

# Sun Tuition Center -9629216361

Std : X

model question paper

Max. marks: 100

Subject: Maths

Time : 3 Hrs

## MODEL EXAM - 1

### 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)  $\frac{b}{\sqrt{3}}$

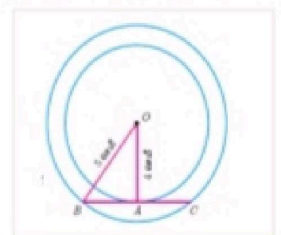
11. The angle of depression of the top and bottom of 20 m tall building from the top of a multistoried building are  $30^\circ$  and  $60^\circ$  respectively. The height of the multistoried building and the distance between two building(in metres)
- (A)  $20, 10\sqrt{3}$  (B)  $30, 5\sqrt{3}$  (C) 20, 10 (D)  $30, 10\sqrt{3}$
12. The height of a right circular cone whose radius is 5cm and slant height is 13 cm will be
- (A) 12cm (B) 10cm (C) 13 cm (D) 5cm
13. 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
- (A)  $5600\pi\text{cm}^3$  (B)  $11200\pi\text{cm}^3$  (C)  $56\pi\text{cm}^3$  (D)  $3600\pi\text{cm}^3$
14. The probability a red marble selected at random from a jar containing p red , q blue and r green marbles is
- (A)  $\frac{q}{p+q+r}$  (B)  $\frac{p}{p+q+r}$  (C)  $\frac{p+q}{p+q+r}$  (D)  $\frac{p+r}{p+q+r}$

## PART – II

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

**10 x 2 = 20**

15. Let  $A = \{1, 2, 3, 7\}$  and  $B = \{3, 0, -1, 7\}$ , which of the following are relations from A to B?  
(i)  $R_1 = \{(2, 1), (7, 1)\}$  (ii)  $R_2 = \{(2, -1), (7, 7), (1, 3)\}$
16. If  $13824 = 2^a \times 3^b$  then find a and b.
17. Which term of an A.P, 16, 11, 6, ... is -54 ?
18. Find the LCM of the given polynomials  $p^2 - 3p + 2$ ,  $p^2 - 4$
19. If the difference between a number and its reciprocal is  $\frac{24}{5}$ , find the number.
20. From the figure, AD is the bisector of  $\angle A$ . If  $BD = 4$  cm,  $DC = 3$  cm and  $AB = 6$  cm, find AC.
21. If radii of two concentric circles are 4cm and 5cm then find the length of the chord of one circle which is a tangent to the other circle.
22. Show that the points P(-1.5, 3), Q (6, -2) and R(-3, 4) are collinear.
23. Find the intercepts made by the line  $4x + 3y + 12 = 0$  on the coordinate axes
24. 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.
25. A kite is flying at a height of 75m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is  $60^\circ$ . Find the length of the string, assuming that there is no slack in the string.
26. If the total surface area of a cone of radius 7cm is  $704\text{ cm}^2$ , then find its slant height.
27. The radius of a spherical balloon increase from 12cm to 16 cm as air being pumped into it. Find the ratio of the surface area of the balloons in the two cases.





28. Cards marked with numbers 1 to 100 are placed in a bag and mixed one card is drawn at random. Find the probability that the number on the card is a prime number less than 30.

### **PART – III**

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

**10 x 5 = 50**

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  $(A \cap B) \times C = (A \times C) \cap (B \times C)$
30. Use Euclid's Division Algorithm to find the Highest Common Factor (HCF) of 84, 90 and 120
31. Find the values of m and n if the following polynomial is a perfect square.  
 $36x^4 - 60x^3 + 61x^2 - mx + n$ .
32. Simplify  $\frac{1}{x^2-5x+6} + \frac{1}{x^2-3x+2} - \frac{1}{x^2-8x+15}$
33. State and Prove Basic Proportionality Theorem (BPT) or Thales Theorem
34. Show that in a triangle, the medians are concurrent.
35. Find the Area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3)
36. Find the equation of the median and altitude of  $\Delta ABC$  through A where the vertices are A(6,2), B(-5, -1) and C(1,9).
37. 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. ( $\sqrt{3} = 1.732$ ).
38. Two ships are sailing in the sea on either sides of a light house. The angle of elevation of the top of the lighthouse as observed from the ships are  $30^\circ$  and  $45^\circ$  respectively. If the lighthouse is 200m high, find the distance between the two ships. ( $\sqrt{3} = 1.732$ )
39. From a well shuffled pack of 52 cards, one card is drawn at random. Find the probability of getting (i) red card (ii) heart card (iii) red king (iv) face card (v) number card.
40. A container open at the top is in the form of a frustum of a cone of height 16cm with radii of its lower and upper ends are 8cm and 20cm respectively. Find the cost of the milk which can completely fill a container at the rate of ₹40 per litre.
41. An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10m and 4 m and whose height is 4m. Find the curved and total surface area of the bucket.
42. If the sum of the first p terms of an A.P is  $ap^2 + bp$ . Find its common difference.

