

# ***SUN TUITION CENTER***

*POON THOTTA PATHAI HINDU MISSION HOSPITAL OPPOSITE  
VILLUPURAM*

*LIFE IS A GOOD CIRCLE*

*YOU CHOOSE THE BEST RADIUS....*

## ***MATHEMATICS***

# ***10<sup>th</sup>***

*PTA MODEL QUESTION PAPER -4  
GOVT MODEL QUESTION PAPER-12*

Minimum  
Study  
Material

price  
Rs. 300

Contact  
9629216361

**GOVT. MODEL QUESTION PAPER - 2019-20****CLASS: X****MATHEMATICS****Question  
Paper****1**

Time allowed: 3 Hours

Max. Marks: 100

Instructions : 1. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

2. Use Blue (or) Black ink to write and underline and pencil to draw diagrams.

Note: This question paper contains four parts.

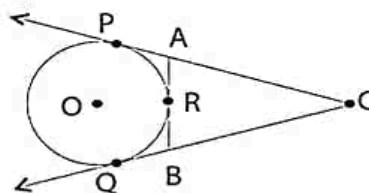
**PART - I**

Note: (i) Answer all the 14 questions.

14×1=14

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- If  $n(A \times B) = 6$  and  $A = \{1, 3\}$  then  $n(B)$  is  
1) 1                      2) 2                      3) 3                      4) 4
- Given  $F_1 = 1$ ,  $F_2 = 3$  and  $F_n = F_{n-1} + F_{n-2}$  then  $F_8$  is  
1) 3                      2) 5                      3) 8                      4) 11
- In an A.P, the first term is 1 and the common difference is 4. How many terms of the A.P must be taken for their sum to be equal to 120?  
1) 6                      2) 7                      3) 8                      4) 9
- $f = \{(2, a), (3, b), (4, b), (5, c)\}$  is a -----  
1) Identity function                      2) one - one function  
3) many - one function                      4) constant function
- The number of points of intersection of quadratic polynomial  $x^2 + 4x + 4$  with the x-axis is  
1) 0                      2) 1                      3) 0 or 1                      4) 2
- The non-diagonal elements in any unit matrix are -----  
1) 0                      2) 1                      3) m                      4) n
- If A is a  $2 \times 3$  matrix and B is a  $3 \times 4$  matrix, how many columns does AB have?  
1) 3                      2) 4                      3) 2                      4) 5
- 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



- 1) 6 cm                      2) 5 cm                      3) 8 cm                      4) 4 cm

*To achieve your target plan well*

9. The slope of the line joining (12, 3), (4, a) is  $\frac{1}{8}$ . The value of 'a' is -----.
- 1) 1                                      2) 4                                      3) -5                                      4) 2
10. If  $x = a \tan \theta$  and  $y = b \sec \theta$  then
- 1)  $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$                       2)  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$                       3)  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$                       4)  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$
11. A letter is chosen at random from the letter of the word "PROBABILITY", Find the probability that it is not a vowel
- 1)  $\frac{4}{11}$                                       2)  $\frac{7}{11}$                                       3)  $\frac{3}{11}$                                       4)  $\frac{6}{11}$
12. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
- 1) 12 cm                                      2) 10 cm                                      3) 13 cm                                      4) 5 cm
13. If the mean and co-efficient of variation of a data are 4 and 87.5% then the standard deviation is
- 1) 3.5                                      2) 3                                      3) 4.5                                      4) 2.5
14. Variance of first 20 natural numbers is
- 1) 32.25                                      2) 44.25                                      3) 33.25                                      4) 30

### PART - II

Answer any 10 questions. Question No. 28 is compulsory.

10×2=20

15. Define a function.
16. Compute  $x$  such that  $10^4 \equiv x \pmod{19}$ .
17. Simplify:  $\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$
18. Pari needs 4 hours to complete the work. His friend Yuvan needs 6 hours to complete the work. How long will it take to complete if they work together?
19. Find the values of  $x, y$  and  $z$  from following equation  $\begin{pmatrix} 12 & 3 \\ x & 5 \end{pmatrix} = \begin{pmatrix} y & z \\ 3 & 5 \end{pmatrix}$
20. What length of ladder is needed to reach a height of 7 ft along the wall when the base of the ladder is 4 ft from the wall?
21. Prove that  $\sqrt{\frac{1+\cos \theta}{1-\cos \theta}} = \operatorname{cosec} \theta + \cot \theta$
22. The radius of a sphere increases by 25 %. Find the percentage increase in its surface area.
23. The Standard Deviation and Mean of a data are 6.5 and 12.5 respectively. Find the co-efficient of variation.
24. If  $f(x) = 3 + x$ ,  $g(x) = x - 4$  then check whether  $f \circ g = g \circ f$
25. An organization plans to plant saplings in 25 streets in a town in such a way that one sapling for the first street, three for the second, nine for the third and so on. How many saplings are needed to complete the work?
26. Find the 19<sup>th</sup> term of an A.P is -11, -15, -19, .....

*an equation means nothing to us unless*

*it express a thought of good god*



**PART - IV****Answer all the questions.****2×8=16**

43. a) PQ is a chord of length 8 cm to a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length of the tangent TP.

**(OR)**

- b) Draw a triangle ABC of base BC = 8 cm,  $\angle A = 60^\circ$  and the bisector of  $\angle A$  meets BC at D such that BD = 6 cm.

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

**(OR)**

- b) A motor boat whose speed is 18 km/hr in still water takes 1 hour more to go to 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

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**ANSWERS****Govt. Model Question Paper - 2019-20****Question Paper****1****PART - I**

- |                         |  |
|-------------------------|--|
| 1. 3) 3                 | 9. 4) 2  |
| 2. 4) 11                | 10. 1) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ |
| 3. 3) 8                 | 11. 2) $\frac{7}{11}$                          |
| 4. 3) many one function | 12. 1) 12 cm                                   |
| 5. 2) 1                 | 13. 1) 3.5                                     |
| 6. 1) 0                 | 14. 3) 33.25                                   |
| 7. 2) 4                 |  |
| 8. 4) 4 cm              |  |

**PART - II**

15. A relation  $f$  between two non-empty sets X and Y is called a function from X to Y if, for each  $x \in X$  there exist only one  $y \in Y$ .

such that  $(x, y) \in f$ That is  $f = \{(x, y) / \text{for all } x \in X, y \in Y\}$ 

16.  $10^2 = 100 \equiv 5 \pmod{19}$   
 $10^4 = (10^2)^2 \equiv 5^2 \pmod{19}$   
 $10^4 \equiv 25 \pmod{19}$   
 $10^4 \equiv 6 \pmod{19}$   
 $x = 6$

17.  $\frac{\cancel{2} \cancel{4} x^2}{\cancel{2} \cancel{2} z^2} \times \frac{\cancel{3} \cancel{6} xz^3}{\cancel{20} y^4} = \frac{3x^2 xz^3}{5y^4 z^2} = \frac{3x^3 z}{5y^4}$

18. Time required for Pari to complete a work = 4 hours  
 Time required for Yuvan to complete a work = 6 hours

35. ABC is a triangle.

right angled at C,  $C = \angle 90^\circ$

$$\therefore AB^2 = BC^2 + AC^2 \quad \text{----- (1)}$$

P and Q are the mid point of AC and BC.

$\Delta AQC$  is a right angle triangle.

$$AQ^2 = AC^2 + QC^2 \quad \text{----- (2)}$$

$\Delta BPC$  is right angle triangle.

$$BP^2 = BC^2 + PC^2 \quad \text{----- (3)}$$

From equation (2) and (3) we get,

$$AQ^2 + BP^2 = AC^2 + QC^2 + BC^2 + PC^2$$

$$\begin{aligned} 4(AQ^2 + BP^2) &= 4(AC^2 + QC^2 + BC^2 + PC^2) \\ &= 4AC^2 + 4QC^2 + 4BC^2 + 4PC^2 \\ &= 4AC^2 + (2QC)^2 + 4BC^2 + (2(PC))^2 \end{aligned}$$

P is the midpoint of AC

$$AP = PC$$

$$AC = AP + PC$$

$$AC = PC + PC = 2PC$$

Q is the midpoint of BC

$$BQ = QC$$

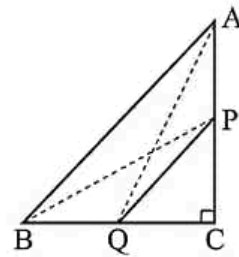
$$BC = BQ + QC = QC + QC$$

$$BC = 2QC$$

substituting in equation (3) we get

$$\begin{aligned} 4(AQ^2 + BP^2) &= 4AC^2 + BC^2 + 4BQC^2 + AC^2 \\ &= 5AC^2 + 5BC^2 \\ &= 5(AC^2 + BC^2) \end{aligned}$$

$$4(AQ^2 + BP^2) = 5(AB^2) \quad \text{by equation (1)}$$



36. Passing through (1, -4) and has intercepts which are in the ratio 2 : 5

X intercept be  $a = 2k$

Y intercept be  $b = 5k$

Equation of straight line  $\frac{x}{a} + \frac{y}{b} = 1$

$$\frac{x}{2k} + \frac{y}{5k} = 1 \quad \text{----- (1)}$$

Given passing through the point (1, -4)

$$(1) \Rightarrow \frac{1}{2k} - \frac{4}{5k} = 1$$

$$\frac{5-8}{10k} = 1$$

$$-3 = 10k$$

$$k = \frac{-3}{10}$$

Value of  $k$  in (1)

$$\frac{x}{2\left(\frac{-3}{10}\right)} + \frac{y}{5\left(\frac{-3}{10}\right)} = 1$$

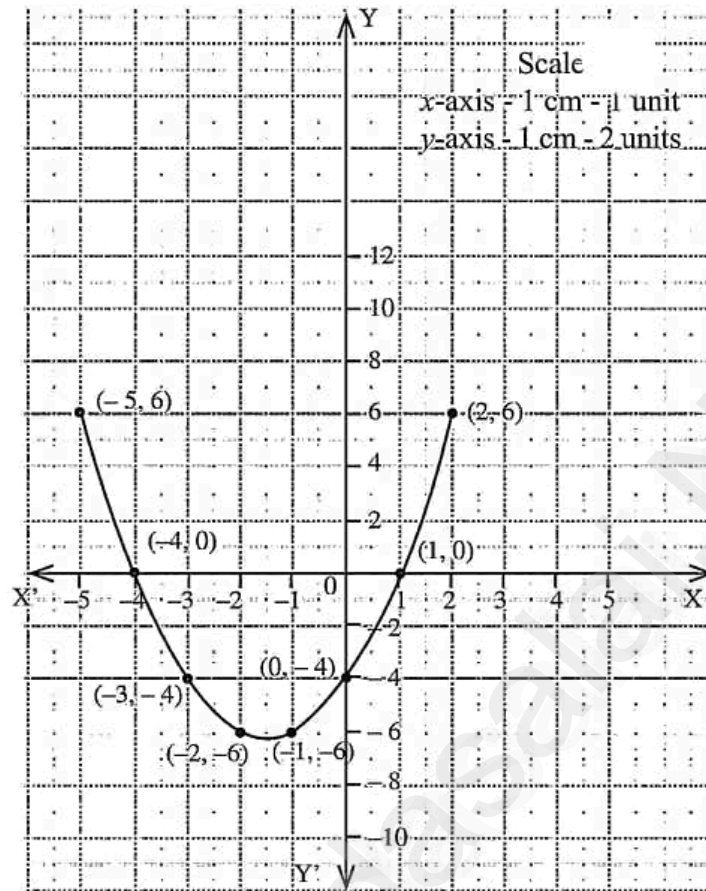
$$\frac{10x}{-6} + \frac{10y}{-15} = 1$$

$$\frac{5x}{-3} + \frac{2y}{-3} = 1$$

$$5x + 2y = -3$$

$$5x + 2y + 3 = 0$$

Then equation  $y = -8$   
No real roots.



44. b) Speed of the water =  $x$  km/hr  
Speed of the boat = 18 km / hour  
Speed of the boat in the direction of the water =  $18 + x$   
Speed of the boat in the opposite direction of the water =  $18 - x$   
Time taken by the boat to cross 24 km along the direction of the water

$$= \frac{\text{Distance}}{\text{Speed}} = \frac{24}{18 + x}$$

Time taken by the boat to cross 24 km in the opposite direction of the water =  $\frac{24}{18 - x}$

By Given data

$$\frac{24}{18 - x} - \frac{24}{18 + x} = 1 \Rightarrow 24 \left( \frac{1}{18 - x} - \frac{1}{18 + x} \right) = 1 \Rightarrow 24 \left( \frac{18 + x - 18 - x}{(18 - x)(18 + x)} \right) = 1$$

$$\Rightarrow 24 \left( \frac{2x}{324 - x^2} \right) = 1 \Rightarrow 48x = 324 - x^2 \Rightarrow x^2 + 48x - 324 = 0$$

$$\Rightarrow (x + 54)(x - 6) = 0$$

$$\Rightarrow x + 54 = 0 \quad \text{OR} \quad x - 6 = 0$$

$x = -54$  which is not possible (or)  $x = 6 \therefore$  Speed of the water = 6 km/hour





## PTA MODEL QUESTION PAPER - 1

CLASS: X

MATHEMATICS

Question  
Paper

2

Time allowed: 3 Hours

Max. Marks: 100

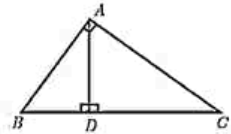
## PART - I

Note: (i) Answer all the 14 questions.

