given by the set {(x, y)/y = x + 3, x∈{0, 1, 2, 3} Determine its domain and Range.

16) Find fog and gof when $f(x) = 2x + 1$ and $g(x) = x^2 - 2$.

17) Find the indicated terms of the sequences whose n^{th} term is $a_n = \frac{5n}{n+2}$, a_6 and a_{13}

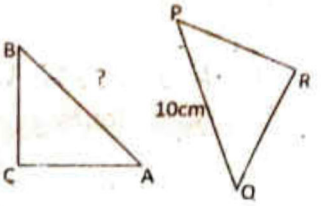
18) Find the sum of the series 3 + 6 + 9 + ... + 96.

19) Determine the nature of the roots: $\sqrt{2}t^2 - 3t + 3\sqrt{2} = 0$

20) $A = \begin{pmatrix} 3 & 0 \\ 4 & 5 \end{pmatrix} B = \begin{pmatrix} 6 & 3 \\ 8 & 5 \end{pmatrix} C = \begin{pmatrix} 3 & 6 \\ 1 & 1 \end{pmatrix}$ find the matrix D, such that C + D = A + B

21) Find the square root of the following: $9x^2 - 24xy + 30xz - 40yz + 25z^2 + 16y^2$

22) The perimeters of two similar triangles ABC & PQR are resectively 36cm & 24 cm. If PQ = 10, find AB



23) The line through the points (−2,a) and (9, 3) has slop $-\frac{1}{2}$. Find the value of *a*.

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 volume of a solid right circular cone is 11088cm^3. If its height is 24cm then find the radius of the cone.

26) The volumes of two cones of same base radius are 3600cm^3 and 5040cm^3. Find the ratio of heights.

27) 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.

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

PART - III

10×5=50

Answer any ten of the following. Question Number 42 is compulsory.

29) Let A = { x ∈ N/ 1 < x < 4}, B = {x ∈ W/ 0 ≤ x < 2} and C = { x ∈ N/ x < 3} Then verify that A × (B ∩ C) = (A × B) ∩ (A × C)

30) A function f:[−5, 9] → R is defined as follows: $f(x) = \begin{cases} 6x+1; & -5 \le x < 2 \\ 5x^2 - 1; & 2 \le x < 6 \\ 3x - 4; & 6 \le x \le 9 \end{cases}$

i) f(−3) + f(2) ii) $\frac{2f(2) - f(6)}{f(4) + f(-2)}$

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

32) If $(m+1)^{th}$ term of an A.P is twice the $(n+1)^{th}$ term, them prove that $(3m+1)^{th}$ term is twice the $(m+n+1)^{th}$ term.

33) There are 12 pieces of five, ten and twenty rupee currencies whose total value is Rs.105. When first 2 sorts are interchanged in their numbers its value will be increased by Rs.20. Find the no. of currencies in each sort.

34) If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ are real and equal. P.T either a = 0 (or) $a^3 + b^3 + c^3 = 3abc$.

35) PQ is a chord of length 8cm to a circle of radius 5cm. The tangents at P and Q intersect at a Point T. Find the length of the tangent TP.

36) Find the equation of the median and altitude of ΔABC through A where the vertices are A(6,2), B(−5, −1) &(1, 9).

37) Find the area of the quadrilateral formed by the points (−9, 0), (−8, 6), (−1, −2) and (−6, −3)

38) The horizontal distance between two buildings is 140m. The angle of depression of the top of the first building when seen from the top of the second building is 30°. If the height of the first building is 60m, find the height of second building ($\sqrt{3}$ =1.732)

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

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

Rainfall (in mm)	45	50	55	60	65	70
No. of places	5	13	4	9	5	4

42) A passenger train takes 1hr morethan an express train to travel a distance of 240 km from chennai to virudhachalam. The speed of passenger train is less than of an express train by 20km per hour. Find the average speed of both the trains.

PART - IV

Answer all the questions. **2×8=16**

43) a) Draw ΔPQR such that PQ = 6.8cm, vertical angle is 50° and the bisector of the vertical angle meets the base at D where PD = 5.2 cm. **(OR)**

b) Construct a triangle similar to a given triangle PQR with its sides equal to 7/3 of the corresponding sides of the triangle PQR (Scale factor 7/3 > 1).

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 $y = x^2 + 3x + 2$ and use it to solve $x^2 + 2x + 1 = 0$.

