Zeestilla Wale
X-A

KPS/X/MATHEMATICS (041)/SET-1/PRE-BOARD EXAMINATION / 2024-25

Time allowed: 3 hours **Maximum Marks: 80**

GENERAL INSTRUCTIONS:

1. This question paper contains 38 questions. All questions are compulsory.
2. Question paper is divided into FIVE sections – SECTION A,B,C, D and E.
3. In section A, question number 1 to 18 are multiple choice questions (MCQs) and question number 19 and 20 are Assertion – Reason based questions of 1 mark each.
4. In section B, question number 21 to 25 are very short answer type questions carrying 2 marks each.
5. In section C, question number 26 to 31 are short answer type questions carrying 3 marks each.
6. In section D, question number 32 to 35 are long answer type questions carrying 5 marks each.
7. In section E, question number 36 to 38 are Case – based integrated units of assessment questions carrying 4 marks each. Internal choice is provided in 2 marks question in each case study.
8. There is no overall choice.However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions in Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.
10. Use of calculators is NOT allowed.

SECTION – A

Section – A consists of Multiple Choice type questions of 1 mark each.

1. Which of the following is true for all θ ($\theta^o \leq \theta \leq 90^o$) ?

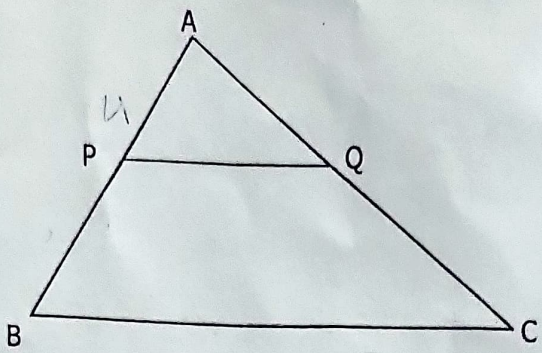
   (a) $\cos^2\theta - \sin^2\theta = 1$ (b) $\text{Cosec}^2\theta - \sec^2\theta = 1$

   (c) $\sec^2\theta - \tan^2\theta = 1$ (d) $\cot^2\theta - \tan^2\theta = 1$

2. If $k + 2$, $4k - 6$ and $3k - 2$ are three consecutive terms of an A.P., then the value of k is

   (a) 3 (b) -3 (c) 4 (d) -4

3. In ΔABC , PQ // BC . If PB = 6 cm , AP = 4 cm , AQ = 8 cm , then find the length AC.



(a) 12 cm (b) 20 cm (c) 6 cm (d) 14 cm

4. The ratio of HCF to LCM of the least composite number and the least prime number is

(a) 1 : 2 (b) 2 : 1 (c) 1 : 1 (d) 1 : 3

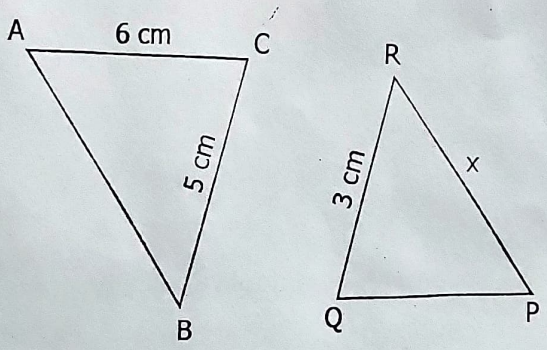
5. A card is drawn at random from a well shuffled pack of 52 cards. The probability that the card draw is a king of red suit is

(a) $\frac{1}{26}$ (b) $\frac{3}{26}$ (c) $\frac{7}{52}$ (d) $\frac{1}{13}$

6. The roots of the equations $x^2 + 3x - 10 = 0$ are

(a) 2 , - 5 (b) - 2 , 5 (c) 2 , 5 (d) – 2 , - 5

7. In the given figure , $\Delta ABC \sim \Delta QPR$, if AC = 6 cm , BC = 5 cm , QR = 3 cm and PR=x, then find the value of x is :



(a) 3.6 cm (b) 2.5 cm (c) 10 cm (d) 3.2 cm

8. The distance of the point (-6 , 8) from origin is

(a) 6 (b) - 6 (c) 8 (d) 10

9. What is the area of a semi-circle of diameter d?

(a) $\frac{1}{16}\pi d^2$ (b) $\frac{1}{4}\pi d^2$ (c) $\frac{1}{8}\pi d^2$ (d) $\frac{1}{2}\pi d^2$

