10 C

Register No. 10 31

HALF YEARLY EXAMINATION - 2025

Time : 3.00 Hours   MATHS   Marks : 100

I.   Choose the best answer   14×1=14

1. If $n(A×B)=6$ and $A=\{1,3\}$ then $n(B)$ is
   (A) 1   (B) 2   (C) 3   (D) 6

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 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. 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

5. A system of three linear equations in three variables is inconsistent if their planes
   (A) intersect only at a point   (B) intersect in a line
   (C) coincides with each other   (D) do not intersect

6. The solution of $(2x-1)^2=9$ is equal to
   (A) -1   (B) 2   (C) -1,2   (D) None of these

7. In $\triangle LMN$ $\angle L=60^\circ$, $\angle M=50^\circ$. If $\triangle LMN \sim \triangle PQR$ then the value of $\angle R$ is
   (A) 40° (B) 70° (C) 30° (D) 110°

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 Angle of Elevation and Depression are usually Measured using
   Theodolite   (B) Microscope   (C) Telescope   (D) Clinometer

10. If $\sin\theta+\cos\theta=a$ and $\sec\theta+cosec\theta=b$, then the value of $b(a^2-1)$ is equal to
    (A) 2a   (B) 3a   (C) 0   (D) 2ab

11. The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is
    (A) 60π cm^2 (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. The range of the data 8,8,8,8,8...8 is
    (A) 0   (B) 1   (C) 8   (D) 3

14. Which is not a probability value
    1.01   (B) 0.57   (C) 2/3   (D) 20%

II.   Answer any 10 from the following Q.No 28 is compulsary   10×2=20

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 $f(x)=2x+5$. If $x\neq0$ then find $\dfrac{f(x+2) - f(2)}{x}$

17. If $13824=2^a×3^b$ then find a and b.

18. Find the sum of $3+6+9+....+96$

19. If α and β are the roots of $x^2+7x+10=0$ find the values of $(\alpha-\beta)$

20. Simplify : $\dfrac{5t^3}{4t-8} × \dfrac{6t-12}{10t}$

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

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

23. Find the slope and y intercept of $\sqrt{3}x+(1-\sqrt{3})y=3$.

24. Prove that $\dfrac{\sin A}{1+\cos A} = \dfrac{1-\cos A}{\sin A}$

25. The volumes of two cones of same base radius are 3600 cm³ and 5040 cm³. Find the ratio of heights.

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

27. What is the probability that a leap year selected at random will contain 53 Saturdays.

28. Find the excluded values of $\dfrac{x}{x^2+1}$

III. Answer any 10 from the following. A. No. 42 is compulsary $10 \times 5 = 50$

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

30. If f(x)=2x+3, g(x)=1-2x and h(x)=3x. Prove that f∘(g∘h)=(f∘g)∘h

31. 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?

32. Solve 3x+y-3z=1; -2x-y+2z=1; -x-y+z=2.

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

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. State and prove BASIC PROPORTIONALITY 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),(-3,k),(3,-2) and (2,3)

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

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

40. A wall clock strikes the bell once at 1 o' clock, 2 times at 2o' clock, 3 times at 3 o' clock and so on. How many times will it strike in a particular Day. Find the Standard deviation of the number of strikes the bell make a day.

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

42. In an A.P., sum of four consecutive terms is 28 and the sum of their squares is 276 . Find the four numbers

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

43 (A) Draw a triangle ABC of base BC=8 cm, ∠A= 60° and the bisector of ∠A meets BC at D Such that BD = 6 cm.

(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 y=x²+3x-4 and hence use it to solve x²+3x-4=0

(OR)

(B) Varshika draw 6 circles with different sizes. Draw a graph for the relationship between the diameter and circumference (approximately related) of each circle as shown in the table and use it to find the circumference of a circle when its diameter is 6 cm.

Diameter (a) xm	1	2	3	4	5
Circumference (y) cm	3.1	6.2	9.3	12.4	15.5