SR-NKL

SECOND REVISION TEST - 2023

10 Std
Time: 3.00 Hrs

MATHEMATICS

Reg No. | | | | | | |
Marks : 100

Namakkal district

PART - I

Answer All the questions. **14 X 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
   a) 3 b) 2 c) 4 d) 8
2. If $f : A \to B$ is a bijective function and if n (B)=7 then n(A) is equal to
   a) 7 b) 49 c) 1 d) 14
3. If 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 $(1^3+2^3+3^3+.....+15^3) - (1+2+3+.....+15)$
   a) 14400 b) 14200 c) 14280 d) 14520
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 ΔLMN, $\angle L = 60^0, \angle M = 50^0$, If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is
   a) 40^0 b) 70^0 c) 30^0 d) 110^0
8. The area of triangle formed by points (-4, 0), (0,-4) and (4,0) is
   a) 0 sq.units b) 16 sq.units c) 4 sq units d) None of those
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. If $\sin\theta=\cos\theta$, then $2\tan^2\theta+\sin^2\theta-1$ is equal to

a) $\frac{-3}{2}$ b) $\frac{3}{2}$ c) $\frac{2}{3}$ d) $\frac{-2}{3}$

11. The curved surface area of a height circular cone of leight 15 cm and base diameter 16 cm is

a) 60 π cm^2 b) 68 π cm^2 c) 120 π cm^2 d) 136 π cm^2

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. Variance of first 20 natural number is

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

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 10 Questions. Question No.28 is compulsory. **10 X 2 = 20**

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

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.

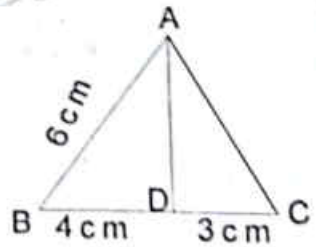
17. Solve $3x-2=0$ (mod 11).

18. Find the LCM of $(5x-10)$, $(5x^2-20)$.

19. Find the quaratic equation whose sum and product of roots are -9, 20

20. If $A=\begin{bmatrix}5 & 4 & 3\\ 1 & -7 & 9\\ 3 & 8 & 2\end{bmatrix}$ then find the transpose of A

21. In the Figure AD is the bisector of $\angle A$ If BD=4cm, DC=3cm AB=6cm, Find AC



22. If the three point (3,-1) (a,3) and (1,-3) are collinear. Find the value of a

23. Find the equation of a line passing throught the point (3,-4), and having slope $\frac{-5}{7}$

24. From the top of a rock $50\sqrt{3}$ m high Thes angle of depression of a car on the ground is observed to be 30^0. Find the distance of the car from the rock.
25. Find the diameter of a sphere whose surface area is 154 m^2 (Eg.7.8)(PN 278)
26. It the lange and the smallest value of a set of data area are 36.8 and 13.4 respectively, then find the largest value.
27. Two dice are rolled together Find the probability of getting a doublet?

PART - III

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

29. Let A = { $x \in w / x<2$ }, B = { $x \in N / 1<x \leq 4$} and C={ 3, 5 } verify $A x (B \cap C) = (A x B) \cap (A x C)$ (Ex 1.1)(6ii) (PN 6)
30. If $f(x)=x^2, g(x)=2x$ and $h(x)=x+4$ slow that (fog) oh = (fo)(goh) (1.5)(8ii)(PN 34)
31. In a G.P the 9th term is 32805 and 6th term is 1215. Find the 12th term (2.7)6 (PN 73)
32. Rekha has 15 square colour papers of size 10 cm , 11 cm, 12 cm.....24cm. How much area can be decorated with these colour papers ? Ex(2.9)6 (PN 81)
33. If $36x^4-60x^3+61x^2-mx+n$ is a perfect square Find the values of m and n (3.8)(3) (PN -106)
34. If $A=\begin{pmatrix}1 & 1\\ -1 & 3\end{pmatrix}, B=\begin{pmatrix}1 & 2\\ -4 & 2\end{pmatrix}, C=\begin{pmatrix}-7 & 6\\ 3 & 2\end{pmatrix}$ verify that A(B+C)=AB+AC (Eg 3.72)(PN 152)
35. State and prove angle bisecetor theroram (PN 74)
36. A triangular slaped glass of with vertices at A=(-5,-4), B=(1, 6) and C = (7, -4) has to be painted. It one bucket of paint covers 6 square feet, how many buckels of paint will be required to paint the whole glass if only one coat of paint is applied. (Ex 5.1)(10)(PN 212)
37. A (-3, 0) B (10, -2) and C (12, 3) are the vertices of a triangle ABC. Find the equation of the altitude through A. (5.4)7 (PN -235)
38. If $\sin\theta(1+\sin^2\theta)=\cos^2\theta$ then prove that $\cos^6\theta-4\cos^4+8\cos^2\theta=4$ (6.1)(9ii)(PN 250)
39. The radius and height of cylinder are in the ratio 5 :7 and its curred surface area is 5500 sq cm Find its radius and height (Ex 7.1)(1)(PN 282)

40. A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm, then find the thickness of the cylinder [Ex 7.4) 7 (PN 297)

41. 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 [Eg 8.6](PN 308)

42. There unbiased coins are tossed once. Find the probability of getting at must 2 tails or atleast 2 heads.

PART - IV

Answer the following. **2 X 8 = 16**

43.a) Construct a ΔPQR such that QR = 5cm $\angle P = 30^0$ and the altitude from P to QR of length 4.2 cm

(OR)

b) Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the tangents PA and PB to the circle and measure their lengths.