14×1=14

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- If  $\{(a, 8), (6, b)\}$  represents an identity function, then the value of  $a$  and  $b$  are respectively  
 1)  $(6, 8)$                       2)  $(8, 6)$                       3)  $(8, 8)$                       4)  $(6, 6)$
- $7^{4k} \equiv \text{-----} \pmod{100}$ .  
 1) 4                                  2) 3                                  3) 2                                  4) 1
- A system of three linear equations in three variables is inconsistent if their planes  
 1) intersect only at a point                      2) intersect in a line  
 3) coincides with each other                      4) do not intersect
- In the adjacent figure  $\angle BAC = 90^\circ$  and  $AD \perp BC$  then,  
 1)  $BD \cdot CD = BC^2$                       2)  $AB \cdot AC = BC^2$   
 3)  $BD \cdot CD = AD^2$                       4)  $AB \cdot AC = AD^2$
- The straight line given by the equation  $x = 11$   
 1) Passing through the origin                      2) Passing through the point  $(0, 11)$   
 3) Parallel to X - axis                      4) Parallel to Y - axis
- If  $(\sin \alpha + \operatorname{cosec} \alpha)^2 + (\cos \alpha + \sec \alpha)^2 = k + \tan^2 \alpha + \cot^2 \alpha$  then the value of  $k$  is equal to  
 1) 3                                  2) 5                                  3) 7                                  4) 9
- The total surface area of a cylinder whose radius is  $1/3$  of its height is  
 1)  $\frac{8\pi h^2}{9}$  sq.units                      2)  $\frac{9\pi h^2}{8}$  sq. units                      3)  $\frac{56\pi h^2}{9}$  sq. units                      4)  $24\pi h^2$  sq. units
- Which of the following is incorrect?  
 1)  $P(A) + P(\bar{A}) = 1$                       2)  $P(\phi) = 0$                       3)  $0 \leq P(A) \leq 1$                       4)  $P(A) > 1$
- The sequence  $-3, -3, -3 \dots$  is  
 1) an A.P. only                      2) a G.P only                      3) neither A.P nor G.P                      4) both A.P and G.P
- The L.C.M of  $x^3 - a^3$  and  $(x - a)^2$  is  
 1)  $(x^3 - a^3)(x + a)$                       2)  $(x^3 - a^3)(x - a)^2$                       3)  $(x - a)^2(x^2 + ax + a^2)$                       4)  $(x + a)^2(x^2 + ax + a^2)$
- In  $n(A) = p$ ,  $n(B) = q$  then the total number of relations that exists between  $A$  and  $B$  is  
 1)  $2^p$                                   2)  $2^q$                                   3)  $2^{p+q}$                                   4)  $2^{pq}$
- If the HCF of 65 and 117 is expressible in the form of  $65m - 117n$  then, the value of  $m$  is  
 1) 1                                  2) 3                                  3) 2                                  4) 4



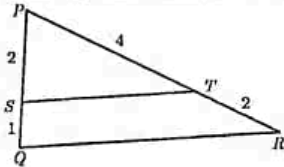
13. The sum of all deviations of the data from its mean is  
 1) always positive    2) always negative    3) zero    4) non-zero integer
14. The angle of elevation and depression are usually measured by a device called  
 1) Theodolite    2) Kaleidoscope    3) Periscope    4) Telescope

### PART – II

Answer any 10 questions. Question no. 28 is compulsory.

10×2=20

15. 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
16. Solve:  $x^4 - 13x^2 + 42 = 0$
17. If A is of order  $p \times q$  and B is order  $q \times r$  what is the order of AB and BA?
18. A relation 'f' is defined by  $f(x) = x^2 - 2$  where,  $x \in \{-2, -1, 0, 3\}$   
 i) List the elements of f    ii) Is f a function?
19. Show that  $\Delta PST \sim \Delta PQR$



20. A tower stands vertically on the ground. From a point on the ground, which is 48m away from the foot of the tower, the angle of elevation of the top of the tower  $30^\circ$ . Find the height of the tower.
21. The volume of a solid right circular cone is  $11088 \text{ cm}^3$ . If its height is 24 cm then find the radius of the cone.
22. If  $P(A) = \frac{2}{3}$ ,  $P(B) = \frac{2}{5}$  and  $P(A \cup B) = \frac{1}{3}$  then find  $P(A \cap B)$ .
23. Find  $A \times B$  and  $A \times A$  if  $A = \{m, n\}$ ;  $B = \phi$
24. Find the middle terms of an A.P. 9, 15, 21, 27, ..., 183.
25. The product of Kumaran's age (in years) two years ago and his age four years from now is one more than twice his present age. What is his present age?
26. Find the equation of a line passing through the point  $(-4, 3)$  and having slope  $-\frac{7}{5}$ .
27. The standard deviations of 20 observations is  $\sqrt{6}$ . If each observation is multiplied by 3, find the standard deviation and variance of the resulting observations.
28. An organization plans to plant saplings in 25 streets in a town in such a way that one sapling for the first street, three for the second, nine for the third and so on. How many saplings are needed to complete the work?

### PART – III

Answer any 10 questions. Question no. 42 is compulsory.

10×5=50

29. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by  $t(C) = F$  where  $(F = \frac{9}{5}C + 32)$ . Find (i)  $t(0)$  (ii)  $t(28)$  (iii)  $t(-10)$  (iv) the value



## PTA MODEL QUESTION PAPER - 2

CLASS: X

MATHEMATICS

Question  
Paper

3

Time allowed: 3 Hours

Max. Marks: 100

## PART - I

Note: (i) Answer all the 14 questions.

14×1=14

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- If  $f: A \rightarrow B$  is a bijective function and if  $n(B) = 7$ , then  $n(A)$  is equal to  
1) 1                      2) 49                      3) 14                      4) 7
- If there are 1024 relations from a set  $A = \{1, 2, 3, 4, 5\}$  to a set  $B$ , then the number of elements in  $B$  is  
1) 2                      2) 3                      3) 4                      4) 8
- The next term of the sequence  $\frac{3}{4}, \frac{1}{4}, \frac{1}{4}, \frac{1}{4}, \dots$  is  
1)  $\frac{2}{3}$                       2)  $\frac{1}{24}$                       3)  $\frac{1}{27}$                       4)  $\frac{1}{81}$
- Which of the following should be added to make  $x^4 + 64$  a perfect square?  
1)  $4x^2$                       2)  $8x^2$                       3)  $-8x^2$                       4)  $16x^2$
- The excluded value of the rational expression  $\frac{x^3 + 8}{x^2 - 2x - 8}$  is  
1) 8                      2) 2                      3) 4                      4) 1
- Graph of a linear equation is a  
1) straight line                      2) circle                      3) parabola                      4) hyperbola
- A Tangent is perpendicular to the radius at the  
1) Centre                      2) infinity                      3) point of contact                      4) chord
- The area of triangle formed by the points  $(-5, 0)$ ,  $(0, -5)$  and  $(5, 0)$  is  
1) 0 sq.units                      2) 5 Sq .units                      3) 25 sq.units                      4) none of these
- The point of intersection of  $3x - y = 4$  and  $x + y = 8$  is  
1) (3, 5)                      2) (2, 4)                      3) (5, 3)                      4) (4, 4)
- If  $5x = \sec\theta$  and  $\frac{5}{x} = \tan\theta$  then,  $x^2 - \frac{1}{x^2}$  is equal to  
1) 1                      2) 5                      3) 25                      4)  $\frac{1}{25}$
- $\frac{\sin(90 - \theta)}{\tan\theta} + \frac{\cos(90 - \theta)\cos\theta}{\cot\theta} =$   
1)  $\tan\theta$                       2) 1                      3) -1                      4)  $\sin\theta$

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

44. a) Take a point which is 11cm away from the centre of a circle of radius 4 cm and draw two tangents to the circle from the point.

(OR)

- b) Draw a triangle ABC of base  $BC = 5.6$  cm,  $\angle A = 40^\circ$  and the bisector of  $\angle A$  meets  $BC$  at  $D$  such that  $CD = 4$  cm.

\*\*\*

**ANSWERS**

**PTA Model Question Paper - 2**

**Question Paper 3**

**PART - I**

- |                        |                        |
|------------------------|------------------------|
| 1. 4) 7                | 8. 3) 25 sq.units      |
| 2. 1) 2                | 9. 1) (3, 5)           |
| 3. 3) $\frac{1}{27}$   | 10. 4) $\frac{1}{25}$  |
| 4. 4) $16x^2$          | 11. 2) 1               |
| 5. 3) 4                | 12. 1) 1 : 2           |
| 6. 1) straight line    | 13. 4) 5               |
| 7. 3) point of contact | 14. 3) $\frac{n+1}{2}$ |

## PTA MODEL QUESTION PAPER - 3

CLASS: X

MATHEMATICS

Question  
Paper

4

Time allowed: 3 Hours

Max. Marks: 100

## PART - I

Note: (i) Answer all the 14 questions.

14×1=14

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

1.  $A = \{a, b, p\}$ ,  $B = \{2, 3\}$ ,  $C = \{p, q, r, s\}$ , then  $n[(A \cup C) \times B]$  is \_\_\_\_\_.  
1) 8                                      2) 12                                      3) 16                                      4) 20
2. Given  $f(x) = (-1)^x$  is a function from  $N$  to  $Z$ . Then the range of  $f$  is  
1)  $\{1\}$                                       2)  $N$                                       3)  $\{1, -1\}$                                       4)  $Z$
3. The value of  $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$  is  
1) 14200                                      2) 14280                                      3) 14400                                      4) 14520
4. If  $2 + 4 + 6 + \dots + 2k = 90$ , then the value of  $k$  is  
1) 8                                      2) 9                                      3) 10                                      4) 11
5. A Straight line has equation  $8y = 4x + 21$ , Which of the following is true?  
1) The slope is 0.5 and the y intercept is 1.6  
2) The slope is 0.5 and the y intercept is 2.6  
3) The slope is 5 and the y intercept is 2.6  
4) The slope is 5 and y intercept is 1.6
6. GCD of  $6x^2y$ ,  $9x^2yz$ ,  $12x^2y^2z$  is  
1)  $36xy^2z^2$                                       2)  $36x^2y^2z$                                       3)  $36x^2y^2z^2$                                       4)  $3x^2y$
7. In  $\triangle ABC$ ,  $DE \parallel BC$ ,  $AB = 3.6$  cm,  $AC = 2.4$  cm and  $AD = 2.1$ cm then the length of  $AE$  is  
1) 1.05 cm                                      2) 1.2 cm                                      3) 1.4 cm                                      4) 1.8 cm
8. The slope of the line joining  $(1, 2, 3)$ ,  $(4, a)$  is  $\frac{1}{8}$  The value of  $a$  is  
1) 1                                      2) 2                                      3) 4                                      4) -5
9.  $(2, 1)$  is the point of intersection of two lines.  
1)  $x + 3y - 3 = 0$ ;  $x - y - 7 = 0$                                       2)  $3x + y = 3$ ;  $x + y = 7$   
3)  $x + y = 3$ ;  $3x + y = 7$                                       4)  $x - y - 3 = 0$ ;  $3x - y - 7 = 0$
10. The value of  $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$  is equal to  
1)  $\cot\theta$                                       2)  $\cot^2\theta$                                       3)  $\sin\theta$                                       4)  $\sec\theta$
11. The total surface area of a hemi-sphere is how much times the square of its radius.  
1)  $4\pi$                                       2)  $3\pi$                                       3)  $2\pi$                                       4)  $\pi$
12. If the volume of sphere is  $36\pi \text{ cm}^3$ , then its radius is equal to  
1) 3 cm                                      2) 2 cm                                      3) 5 cm                                      4) 10 cm