10. For the following distribution:

CLASS	0 – 5	5 – 10	10 - 15	15 - 20	20 - 25
FREQUENCY	10	15	12	20	9

The modal class is

(a) 0 – 5 (b) 5 – 10 (c) 15 – 20 (d) 20 – 25

11. If a pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground , then sun's elevation is:

(a) 60° (b) 45° (c) 30° (d) 90°

12. The length of tangent drawn to a circle of radius 7 cm from a point 25 cm from the Centre is

(a) 24 cm (b) 26 cm (c) 7 cm (d) 25 cm

13. If α and β are the zeroes of the polynomial $x^2 - 1$ then the value of $\alpha + \beta$ is

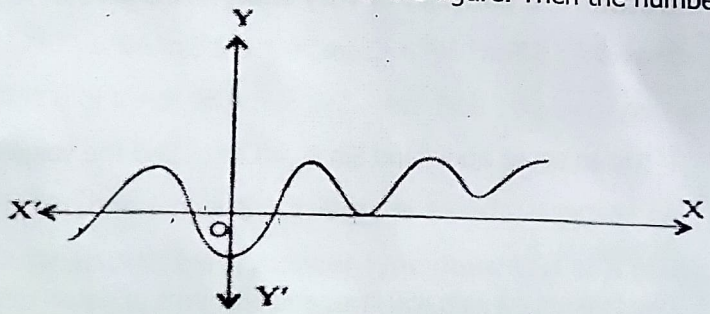
(a) 2 (b) 1 (c) - 1 (d) 0

14. The pair of linear equations $2x - 5y - 6 = 0$ and $6x - 15y - 18 = 0$ represents two lines which are

(a) Intersecting (b) parallel

(c) coincident (d) either intersecting or parallel

15. If the graph of the $y = p(x)$ is as shown in the figure. Then the number of zeroes of $p(x)$ is



(a) 0 (b) 2 (c) 3 (d) 4

16. Which of the following cannot be the probability of an event ?

(a) 0.7 (b) $\frac{2}{3}$ (c) – 1.5 (d) 15%

17. The coordinate of the point where line $\frac{x}{a} + \frac{y}{b} = 7$ intersects y-axis are

(a) (a , 0) (b) (0 , b) (c) (0 , 7b) (d) (2a , 0)

18. When a die is thrown, the probability of getting an odd number less than 3 is

(a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) 0

Directions: In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option out of the following,

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

19. Assertion (A): In a cricket match, a batsman hits a boundary 9 times out of 45 balls he plays. The probability of not hitting the boundary is $\frac{4}{5}$.

Reason (R) : P(E) + P(not E) = 1 .

20. Assertion (A):The common difference of an A.P. whose n^{th} term is $(3n + 7)$ is 3 .

Reason (R) : The general term of an A. P. is $a_n = a + (n - 1)d$

SECTION – B

Section – B consists of very short Answer type questions of 2 marks each.

21. Evaluate : $5 \tan^2 30^\circ + \operatorname{Cosec}^2 60^\circ + 2 \sin^2 90^\circ$.

OR

If θ is an acute angle and $\sin\theta = \cos\theta$, find the value of $\tan^2\theta + \cot^2\theta$.

22. An integer is chosen at random between 1 and 100. Find the probability that it is divisible by 8.

23. Two tankers contain 850 litres and 680 litres of petrol respectively. Find the maximum capacity of container which can measure the petrol of either tanker in exact number of times.

24. Find the discriminant of the quadratic equation $4x^2 - 5 = 0$ and hence comment on the nature of roots of the equation.

OR

If α and β are roots of quadratic equation $2x^2 - 9x + 4 = 0$ then find $\frac{1}{\alpha} + \frac{1}{\beta}$.

25. If one zero of the polynomial $p(x) = 6x^2 + 37x - (k - 2)$ is reciprocal of the other, then find the value of k .

SECTION – C

Section – C consists of short Answer type questions of 3 marks each.

26. Prove that the length of the tangents drawn from an external point to a circle are equal.

27. Solve for x : $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$.

28. Prove that: Sec A (1 – Sin A) (Sec A + Tan A) = 1.

OR

Prove that : $\frac{\text{Cot A-Cos A}}{\text{Cot A+Cos A}} = \frac{\text{CosecA - 1}}{\text{CosecA + 1}}$.