44. a) Draw the graph of $y = x^2 - 4$ and hence solve $x^2 - x - 12 = 0$

(OR)

b) Graph the following linear function $y = \frac{1}{2}x$ Identify the constant of variation and verify it with the graph. Also find y when $x = 9$

ii) find x when y = 7.5

Tirupattur

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

   a) { 0, -1} b) R - { 0, -1 } c) R - {0} d) R - {-1}

3. The next term of the sequence 3/16, 1/8, 1/12, 1/18 is

   a) 1 / 24 b) 1 / 27 c) 2 / 3 d) 1/ 81

4. if 10th term of A.P. is 52 and 16th term of A.P. is 82 then the nth term of this A.P. is

   a) n + 2 b) 5n - 2 c) 5n + 2 d) 5n

5. Which of the following should be added to make $x^4 + 64$ a perferct square

   a) $4x^2$ b) $16x^2$ c) $8x^2$ d) $-8x^2$

6. If A = (1 -2 3), $B = \begin{pmatrix} -1 \\ 2 \\ -3 \end{pmatrix}$ then $A + B^T$ = ?

   a) (0 0 0) b) $\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$ c) (2 4 6) d) not defined

7. If in ΔABC is an isosceles triangle with $\angle C = 90^0$ and AC = 5 cm, then AB is

   a) 2.5 cm b) 5 cm c) 10 cm d) $5\sqrt{2}$ cm

8. If A is a point on the Y axis whose ordinate is 8 and B is a point on the X axis whose abscissae is 5 then the equation of the line AB is

   a) 8x + 5y = 40 b) 8x - 5y = 40 c) x = 8 d) y = 5

9. The area of quadrilateral formed by the points (-1, 1), (1, 1), (1, -1) and (-1, -1) is

   a) 0 sq. units b) 4 sq. units c) 25 sq. units d) 1 sq. units

10. a cot θ + b cot θ = p and b cot θ + a cosec θ = q then $p^2 - q^2$ is equal to

    a) $a^2 - b^2$ b) $b^2 - a^2$ c) $a^2 + b^2$ d) b - a

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. If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is

    a) 1 : 2 b) 1 : 4 c) 1 : 6 d) 1 : 8

13. Variance of first 20 natural numbers is

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

14. Kamalam went to play a lucky draw contest 135 tickets of the lucky draw were sold. If the probability of kamalam winning is 1/9, then number of tickets bought by kamalam

a) 5 b) 10 c) 15 d) 20

PART - II

Answer any Ten Questions. Q.No. 28 is compulsory **10 x 2 = 20**

15. Let A = { 1, 2, 3, 4, ... 45 } and R be the relation defined as "is square of a number" on A. Write R as a subset of A x A. Also, find the domain and range of R.
16. Let f be a function from R to R defined by f(x) = 3x - 5. Find the values of a and b given than (a, 4) and (1,b) belong to f.
17. 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'
18. If 3+k, 18-k, 5k+1 are in A.P. then find k
19. Find the square root of the following expression. $144\, a^8 b^{12} c^{16} + 81\, f^{12} g^4 h^{14}$
20. Find the sum and product of the roots of the following quadratic equation : $Kx^2 - k^2x - 2k^3 = 0$
21. A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point.
22. Find the area of a triangle formed by the points (5, 2), (3, -5) and (-5, -1)
23. Calculate the slope and y intercept of the straight line 8x - 7y + 6 = 0
24. Prove that $\sec\theta - \cos\theta = \tan\theta \sin\theta$
25. If the base area of a hemispherical solid is 1386 sq. meters, then its total surface area?
26. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.
27. A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and coin shows a head.
28. From the top of a rock $50\sqrt{3}m$ high, the angle of depression of a car on the ground is observed to 30^0. Find the distance of the car from the rock.

PART - III

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

29. Find x if gff(x) = fgg(x), given f(x) = 3x + 1 and g(x) = x + 3.
30. 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 paris (ii) a table (iii) An arrow diagram (iv) A graph

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

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

33. Find the GCD of $6x^3 - 30x^2 + 60x - 48$ and $3x^3 - 12x^2 + 21x - 18$

34. If $A=\begin{bmatrix}1 & 1\\ -1 & 3\end{bmatrix}$, $B=\begin{bmatrix}1 & 2\\ -4 & 2\end{bmatrix}$ $C=\begin{bmatrix}-7 & 6\\ 3 & 2\end{bmatrix}$ verify that A(B+C) = AB + AC.

35. State and prove the Basic proportionality theorem.

36. Find the equation of the median and altitude of ΔABC through A where the vertices are A(6,2), B(-5,-1) and C (1, 9).

37. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are 30^0 and 45^0 respectively. If the lighthouse is 200m high, find the distance between the two ships. $(\sqrt{3}=1.732)$

38. 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 of its common diameter is 12cm.