**PTA MODEL QUESTION PAPER - 4**

**CLASS: X**

## MATHEMATICS

## Question Paper

5

Time allowed: 3 Hours

Max. Marks: 100

## PART - I

**Note: (i) Answer all the 14 questions.**

$$14 \times 1 = 14$$

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

1. The range of  $R = \{(x, x^2) \mid x \text{ is a prime number less than } 13\}$  is  
1)  $\{4, 9, 25, 49, 121\}$  2)  $\{1, 4, 9, 25, 49, 121\}$   
3)  $\{2, 3, 5, 7\}$  4)  $\{2, 3, 5, 7, 11\}$
2. Let  $A = \{1, 2, 3, 4\}$ ,  $B = \{4, 8, 9, 10\}$ . A function  $f: A \rightarrow B$  given by  $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$  is a  
1) Many-one function 2) Identity function  
3) One to One function 4) Into function
3. If 6 times of 6<sup>th</sup> term of an A.P., is equal to 7 times the 7<sup>th</sup> term, then the 13<sup>th</sup> term of the A.P. is  
1) 0 2) 6 3) 7 4) 13
4. The sum of the exponents of prime factors in the prime factorization of 1729 is  
1) 4 2) 3 3) 2 4) 1
5. If  $a$  and  $b$  are two positive integers where  $a > 0$  and  $b$  is a factor of  $a$ , then HCF of  $a$  and  $b$  is  
1)  $b$  2)  $a$  3)  $3ab$  4)  $\frac{a}{b}$
6. If  $(x - 6)$  is the HCF of  $x^2 - 2x - 24$  and  $x^2 - kx - 6$  then the value of  $k$  is  
1) 8 2) 6 3) 5 4) 3
7. If a polynomial is a perfect square then its factors will be repeated \_\_\_\_\_ number of times.  
1) Odd 2) Zero 3) Even 4) None of the above
8. If  $\triangle ABC$  is an isosceles triangle with  $\angle C = 90^\circ$  and  $AC = 5\text{ cm}$ , then  $AB$  is  
1)  $5\sqrt{2}\text{ cm}$  2)  $10\text{ cm}$  3)  $2.5\text{ cm}$  4)  $5\text{ cm}$
9. When proving that a quadrilateral is a trapezium, it is necessary to show  
1) Two parallel and two non-parallel sides 2) Two sides are parallel.  
3) Opposite sides are parallel 4) All sides are of equal length
10. The equation of a line passing through the origin and perpendicular to the line  $7x - 3y + 4 = 0$  is  
1)  $7x - 3y + 4 = 0$  2)  $3x - 7y + 4 = 0$  3)  $7x - 3y = 0$  4)  $3x + 7y = 0$
11. If  $\sin\theta = \cos\theta$  and  $2\tan^2\theta + \sin^2\theta - 1$  is equal to  
1)  $\frac{3}{2}$  2)  $-\frac{3}{2}$  3)  $\frac{2}{3}$  4)  $-\frac{2}{3}$

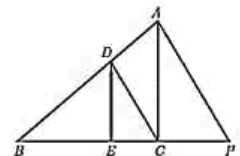
12. In a hollow cylinder, the sum of the external and internal radii is 14 cm and the width is 4 cm. If its height is 20 cm, the volume of the material in it is  
 1)  $56\pi \text{ cm}^3$       2)  $3600\pi \text{ cm}^3$       3)  $5600\pi \text{ cm}^3$       4)  $11200\pi \text{ cm}^3$
13. Which of the following is incorrect?  
 1)  $P(A) + P(\bar{A}) = 1$       2)  $P(\phi) = 0$       3)  $0 \leq P(A) \leq 1$       4)  $P(A) > 1$
14. Probability of getting 3 heads or 3 tails in tossing a coin 3 times is  
 1)  $\frac{1}{8}$       2)  $\frac{1}{4}$       3)  $\frac{3}{8}$       4)  $\frac{1}{2}$

### PART – II

Answer any 10 questions. Question no. 28 is compulsory.

$10 \times 2 = 20$

15. Find  $k$  if  $f \circ f(k) = 5$  where  $f(k) = 2k - 1$ .
16. Let  $A = \{1, 2, 3, \dots, 100\}$  and  $R$  be the relation defined as "is cube of" on  $A$ . Find the domain and the range of  $R$ .
17. In a theatre, there are 20 seats in the front row and 30 rows were allotted. Each successive row contains two additional seats than its front row. How many seats are there in the last row?
18. In a G.P  $\frac{1}{4}, -\frac{1}{2}, 1, -2, \dots$ . Find  $t_{10}$ .
19. Which rational expression should be subtracted from  $\frac{x^2 + 6x + 8}{x^3 + 8}$  to get  $\frac{3}{x^2 - 2x + 4}$
20. Determine the quadratic equations, whose sum and products of roots are  $\left(-\frac{3}{2}, -1\right)$
21. State Pythagoras Theorem.
22. In a figure  $DE \parallel AC$  and  $DC \parallel AP$  Prove that  $\frac{BE}{EC} = \frac{BC}{CP}$ .
23. Show that the points  $P(-1.5, 3)$ ,  $Q(6, -2)$  and  $R(-3, 4)$  are collinear.
24. Prove that  $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$
25. The volumes of two cones of same base radius are  $3600 \text{ cm}^3$  and  $5040 \text{ cm}^3$ . 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. Write the sample space for selecting two balls from a bag containing 6 balls numbered 1 to 6 using tree diagram (with replacement).
28. Find the sum and product of the roots of equation  $8x^2 - 25 = 0$ .



### PART – III

Answer any 10 questions. Question no. 42 is compulsory.

$10 \times 5 = 50$

29. The data in the adjacent table depicts the length of a woman's forearm and her corresponding height. Based on this data, a student finds a relationship between the height ( $y$ ) and the forearm length ( $x$ ) as  $y = ax + b$ , where  $a, b$  are constants



Length $x$ of forehand (in cm)	Height 'y' (in inches)
35	56
45	65
50	69.5
55	74

- i) Check if this relation is a function ii) Find  $a$  and  $b$ .  
 iii) Find the height of a woman whose forehand length is 40 cm.  
 iv) Find the length of forehand of a woman if her height is 53.3 inches.

30. A function  $f: [-5, 9] \rightarrow \mathbb{R}$  is defined as follows.

$$f(x) = \begin{cases} 6x+1 & -5 \leq x < 2 \\ 5x^2-1 & 2 \leq x < 6 \\ 3x-4 & 6 \leq x \leq 9 \end{cases} . \text{ Find (i) } f(7) - f(1) \text{ and (ii) } \frac{f(4) - f(-2)}{f(4) + f(-2)}$$

31. Find the sum to  $n$  terms of the series  $5 + 55 + 555 + \dots$ .

32. 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.

33. Find the non-zero values of  $x$  satisfying the matrix equation

$$x \begin{pmatrix} 2x & 2 \\ 3 & x \end{pmatrix} + 2 \begin{pmatrix} 8 & 5x \\ 4 & 4x \end{pmatrix} = 2 \begin{pmatrix} x^2+8 & 24 \\ 10 & 6x \end{pmatrix}$$

34. Find the values of  $a$  and  $b$  if the following polynomials are perfect squares  
 $4x^4 - 12x^3 + 37x^2 + bx + a$

35. State and Prove Alternate Segment Theorem.

36. Find the Equation of a straight line through the point of intersection of the lines  $8x+3y=18$ ,  $4x+5y=9$  and bisecting the line segment joining the points  $(5, -4)$  and  $(-7, 6)$ .

37. A building and a statue are in opposite side of a street from each other 35m apart. From a point on the roof of building the angle of elevation of the top of statue is  $24^\circ$  and the angle of depression of base of the statue of  $34^\circ$ . Find the height of the statue.  
 $(\tan 24^\circ = 0.4452, \tan 34^\circ = 0.6745)$

38. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand completely. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

39. The consumption of number of guava orange on a particular week by a family are given below.

Number of Guavas	3	5	6	4	3	5	4
Number of Oranges	1	3	7	9	2	6	2

Which fruit is consistently consumed by the family?

40. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 1 opted both NCC and NSS. 8 One of the students is selected at random, Find the probability that



- i) The student opted for NCC but not NSS.  
 ii) The student opted for NSS but not NCC.  
 iii) The student opted for exactly one of them.
41. By using slopes, show that the points (1, -4), (2, -3) and (4, -7) form a right angled triangle.
42. A man saved ₹ 16,500 in ten years. In each year after the first he saved 100 more than he did in the preceding year. How much did he save the first year?

**PART - IV****Answer the following.****2×8=16**

43. a) Draw the graph of  $y = 2x^2$  and hence solve  $2x^2 - x - 6 = 0$ .

**(OR)**

- b) Graph the following linear function  $y = \frac{1}{2}x$ . Identify the constant of variation and verify it with the graph. Also (i) find  $y$  when  $x = 9$  (ii) find  $x$  when  $y = 7.5$ .

44. a) Draw a  $\Delta PQR$  such that  $PQ = 6.8$  cm, vertical angle is  $50^\circ$  and the bisector of the vertical angle meets the base at  $D$ , where  $PD = 5.2$  cm.

**(OR)**

- b) Draw a  $\Delta PQR$  in which  $QR = 5$  cm,  $\angle P = 40^\circ$  and the median  $PG$  from  $P$  to  $QR$  is 4.4 cm. Find the length of the altitude from  $P$  to  $QR$ .

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**ANSWERS****PTA Model Question Paper - 4****Question Paper 5****PART - I**

- |                           |   |
|---------------------------|---|
| 1. 1) {4, 9, 25, 49, 121} | 8. 1) $5\sqrt{2}$ cm                          |
| 2. 3) One to One function | 9. 1) Two parallel and two non-parallel sides |
| 3. 1) 0                   | 10. 4) $3x + 7y = 0$                          |
| 4. 2) 3                   | 11. 1) $\frac{3}{2}$                          |
| 5. 1) b                   | 12. 4) $11200\pi$ cm <sup>3</sup>             |
| 6. 3) 5                   | 13. 4) $P(A) > 1$                             |
| 7. 3) even                | 14. 2) $\frac{1}{4}$                          |

Std : X

MODEL QUESTION PAPER - 6

Max. marks: 100

Subject: Maths

Time : 3 Hrs

**PART - I**

Note : (1) Answer all the 14 questions

14 x 1 = 14

(2) Choose the correct answer from the given four alternatives and write the option code and the corresponding answer.

- Let  $n(A) = m$  and  $n(B) = n$  then the total number of non-empty relations that can be defined from A to B is  
(A)  $m^n$  (B)  $n^m$  (C)  $2^{mn} - 1$  (D)  $2^{mn}$
- If the HCF of 65 and 117 is expressible in the form of  $65m - 117n$  then the value of m is  
(A) 4 (B) 2 (C) 1 (D) 3
- If 6 times of 6<sup>th</sup> term of an A.P., is equal to 7 times the 7<sup>th</sup> term, then the 13<sup>th</sup> term of the A.P. is 120? (A) 0 (B) 6 (C) 7 (D) 13
- If  $(x - 6)$  is the HCF of  $x^2 - 2x - 24$  and  $x^2 - kx - 6$  then the value of k is  
(A) 3 (B) 5 (C) 6 (D) 8
- 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)  $x = 1, y = -2, z = 3$
- If in  $\triangle ABC$ ,  $DE \parallel BC$ ,  $AB = 3.6\text{cm}$ ,  $AC = 2.4\text{cm}$  and  $AD = 2.1\text{cm}$  then the length of AE is  
(A) 1.4 cm (B) 1.8 cm (C) 1.2 cm (D) 1.05 cm
- The two tangents from an external points P to a circle With center at O Are PA and PB. If  $\angle APB = 70^\circ$  then the value of  $\angle AOB$  is (A)  $100^\circ$  (B)  $110^\circ$  (C)  $120^\circ$  (D)  $130^\circ$
- The straight line given by the equation  $x = 11$   
(A) Parallel to Y - axis (B) Parallel to X -axis  
(C) Passing through the origin (D) Passing through the point (0,11)
- If the reciprocal of the gradient of a straight line is  $\sqrt{3}$ . Then the angle of inclination is  
(A)  $60^\circ$  (B)  $30^\circ$  (C)  $45^\circ$  (D)  $90^\circ$
- The electric pole subtends an angle of  $30^\circ$  at point on the same level as its foot. at a second point 'b metres above the first, the depression of the foot of the pole is  $60^\circ$ . The height of the pole (in metres) is equal to  
(A)  $\sqrt{3} b$  (B)  $\frac{b}{3}$  (C)  $\frac{b}{2}$  (D)  $\frac{b}{\sqrt{3}}$