29. Two concentric circle are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

30. Prove that $4+\frac{2}{3}\sqrt{3}$ is an irrational , given as $\sqrt{3}$ is an irrational number .

31. A manufacturer of a TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find the production in the first year. Also find the total production in the first 7 years.

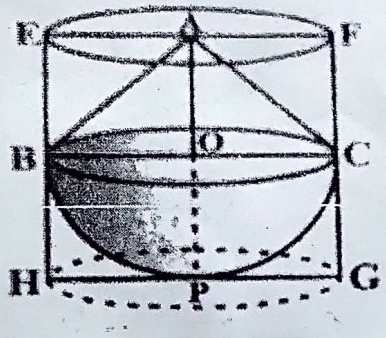
OR

The sum of first n terms of an A.P. is $3n^2 - 4n$. Find 10th term and nth term.

SECTION – D

Section – D consists of Long Answer type questions of 5 marks each.

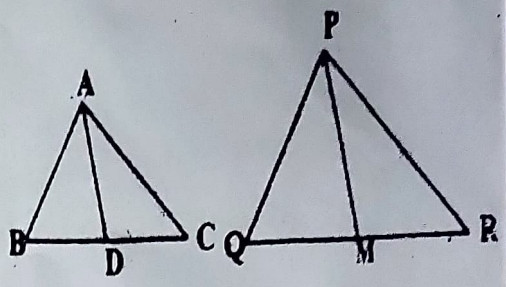
32. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the radius of the base is 2 cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volumes of the cylinder and the toy. (take $\pi = 3.14$)



33. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.

OR

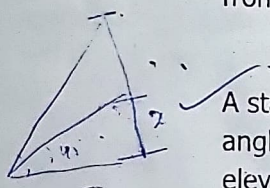
Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of the another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.



34. If the median of the distribution given below is 27, find the values of x and y.

CLASS INTERVAL	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
FREQUENCY	5	x	20	14	y	8	68

35. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the further time taken by the car to reach the foot of the tower from this point.



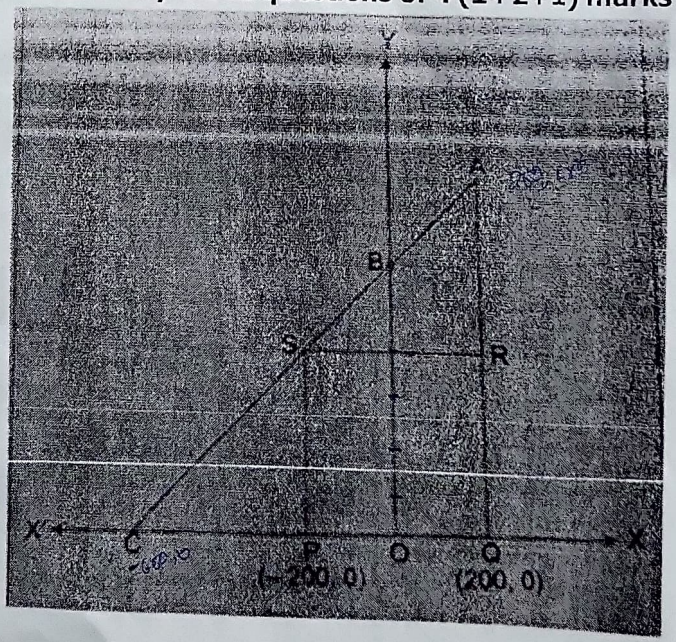
OR

A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

SECTION – E

Section – E consists of three case study based questions of 4 (1+2+1) marks each.

36. Rohit has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O.



Based on the above information, answer the following questions.

(i) Taking O as origin, coordinate of P and Q (- 200, 0) and (200, 0), PQRS being a square,what are the coordinates of R and S?

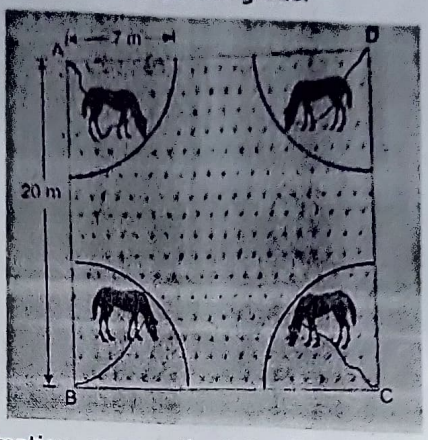
(ii) What is the area of Square PQRS?