39. An aluminium sphere of radius 12cm is melted to make a cylinder of radius 8cm. Find the height of the cylinder.

40. Find the co-efficient of variation of 24, 26, 33, 37, 29, 31

41. Two dice are rolled. Find the porbability that the sum of outcomes is (i) equal to 4 (ii) greater than 10 (iii) less than 13.

42. If -4 is a root of the equation $x^2 + px - 4 = 0$ and if the equation $x^2 + px + q = 0$ has equal roots, find the values of p and q.

PART - IV

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

43. a) Construct a smiliar triangle to given triangle LMN with its sides equal to 4 / 5 of the corresponding sides of the triangle LMN. (Scale factor 4 / 5 < 1) **(OR)**

b) Take a point which is 11cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.

44. a) Graph the following linear function y = 1 / 2x. 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) Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$.

V10M

Virudhunagar District Common Examinations
Second Revision Test - February 2023

Standard 10

MATHEMATICS

Time: 3.00 Hrs. Marks: 100

PART - I

Note: i) Answer ALL the questions. **14×1=14**

ii) Choose the correct answer from the four alternatives and write the option code and the corresponding answer.

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

2) If g = {(1, 1), (2, 3), (3, 5), (4, 7)} is a function given by g(x) = αx+β then the value of α and β are
   a) (−1, 2) b) (2, −1) c) (−1, −2) d) (1, 2)

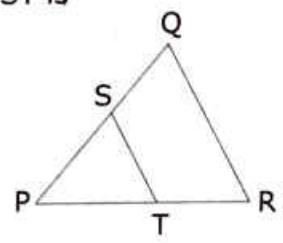
3) The sum of the exponents of the prime factors in the prime factorization of 1729 is
   a) 1 b) 2 c) 3 d) 4

4) The first term of an arithmetic progression is unity 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

5) 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

6) Which of the following must be added to make x^4+64 a perfect square?
   a) $16x^2$ b) $-16x^2$ c) 16x d) −16x

7) In the figure ST || QR, PS = 2 cm and SQ = 3 cm then the ratio of the area of ΔPQR to the area of ΔPST is



   a) 25 : 4 b) 25:9 c) 4:9 d) 9:4

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) (2, 1) is the point of intersection of the straight lines
   a) x−y−3 = 0; 3x−y−7 = 0
   b) x+y = 3; 3x+y = 7
   c) 3x+y = 3; x+y = 7
   d) x+3y−3 = 0; x−y−7 = 0

10) A tower is 60m high. Its shadow is x metres shorter when the sun's altitude is 60° than when it has been 45° then x is equal to
   a) 34.64 m
   b) 25.36 m
   c) 64.34 m
   d) 36.25 m

11) If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is

a) 1:2 b) 1:4 c) 1:6 d) 1:8

12) The volume (in cm^3) of the greatest sphere that can be cut off from a cylindrical 10g 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) $\frac{20}{3}\pi$

13) If the standard deviation of x, y, z is p then the standard deviation of 3x+5, 3y+5, 3z+5 is

a) 3p+5 b) 3p c) p+5 d) 9p+15

14) Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of Kamalam winning is 1/9, then the number of tickets bought by Kamalam is

a) 5 b) 10 c) 15 d) 20

PART - II

Note: i) Answer any TEN questions. **10×2=20**

ii) Question No. 28 is compulsory.

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

16) A Relation R is given by the set {(x, y) / y = x+3, x ∈ {0, 1, 2, 3, 4, 5}. Determine its domain and range.

17) Find the HCF of 340 and 412 using Euclids Division Algorithm.

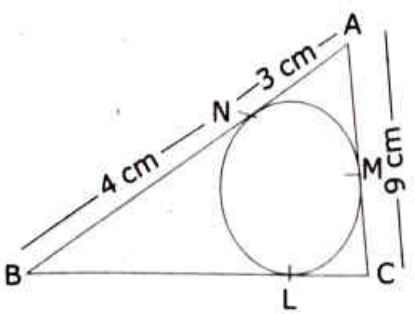
18) Solve: $8x \equiv 1 \pmod{11}$

19) Find the excluded value of the polynomial $\frac{t}{t^2 - 5t + 6}$.

20) If α and β are roots of the quadratic equation $x^2+7x+10 = 0$ then find the value of $\alpha^3-\beta^3$.

21) If $A = \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix}$ and $B = \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$ then find B−5A.

22) In the figure, ΔABC is circumscribing a circle. Find the length of BC.



23) The line through the points (−2, a) and (9, 3) has slope −1/2. Find the value of a.

24) Prove: $\frac{\sin A}{1+\cos A} + \frac{\sin A}{1-\cos A} = 2 \operatorname{cosec} A$

25) The radius of a spherical balloon increases from 12 cm to 16 cm as air being pumped into it. Find the ratio of the surface area of the balloons in the two cases.

26) Find the range and co-efficient of range for the data
43.5, 13.6, 18.9, 38.4, 61.4, 29.8

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

28) The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area.

PART - III

Note: i) Answer any TEN questions only. **10×5=50**
ii) Question No. 42 is compulsory.