CLASS : X

SUBJECT : MATHEMATICS

MARKS : 100

TIME : 3 HRS

**MODEL QUESTION PAPER - 7**  
**PART - A**

**CHOOSE THE CORRECT ANSWER****14 X 1 = 14**

1. If  $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$  is a function given by  $g(x) = \alpha x + \beta$  then the values of  $\alpha$  and  $\beta$  are (A) (1, 2) (B) (-1, 2) (C) (2, -1) (D) (-1, -2)
2. An A.P. consists of 31 terms. If its 16<sup>th</sup> term is  $m$ , then the sum of all the terms of this A.P. is (A)  $16m$  (B)  $62m$  (C)  $31/2m$  (D)  $31m$
3. The radioactive sample decays and the remaining sample at infinite time is given by  $b = 1 - [\frac{1}{2} + \frac{1}{4} + \dots \infty]$  then  $b$  is ... .. (A) 0 (B) 1 (C)  $\frac{1}{\sqrt{2}}$  (D)  $\frac{1}{2}$
4. The solution of  $(2x - 1)^2 = 9$  is equal to (A) -1, 2 (B) -1 (C) 2 (D) None of these
5. Which of the following should be added to make  $x^4 + 64$  is a perfect square (A)  $4x^2$  (B)  $8x^2$  (C)  $-8x^2$  (D)  $16x^2$
6. For a matrix A, B is called the additive inverse of A if (A)  $A + B \neq B + A$  (B)  $B + A = A + B = 0$  (C)  $B + A = A + B \neq 0$  (D)  $A + B = 0 \neq B + A$
7. If  $\triangle ABC$  is an isosceles triangle with  $\angle C = 90^\circ$  and  $AC = 5$  cm, then  $AB$  is (A)  $5\sqrt{2}$  cm (B) 10 cm (C) 2.5 cm (D) 5 cm
8. When proving that a quadrilateral is a trapezium, it is necessary to show (A) Two parallel and two non-parallel sides. (B) Two sides are parallel. (C) Opposite sides are parallel. (D) All sides are of equal length.
9. If the points (0,0), (a,0) and (0,b) are collinear, then (A)  $a=b$  (B)  $a+b$  (C)  $ab=0$  (D)  $a \neq b$
10.  $(1 + \tan \theta + \sec \theta)(1 + \cot \theta - \operatorname{cosec} \theta)$  is equal to (A) -1 (B) 0 (C) 1 (D) 2



11. 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 : 6 (B) 1 : 8 (C) 1 : 2 (D) 1 : 4
12. A solid frustum is of height 8 cm. If the radii of its lower and upper ends are 3 cm and 9 cm respectively, then its slant height is:  
(a) 15 cm (b) 12 cm (c) 10 cm (d) 17 cm
13. If the standard deviation of  $x, y, z$  is  $p$  then the standard deviation of  $3x + 5, 3y + 5, 3z + 5$  is (A)  $3p$  (B)  $3p + 5$  (C)  $9p + 15$  (D)  $p + 5$
14. Which of the following is incorrect?  
(A)  $P(A) + P(\bar{A}) = 1$  (B)  $P(\emptyset) = 0$  (C)  $0 \leq P(A) \leq 1$  (D)  $P(A) > 1$

### PART - B

ANSWER ANY 10 QUESTIONS (QUESTION NUMBER 28 IS COMPULSORY)

10 X 2 = 20

15. Let  $A = \{1, 2, 3, 4, 5\}$ ,  $B = N$  and  $f: A \rightarrow B$  be defined by  $f(x) = x^2$ . Find the range of  $f$ . Identify the type of function.
16. 'a' and 'b' are two positive integers such that  $a^b \times b^a = 800$ . Find 'a' and 'b'.
17. Which term of an A.P. 16, 11, 6, 1, ... is -54?
18. Find the quotient and remainder when  $x^3 + x^2 - 7x - 3$  is divided by  $x - 3$ .
19. A has 'a' rows and 'a+3' columns. B has 'b' rows and '17-b' columns, and if both products AB and BA exist, find a, b?
20. Find the area of the triangle whose vertices are (-3, 5), (5, 6) and (5, -2).
21. Find the equation of a straight line passing through (5, -3) and (7, -4).
22. Prove that  $\sec\theta - \cos\theta = \tan\theta \sin\theta$
23. A tower stands vertically on the ground. From a point on the ground, which is 48 m away from the foot of the tower, the angle of elevation of the top of the tower is  $30^\circ$ . Find the height of the tower.
24. 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.
25. If the ratio of radii of two spheres is 4:7, find the ratio of their volumes.

40. Water is flowing at the rate of 15 km per hour through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tanks will rise by 21 cm.
41. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.
42. Given  $\sum x = 99$ ,  $n = 9$ ,  $\sum (x - 10)^2 = 79$ , then find  $\sum x^2$  and  $\sum (x - \bar{x})^2$ .

### PART - C

#### ANSWER THE FOLLOWING QUESTIONS

2 X 2 = 16

43. (a) Construct a  $\Delta PQR$  in which  $QR = 5$  cm,  $\angle P = 40^\circ$  and the median  $PG$  from  $P$  to  $QR$  is 4.4 cm. Find the length of the altitude from  $P$  to  $QR$ . (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  $y = x^2 - 4x + 3$  and use it to solve  $x^2 - 6x + 9 = 0$ . (OR)
- (b) A school announces that for a certain competition, the cash price will be distributed for all the participants equally as show below

No. of participants(x)	2	4	6	8	10
Amount for each participants in Rs (y)	180	90	60	45	36

- (i) Find the constant of variation
- (ii) Graph the above and hence, find how much will each participant get if the number of participants are 12

*Life is like riding a bicycle to keep your balance,  
you must keep moving*

Std : X

Max. marks: 100

Subject: Maths

MODEL QUESTION PAPER -8

Time : 3 Hrs

**MODEL EXAM - 2****PART - I**

Note : (1) Answer all the 14 questions

14 x 1 = 14

(2) Choose the correct answer from the given four alternatives and write the option code and the corresponding answer.

- If there are 1024 relations from a set  $A = \{1, 2, 3, 4, 5\}$  to a set B, then the number of elements in B is (A) 3 (B) 2 (C) 4 (D) 8
- Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are  
(A) 0,1,8 (B) 1,4,8 (C) 0,1,3 (D) 1,3,5
- An A.P., consists of 31 terms. if its 16<sup>th</sup> term is m, then the sum of all the terms of this A.P. is (A) 16m (B) 62m (C) 31m (D)  $\frac{31}{2} m$
- 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)  $16 \left| \frac{y^2}{x^2 z^4} \right|$  (C)  $\frac{16}{5} \left| \frac{y}{xz^2} \right|$  (D)  $\frac{16}{5} \left| \frac{xz^2}{y} \right|$
- The solution of  $(2x - 1)^2 = 9$  is equal to  
(A) -1 (B) 2 (C) -1,2 (D) None of these
- $\triangle LMN - \angle L = 60^\circ, \angle M = 50^\circ$ , If  $\triangle LMN \sim \triangle PQR$  then the value of,  $\angle R$  is  
(A)  $40^\circ$  (B)  $70^\circ$  (C)  $30^\circ$  (D)  $110^\circ$
- A Tangent is perpendicular to the radius at then  
(A) Centre (B) point of contact (C) Infinity (D) Chord
- If (5,7), (3,p) and (6,6) are collinear, then the value of , p is  
(A) 3 (B) 6 (C) 9 (D) 12
- When proving that a quadrilateral is a parallelogram by using slopes you must find .  
(A) The slopes of two sides (B) The slopes of two pair of opposite sides  
(C) The lengths of all sides (D) Both the lengths and slopes of two sides
- The electric pole subtends an angle of  $30^\circ$  at point on the same level as its foot. at a second point "b metres above the first, the depression of the foot of the pole is  $60^\circ$ . The height of the pole (in metres) is equal to  
(A)  $\sqrt{3} b$  (B)  $\frac{b}{3}$  (C)  $\frac{b}{2}$  (D)  $\frac{b}{\sqrt{3}}$
- A tower is 60m height. its shadow is x metres shorter when the sun's altitude is  $45^\circ$  than when it has been  $30^\circ$ , then x is equal to  
(A) 41.92 m (B) 43.92 m (C) 43m (D) 45.6m



12. Two persons are standing  $x''$  metres apart from each other and the height of the first person is double that of other. If from the middle point of the line joining their feet an observer finds the angular elevation of their tops to be complementary, then the height of the shorter person (in metres) is (A)  $\sqrt{2x}$  (B)  $\frac{x}{2\sqrt{2}}$  (C)  $\frac{x}{\sqrt{2}}$  (D)  $2x$
13. The Pre-image of 2 under the function  $f = \{(0,1), (2,2), (3,2), (5,8), (4,8)\}$  are (A) 3 and 5 (B) 0 and 2 (C) 2 and 3 (D) 5 and 4
14. If a Polynomial is a perfect square then its factors will be repeated ----- number of times (A) Odd (B) Zero (C) Even (D) None of the above

### **PART – II**

**Answer any 10 questions. Question no. 28 is compulsory.**

**10 x 2 = 20**

- If  $B \times A = \{(-2, 3), (-2, 4), (0,3), (0,4), (3,3), (3,4)\}$  find A and B
- If the Highest Common factor of 210 and 55 is expressible in the form  $55x - 325$ , find x.
- If  $3 + k, 18 - k, 5k + 1$  are in A.P, then find k.
- Find the L.C.M. of  $x^3 - a^3$  and  $(x - a)^2$
- Determine the nature of roots for the following quadratic equation  $x^2 - x - 20 = 0$
- What length of ladder is needed to reach a height of 7ft along the wall when the base of the ladder is 4 ft from the wall? Round off your answer to the next tenth place?
- Find the length of the tangent drawn from a point whose distance from the centre of a circle is 5cm and radius of the circle is 3 cm.
- What is the probability of drawing either a king or a queen in a single draw from a well shuffled pack of 52 cards?
- Show that the points  $(-2, 5), (6, -1)$  and  $(2,2)$  are collinear.
- From the top of a tree of height 13m the angle of elevation and depression of the top and bottom of another tree are  $45^\circ$  and  $30^\circ$  respectively. Find the height of the second tree. ( $\sqrt{3} = 1.732$ )
- 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  $30^\circ$ . Find the distance of the car from the rock
- Find the diameter of a sphere whose surface area is  $154 \text{ m}^2$
- If the ratio of radii of two spheres is 4:7, find the ratio of their volumes.
- Find the intercepts made by the line  $3x - 2y - 6 = 0$  on the coordinate axes

### **PART – III**

**Answer any 10 questions. Question no. 42 is compulsory.**

**10 x 5 = 50**

- Represent the given relation by (a) an arrow diagram (b) a graph and (c) a set in roster form, wherever possible.  $\{(x,y)|y=x+3, x,y \text{ are natural numbers} < 10\}$
- In an A.P. if  $m^{\text{th}}$  term is n and  $n^{\text{th}}$  term is m, then find the  $p^{\text{th}}$  term
- Find x, y, z, given that the numbers x, 10, y, 24, z are in A.P.

SUBJECT: MATHS

Std: 10

**MODEL QUESTION PAPER -9**

Mark: 100

Time: 3 hrs

**Part - A**

Choose the correct Answer:-

14x1=14

1.  $A = \{a, b, p\}, B = \{2, 3\}, C = \{p, q, r, s\}$  then  $n[(A \cup C) \times B]$  is  
(A) 8 (B) 20 (C) 12 (D) 16
2. The range of the relation  $R = \{(x, x^2) | x \text{ is a prime number less than } 13\}$  is  
(A)  $\{2, 3, 5, 7\}$  (B)  $\{2, 3, 5, 7, 11\}$  (C)  $\{4, 9, 25, 49, 121\}$  (D)  $\{1, 4, 9, 25, 49, 121\}$
3. The sum of the exponents of the prime factors in the prime factorization of 1729 is  
(A) 1 (B) 2 (C) 3 (D) 4
4. The first term of an A.P. whose 8<sup>th</sup> and 12<sup>th</sup> terms are 39 and 59 respectively is  
(A) 5 (B) 6 (C) 4 (D) 3
5. If  $(x - 6)$  is the HCF of  $x^2 - 2x - 24$  and  $x^2 - kx - 6$  then the value of  $k$  is  
(A) 3 (B) 5 (C) 6 (D) 8
6. If  $ax^2 + bx + c = 0$  has equal roots, then  $c$  is equal (A)  $\frac{b^2}{2a}$  (B)  $\frac{b^2}{4a}$  (C)  $-\frac{b^2}{2a}$  (D)  $-\frac{b^2}{4a}$
7. If in  $\triangle ABC$ ,  $DE \parallel BC$ .  $AB = 3.6$  cm,  $AC = 2.4$  cm and  $AD = 2.1$  cm then the length of  $AE$  is  
(A) 1.4 cm (B) 1.8 cm (C) 1.2 cm (D) 1.05 cm
8. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops? (A) 13 m (B) 14 m (C) 15 m (D) 12.8 m
9. The angle of inclination of a straight line parallel to x-axis is equal to (A)  $0^\circ$  (B)  $60^\circ$  (C)  $45^\circ$  (D)  $90^\circ$
10. The slope of the line which is perpendicular to a line joining the points (0,0) and (-8,8) is  
(A) -1 (B) 1 (C)  $\frac{1}{3}$  (D) -8
11. If the ratio of the height of a tower and the length of its shadow is  $\sqrt{3} : 1$ , then the angle of elevation of the sun has measure (A)  $45^\circ$  (B)  $30^\circ$  (C)  $90^\circ$  (D)  $60^\circ$
12. If the radius of the base of a cone is tripled and the height is doubled then the volume is  
(A) made 6 times (B) made 18 times (C) made 12 times (D) unchanged
13. Radius and height of a right circular cone and that of a right circular cylinder are respectively, equal. If the volume of the cylinder is  $120 \text{ cm}^3$ , then the volume of the cone is equal to  
(A)  $1200 \text{ cm}^3$  (B)  $360 \text{ cm}^3$  (C)  $40 \text{ cm}^3$  (D)  $90 \text{ cm}^3$
14. Which of the following is incorrect?  
(A)  $P(A) > 1$  (B)  $0 \leq P(A) \leq 1$  (C)  $P(\emptyset) = 0$  (D)  $P(A) + P(\overline{A}) = 1$

**Part - B**

10x2=20

i) Answer any 10 Questions.

ii) Question No 28 is Compulsory.