### **PART – IV**

**Answer the following.**

**2 x 8 = 16**

43. Take a point which is 11cm away from the centre of a circle a radius 4cm and draw the two tangents to the circle from that point. (OR)  
 Construct a triangle similar to a given triangle LMN with its sides equal to  $\frac{4}{5}$  of the corresponding sides of the triangle LMN (Scale factor  $\frac{4}{5}$ )
44. Discuss the nature of solutions of the quadratic equations  $x^2 - 4x + 4 = 0$  (OR)  
 Draw the graph of  $y = 2x^2$  and hence use it to solve  $2x^2 - 4x - 6 = 0$ .

# Sun Tuition Center - 9629216361

## model question paper

10<sup>th</sup> Std  
TIME : 3 Hrs

MATHEMATICS

11.01.2022  
MARKS : 100

### PART - I

Note:

- Answer all the 14 questions.
- Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer.

I Choose the correct answer :

14x1=14

- If  $n(A \times B) = 6$  and  $A = \{1, 3\}$  then  $n(B)$  is  
(a) 1 (b) 2 (c) 3 (d) 6
- Euclid's division lemma states that for positive integers  $a$  and  $b$ , there exist unique integers  $q$  and  $r$  such that  $a = bq + r$ , where  $r$  must satisfy  
(a)  $1 < r < b$  (b)  $0 < r < b$  (c)  $0 \leq r < b$  (d)  $0 < r \leq b$
- 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  
(a) 0 (b) 6 (c) 7 (d) 13
- 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)  $x = 1, y = -2, z = 3$
- The square root of  $\frac{256x^9y^4z^{10}}{25x^6y^6z^6}$  is equal to  
(a)  $\frac{16}{5} \left| \frac{x^2z^4}{y^2} \right|$  (b)  $16 \left| \frac{y^2}{x^2z^4} \right|$  (c)  $\frac{16}{5} \left| \frac{y}{xz^2} \right|$  (d)  $\frac{16}{5} \left| \frac{xz^2}{y} \right|$
- Graph of a linear equation is a  
(a) straight line (b) circle (c) Parabola (d) hyperbola
- If in triangles ABC and EDF,  $\frac{AB}{DE} = \frac{BC}{FD}$  then they will be similar, when  
(a)  $\angle B = \angle E$  (b)  $\angle A = \angle D$  (c)  $\angle B = \angle D$  (d)  $\angle A = \angle F$
- If in  $\triangle ABC$ ,  $DE \parallel BC$ ,  $AB = 3.6$  cm,  $AC = 2.4$  cm and  $AD = 2.1$  cm then length of AE is  
(a) 1.4 cm (b) 1.8 cm (c) 1.2 cm (d) 1.05 cm
- The area of triangle formed by the points  $(-5, 0)$ ,  $(0, -5)$  and  $(5, 0)$  is  
(a) 0 sq. units (b) 25 sq. units (c) 5 sq. units (d) none of these
- 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)
- 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)  $60^\circ$
- The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is  
(a)  $60\pi$  cm<sup>2</sup> (b)  $68\pi$  cm<sup>2</sup> (c)  $120\pi$  cm<sup>2</sup> (d)  $136\pi$  cm<sup>2</sup>
- The total surface area of a hemisphere is how much times the square of its radius.  
(a)  $\pi$  (b)  $4\pi$  (c)  $3\pi$  (d)  $2\pi$
- Which of the following is incorrect?  
(a)  $P(A) > 1$  (b)  $0 \leq P(A) \leq 1$  (c)  $P(\emptyset) = 0$  (d)  $P(A) + P(\bar{A}) = 1$

### PART - II

Note:

- Answer only 10 questions.
- Question Number 28 is compulsory.