29) A function f is defined by $f(x) = 2x-3$. (i) find $\frac{f(0)+f(1)}{2}$ (ii) find x such that $f(x) = 0$ (iii) find x such that $f(x) = x$ (iv) find x such that $f(x) = f(1-x)$.

30) Prove $(fog)oh = fo(goh)$ for the functions $f(x) = x-4$, $g(x) = x^2$ and $h(x) = 3x-5$.

31) The 13^{th} term of an A.P is 3 and the sum of first 13 terms is 234. Find the sum of first 21 terms.

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 prove that $x^{b-c} \times y^{c-a} \times z^{a-b} = 1$.

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

34) State and prove Angle bisector theorem.

35) Find the equation of a straight line passing through (−3, 8) and whose sum of the intercepts on the co-ordinate axes is 7.

36) Find the equation of a straight line through the point of intersection of the lines $8x+3y = 18$, $4x+5y = 9$ and bisecting the line segment joining the points (5, −4) and (−7, 6).

37) A TV Tower stands vertically on the bank of a canal. The tower is watched from a point on the other bank directly opposite to it. The angle of elevation of the tower is 60°. From the another point 20m away from this point on the line joining this point to the foot of the tower, the angle elevation of the top of the tower is 30°. Find the height of the tower and the width of the canal.

38) Calculate the weight of the hollow brass sphere if the inner diameter is 14 cm and thickness is 1mm, and whose density is 17.3 g/cm^3.

39) A right circular cylindrical container of base radius 6 cm and 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 cap. Find the number of cones needed to empty the container.

40) The mean and standard deviation of 15 observations are 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) 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.

42) Find the GCD of $6x^3-30x^2+60x-48$ and $3x^3-12x^2+21x-18$.

PART - IV

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

43) Draw a circle of diameter 6 cm. At a point L on it draw a tangent to the circle using the alternate segment theorem.

(OR)

Draw the $\triangle ABC$ of base 1 BC = 8 cm, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that BD = 6 cm.

44) 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 1½ hours.

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

(OR)

Discuss the nature of solutions of the quadratic equation $x^2+2x+5 = 0$ using graph.

CLASS 10

REG.NO

COMMON REVISION EXAMINATION – FEBRUARY / MARCH 2023

MATHEMATICS

TIME: 3.00 Hrs MARKS:100

Instructions:

(i) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(ii). Use Blue or Black ink. to write and underline and pencil to draw diagrams.

This Question Paper contains four parts.

PART -I

NOTE: (i) Answer all the 14 questions. 14×1=14

(ii) Choose the most suitable answer from the given four alternatives and write the option code with the correct answer.

(iii) Each question carries 1 mark.

1. Let A = {1,2, 3, 4} and 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) Identity function
   (C) One-to-one function (D) Into function
2. 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
3. If $A = 2^{65}$ and $B = 2^{64}+2^{63}+2^{62}+\ldots+2^0$ which of the following is true?
   (A) B is 2^{64} more than A (B) A and B are equal
   (C) B is larger than A by 1 (D) A is larger than B by 1
4. The values of a and b if $4x^4-24x^3+76x^2+ax+b$ is a perfect square are
   (A) 100,120 (B) 10,12 (C) -120 ,100 (D) 12,10
5. 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
6. In a given figure ST ∥QR, PS = 2 cm and SQ = 3 cm. Then the ratio of the area of ΔPQR to the area of ΔPST is
   (A) 25 : 4 (B) 25 : 7 (C) 25 : 11 (D) 25 : 13

7. 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
8. 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
9. If $5x = \sec\theta$ and $\frac{5}{x} = \tan\theta$ then $x^2 - \frac{1}{x^2}$ is equal to
   (A) 25 (B) $\frac{1}{25}$ (C) 5 (D) 1
10. The total surface area of a cylinder whose radius is $\frac{1}{3}$ of its height is
    (A) $\frac{9\pi h^2}{8}$ sq.units (B) $24\pi h^2$ sq.units (C) $\frac{8\pi h^2}{9}$ sq.units (D) $\frac{56\pi h^2}{9}$ sq.units
11. 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
12. The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$ then the value of x is
    (A) 2 (B) 1 (C) 3 (D) 1.5
13. If B×A = {(3,1),(3,2),(3,3),(4,1),(4,2),(4,3)} then A is
    (A) {3,4} (B) {3,2,1} (C) {1,2,3} (D) {4,3}
14. The probability of an impossible event is
    (A) 1 (B) 2 (C) -1 (D) 0

PART – II

Note: Answer any 10 questions. QuestionNo.28 is compulsory. 10 × 2 = 20

15. Find A ×B , A ×A A={m,n} ; B=∅
16. Let A = {1,2, 3, 4} and B = N Let f : A →B be defined by $f(x) = x^3$ then,
    (i) find the range of f (ii) identify the type of function
17. A man has 532 flower pots. He wants to arrange them in rows such that each row contains 21 flower pots. Find the number of completed rows and how many flower pots are left over.
18. Find the number of terms in the A.P. 3, 6, 9, 12,..., 111.
19. Find the excluded values of the expression, $\frac{x}{y^2-25}$
20. If a matrix has 18 elements, what are the possible orders it can have? What if it has 6 elements?
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. Find the slope of a line joining the given points (-6,1) and (-3,2)
23. Prove that $\sec\theta - \cos\theta = \tan\theta \sin\theta$
24. 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.
25. The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. Find the diameter of the cylinder.