15. If  $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$  then find  $A$  and  $B$ .
16. 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.
17. If the Highest Common Factor of 210 and 55 is expressible in the form  $55x - 325$ , find  $x$
18. The general term of a sequence is defined as  

$$a_n = \begin{cases} n(n+3); n \in \mathbb{N} \text{ is odd} \\ n^2 + 1; n \in \mathbb{N} \text{ is even} \end{cases}$$
Find the eleventh and eighteenth terms.
19. Which rational expression should be subtracted from  $\frac{x^2+6x+8}{x^3+8}$  to get  $\frac{3}{x^2-2x+4}$
20. If the difference between the roots of the equation  $x^2 - 13x + k$  is 17 find  $k$ .
21. If  $\triangle ABC \sim \triangle DEF$  such that area of  $\triangle ABC$  is  $9 \text{ cm}^2$  and the area of  $\triangle DEF$  is  $16 \text{ cm}^2$  and  $BC = 2.1$  cm. Find the length of  $EF$
22. Find the value of ' $a$ ' for which the given points are collinear.  $(2, 3), (4, a)$  and  $(6, -3)$
23. Find the slope of a line joining the given points  $(-6, 1)$  and  $(-3, 2)$



CLASS : X

SUBJECT : MATHEMATICS

MARKS : 100

TIME : 3 HRS

**MODEL QUESTION PAPER -10****PART - A****CHOOSE THE CORRECT ANSWER****14 X 1 = 14**

1. If  $f(x) = x^2 - x$  then  $f(x+1) - f(x-1)$  is (a) 0 (b)  $4x$  (c)  $4x + 2$  (d)  $4x - 2$
2. In an A.P., the first term is 1 and the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120? (a) 8 (b) 9 (c) 7 (d) 6
3. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are (a) 1, 3, 5 (b) 1, 4, 8 (c) 0, 1, 3 (d) 0, 1, 8
4. If  $(x - 6)$  is the HCF of  $x^2 - 2x - 24$  and  $x^2 - kx - 6$  then the value of  $k$  is (a) 8 (b) 6 (c) 5 (d) 3
5. The value of  $x$  in  $(x+2)^c + 2(x-1)^c = 4x-3$  (a) 2 (b) 3 (c) -2 (d) -3
6. If  $A$  is a  $2 \times 3$  matrix and  $B$  is a  $3 \times 4$  matrix, how many columns does  $AB$  have (a) 3 (b) 4 (c) 2 (d) 5
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)  $30^\circ$  (b)  $40^\circ$  (c)  $70^\circ$  (d)  $110^\circ$
8. In a  $\triangle ABC$ ,  $AD$  is the bisector of  $\angle BAC$ . If  $AB = 8$  cm,  $BD = 6$  cm and  $DC = 3$  cm. The length of the side  $AC$  is (a) 3 cm (b) 4 cm (c) 6 cm (d) 8 cm
9. The equation of a line passing through the origin and perpendicular to the line  $7x - 3y + 4 = 0$  is (a)  $7x - 3y + 4 = 0$  (b)  $3x - 7y + 4 = 0$  (c)  $7x - 3y = 0$  (d)  $3x + 7y = 0$
10. The point of intersection of  $3x - y = 4$  and  $x + y = 8$  is (a) (5, 3) (b) (2, 4) (c) (3, 5) (d) (4, 4)
11.  $(\cos^2 \theta - 1)(\cot^2 \theta + 1) + 1 =$  (a) 1 (b) -1 (c) 2 (d) 0
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) 1 : 4 (b) 4 : 1 (c) 1 : 2 (d) 2 : 1



# MODEL QUESTION PAPER - 11

**STD : X****MARK:100****SUBJECT: MATHEMATICS****TIME: 3:00hrs****PART-I****I.CHOOSE THE CORRECT ANSWER:****14x1=14**

1. If  $n(A \times B) = 6$  and  $A = \{1, 3\}$  then  $n(B)$  is  
(1) 1 (2) 2 (3) 3 (4) 6
2. 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 ?  
(1)  $(A \times C) \subset (B \times D)$  (2)  $(B \times D) \subset (A \times C)$   
(3)  $(A \times B) \subset (A \times D)$  (4)  $(D \times A) \subset (B \times A)$
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.  
(1)  $1 < r < b$  (2)  $0 < r < b$  (3)  $0 \leq r < b$  (4)  $0 < r \leq b$
4. Given  $F_1 = 1$ ,  $F_2 = 3$  and  $F_n = F_{n-1} + F_{n-2}$  then  $F_5$  is  
(1) 3 (2) 5 (3) 8 (4) 11
5. Which of the following should be added to make  $x^2 + 64$  a perfect square  
(1)  $4x^2$  (2)  $16x^2$  (3)  $8x^2$  (4)  $-8x^2$
6. If the roots of the equation  $q^2 x^2 + p^2 x + r^2 = 0$  are the squares of the roots of the equation  $qx^2 + px + r = 0$ , then  $q, p, r$  are in \_\_\_\_  
(1) A.P (2) G.P (3) Both A.P and G.P (4) none of these
7. The slope of the line which is perpendicular to a line joining the points  $(0,0)$  and  $(-8,8)$  is  
(1) -1 (2) 1 (3)  $\frac{1}{3}$  (4) -8
8. If slope of the line PQ is  $\frac{1}{\sqrt{3}}$  then slope of the perpendicular bisector of PQ is  
(1) 3 (2)  $-\sqrt{3}$  (3)  $\frac{1}{\sqrt{3}}$  (4) 0
9. If  $\Delta ABC$  is an isosceles triangle with  $\angle C = 90^\circ$  and  $AC = 5$  cm, then AB is  
(1) 2.5 cm (2) 5 cm (3) 10 cm (4) 5 2 cm

40. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?
41. In a game, the entry fee is ₹150. The game consists of tossing a coin 3 times. Dhana bought a ticket for entry. If one or two heads show, she gets her entry fee back. If she throws 3 heads, she receives double the entry fees. Otherwise she will lose. Find the probability that she (i) gets double entry fee (ii) just gets her entry fee (iii) loses the entry fee.
42. The angle of elevation of the top of a cell phone tower from the foot of a high apartment is  $60^\circ$  and the angle of depression of the foot of the tower from the top of the apartment is  $30^\circ$ . If the height of the apartment is 50 m, find the height of the cell phone tower. According to radiations control norms, the minimum height of a cell phone tower should be 120 m. State if the height of the above mentioned cell phone tower meets the radiation norms.

#### PART-IV

#### IV. ANSWER BOTH QUESTIONS.

2X8=16.

43. a) Construct a  $\Delta PQR$  such that  $QR = 6.5\text{cm}$ ,  $\angle P = 60^\circ$  and the altitude from P to QR is of length 4.5 cm.

(OR)

b) Draw a circle of radius 4 cm. At a point L on it draw a tangent to the circle using the alternate segment.

44. a) Draw the graph of  $y = x^2 - 4$  and hence solve  $x^2 - x - 12 = 0$ .

(OR)

b) Draw the graph of  $y = (x - 1)(x + 3)$  and hence solve  $x^2 - x - 6 = 0$ .

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14. Which of the following is incorrect?

(a)  $P(A) > 1$

(b)  $0 \leq P(A) \leq 1$

(c)  $P(\infty) = 0$

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

### Part-B

10 x 2 = 20

Answer any 10 questions and Qn No. 28 is compulsory

15. If  $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$  find  $A$  and  $B$ .

16. 'a' and 'b' are two positive integers such that  $a^b \times b^a = 800$ . Find 'a' and 'b'.

17. If  $3 + k$ ,  $18 - k$ ,  $5k + 1$  are in A.P. then find  $k$ .

18. Solve:  $x^2 - 3x - 2 = 0$

19. Simplify  $\frac{x+2}{x+3} + \frac{x-1}{x-2}$

20. The perimeters of two similar triangles  $ABC$  and  $PQR$  are respectively 36 cm and 24 cm. If  $PQ = 10$  cm, find  $AB$ .

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. The line  $p$  passes through the points  $(3, -2)$ ,  $(12, 4)$  and the line  $q$  passes through the points  $(6, -2)$  and  $(12, 2)$ . Is  $p$  parallel to  $q$ ?

23. A tower stands vertically on the ground. From a point on the ground, which is 48 m away from the foot of the tower, the angle of elevation of the top of the tower is  $30^\circ$ . Find the height of the tower

24. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height  $10\sqrt{3}$  m.

25. The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area

26. The volume of a cylindrical water tank is  $1.078 \times 10^6$  litres. If the diameter of the tank is 7 m, find its height.

27. A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the numbers 1, 2, 3, ... 12. What is the probability that it will point to (i) 7 (ii) a prime number

28. Find the equations of the lines, whose sum and product of intercepts are 1 and -6 respectively.

### Part-C

10 x 5 = 50

Answer any 10 questions and Qn No. 42 is compulsory

29. Let  $A$  = The set of all natural numbers less than 8,

$B$  = The set of all prime numbers less than 8,  $C$  = The set of even prime number.

Verify that (i)  $(A \cap B) \times C = (A \times C) \cap (B \times C)$  (ii)  $A \times (B - C) = (A \times B) - (A \times C)$

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

31. Find the GCD of the polynomials  $x^3 + x^2 - x + 2$  and  $2x^3 - 5x^2 + 5x - 3$ .

32. If  $9x^4 + 12x^3 + 28x^2 + ax + b$  is a perfect square, find the values of  $a$  and  $b$ .

33. If  $\alpha$  and  $\beta$ , are the roots of the equation  $2x^2 - x - 1 = 0$ , then form the equation whose roots are

(i)  $\frac{1}{\alpha}, \frac{1}{\beta}$  (ii)  $\alpha^2 \beta, \alpha \beta^2$  (iii)  $2\alpha + \beta, \alpha + 2\beta$

34.. State and prove Pythagoras theorem

35. Find the area of the quadrilateral formed by the points  $(-9, 0)$ ,  $(-8, 6)$ ,  $(-1, -2)$  and  $(-6, -3)$

36. A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through  $(-3, 8)$ . Find its equation.

37. From the top of a 12 m high building, the angle of elevation of the top of a cable tower is  $60^\circ$  and the angle



TIME: 3.00 HOURS

# MODEL QUESTION PAPER-13

## MATHEMATICS

MAX.MARKS : 100

Instructions :

(1) Check the question paper for the fairness of printing. If there is any lack of fairness, inform the hall supervisor immediately.

(2) Use Blue or Black pen to write and pencil to draw and underline.

Note : This question paper contains four parts.

### PART - I

Note : Answer all the questions. Choose the most suitable answer with the corresponding answer code. (14 x 1 = 14 Marks)

1. If  $A$  is a point on the  $y$ -axis whose ordinate is 8 and  $B$  is a point on the  $X$  axis whose abscissae is 5 then the equation of the line  $AB$  is  
(A)  $8x+5y=40$  (B)  $8x-5y=40$  (C)  $x=8$  (D)  $y=5$
2. Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of kamalam winning is  $\frac{1}{9}$ , then the number of tickets bought by kamalam is  
(A) 5 (B) 10 (C) 15 (D) 20
3. If  $n(A)=p, n(B)=q$  then the total number of relations that exist between  $A$  and  $B$  is  
(A)  $2^p$  (B)  $2^q$  (C)  $2^{p+q}$  (D)  $2^{pq}$
4. A shuttle cock used for playing badminton has the shape of the combination of  
(A) a cylinder and a sphere (C) a hemisphere and a cone  
(B) a sphere and a cone (D) frustum of a cone and a hemisphere
5. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are  
(A) 0, 1, 8 (B) 1, 4, 8 (C) 0, 1, 3 (D) 1, 3, 5
6. If  $(x-6)$  is the HCF of  $x^2-2x-24$  and  $x^2-kx-6$  then the value of  $k$  is  
(A) 3 (B) 5 (C) 6 (D) 8
7. The solution of  $x^2-25=0$  is  
(A) No real roots (B) real and equal roots (C) Real and unequal roots (D) imaginary roots
8. 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)  $40^\circ$  (B)  $70^\circ$  (C)  $30^\circ$  (D)  $110^\circ$
9. If the ratio of the height of a tower and the length of its shadow is  $\sqrt{3}:1$ , then the angle of elevation of the sun has measure  
(A)  $45^\circ$  (B)  $30^\circ$  (C)  $90^\circ$  (D)  $60^\circ$
10. The total surface area of a hemi-sphere is how many times the square of its radius ?  
(A)  $\pi$  (B)  $4\pi$  (C)  $3\pi$  (D)  $2\pi$
11. The angle of elevation and depression are usually measured by a device called  
(A) Clinometer (B) Kaleidoscope (C) Periscope (D) Theodolite
12. 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
13. Graph of a linear equation is a  
(A) Straight line (B) circle (C) parabola (D) hyperbola
14. In a  $\triangle ABC$ ,  $AD$  is the bisector of  $\angle BAC$ . If  $AB=8$  cm,  $BD=6$  cm and  $DC=3$  cm. The length of the side  $AC$  is  
(A) 6 cm (B) 4 cm (C) 3 cm (D) 8 cm

### PART - II

Note : Answer any ten questions. Question No.28 is compulsory.

