

**BRINDHAVAN HIGHER SECONDARY SCHOOL - SUKKIRANPATTI**  
**FIRST 50% PORTION TEST**  
 10th Standard  
 Maths

Date : 07-Jan-23

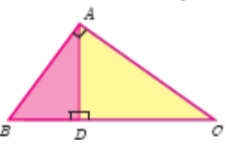
Exam Time : 03:00:00 Hrs

Reg.No. :      

Total Marks : 100

14 x 1 = 14

**PART -A****CHOOSE THE CORRECT ANSWER**

- 1) If  $n(A \times B) = 6$  and  $A = \{1,3\}$  then  $n(B)$  is  
 (a) 1 (b) 2 (c) 3 (d) 6
- 2) Let  $f(x) = \sqrt{1+x^2}$  then  
 (a)  $f(xy) = f(x).f(y)$  (b)  $f(xy) \geq f(x).f(y)$  (c)  $f(xy) \leq f(x).f(y)$  (d) None of these
- 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)  $7^{4k} \equiv \underline{\hspace{2cm}} \pmod{100}$   
 (a) 1 (b) 2 (c) 3 (d) 4
- 5) If the sequence  $t_1, t_2, t_3, \dots$  are in A.P. then the sequence  $t_6, t_{12}, t_{18}, \dots$  is  
 (a) a Geometric Progression (b) an Arithmetic Progression  
 (c) neither an Arithmetic Progression nor a Geometric Progression (d) a constant sequence
- 6) 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)  $x = 1, y = 2, z = 3$
- 7)  $\frac{x}{x^2-25} - \frac{8}{x^2+6x+5}$  gives  
 (a)  $\frac{x^2-7x+40}{(x-5)(x+5)}$  (b)  $\frac{x^2+7x+40}{(x-5)(x+5)(x+1)}$  (c)  $\frac{x^2-7x+40}{(x^2-25)(x+1)}$  (d)  $\frac{x^2+10}{(x^2-25)(x+1)}$
- 8) The number of points of intersection of the quadratic polynomial  $x^2 + 4x + 4$  with the X axis is  
 (a) 0 (b) 1 (c) 0 or 1 (d) 2
- 9) Which of the following can be calculated from the given matrices  $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}, B = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$ ,  
 (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
- 10) The perimeters of two similar triangles  $\triangle ABC$  and  $\triangle PQR$  are 36 cm and 24 cm respectively. If  $PQ = 10$  cm, then the length of  $AB$  is  
 (a)  $6\frac{2}{3}$  (b)  $\frac{10\sqrt{6}}{3} \text{ cm}$  (c)  $60\frac{2}{3} \text{ cm}$  (d) 15cm
- 11) In the adjacent figure  $\angle BAC = 90^\circ$  and  $AD \perp BC$  then  
  
 (a)  $BD \cdot CD = BC^2$  (b)  $AB \cdot AC = BC^2$  (c)  $BD \cdot CD = AD^2$  (d)  $AB \cdot AC = AD^3$
- 12) If  $f(x) + f(1-x) = 2$  then  $f\left(\frac{1}{2}\right)$  is  
 (a) 5 (b) -1 (c) -9 (d) 1
- 13) The general term of  $1/2, 2/3, 3/4, \dots$  is  
 (a)  $\frac{n}{n-1}$  (b)  $\frac{n}{n+1}$  (c)  $\frac{n}{2n+1}$  (d)  $\frac{n}{2n-1}$
- 14) The quadratic equation whose roots are  $2 + \sqrt{2}$  and  $2 - \sqrt{2}$  is  
 (a)  $x^2 - 4x + 2 = 0$  (b)  $x^2 - 2x + 2 = 0$  (c)  $x^2 + 2x - 4 = 0$  (d)  $x^2 - 2x + 4 = 0$

**PART -B**

10 x 2 = 20

**ANSWER ANY 10 QUESTIONS. QUESTION NO.28 IS COMPULSORY**

- 15) If  $A \times B = \{(3,2), (3,4), (5,2), (5,4)\}$  then find A and B.
- 16) Let  $X = \{3, 4, 6, 8\}$ . Determine whether the relation  $R = \{(x, f(x)) \mid x \in X, f(x) = x^2 + 1\}$  is a function from X to  $\mathbb{N}$ ?
- 17) Show that the square of an odd integer is of the form  $4q + 1$ , for some integer  $q$ .
- 18) Compute  $x$ , such that  $10^4 \equiv x \pmod{19}$
- 19) If  $1^3 + 2^3 + 3^3 + \dots + k^3 = 44100$  then find  $1 + 2 + 3 + \dots + k$
- 20) If a matrix has 16 elements, what are the possible orders it can have?
- 21) Find the excluded values of the following expressions (if any).  
 $\frac{7p+2}{8p^2+13p+5}$