26. Find the range of the following distribution

Age (in years)	16-18	18-20	20-22	22-24	24-26	26-28
Number of students	6	4	6	8	7	2

27. Find the intercepts made by the line $4x + 3y - 12 = 0$ on the coordinate axes.

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

PART - III

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

29. Let $A = \{x \in \mathbb{N} : 1 < x < 4\}$, $B = \{x \in \mathbf{W} : 0 \leq x < 2\}$ and $C = \{x \in \mathbb{N} : x < 3\}$.
Then verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$.

30. If $f(x) = x - 4$, $g(x) = x^2$ and $h(x) = 3x - 5$, then verify $(f \circ g) \circ h = f \circ (g \circ h)$.

31. If $S_1, S_2, S_3, \ldots, S_m$ are the sums of n terms of m A.P.'s whose first terms are $1, 2, 3, \ldots, m$ and whose common differences are $1, 3, 5, \ldots, (2m-1)$ respectively, then show that $S_1 + S_2 + S_3 + \cdots + S_m = \frac{1}{2}mn(mn+1)$.

32. If $1+2+3+\ldots+x = 666$, then find x.

33. Find the square root of the following polynomial by division method
$37x^4 - 28x^3 + 4x^2 + 42x + 9$

34. The hypotenuse of a right angled triangle is 15 cm and its perimeter is 36 cm. Find the length of the smallest side.

35. State and prove Basic Proportionality Theorem.

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

37. 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 45°. 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.

38. An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10 m and 4 m and whose height is 4 m. Find the curved and total surface area of the bucket.

39. A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm, then find the thickness of the cylinder.

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. Two dice are rolled once. Find the probability of getting an even number on the first die or a total of face sum 4.

42. Find the area of the quadrilateral whose vertices are at
$(-9, 0)$, $(-8, 6)$, $(-1, -2)$ and $(-6, -5)$.

PART - IV

Answer all the questions **2 × 8 = 16**

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR. (scale factor $\frac{7}{3} > 1$)

b) Draw a triangle ABC of base $BC = 8$ cm, $\angle A = 60°$ and the bisector of $\angle A$ meets BC at D such that $BD = 6$ cm.

44. a) A school announces that for a certain competitions, the cash price will be distributed for all the participants equally as shown below.

No. of Participants(x)	2	4	6	8	10
Amount for each Participant in ₹(y)	180	90	60	45	36

(i) Find the constant of variation.
(ii) Graph the above data and hence, find how much will each participant get if the number of participants are 12.

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

2RM MADURAI

10 - Std Second Revision Test - 2023

MATHEMATICS

Time : 3.00 hrs. Marks : 100

I **Choose the correct answer from the four alternatives and write the option code and the corresponding answer.** 14 x 1 = 14

1. Let n (A) = m and n (B) = n then the 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. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is
   a) linear b) cubic c) reciprocal d) quadratic
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 $\frac{a^2}{a^2-b^2} + \frac{b^2}{b^2-a^2}$ is a) a - b b) a + b c) $a^2 - b^2$ d) 1
5. 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
6. Transpose of a row matrix is
   a) unit matrix b) diagonal matrix c) column matrix d) row matrix
7. If $\triangle ABC$ is an isosceles triangle with $\angle C = 90^\circ$ 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 point P to a circle with centre O are PA and PB. If $\angle APB = 70^\circ$ then the value of $\angle AOB$ is
   a) 100° b) 110° c) 120° d) 130°
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. 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
11. if x = a tanθ and y = b sec θ then
    a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$
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. A cone of height 24cm and radius 6cm is made up of modeling clay. A child reshapes it in the form of a sphere then the radius of the sphere is
    a) 24 cm b) 12 cm c) 6 cm d) 48cm
14. If a letter is chosen at random from the English alphabets {a, b, c, ... z} then the probability that the letter chose precedes x a) $\frac{12}{13}$ b) $\frac{1}{13}$ c) $\frac{23}{26}$ d) $\frac{3}{26}$

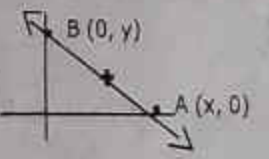
Answer any 10 questions. Q.No. 28 is compulsory. 10 X 2 = 20

15. If B x A = {(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3) (3, 4) find A and B.
16. 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.
17. Find the least number that is divisible by the first ten natural numbers.
18. Find the sum of $1^3 + 2^3 + 3^3 + \ldots\ldots\ldots\ldots 16^3$.
19. Find the excluded value of the expression $\frac{7p+2}{8p^2+13p+5}$.
20. If $A = \begin{pmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{pmatrix}$ then find the transpose of -A.