(10 x 2 = 20 Marks)

15. A Relation  $R$  is given by the set  $\{(x,y)/y=x^2+3, x \in \{0,1,2,3,4,5\}\}$ . Determine its domain and range
16. Find the value of  $k$ , if the area of a quadrilateral is 28 sq. units, whose vertices are  $(-4,-2), (-3,k), (3,-2)$  and  $(2,3)$
17. Find the number of terms in the A.P. 3, 6, 9, 12, ..., 111.
18. The ratio of the volumes of two cones is 2:3. Find the ratio of their radii if the height of second cone is double the height of the first.
19. Find the slope of a line joining the given points.  
(i)  $(14,10)$  and  $(14,-6)$   
(ii)  $(3,\sqrt{3})$  and origin
20. Let  $A=\{1,2,5\}$  and  $B=\{x|x \text{ is a prime number less than } 10\}$ . Find  $A \times B$  and  $B \times A$ .
21. Find the HCF of 396, 504, 636.

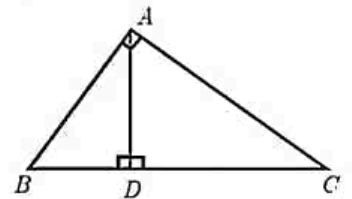
Marks: 100  
**STD -IO**

**MODEL QUESTION PAPER - 14** Time: 3 hrs  
Mathematics

I. Choose the best answer:-

14 x 1 = 14

1. Given  $f(x) = (-1)^x$  is function from  $N$  to  $Z$ . Then the range of  $f$  is  
 (1)  $\{1\}$  (2)  $N$  (3)  $\{1, -1\}$  (4)  $Z$
2. Let  $n(A) = m$  and  $n(B) = n$  then the total number of non-empty relations that can be defined from  $A$  to  $B$  is  
 (1)  $m^n$  (2)  $n^m$  (3)  $2^{mn} - 1$  (4)  $2^{mn}$
3.  $7^{4k} \equiv \underline{\hspace{1cm}} \pmod{100}$   
 (1) 1 (2) 2 (3) 3 (4) 4
4. 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  
 (1) a Geometric Progression (2) an Arithmetic Progression  
 (3) neither an Arithmetic Progression nor a Geometric Progression  
 (4) a constant sequence
5. Which of the following should be added to make  $x^4 + 64$  a perfect square  
 (1)  $4x^2$  (2)  $16x^2$  (3)  $8x^2$  (4)  $-8x^2$
6. If  $A$  is a  $2 \times 3$  matrix and  $B$  is a  $3 \times 4$  matrix, how many columns does  $AB$  have  
 (1) 3 (2) 4 (3) 2 (4) 5
7. In the adjacent figure  $\angle BAC = 90^\circ$  and  $AD \perp BC$  then  
 (1)  $BD \cdot CD = BC^2$  (2)  $AB \cdot AC = BC^2$   
 (3)  $BD \cdot CD = AD^2$  (4)  $AB \cdot AC = AD^2$
8. If slope of the line  $PQ$  is  $\frac{1}{\sqrt{3}}$  then the slope of the perpendicular bisector of  $PQ$  is  
 (1)  $\sqrt{3}$  (2)  $-\sqrt{3}$  (3)  $\frac{1}{\sqrt{3}}$  (4) 0

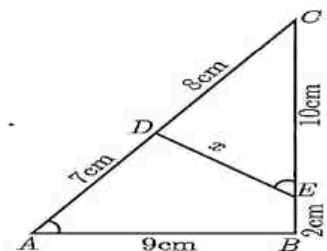


9.  $a \cot \theta + b \operatorname{cosec} \theta = p$  and  $b \cot \theta + a \operatorname{cosec} \theta = q$  then  $p^2 - q^2$  is equal to  
 (1)  $a^2 - b^2$  (2)  $b^2 - a^2$  (3)  $a^2 + b^2$  (4)  $b - a$
10. If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is  
 (1) 1 : 2 (2) 1 : 4 (3) 1 : 6 (4) 1 : 8
11. The volume (in  $\text{cm}^3$ ) of the greatest sphere that can be cut off from a cylindrical log of wood of base radius 1 cm and height 5 cm is  
 (1)  $\frac{4}{3}\pi$  (2)  $\frac{10}{3}\pi$  (3)  $5\pi$  (4)  $\frac{20}{3}\pi$
12. The top of two poles of height 18.5 m and 7 m are connected by a wire. If the wire makes an angle of measure  $30^\circ$  with horizontal, then the length of the wire is  
 (1) 23 m (2) 18 m (3) 28 m (4) 25.5 m
13. The standard deviation of a data is 3. If each value is multiplied by 5 then the new variance is  
 (1) 3 (2) 15 (3) 5 (4) 225
14. The probability of getting a job for a person is  $\frac{x}{3}$ . If the probability of not getting the job is  $\frac{2}{3}$  then the value of x is  
 (1) 2 (2) 1 (3) 3 (4) 1.5

II. Answer any 10 questions. (Q.NO : 28 compulsory)

10 x 2 = 20

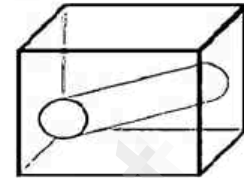
15. Define 'Cartesian Product'.
16. A function  $f$  is defined by  $f(x) = 3 - 2x$ . Find  $x$  such that  $f(x^2) = (f(x))^2$ .
17. If the first term of an infinite G.P. is 8 and its sum to infinity is  $\frac{32}{3}$  then find the common ratio.
18. Simplify :  $\frac{4x}{x^2-1} - \frac{x+1}{x-1}$
19. Solve by completing square method :  $x^2 - 3x - 2 = 0$
20. In the figure  $\angle A = \angle CED$ , then find the value of  $x$ .





36. A lift in a building of height 90 feet with transparent glass walls is descending from the top of the building. At the top of the building, the angle of depression to a fountain in the garden is  $60^\circ$ . Two minutes later, the angle of depression reduces to  $30^\circ$ . If the fountain is  $30\sqrt{3}$  feet from the entrance of the lift, find the speed of the lift which is descending.

37. As shown in the figure a cylinder with diameter 7cm is cut out from a cubical solid of side 7cm. Find the surface area of the remaining solid.



38. The time taken by 50 students to complete a 100m race is given below. Find its variance.

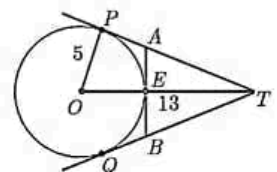
Time taken(sec)	8.5-9.5	9.5-10.5	10.5-11.5	11.5-12.5	12.5-13.5
Number of students	6	8	17	10	9

39. If two dice are rolled, then find the probability of getting the product of face value 6 or the difference of face value 5.
40. A solid sphere of radius 6cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5cm and its height is 32cm, then find the thickness of the cylinder.
41. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm,..., 24cm. How much area can be decorated with these colour papers?
42. Find the image of the point (3,8) with respect to the line  $x + 3y = 7$  assuming the line to be a plane mirror.

IV. Answer both questions

$$2 \times 8 = 16$$

43. a) Draw the graph of  $y = x^2 - 5x - 6$  and hence solve  $x^2 - 5x - 14 = 0$ . (or)
- b) The number of seats in a row is equal to the total number of rows in a hall. The total number of seats in the hall will increase by 375 if the number of rows is doubled and the number of seats in each row is reduced by 5. Find the number of rows in the hall at the beginning.
44. a) Construct a  $\Delta PQR$  in which  $QR = 5\text{cm}$ ,  $\angle P = 40^\circ$  and the median  $PG$  from  $P$  to  $QR$  is 4.4cm. Find the length of the altitude from  $P$  to  $QR$ . (or)
- b) In the fig,  $O$  is the centre of the circle with radius 5cm.  $T$  is a point such that  $OT = 13\text{cm}$  and  $OT$  intersects the circle  $E$ , if  $AB$  is the tangent to the circle at  $E$ , find the length of  $AB$ .



**MODEL QUESTION PAPER - 15****Class:X****Mathematics****Marks:100****Date:****Time:3.00hrs****I choose the correct Answer****14x1=14**

- (1) If  $f: A \rightarrow B$  is a bijective function and if  $n(B) = 7$ , then  $n(A)$  is equal to  
 (1) 7 (2) 49 (3) 1 (4) 14
- (2) If  $f \circ f(k) = 5$  where,  $f(k) = 2k - 1$  Find  $k$ .  
 (1) 0 (2) 1 (3) 2 (4) 4
- (3) The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.  
 (1) 4551 (2) 10091 (3) 7881 (4) 13531
- (4) The sum of the exponents of the prime factors in the prime factorization of 1729 is  
 (1) 1 (2) 2 (3) 3 (4) 4
- (5) In the expression:  $\frac{x}{x^2+1}$ , the excluded value is  
 (1)  $x^2 + 1$  (2) no real (3) zero (4)  $x$
- (6) When proving that a quadrilateral is a trapezium, it is necessary to show  
 (1) Two sides are parallel. (2) Two parallel and two non-parallel sides.  
 (3) Opposite sides are parallel. (4) All sides are of equal length.
- (7) If number of columns and rows are not equal in a matrix then it is said to be a  
 (1) diagonal matrix (2) rectangular matrix (3) square matrix (4) identity matrix
- (8) A tower is 60 m high. Its shadow is  $x$  metres shorter when the sun's altitude is  $45^\circ$  than when it has been  $30^\circ$ , then  $x$  is equal to  
 (1) 41.92 m (2) 43.92 m (3) 43 m (4) 45.6 m
- (9) A shuttle cock used for playing badminton has the shape of the combination of  
 (1) a cylinder and a sphere (2) a hemisphere and a cone  
 (3) a sphere and a cone (4) frustum of a cone and a hemisphere
- (10) Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?  
 (1) 13 m (2) 14 m (3) 15 m (4) 12.8 m
- (11) The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be  
 (1) 12 cm (2) 10 cm (3) 13 cm (4) 5 cm
- (12)  $\frac{\sec A}{\sin A} - \frac{\csc A}{\cos A} =$   
 (1)  $\cos A$  (2)  $\sin A$  (3)  $\cot A$  (4)  $\tan A$
- (13) If  $A$  and  $B$  are mutually exclusive events then  $P(A \cap B) =$   
 (1) 0 (2) 1 (3) 0.1 (4)  $\frac{1}{2}$
- (14) The sum of all deviations of the data from its mean is  
 (1) Always positive (2) always negative (3) zero (4) non-zero integer.



- (31) Find the total area of 14 squares whose sides are 11 cm, 12 cm, ..., 24 cm, respectively.
- (32) The product of three consecutive terms of a Geometric Progression is 343 and their sum is  $\frac{91}{3}$ . Find the three terms
- (33) The sum of the digits of a three-digit number is 11. If the digits are reversed, the new number is 46 more than five times the former number. If the hundreds digit plus twice the tens digit is equal to the units digit, then find the original three digit number
- (34) If  $9x^4 + 12x^3 + 28x^2 + ax + b$  is a perfect square, find the values of  $a$  and  $b$ .
- (35) Given  $A = \begin{pmatrix} p & 0 \\ 0 & 2 \end{pmatrix}$ ,  $B = \begin{pmatrix} 0 & -q \\ 1 & 0 \end{pmatrix}$ ,  $C = \begin{pmatrix} 2 & -2 \\ 2 & 2 \end{pmatrix}$  and if  $BA = C^2$ , find  $p$  and  $q$ .
- (36) State and prove Basic Proportionality Theorem
- (37) If  $\operatorname{cosec} \theta + \cot \theta = P$ , then prove that  $\cos \theta = \frac{P^2 - 1}{P^2 + 1}$
- (38) A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25 cm. Find the total surface area of the toy if its common diameter is 12 cm.
- (39) A conical flask is full of water. The flask has base radius  $r$  units and height  $h$  units, the water poured into a cylindrical flask of base radius  $xr$  units. Find the height of water in the cylindrical flask
- (40) The following table shows the marks obtained by 48 students in a Quiz competition in Mathematics. Calculate the standard deviation.

data $x$	6	7	8	9	10	11	12
frequency $f$	3	6	9	13	8	5	4

- (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) Prove analytically that the line segment joining the mid-points of two sides of a triangle is parallel to the third side and is equal to half of its length.