22) Simplify

$$\frac{x^3}{x-y} + \frac{y^3}{y-x}$$

23) If  $\triangle ABC$  is similar to  $\triangle DEF$  such that  $BC = 3$  cm,  $EF = 4$  cm and area of  $\triangle ABC = 54$  cm<sup>2</sup>. Find the area of  $\triangle DEF$ .

24) In two concentric circles, a chord of length 16 cm of larger circle becomes a tangent to the smaller circle whose radius is 6 cm. Find the radius of the larger circle.

25) Find  $k$ , if  $f(k) = 2k - 1$  and  $f \circ f(k) = 5$ .

26) Determine the nature of roots for the following quadratic equations

$$9x^2 - 24x + 16 = 0$$

27) If  $\alpha, \beta$  are the roots of the equation  $3x^2 + 7x - 2 = 0$ , find the values of

$$\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$$

28) Find the sum upto infinity of the G.P  $1, \frac{1}{3}, \frac{1}{9}, \dots$ **PART-C**

10 x 5 = 50

**ANSWER ANY 10 QUESTIONS. QUESTION NO.42 IS COMPULSORY**29) Let  $A = \{x \in W \mid x < 2\}$ ,  $B = \{x \in N \mid 1 < x \leq 4\}$  and  $C = (3,5)$ . Verify that

$$A \times (B \cup C) = (A \times B) \cup (A \times C)$$

30) Let  $A = \{1,2,3,4\}$  and  $B = \{2, 5, 8, 11,14\}$  be two sets. Let  $f: A \rightarrow B$  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) Consider the functions  $f(x) = x - 4$ ,  $g(x) = x^2$  and  $h(x) = 3x - 5$ . Show that  $(f \circ g) \circ h = f \circ (g \circ h)$ 32) Determine the general term of an A.P. whose 7<sup>th</sup> term is -1 and 16<sup>th</sup> term is 17.33) The sum of first  $n$ ,  $2n$  and  $3n$  terms of an A.P are  $S_1, S_2$  and  $S_3$  respectively prove that  $S_3 = 3(S_2 - S_1)$ 34) Find the GCD of  $6x^3 - 30x^2 + 60x - 48$  and  $3x^3 - 12x^2 + 21x - 18$ .

35) Find the square root of the following polynomials by division method

$$x^4 - 12x^3 + 42x^2 - 36x + 9$$

36) A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

37) If the roots of the equation  $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$  are real and equal prove that either  $a = 0$  (or)  $a^3 + b^3 + c^3 = 3abc$ .38) If  $A = \begin{bmatrix} 1 & -1 & 2 \\ 1 & -1 & 2 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & -1 \\ 2 & 1 \\ 1 & 3 \end{bmatrix}$  and  $C = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$  show that  $(AB)C = A(BC)$ 

39) A girl looks the reflection of the top of the lamp post on the mirror which is 6.6 m away from the foot of the lamppost. The girl whose height is 12.5 m is standing 2.5 m away from the mirror. Assuming the mirror is placed on the ground facing the sky and the girl, mirror and the lamppost are in a same line, find the height of the lamp post.

40) State the Pythagoras Theorem

41) Find the sum to  $n$  terms of the series  $5 + 55 + 555 + \dots$ 

42) The base of a triangle is 4cm longer than its altitude. If the area of a triangle is 48sq.cm, then find its base and altitude

**PART -D**

2x 8 = 16

**ANSWER THE QUESTIONS**43) a) Construct a triangle similar to a given triangle PQR with its sides equal to  $\frac{7}{4}$  of the corresponding sides of the triangle PQR (scale factor  $\frac{7}{4} > 1$ )

(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) Draw the graph  $xy = 24$ ,  $x, y > 0$ . Using the graph find,

- (i)  $y$  when  $x = 3$  and
- (ii)  $x$  when  $y = 6$ .

(OR)

b) A two wheeler parking zone near bus stand charges as below

Time in hours (x)	4	8	12	24
Amount Rs. (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.

**ALL THE BEST**

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