21. Check whether AD is bisector of $\angle A$ of ΔABC in the following AB = 5 cm, AC = 10 cm, BD = 1.5cm and CD = 3.6cm.
22. Show that the points (-3, -4), (7, 2) and (12, 5) are collinear.
23. Show that the straight lines x - 2y + 3 = 0, 6x + 3y + 8 = 0 are perpendicular.
24. Prove that $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$
25. Find the diameter of a sphere whose surface area is $154m^2$.
26. Find the range and co-efficient of range of the following data.
    25, 67, 48, 53, 44, 39, 18
27. A coin is tossed thrice. What is the probability of getting two consecutive tails.
28. A cone of height 24cm is made up of modeling day. A child reshapes it in the the form of a cylinder of same radius as cone. Find the height of the cylinder.

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

29. Let $f : A \to B$ 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
30. If f(x) = 2x + 3, g (x) = 1 - 2x and h(x) = 3x prove that fo(goh) = (fog)oh.
31. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
32. The sum of squares of first n natural numbers is 285 and the sum of cubes of first n natural numbers is 2025, then find the value of n.
33. Find the square root of $x^4 - 12x^3 + 42x^2 - 36x + 9$.
34. A ladder 17 feet long is leaning against a wall. If the ladder, vertical wall and the floor from the bottom of the wall to the ladder form a right triangle, find the height of the wall where the top of the ladder meets if the distance between bottom of the wall to bottom of the ladder is 7 feet less than the height of the wall.
35. State and prove Basic proportionality theorem.
36. Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).
37. A straight line AB cuts the co - ordinate axes at A and B. If the mid - point of AB is (2, 3). Find the equation of AB.



38. From the top of a tower 60m high, the angle of depression of the top and bottom of a vertical lamp post are observed to the 38° and 60° respectively. Find the height of the lamp post. (tan 38° = 0.7813, $\sqrt{3}$ = 1.732)
39. If the radii of the circular ends of a frustrum which is 45cm high are 28cm and 7cm, find the volume of the frustrum.
40. The scores of a cricketer in 7 matches are 70, 80, 60, 50, 40, 90, 95 . Find the standard deviation.
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 $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ show that $A^2 - 5A + 7I_2 = 0$.

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

43. a) Draw two tangents from a point which is 10cm away from the centre of a circle of radius 5cm. Also measure the length of the tangents. ***(OR)*** b) Draw a triangle ABC of base BE 8 cm, $\angle A = 60^0$ and the bisector of $\angle A$ meets BC at D such that BD = 6cm.
44. a) Graph the following linear function y = 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) Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$.

H

Reg. No.: | 1 | 0 | 2 | 2 | 7 | |

COMMON SECOND REVISION TEST - 2023

Std - X

Time : 3.00 Hours **MATHEMATICS** Marks: 100

Part - A

I. **Answer all the questions. Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer:** **14 x 1 = 14**

1. 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) $\frac{1}{6x^2}$

2. In a G.P. if $t_1 = \frac{1}{5}$ and $t_2 = \frac{1}{25}$ then the common ratio is .....

a) $\frac{1}{5}$ b) 5 c) 25 d) $\frac{2}{5}$

3. The value of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are

a) 100, 120 b) 10, 12 c) -120, 100 d) 12, 10

4. In a ΔABC, AD is the bisector of $\angle BAC$. If AB = 8 cm, BD = 6 cm and DC = 3cm. The length of the side AC is

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

5. A straight line has equation 8y = 4x + 21. Which of the following is true ?

a) The slope is 0.5 and the y intercept is 2.6

b) The slope is 5 and the y intercept is 1.6

c) The slope is 0.5 and the y intercept is 1.6

d) The slope is 5 and the y intercept is 2.6

6. $a\cot\theta + b\,\text{cosec}\,\theta = p$ and $b\cot\theta + a\,\text{cosec}\theta = q$ then $p^2 - q^2$ is equal to

a) $a^2 - b^2$ b) $b^2 - a^2$ c) $a^2 + b^2$ d) b - a

7. A shuttle cock used for playing badminton has the shape of the combination of

a) a cylinder and a sphere b) a hemisphere and a cone

c) a sphere and a cone d) frustum of a cone and a hemisphere

8. The standard deviation of a data is 3. If each value is multiplied by 5 then the new variance is

a) 3 b) 15 c) 5 d) 225

9. The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$ then the value of x is

a) 2 b) 1 c) 3 d) 1.5

10. If in triangles ABC and EDF, $\frac{AB}{DE}=\frac{BC}{FD}$ then they will be similar, when

a) $\angle B = \angle E$ b) $\angle A = \angle D$ c) $\angle B = \angle D$ d) $\angle A = \angle F$