## X - MATHEMATICS

Time : 3 Hrs + 15 Minutes

Maximum Marks : 100

## MODEL QUESTION PAPER - 16

## PART - A

14X1=14

Answer All The Questions :

- If  $f$  is an identity function, then the value of  $f(1) - 2f(2) + f(3)$  is  
a) 0                      b) -3                      c) 1                      d) -1
- If  $f(x) = x + 1$  then  $f(f(f(y + 2)))$  is  
a)  $y + 3$                       b)  $y + 5$                       c)  $y + 7$                       d)  $y + 9$
- Sum of first  $n$  terms of the series  $\sqrt{2} + \sqrt{8} + \sqrt{18} + \dots$  is  
a)  $\frac{n(n+1)}{2}$                       b)  $\sqrt{n}$                       c)  $\frac{n(n+1)}{\sqrt{2}}$                       d) 1
- A boy save Rs.1 on the first day, Rs.2 on the second day, Rs.4 on the third day and so on. How much did the boy will save up to 20 days?  
a)  $2^{19} + 1$                       b)  $2^{19} - 1$                       c)  $2^{20} - 1$                       d)  $2^{21} - 1$
- The square root of  $4m^2 - 24m + 36$  is  
a)  $4(m - 3)$                       b)  $2(m - 3)$                       c)  $(2m - 3)^2$                       d)  $m - 3$
- If  $\begin{bmatrix} 4 & 3 & 2 \\ 1 & -2 & x \end{bmatrix} = 6$ , then  $x$  is  
a) 4                      b) 3                      c) 2                      d) 1
- A line which intersects a circle at two distinct points is called  
a) Point of contact                      b) Secant                      c) Diameter                      d) Tangent
- If the points  $(0,0)$ ,  $(a, 0)$  and  $(0, b)$  are collinear, then  
a)  $a = b$                       b)  $a + b$                       c)  $ab = 0$                       d)  $a \neq b$
- In a right angled triangle ABC, right angled at B, if the side BC is parallel to X-axis, then slope of AB is  
a)  $\sqrt{3}$                       b)  $\frac{1}{\sqrt{3}}$                       c) 1                      d) not defined
- A ladder of length  $14m$  just reaches the top of a wall. If the ladder makes an angle  $60^\circ$  with the horizontal, then the height of the wall is  
a)  $14\sqrt{3} m$                       b)  $28\sqrt{3} m$                       c)  $7\sqrt{3} m$                       d)  $35\sqrt{3} m$
- The curved surface area of a right circular cone of height  $15 cm$  and base diameter  $16 cm$  is  
a)  $60\pi cm^2$                       b)  $68\pi cm^2$                       c)  $120\pi cm^2$                       d)  $136\pi cm^2$
- A semicircular thin sheet of a metal of diameter  $28 cm$  is bent and an open conical cup is made. What is the capacity of the cup?  
a)  $\left[\frac{1000}{3}\right]\sqrt{3}cm^3$                       b)  $[300]\sqrt{3}cm^3$                       c)  $\left[\frac{700}{3}\right]\sqrt{3}cm^3$                       d)  $\left[\frac{1078}{3}\right]\sqrt{3}cm^3$
- If the observations  $1, 2, 3, \dots, 50$  have the variance  $V_1$  and the observations  $51, 52, 53, \dots, 100$  have the variance  $V_2$  then  $\frac{V_1}{V_2}$  is  
a) 0                      b) 1                      c) 2                      d) 3
- When three coins are tossed, the probability of getting the same face on all the three coins is  
a)  $\frac{1}{8}$                       b)  $\frac{1}{4}$                       c)  $\frac{3}{8}$                       d)  $\frac{1}{3}$

35. If  $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ ,  $B = \begin{pmatrix} 0 & 3 \\ -1 & 5 \end{pmatrix}$ ,  $C = \begin{pmatrix} -1 & 5 \\ 1 & 3 \end{pmatrix}$ , prove that  $A(BC) = (AB)C$ .
36. The hypotenuse of a right triangle is 6 m more than twice of the shortest side. If the third side is 2 m less than the hypotenuse, find the sides of the triangle.
37. The area of a triangle is 5sq.units. Two of its vertices are (2,1) and (3, -2). The third vertex is (x, y) where  $y = x + 3$ . Find the coordinates of the third vertex.
38. As observed from the top of a 60m high light house from the sea level, the angle of depression of two ships are  $28^\circ$  and  $45^\circ$ . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships. ( $\tan 28^\circ = 0.5317$ ).
39. A shuttle cock used for playing badminton has the shape of a frustum of a cone is mounted on a hemisphere. The diameter of the frustum are 5cm and 2cm. The height of the entire shuttle cock is 7cm. Find its external surface area.
40. A cylindrical bucket 32 cm high and with radius of base 18 cm, is filled with sand completely. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.
41. The temperature of two cities A and B in a winter season are given below.
- |   |    |    |    |    |    |
|---|----|----|----|----|----|
| Temperature of city A ( in degree Celsius ) | 18 | 20 | 22 | 24 | 26 |
| Temperature of city B ( in degree Celsius ) | 11 | 14 | 15 | 17 | 18 |
- Find which city is more consistent in temperature changes?
42. A coin is tossed thrice. Find the probability of getting exactly two heads or at least one tail or two consecutive heads.

**PART – D****2x8=16****Answer All The Questions :**

43. a) Construct a  $\Delta PQR$  in which  $PQ = 8 \text{ cm}$ ,  $\angle R = 60^\circ$  and the median RG from R to PQ is 5.8 cm. Find the length of the altitude from R to PQ. **(OR)**
- b) Take a point which is 11 cm away from the centre of a radius 4 cm and draw two tangents to the circle from the point.
44. a) Draw the graph of  $y = 2x^2$  and hence solve  $2x^2 - x - 6 = 0$ . **(OR)**
- b) Draw the graph of  $y = x^2 + x - 2$  and use it to solve  $x^2 + x - 2 = 0$ .

**PUBLIC MODEL QUESTION PAPER -17****MATHEMATICS****TOTAL MARKS: 100****Std - X****TIME: 2.30 HRS****SECTION - A****I Choose the best answer****14x1=14**

1. If  $f: A \rightarrow B$  is a bijective function and if  $n(B)=7$ , then  $n(A)$  is equal to  
 1) 7                                      2) 49                                      3) 1                                      4) 14
2. The range of the relation  $R = \{(x, x^2) / x \text{ is a prime number less than } 13\}$  is  
 1)  $\{2, 3, 5, 7\}$                                       2)  $\{2, 3, 5, 7, 11\}$   
 3)  $\{4, 9, 25, 49, 121\}$                                       4)  $\{1, 4, 9, 25, 49, 121\}$
3. An A.P consists of 31 terms. If its 16<sup>th</sup> term is  $m$ , then the sum of all the terms of this A.P is  
 1)  $16m$                                       2)  $62m$                                       3)  $31m$                                       4)  $\frac{31}{2}m$
4. The next term of the sequence  $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$   
 1)  $\frac{1}{24}$                                       2)  $\frac{1}{27}$                                       3)  $\frac{2}{3}$                                       4)  $\frac{1}{81}$
5. Which of the following should be added to make  $x^4 + 64$  a perfect square  
 1)  $4x^2$                                       2)  $16x^2$                                       3)  $8x^2$                                       4)  $-8x^2$
6. If  $A$  is a  $2 \times 3$  matrix and  $B$  is a  $3 \times 4$  matrix, how many columns does  $AB$  have  
 1) 3                                      2) 4                                      3) 2                                      4) 5
7. How many tangents can be drawn to a circle from an exterior point?  
 1) one                                      2) two                                      3) infinite                                      4) zero
8. The area of the triangle formed by the points  $(-5, 0)$ ,  $(0, -5)$ ,  $(5, 0)$  is  
 1) 0 sq.units                                      2) 25 sq.units                                      3) 5 sq.units                                      4) none of these
9.  $(2, 1)$  is the point of intersection of two lines  
 1)  $x - y - 3 = 0$ ;  $3x - y - 7 = 0$                                       2)  $x + y = 3$ ;  $3x + y = 7$   
 3)  $3x + y = 3$ ;  $x + y = 7$                                       4)  $x + 3y - 3 = 0$ ;  $x - y - 7 = 0$
10. The tower is 60m high. Its shadow is  $x$  metre shorter when the sun's altitude is  $45^\circ$  than when it has been  $30^\circ$ , then  $x$  is equal to  
 1) 41.92m                                      2) 43.92m                                      3) 43m                                      4) 45.6m
11. The total surface area of a hemi sphere is how much times the square of its radius  
 1)  $\pi$                                       2)  $4\pi$                                       3)  $3\pi$                                       4)  $2\pi$
12. The ratio of the volume of a cylinder, a cone, and a sphere, if each has the same diameter and same height is  
 1) 1:2:3                                      2) 2:1:3                                      3) 1:3:2                                      4) 3:1:2
13. Variance of first 20 natural number is  
 1) 32.25                                      2) 44.25                                      3) 33.25                                      4) 30
14. Which of the following is incorrect  
 1)  $P(A) > 1$                                       2)  $0 \leq P(A) \leq 1$   
 3)  $P(\emptyset) = 0$                                       4)  $P(A) + P(\bar{A}) = 1$



39. A right circular cylindrical container of base radius 6cm and height 15cm full of ice-cream. The ice-cream is to be filled in cones of height 9cm and base radius 3cm having a hemispherical cap. Find the number of cones needed to empty the cone.
40. Find the mean and variance of the first  $n$  natural numbers.
41. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.
42. If  $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ , show that  $A^2 - 5A + 7I_2 = 0$

### SECTION- D

#### IV Answer any one of the following

2x8=16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to  $\frac{7}{3}$  of the corresponding sides of the triangle PQR (scale factor  $\frac{7}{3} > 1$ )  
(or)  
b) Draw a circle of diameter 6cm from a point P, which is 8cm away from its centre. Draw two tangents PA and PB to the circle and measure their lengths
44. a) Draw a graph of  $xy = 24, x, y > 0$ . using the graph find  
i)  $y$  when  $x=3$                       ii)  $x$  when  $y=6$   
(or)  
b) Discuss the nature of the solution of  $x^2 + x - 12 = 0$ .

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Model Public Exam / மாதிரி பொதுத் தேர்வு - 2022		பதிவு எண்							
Set - A									
X – MATHEMATICS / கணிதம்									
Time : 3hrs + 15 mins		MODEL QUESTION PAPER - 18				Total Marks : 100			
கால அளவு : 3 மணி+15 நிமிடம்						மொத்த மதிப்பெண் : 100			

**Note :** 1. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

2. Use Blue or Black ink to write and underline and pencil to draw diagrams.

அறிவுரைகள் : 1. அனைத்து வினாக்களும் சரியாக பதிவாகி உள்ளதா என்பதனை சரிபார்த்துக் கொள்ளவும். அச்சப்பதிவில் குறையிருப்பின் அறைக் கண்காணிப்பாளரிடம் உடனடியாக தெரிவிக்கவும்.  
2. நீலம் அல்லது கருப்பு மையினை மட்டுமே எழுதுவதற்கும் அடிக்கோடிடுவதற்கும் பயன்படுத்த வேண்டும். படங்கள் வரைவதற்கு பென்சில் பயன்படுத்தவும்.

### Part - I / பகுதி - I

**Note :** i) Answer all the questions

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer

குறிப்பு : i) அனைத்து வினாக்களுக்கும் விடையளிக்கவும்

ii) கொடுக்கப்பட்டுள்ள நான்கு விடைகளில் மிகவும் ஏற்புடைய விடையினைத் தேர்ந்தெடுத்து குறியீட்டுடன் விடையினையும் சேர்த்து எழுதவும். (14 × 1 = 14)

1. Let  $n(A) = m$  and  $n(B) = n$  then the total number of non-empty relations that can be defined from  $A$  to  $B$  is  $n(A) = m$  மற்றும்  $n(B) = n$  என்க.  $A$  -லிருந்து  $B$  -க்கு வரையறுக்கப்பட்ட வெற்று கணமில்லாத உறவுகளின் மொத்த எண்ணிக்கை.

