BRINDHAVAN HR SEC SCHOOL,SUKKIRANPATTI

MODEL PUBLIC EXAMINATION 2025

10th Standard

Maths

Date : 04-03-25
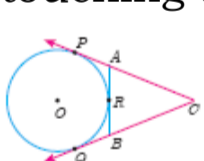
Reg.No. : ☐☐☐☐☐☐

Exam Time : 03:00 Hrs

Total Marks : 100

PART - A

14 x 1 = 14

CHOOSE THE CORRECT ANSWER

1) If A = {1, 2}, B = {1, 2, 3, 4}, C = {5, 6} and D = {5, 6, 7, 8} then state which of the following statement is true..

 (a) $(A \times C) \subset (B \times D)$ (b) $(B \times D) \subset (A \times C)$ (c) $(A \times B) \subset (A \times D)$ (d) $(D \times A) \subset (B \times A)$

2) 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}

3) Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that a = bq + r , where r must satisfy

 (a) $1 < r < b$ (b) $0 < r < b$ (c) $0 \leq r < b$ (d) $0 < r \leq b$

4) The solution of the system x + y − 3z = −6, −7y + 7z = 7, 3z = 9 is

 (a) x = 1, y = 2, z = 3 (b) x = −1, y = 2, z = 3 (c) x = −1, y = −2, z = 3
 (d) x = 1, y = -2, z = 3

5) Transpose of a column matrix is

 (a) unit matrix (b) diagonal matrix (c) column matrix (d) row matrix

6) In figure CP and CQ are tangents to a circle with centre at O. ARB is another tangent touching the circle at R. If CP = 11 cm and BC = 7 cm, then the length of BR is

 (a) 6 cm (b) 5 cm (c) 8 cm (d) 4 cm

7) 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

8) Consider four straight lines

(i) $l_1 : 3y = 4x + 5$

(ii) $l_2 : 4y = 3x - 1$

(iii) $l_3 : 4y + 3x = 7$

(iv) $l_4 : 4x + 3y = 2$

Which of the following statement is true?

(a) l_1 and l_2 are perpendicular (b) l_1 and l_4 are parallel

(c) l_2 and l_4 are perpendicular (d) l_2 and l_3 are parallel

9) $a \cot \theta + b \csc\theta = p$ and $b \cot \theta + a \csc\theta = q$ then $p^2 - q^2$ is equal to

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

10) 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

11) When the radius of a cylinder is double its height, find the relation between its C.S.A. and base area.

(a) Double (b) Equal (c) Not equal (d) Thrice

12) The variance of 5 values is 16. If each value is doubled them the standard deviation of new values is_____

(a) 4 (b) 8 (c) 32 (d) 16

13) If 3, x, 6.75 are in G.P. then x is ___

(a) 20.25 (b) 21 (c) 4.5 (d) 3.75

14) A purse contains 10 notes of Rs. 2000, 15 notes of Rs. 500, and 25 notes of Rs. 200. One note is drawn at random. What is the probability that the note is either a Rs. 500 note or Rs. 200 note?

(a) $\frac{1}{5}$ (b) $\frac{3}{10}$ (c) $\frac{2}{3}$ (d) $\frac{4}{5}$

PART - B

10 x 2 = 20

ANSWER ANY 10 QUESTIONS.QUESTION NO.28 IS COMPULSORY

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

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

17) Compute x, such that $10^4 \equiv x$ (mod 19)

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

19) Solve $2x^2 - 3x - 3 = 0$ by formula method.

20) Verify that $A^2 = I$ when $A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$

21) If $\triangle$ABC is similar to $\triangle$DEF such that BC = 3 cm, EF = 4 cm and area of $\triangle$ABC = 54 cm^2. Find the area of $\triangle$DEF.

22) Find the equation of a line passing through (6, -2) and perpendicular to the line joining the points (6, 7) and (2, –3).

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

24) A garden roller whose length is 3 m long and whose diameter is 2.8 m is rolled to level a garden. How much area will it cover in 8 revolutions?

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

26) Find the equation of a line whose inclination is 30˚ and making an intercept - 3 on the Y axis.

27) The external radius and the length of a hollow wooden log are 16 cm and 13 cm respectively. If its thickness is 4 cm then find its T.S.A.

28) What will be the probability that a non-leap year will have 53 saturdays?

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PART - C   10 x 5 = 50

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ANSWER ANY 10 QUESTIONS.QUESTION NO.42 IS COMPULSORY

29) If the function f: R$\rightarrow$ R defined by
$$f(x) = \begin{cases} 2x + 7, x < -2 \\ x^2 - 2, -2 \le x < 3 \\ 3x - 2, x \ge 3 \end{cases}$$
(i) f(4)
(ii) f(-2)
(iii) f(4) + 2f(1)
(iv) $\frac{f(1) - 3f(4)}{f(-3)}$

30) f(x) = x^2, g(x) = 2x and h(x) = x + 4 then Show that (f o g) o h = f o (g o h)

31) if a_1 = 1, a_2 = 1 and a_n = 2a_{n-1} + a_{n-2} n $\ge$3, n $\in$ N, then find the first six terms of the sequence

32) In a Geometric progression, the 4th term is $\frac{8}{9}$ and the 7th term is $\frac{64}{243}$. Find the Geometric Progression.

33) If A = $\begin{bmatrix} 1 & -1 & 2 \end{bmatrix}$, B = $\begin{bmatrix} 1 & -1 \\ 2 & 1 \\ 1 & 3 \end{bmatrix}$ and C = $\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ show that (AB)C = A(BC)

34) In figure, O is the centre of the circle with radius 5 cm. T is a point such that OT = 13 cm and OT intersects the circle E, if AB is the tangent to the circle at E, find the length of AB
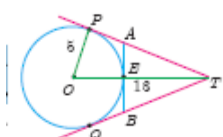
35) Without using Pythagoras theorem, show that the vertices $(1, -4)$, $(2, -3)$ and $(4, -7)$ form a right angled triangle.

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

37) if $\cos\theta + \sin\theta = \sqrt{2} \cos\theta$, then prove that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

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) 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 breathe. What should be the height of the conical part of the tent if the height of cylindrical part is 8 m?

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) In an apartment in selecting a house from door numbers 1 to 100 randomly, find the probability of getting the door number of the house to be an even number or a perfect square number or a perfect cube number

42) The length of a rectangular garden is the sum of a number and its reciprocal. The breadth is the difference of the square of the same number and its reciprocal . Find the length, breadth and the ratio of the length to the breadth of the rectangle

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PART - D

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2 x 8 = 16

ANSWER THE QUESTIONS

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

<div align="center">(OR)</div>

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 that point.

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

<div align="center">(OR)</div>

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.