(10 x 2 = 20)

- If  $A = \{2, -2, 3\}$  and  $B = \{1, -4\}$  then find  $A \times B$  and  $B \times A$
- 'a' and 'b' are two positive integers such that  $a^b \times b^a = 800$ . Find 'a' and 'b'.
- Find the first four terms of the sequences whose  $n^{\text{th}}$  terms are given by  $a_n = n^3 - 2$
- Simplify  
$$\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$$
- Determine the quadratic equations, whose sum and product of root are  $-9, 20$
- In  $\triangle ABC$ , D and E are the points on the sides AB and AC respectively such that  $DE \parallel BC$ , if  $\frac{AD}{DB} = \frac{3}{4}$  and  $AC = 15$  cm, find AE.
- The length of the tangent to a circle from a point P, which is 25 cm away from the centre is 24 cm. What is the radius of the circle?



22. Find the slope of a line joining the points  $(5, \sqrt{5})$  with the origin
23. 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.
24. 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.
25. The external radius and the length of a hollow wooden log are 16 cm and 13 cm respectively. If its thickness is 4 cm then find its T.S.A.
26. Find the volume of a cylinder whose height is 2 m and whose base area is  $250 \text{ m}^2$ .
27. A and B are two events such that,  $P(A) = 0.42$ ,  $P(B) = 0.48$  Find (i)  $P(\text{not } A)$  (ii)  $P(\text{not } B)$
28. Reduce the rational expressions to its lowest form  $\frac{x^2 - 1}{x^2 + x}$

## PART - III

Note: (i) Answer only 10 questions.

(ii) Question Number 42 is compulsory.

(10 x 5 = 50)

29. If  $A = \{5, 6\}$ ,  $B = \{4, 5, 6\}$ ,  $C = \{5, 6, 7\}$  show that  $A \times A = (B \times B) \cap (C \times C)$
30. Use Euclid's Division Algorithm to find the Highest Common Factor (HCF) of 340 and 412
31. Find the  $15^{\text{th}}$ ,  $24^{\text{th}}$  and  $n^{\text{th}}$  term (general term) of an A.P. given by 3, 15, 27, 39...
32. If  $A = \frac{2x+1}{2x-1}$ ,  $B = \frac{2x-1}{2x+1}$  find  $\frac{1}{A-B} - \frac{2B}{A^2-B^2}$
33. Find the values of a and b if the following polynomials are perfect squares  
 $4x^4 - 12x^3 + 37x^2 + bx + a$
34. 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.
35. A vertical stick of length 6 m casts a shadow 400 cm long on the ground and at the same time a tower casts a shadow 28 m long. Using similarity, find the height of the tower.
36. State and prove Pythagora's theorem.
37. Find the value of k, if the area of a quadrilateral is 28 sq. units, whose vertices are taken in the order  $(-4, -2)$ ,  $(-3, k)$ ,  $(3, -2)$  and  $(2, 3)$
38. Find the equation of a line through the given pair of points  $(2, 3)$  and  $(-7, -1)$
39. The angles of elevation and depression of the top and bottom of a lamp post from the top of a 66 m high apartment are  $60^\circ$  and  $30^\circ$  respectively. Find  
 (i) The height of the lamp post.  
 (ii) The difference between height of the lamp post and the apartment.  
 (iii) The distance between the lamp post and the apartment. ( $\sqrt{3} = 1.732$ )
40. Nathan, an engineering student was asked to make a model shaped like a cylinder with two cones attached at its two ends. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of the model that Nathan made.
41. Three fair coins are tossed together. Find the probability of getting  
 (i) all heads (ii) atleast one tail (iii) atmost one head (iv) atmost two tails.
42. Let  $A = \{1, 2, 3, 7\}$  and  $B = \{3, 0, -1, 7\}$ . Which of the following are relation from A to B?  
 (i)  $R_1 = \{(2, 1), (7, 1)\}$  (ii)  $R_2 = \{(-1, 1)\}$   
 (iii)  $R_3 = \{(2, -1), (7, 7), (1, 3)\}$  (iv)  $R_4 = \{(7, -1), (0, 3), (3, 3), (0, 7)\}$

## PART - IV

Note:

(i) This section contains one question with two alternatives.

(ii) Answer the given question choosing either of the alternatives.

(2 x 8 = 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 the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.
44. (a) Discuss the nature of solution of the quadratic equation  $x^2 - 9 = 0$   
 (OR)  
 (b) Draw the graph of  $y = x^2 - 4$  and hence solve  $x^2 - x - 12 = 0$