T

COMMON FIRST REVISION EXAMINATION - JAN. 2025

Standard - X   Reg.No.

Time: 3.00 hrs.   **MATHEMATICS**   Marks:100

PART - I (MARKS : 14)

Note : I) Answer all the questions.

  ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer. 14×1=14

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

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

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

4. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \ldots \ldots + 2^0$ 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

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

6. The square root of $\frac{256\ x^8 y^4 z^{10}}{25\ x^6 y^6 z^6}$ is equal to
   a) $\frac{16}{5}\left|\frac{x^2 z^4}{y^2}\right|$ b) $\frac{16}{5}\left|\frac{y^2}{x^2 z^4}\right|$ c) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ d) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

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

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

9. Cotθ = tanθ If θ is = _____.
   a) 0°   b) 30°   c) 45°   d) 60°

10. 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

11. The equation of a line passing through the origin and perpendicular to the line
    $7x - 3y + 4 = 0$

    a) $7x - 3y + 4 = 0$ b) $3x - 7y + 4 = 0$ c) $3x + 7y = 0$ d) $7x - 3y = 0$

12. If $(\sin\alpha + \mathrm{cosec}\,\alpha)^2 + (\cos\alpha + \sec\alpha)^2 = k + \tan^2\alpha + \cot^2\alpha$, then the value of k is
    equal to

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

13. If $\sin\theta + \cos\theta = a$ and $\sec\theta + \mathrm{cosec}\,\theta = b$ then the value of $b(a^2 - 1)$ is equal to

    a) $2a$ b) $3a$ c) 0 d) $2ab$

14. The inclination of Y axis and every line parallel to Y axis is

    a) 0° b) 30° c) 60° d) 90°

PART - II (MARKS : 20)

Answer any TEN questions. Question No.28 is compulsory.

Each question carries 2 marks.   **10×2=20**

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

16. Let A = {1, 2, 3, 4, ..., 100} and R be the relation defined as "is cube of a
    number" on A. Find the domain and range of R.

17. Let f be a function f : N → N defined by $f(x) = 3x + 2$, $x \in N$. Find the pre-images
    of 29, 53.

18. How many terms of the series $1 + 4 + 16 + ...$ make the sum 1365?

19. 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.

20. If $1^3 + 2^3 + 3^3 + ...k^3 = 16900$ then find $1 + 2 + 3 + ...k$.

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

22. If two positive integers p and q are written as $p = a^2b^3$ and $q = a^3b$; a, b are
    prime numbers, then verify LCM (P, q) × HCF (p, q) = pq

23. Determine the nature of roots for the following quadratic equation
    $2x^2 - 2x + 9 = 0$.

24. If ΔABC is similar to ΔDEF such that BC = 3cm, EF = 4cm and area of
    ΔABC = 54cm², Find the area of ΔDEF.

25. Find the intercepts made by the line $4x - 9y + 36 = 0$ on the coordinates axes.

26. Show that the given points are collinear by using slope concept (-3, -4), (7, 2)
    and (12, 5).

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

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

PART - III (Marks : 50)

Answer any TEN questions. Question No.42 is compulsory.

Each question carries 5 marks.   **10×5=50**

29. Let $A = \{x \in W \setminus x < 2\}$, $B = \{x \in N | 1 < x \leq 4\}$ and $C = \{3, 5\}$. Check if $A \times (B \cap C) = (A \times B) \cap (A \times C)$ is true?

30. Let $A = \{1, 2, 3, 4\}$ and $B = \{2, 5, 8, 11, 14\}$ be two sets. Let $f : A \to B$ be a function given by $f(x) = 3x - 1$. Represent this function (i) by arrow diagram (ii) in a table form (iii) as a set of ordered pairs (iv) in a graphical form.

31. Find x if $gf\,f(x) = fgg(x)$, given $f(x) = 3x + 1$, $g(x) = x + 3$.

32. Find the sum to n terms of the series $5 + 55 + 555 + \ldots \ldots$ to n terms.

33. The product of three consecutive terms of a Geometric Progression is 343 and their sum is $\dfrac{91}{3}$. Find the three terms.

34. Find the sum of the all 3 digit natural numbers which are divisible by 9.

35. Solve : $x + y + z = 5$; $2x - y + z = 9$; $x - 2y + 3z = 16$.

36. Find the square root of $(x^2 + 5x + 6)(x^2 - 2x - 8)(x^2 - x - 12)$

37. A girl is twice as old as her sister. Five years hence, the product of their ages (in years) will be 375. Find their present ages.

38. State and Prove Thales Theorem.

39. Find the area of the quadrilateral formed by the points $(8, 6)$, $(5, 11)$, $(-5, 12)$ and $(-4, 3)$

40. 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 $2y = x + 3$.

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

42. PQRS is a rhombus. Its diagonals PR and QS intersect at the point M and satisfy $QS = 2PR$. If the coordinates of S and M are $(1, 1)$ and $(2, -1)$ respectively, find the coordinates of P.

PART - IV (Marks : 16)

Answer both questions. Each question carries 8 marks.   **2×8=16**

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

   of the corresponding sides of the triangle ABC (scale factor $\frac{6}{5}$)

   (OR)

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

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

   (OR)

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