11. A tower is 60m height. Its shadow is x metres shorter when the sun's altitude is 45° than when it has been 30°, then x is equal to

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

12. 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

d) passing through the point (0, 11)

13. If $A=\begin{pmatrix}1 & 2 & -2\\ 5 & -4 & 6\\ -3 & 2 & 9\end{pmatrix}$, $B=\begin{pmatrix}1 & 8\\ 3 & 4\\ 9 & 6\end{pmatrix}$, A + B =

a) $\begin{pmatrix}2 & 10\\ 8 & 0\\ 6 & 8\end{pmatrix}$ b) $\begin{pmatrix}2 & 10 & -2\\ 8 & 0 & 6\\ 6 & 8 & 9\end{pmatrix}$ c) not possible to add d) none of these

14. A cone of height 24 cm is made up of modeling clay. A child reshapes it in the form of a cylinder a same radius as cone. The height of the cylinder is

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

Part - B

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

15. A relation f : X → Y is defined by $f(x) = x^2 - 4$ where, $x \in \{-2, -1, 0, 3\}$ and Y = R.

i) List the elements of f ii) Is f a function?

16. A function f is defined by f(x) = 3 - 2x. Find x such that $f(x^2) = (f(x))^2$.

17. Prove that $2^n + 6 \times 9^n$ is always divisible by 7 for any positive integer n.

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

19. Which rational expression should be subtracted from $\frac{x^2+6x+8}{x^3+8}$ to get $\frac{3}{x^2-2x+4}$

20. The product of Kumaran's age (in years) two years ago and his age four years from now is one more than twice his present age. What is his present age?

21 If the total surface area of a cone of radius 7 cm is 704 cm^2, then find its slant height.

22 The line through the points (-2, 6) and (4, 8) is perpendicular to the line through the points (8, 12) and (x, 24). Find the value of x.

23 Prove the following identities $\frac{\cos\theta}{1+\sin\theta} = \sec\theta - \tan\theta$

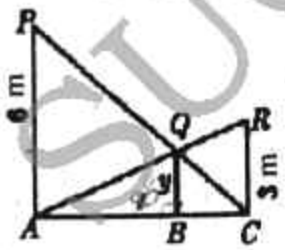
24 Find the number of spherical lead shots, each of diameter 6cm that can be made from a solid cuboids of lead having dimensions 24cm x 22 cm x 12 cm

25 If n = 5, $\bar{x} = 6$, $\sum x^2 = 765$ then calculate the coefficient of variations.

26 A and B are two candidates seeking admission to IIT. The probability that A getting selected is 0.5 and the probability that both A and B getting selected is 0.3. Prove that the probability of B being selected is atmost 0.8.

27 Find the equation of a straight line perpendicular to the line $y = \frac{4}{3}x - 7$ and passing through the point (7, -1)

28 Two vertical poles of heights 6m and 3m are erected above a horizontal ground AC. Find the value of y.



Part - C

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

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. Forensic scientists can determine the height (in cm) of a person based on the length of the thigh bone. They usually do so using the function h(b) = 2.47b+54.10 where b is the length of the thigh bone.
   i) Verify the function h is one - one or not.
   ii) Also find the height of a person if the length of his thigh bone is 50cm.
   iii) Find the length of the thigh bone if the height of a person is 147.96 cm.

31. Use Euclid's Division Algorithm to find the Highest Common Factor (HCF) of 396, 504, 636.

32. A brick staircase has a total of 30 steps. The bottom step requires 100 bricks. Each successive step requires two bricks less than the previous step.
   i) How many bricks are required for the top most step?
   ii) How many bricks are required to build the stair case?

33. Solve the following system of linear equations in three variables.
   x + y + z = 5, 2x - y + z = 9, x - 2y + 3z = 16

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

35. State and prove Baudhayana (Pythagoras) theorem.

36. The area of a triangle is 5 sq. units. Two of its vertices are (2, 1) and (3, -2). The third vertex lies on the line $y = x + 3$. Find the third vertex.

37. Find the equation of the median of ΔABC through C. Where the vertices are A (6,2), B (-5, -1) and C (1, 9)

38. The angles of elevation and depression of the top and bottom of a lamp post from the top of a 66m high 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 ($\sqrt{3} = 1.732$)

39. A metallic sheet in the form of a sector of a circle of radius 21cm has central angle of 216°. The sector is made into a cone by bringing the bounding radii together. Find the volume of the cone formed.

40. The marks scored by the students in a slip test are given below. Find the standard deviation of their marks.

x	4	6	8	10	12
f	7	3	5	9	5

41. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ show that $A^2 - (a + d) A = (bc - ad)I_2$

42. If two dice are rolled, then find the probability of getting the product of face value 6 or the difference of face values 5.

Part - D

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

43. a) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point. **(OR)**

b) Construct a triangle ΔPQR such that QR = 8 cm, $\angle P = 30°$ and the altitude from P to QR is of length 4.8cm.

44. a) Draw the Graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$ **(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 hr.

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