OR

What is the length of diagonal PR in the square PQRS?

(iii) If S divides CA in the ratio k:1 , what is the value of k ,where point A (200 , 800) and C (-600,0).

37. A stable owner has four horses. he usually ties their horses with 7 m long rope to pegs at each corner of a square shaped grass field of 20 m length, to graze in his farm. But tying with rope sometimes results in injuries to his horses, so he decided to build fence around the area, so that each horse can graze.



Based on the above information, answer the following questions.

(i) Find the area of the square shaped grass field.

(ii) Find the area of the total field in which these horses can graze.

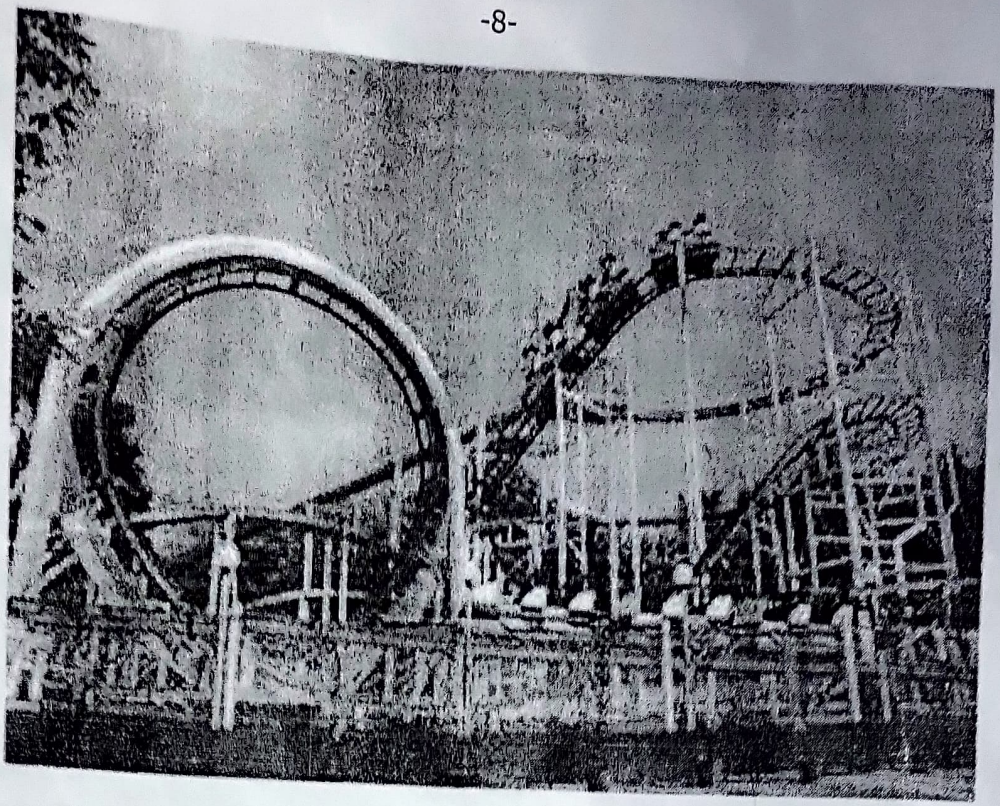
OR

If the length of the rope of each horse is increased from 7 m to 10 m, find the area grazed by one horse. (use $\pi = 3.14$)

(iii) What is the area of the field that is left ungrazed, if the length of the rope of each horse is 7 m.

38. Essel world is one of India's largest amusement parks that offers a diverse range of thrilling rides, water attractions and entertainment options for visitors of all ages.

The park is known for its iconic "water kingdom "section, making it a popular destination for family outings and fun filled adventure. The ticket charges for the park are Rs. 150 per child and Rs.250 per adult. On a day, the cashier of the park found that 300 tickets were sold and an amount of Rs. 55,000 was collected.



Read the above information and answer the following questions.

(i) If the number of children's visited be x and number of adults visited be y, then write the given situation algebraically.

(ii) How many children visited the amusement park that day?

OR

How many adults visited the amusement park that day?

(iii) How much amount will be collected if 250 children's and 100 adults visit the amusement park?