COMMON HALF YEARLY EXAMINATION - 2023

B

Standard X

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Reg.No.					

D	MATHE	MATICS	400
Time : 3.00 hrs	Pa	rt - I	Marks: 100
I. Choose the corre	ect answer:	*	. 14×1=14
	2, 3}, C = {p, q, r, s} tl	hen n[(A \cup C) x B] is	
a) 8	b) 20		d) 16
a) o		the range of f will have	elements.
a) 2	b) 0	c) 1	d) none of these
a) 2 The least number		the numbers from 1 to	10 (both inclusive) is
a) 2025	b) 5220	c) 5025	d) 2520
4. The value of (13) - (1 + 2 + 3 + + 15	i) is
a) 14400		b) 14200	
c) 14280		d) 14520	4
	ar equation is a		
a) straight line		c) parabola	d) hyperbola
	$(16)^2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$	5)	* * * * * * * * * * * * * * * * * * * *
(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. In a AABC, AD is	the bisector of ∠BAC	C. If $AB = 8$ cm, $BD = 6$ c	cm and DC = 3 cm. The
length of the sid	e AC is		
al 6 cm	b) 4 cm	c) 3 cm	d) 8 cm
8. The slope of the	line joining (12,3), (4,	a) is $\frac{1}{8}$. The value of 's	a is
a) 1	b) 4	c) -5	d) 2 ,
 (secθ + tanθ) (s 	ecθ – tanθ) is		d) 1
a) -1	b) $\sec^2\theta$	c) tan ² 0	
10. The angle of ele depression of it the lake is	vation of a cloud from s reflection in the lake	a point h metres above is 45°. The height of lo	a lake is β. The angle of cation of the cloud from
	b) $\frac{h(1-\tan\beta)}{1+\tan\beta}$	c) $htan(45^{\circ} - \beta)$	d) none of these

X Maths

- 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

d) 30000

- 12. 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 13. The mean of 100 activations is 40 and their standard deviation is 3. The sum of squares of all observations is a) 40000 b) 160900
- 14. Which of the following is incorrect?
 - a) P(A) > 1 b) $0 \le P(A) \le 1$ c) $P(\phi) = 0$

c) 160000 -

d) $P(A) + P(\overline{A}) = 1$

Part - II

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

- $10 \times 2 = 20$
- 15. A Relation R is given by the set $\{(x, y) \mid y = x + 3, x \in \{0,1,2,3,4,5\}\}$. Determine its domain and range.
- 16. If the ordered pairs $(x^2 3x, y^2 + 4y)$ and (-2, 5) are equal, then find x and y.
- 17. What is the time 100 hours after 7 a.m?
- 18. Find the 19th term of an A.P. -11, -15, -19,
- 19. Simplify: $\frac{5t^3}{4t-8} \times \frac{6t-12}{10t}$
- 20. If $A = \begin{pmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{pmatrix}$, $B = \begin{pmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{pmatrix}$, then find 2A + B.
- 21. 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. 22. Check whether the given lines are parallel or perpendicular, 5x + 23y + 14 = 0 and
- 23x 5y + 9 = 0
- 23. Show that $\frac{1}{1 + \sin \theta} + \frac{1}{1 \sin \theta} = 2 \sec^2 \theta$
- 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. Find the diameter of a sphere whose surface area is 154 m².

 $10 \times 5 = 50$

- Find the standard deviation of first 21 natural numbers.
- 27. Two coins are tossed together. What is the probability of getting different faces on the coins?
- 28. Find the slope of a line Joining the given points (-6, 1) and (-3, 2)

Part - III

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

- 29. Let f: A → B be a function defined by $f(x) = \frac{x}{2} - 1$, where A = {2, 4, 6, 10, 12}.

- ii) a table i) Set of ordered pairs
- iv) a graph iii) an arrow diagram
- 30. If $f(x) = x^2$, g(x) = 2x and h(x) = x + 4, prove that fo(goh) = (fog)oh31. If nine times ninth term is equal to the fifteen times fifteenth term, show that six times twenty fourth term is zero.
- 32. Find the sum of the following series: $10^3 + 11^3 + 12^3 + \dots + 20^3$
- 33. Find the square root of $64x^4 16x^3 + 17x^2 2x + 1$ 34. State and prove Thales theorem.
- 35. Find the value of k, if the area of a quadrilateral is 28 sq.units, whose vertices are taken in order (-4, -2), (-3, k), (3, -2) and (2, 3)
- 36. If the vertices of \triangle ABC are A(6,2), B(-5,-1) and C(1,9), find the equation of median.
- 37. From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree for 45° and 30° respectively. Find the height of the second tree. $(\sqrt{3} = 1.732)$ 38. 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. 39. Find the number of spherical lead shots, each of diameter 6 cm that can be made
- from a solid cuboids of lead having dimensions 24 cm x 22 cm x 12 cm. 40. The following table gives the values of mean and variance of heights and weights of the 10th standard students of a school.

	Height	Weight	
Mean	155 cm	46.50 kg	
Variance	72.25 cm ²	28.09 kg	

Which is more varying than the other?

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 $A^2 - 5A + 7I_2 = 0$

Part - IV

IV. Answer all the questions.

 $2 \times 8 = 16$

Construct a triangle similar to a given triangle LMN with its side equal to $\frac{4}{5}$ of the corresponding sides of the triangle LMN (scale factor $\frac{4}{5}$ <1)

(OR)

- b) Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.
- 44. a) Nishanth is the winner in a Marathon race of 12 km distance. He ran at a uniform speed of 12 km / hr and reached the destination in 1 hour. He was followed by Aradhana, Jayanth; Sathya and Swetha with their respective speed of 6 km/hr, 4 km/hr, 3km/hr and 2 km/hr. And, they covered the distance in 2 hours, 3 hours, 4 hours and 6 hours respectively.

Draw the speed-time graph and use it to find the time taken of Kaushik with his speed of 2.4 km/hr.

(OR)

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