(A)  $m^n$  (B)  $n^m$  (C)  $2^{mn} - 1$  (D)  $2^{mn}$

2. If the HCF of 65 and 117 is expressible in the form of  $65m - 117$ , then the value of  $m$  is

65 மற்றும் 117 -யின் மீ.பொ.வ -வை  $65m - 117$  என்ற வடிவில் எழுதும்போது,  $m$  -யின் மதிப்பு

(A) 4 (B) 2 (C) 1 (D) 3

3. If  $a$  and  $b$  are two positive integers where  $a > 0$  and  $b$  is a factor of  $a$ , then HCF of  $a$  and  $b$  is

$a$  மற்றும்  $b$  என்பன இரு மிகை முழுக்கள்.  $a > 0$ ,  $b$  என்பது  $a$  -ன் ஒரு காரணி எனில்  $a$  மற்றும்  $b$  ஆகியவற்றின் மீ.பொ.வ

(A)  $b$  (B)  $a$  (C)  $3ab$  (D)  $\frac{a}{b}$

4.  $\frac{3y-3}{y} \div \frac{7y-7}{3y^2} =$

$\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$  என்பது

(A)  $\frac{9y}{7}$  (B)  $\frac{9y^3}{21y-21}$  (C)  $\frac{21y^2-42y+21}{3y^3}$  (D)  $\frac{7(y^2-2y+1)}{y^2}$

5. The solution of  $(2x - 1)^2 = 9$  is equal to

$(2x - 1)^2 = 9$  -யின் தீர்வு

(A) -1 (B) 2 (C) -1, 2 (D) 1

6. If in triangles  $ABC$  and  $EDF$ ,  $\frac{AB}{DE} = \frac{BC}{FD}$  then they will be similar, when

$\frac{AB}{DE} = \frac{BC}{FD}$  எனில்,  $ABC$  மற்றும்  $EDF$  எப்பொழுது வடிவொத்தவையாக அமையும்?

(A)  $\angle B = \angle E$  (B)  $\angle A = \angle D$  (C)  $\angle B = \angle D$  (D)  $\angle A = \angle F$

7. In a  $\Delta ABC$ ,  $AD$  is the bisector of  $\angle BAC$ . If  $AB = 8$  cm,  $BD = 6$  cm and  $DC = 3$  cm. The length of the side  $AC$  is  $\Delta ABC$ -யில்  $AD$  ஆனது,  $\angle BAC$ -யின் இருசமவெட்டி.  $AB = 8$  செ.மீ,  $BD = 6$  செ.மீ மற்றும்  $DC = 3$  செ.மீ எனில், பக்கம்  $AC$ -யின் நீளம்

(A) 6 cm (B) 4 cm (C) 3 cm (D) 8 cm

8. If slope of the line  $PQ$  is  $\frac{1}{\sqrt{3}}$  then the slope of the perpendicular bisector of  $PQ$  is

கோட்டுத்துண்டு  $PQ$ -யின் சாய்வு  $\frac{1}{\sqrt{3}}$  எனில்,  $PQ$ -க்கு செங்குத்தான இரு சம வெட்டியின் சாய்வு

(A)  $\sqrt{3}$  (B)  $-\sqrt{3}$  (C)  $\frac{1}{\sqrt{3}}$  (D) 0



9. A tower is 60 m height. Its shadow is  $x$  metres shorter when the sun's altitude is  $45^\circ$  than when it has been  $30^\circ$ , then  $x$  is equal to  
 ஒரு கோபுரத்தின் உயரம் 60 மீ ஆகும். சூரியனை காணும் ஏற்றக்கோணம்  $30^\circ$  -லிருந்து  $45^\circ$  ஆக உயரும்போது கோபுரத்தின் நிழலானது  $x$  மீ குறைகிறது எனில்  $x$ -ன் மதிப்பு  
 (A) 41.92 m (B) 43.92 m (C) 43 m (D) 45.6 m
10. If (5, 7), (3,  $p$ ) and (6, 6) are collinear then the value of  $p$  is  
 (5,7), (3,  $p$ ) மற்றும் (6,6) என்பன ஒரு கோட்டமைந்தவை எனில்,  $p$ -யின் மதிப்பு  
 (A) 3 (B) 6 (C) 9 (D) 12
11. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is  
 சமமான விட்டம் மற்றும் உயரம் உடைய ஓர் உருளை, ஒரு கூம்பு மற்றும் ஒரு கோளத்தின் கன அளவுகளின் விகிதம்  
 (A) 1:2:3 (B) 2:1:3 (C) 1:3:2 (D) 3:1:2
12. If the radius of the base of a cone is tripled and the height is doubled then the volume is  
 (A) made 6 times (B) made 18 times (C) made 12 times (D) unchanged  
 ஒரு கூம்பின் அடிப்புற ஆரம் மூன்றுமடங்காகவும் உயரம் இரு மடங்காகவும் மாறினால் கன அளவு எத்தனை மடங்காக மாறும்?  
 (அ) 6 மடங்கு (ஆ) 18 மடங்கு (இ) 12 மடங்கு (ஈ) மாற்றமில்லை
13. Which of the following is incorrect?  
 கொடுக்கப்பட்டவைகளில் எது தவறானது?  
 (A)  $P(A) > 1$  (B)  $0 \leq P(A) \leq 1$  (C)  $P(\emptyset) = 0$  (D)  $P(A) + P(\bar{A}) = 1$
14. A fair die is thrown once. The probability of getting a prime (or) composite number is  
 ஒரு சீரான பகடை ஒரு முறை உருட்டப்படும்போது கிடைக்கும் எண், பகா எண் அல்லது பகு எண்ணாக இருப்பதற்கான நிகழ்தகவு  
 (A) 1 (B) 0 (C)  $\frac{5}{6}$  (D)  $\frac{1}{6}$

## Part - II / பகுதி - II

Note : Answer any 10. Question No.28 is Compulsory.

குறிப்பு : எவையேனும் 10 வினாக்களுக்கு மட்டும் விடையளிக்கவும்.

வினா எண் 28-க்கு கட்டாயமாக விடையளிக்கவும்.

(10 × 2 = 20)

15. If  $B \times A = \{(-2,3), (-2,4), (0,3), (0,4), (3,3), (3,4)\}$  Find A and B.  
 $B \times A = \{(-2,3), (-2,4), (0,3), (0,4), (3,3), (3,4)\}$  எனில், A மற்றும் B ஆகியவற்றைக் காண்க.

16. Prove that two consecutive positive integers are always coprime.

எந்த இரு அடுத்தடுத்த மிகை முழுவும் சார்பகா எண்கள் என நிறுவுக.

17. Find  $a_8$  and  $a_{15}$  whose  $n^{th}$  term is  $a_n = \begin{cases} \frac{n^2-1}{n+3}; n \text{ is even}, n \in \mathbb{N} \\ \frac{n^2}{2n+1}; n \text{ is odd}, n \in \mathbb{N} \end{cases}$

$a_n = \begin{cases} \frac{n^2-1}{n+3}; \text{ ஓர் இரட்டை எண் } n \in \mathbb{N} \\ \frac{n^2}{2n+1}; \text{ ஓர் ஒற்றை எண் } n \in \mathbb{N} \end{cases}$  என்பது  $n$ -வது உறுப்பு எனில்,  $a_8$  மற்றும்  $a_{15}$  காண்க.

18. If the difference between a number and its reciprocal is  $\frac{24}{5}$ , find the number.

ஓர் எண் மற்றும் அதன் தலைகீழி ஆகியவற்றின் வித்தியாசம்  $\frac{24}{5}$  எனில், அந்த எண்ணைக் காண்க.

19. Subtract :  $\frac{(2x+1)(x-2)}{x-4} - \frac{(2x^2-5x+2)}{x-4}$   
 கழிக்க:  $\frac{(2x+1)(x-2)}{x-4} - \frac{(2x^2-5x+2)}{x-4}$

20. In a theatre, there are 20 seats in the front row and 30 rows were allotted. Each, successive row contains two additional seats than its front row. How many seats are there in the last row?

ஒரு சினிமா அரங்கின் முதல் வரிசையில் 20 இருக்கைகளும் மொத்தம் 30 வரிசைகளும் உள்ளன. அடுத்தடுத்த ஒவ்வொரு வரிசையிலும் அதற்கு முந்தைய வரிசையைவிட இரண்டு இருக்கைகள் கூடுதலாக உள்ளன. கடைசி வரிசையில் எத்தனை இருக்கைகள் இருக்கும்?

21. Find the area of the triangle formed by the points  $(-10, -4)$ ,  $(-8, -1)$  and  $(-3, -5)$ .

கீழ்க்கண்ட புள்ளிகளால் அமைக்கப்படும் முக்கோணத்தின் பரப்பு காண்க  $(-10, -4)$ ,  $(-8, -1)$  மற்றும்  $(-3, -5)$ .



38. An aeroplane at an altitude of 1800m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are  $60^\circ$  and  $30^\circ$  respectively. Find the distance between the two boats. ( $\sqrt{3} = 1.732$ )

1800 மீ உயரத்தில் பறக்கும் ஒரு விமானத்திலிருந்து ஒரே திசையில் விமானத்தை நோக்கிச் செல்லும் இரு படகுகள் பார்க்கப்படுகிறது. விமானத்திலிருந்து இரு படகுகளை முறையே  $60^\circ$  மற்றும்  $30^\circ$  இறக்கக்கோணங்களில் உற்று நோக்கினால், இரண்டு படகுகளுக்கும் இடைப்பட்டத் தொலைவைக் காண்க. ( $\sqrt{3} = 1.732$ )

39. If the circumference of a conical wooden piece is 484 cm then find its volume when its height is 105 cm.

484 செ.மீ சுற்றளவுள்ள ஒரு மரக்கூம்பின் உயரம் 105 செ.மீ எனில், கூம்பின் கன அளவைக் காண்க.

40. In a box there are 20 non-defective and some defective bulbs. If the probability that a bulb selected at random from the box found to be defective is  $\frac{3}{8}$  then, find the number of defective bulbs.

ஒரு பெட்டியில் 20 குறைபாடில்லாத விளக்குகளும் ஒரு சில குறைபாடுடைய விளக்குகளும் உள்ளன. பெட்டியிலிருந்து சமவாய்ப்பு முறையில் தேர்ந்தெடுக்கப்படும் ஒரு விளக்கானது குறைபாடுடையதாக இருப்பதற்கான வாய்ப்பு  $\frac{3}{8}$  எனில், குறைபாடுடைய விளக்குகளின் எண்ணிக்கையைக் காண்க.

41. Find the value of K, if the area of a quadrilateral is 28sq.units, whose vertices are taken in the order  $(-4, -2), (-3, k), (3, -2)$  and  $(2, 3)$ .

$(-4, -2), (-3, k), (3, -2)$  மற்றும்  $(2, 3)$  ஆகியவற்றை முனைகளாகக் கொண்ட நாற்கரத்தின் பரப்பு 28 ச.அலகுகள் எனில்,  $k$ -யின் மதிப்புக் காண்க.

42. State and Prove Basic Proportionality Theorem or Thales Theorem.

அடிப்படை விகிதச்சம தேற்றம் அல்லது தேல்ஸ் தேற்றத்தை எழுதி நிறுவுக

### Part – IV / பகுதி - IV

Note : Answer the following questions.

குறிப்பு : பின்வரும் வினாக்களுக்கு விடையளிக்கவும்

(2 × 8 = 16)

43. (a) Draw a circle of radius 4.5 cm. Take a point on the circle. Draw the tangent at that point using the alternate segment theorem.

4.5 செ.மீ ஆரமுள்ள வட்டம் வரைக. வட்டத்தின் மீது ஏதேனும் ஒரு புள்ளிக்கு மாற்று வட்டத்துண்டு தேற்றத்தினைப் பயன்படுத்தித் தொடுகோடு வரைக.

(OR)

(b) Construct a triangle  $\Delta PQR$  such that  $QR = 5$  cm,  $\angle P = 30^\circ$  and the altitude from  $P$  to  $QR$  is of length 4.2 cm.

$QR = 5$  செ.மீ,  $\angle P = 30^\circ$  மற்றும்  $P$ -யிலிருந்து  $QR$ க்கு வரையப்பட்ட குத்துக்கோட்டின் நீளம் 4.2 செ.மீ கொண்ட  $\Delta PQR$  வரைக.

44. (a) Discuss the nature of solutions of the following quadratic equation  $x^2 + 2x + 5 = 0$ .

பின்வரும் இருபடிச் சமன்பாட்டின் தீர்வுகளின் தன்மையை வரைபடம் மூலம் ஆராய்க  $x^2 + 2x + 5 = 0$ .

(OR)

(b) Draw the graph of  $y = x^2 + x$  and hence solve  $x^2 + 1 = 0$ .

$y = x^2 + x$  -யின் வரைபடம் வரைந்து,  $x^2 + 1 = 0$  என்ற சமன்பாட்டைத் தீர்க்கவும்.