

**KENDRIYA VIDYALAYA GACHIBOWLI , GPRA CAMPUS HYD - 32**  
**SAMPLE TEST PAPER 07 FOR CLASS X BOARD EXAM 2021**

**Max. marks: 80**

**Time Allowed: 3 hrs**

**General Instruction:**

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

**Part – A:**

1. It consists three sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

**Part – B:**

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

**PART - A**  
**SECTION-I**

**Questions 1 to 16 carry 1 mark each.**

1. Find the values of k for which the quadratic equation  $2kx^2 - 40x + 25 = 0$  has equal roots.
2. Determine the number of solutions of the pair of linear equations:  
 $2x - 3y - 5 = 0$ ,  $6y - 4x - 3 = 0$ .
3. Find the edge of the cube whose total surface area is  $433.5 \text{ cm}^2$ .
4. Find the numerical value of  $\cos^2 \theta + \frac{1}{1 + \cot^2 \theta}$ .

**OR**

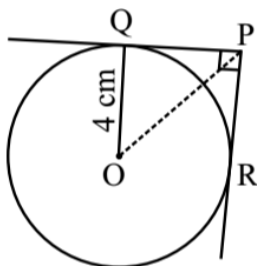
Find the value of  $(\operatorname{cosec}^2 60^\circ + \tan^2 30^\circ + \cot^2 60^\circ)$ .

5. Find the distance between the points  $(0, \sec \theta)$  and  $(-\tan \theta, 0)$ .
6. Find the common difference of an AP whose 6th term is 12 and the 8th term is 22.
7. Find the product of the zeros of the polynomial  $4x^3 - 7x^2 + 3x - 2$ .

**OR**

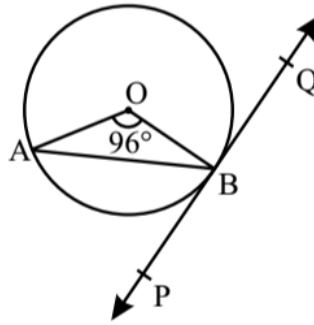
Find a quadratic polynomial, the sum and product of whose zeros are  $7/2$  and  $-5/4$  respectively.

8. If the point  $(x, 4)$  lies on a circle whose centre is at the origin and radius is 5, then find the value of x.
9. In the given below figure, from an external point P, two tangents PQ and PR are drawn to a circle of radius 4 cm with centre O. If  $\angle QPR = 90^\circ$ , then find the length of PQ.



**OR**

In the below figure, PQ is tangent to the circle with centre at O, at the point B. If  $\angle AOB = 96^\circ$ , then find  $\angle ABP$ .



10. Find the centre of a circle whose end points of a diameter are (4, 7) and (-8, 1).

**OR**

If A (3, y) is equidistant from points P (8, -3) and Q (7, 6), find the value of y.

11. If 4 is a root of the quadratic equation  $x^2 + 2x + k = 0$ , then find the value of k.

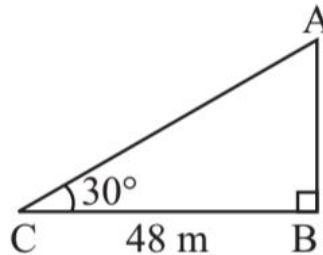
**OR**

Show that the equation  $5x^2 - 9x + 5 = 0$  is not true for any real value of x.

12. Find the probability of throwing a number greater than 2 with a fair dice.

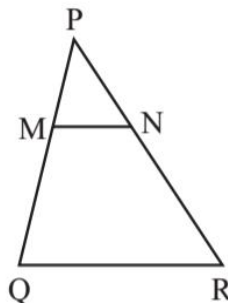
13. A card is drawn at random from a well shuffled deck of 52 cards. Find the probability that the card drawn is neither a red card nor a queen.

14. In the given figure, the angle of elevation of the top of a tower from a point C on the ground, which is 48 m away from the foot of the tower is  $30^\circ$ . Find the height of the tower.



15. The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there?

16. In the given figure,  $MN \parallel QR$ . If  $PN/NR = 3/7$  and  $PM = 2.1$  cm, then find MQ.

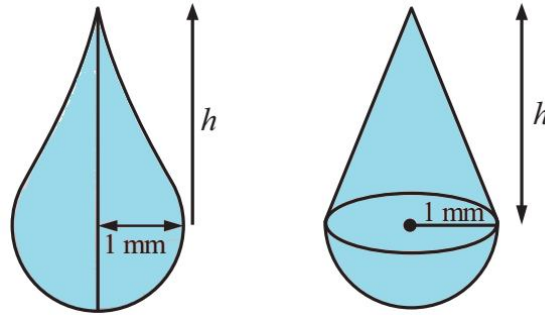


## SECTION-II

Case study-based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

### 17. Case Study based-2:

In the month of December 2020, it rained heavily throughout the day over the city of Hyderabad. Anil observed the raindrops as they reached him. Each raindrop was in the shape of a hemisphere surmounted by a cone of the same radius of 1 mm. Volume of one of such drops is  $3.14 \text{ mm}^3$ . Anil collected the rain water in a pot having a capacity of  $1099 \text{ cm}^3$ . [Use  $\sqrt{2} = 1.4$ ]



Based on the above situation, answers the following questions.

(a) Find the total height of the drop.

- (i) 1 mm                      (ii) 2 mm                      (iii) 3 mm                      (iv) 4 mm

(b) The curved surface area of the drop is

- (i)  $8.74 \text{ mm}^3$                       (ii)  $9.12 \text{ mm}^3$                       (iii)  $10.68 \text{ mm}^3$                       (iv)  $12.54 \text{ mm}^3$

(c) As the drop fell into the pot, it changed into a sphere. What was the radius of this sphere?

- (i)  $(3/4)^{1/3}$                       (ii)  $(4/3)^{1/3}$                       (iii)  $3^{1/3}$                       (iv)  $4^{1/3}$

(d) How many drops will fill the pot completely.

- (i) 260000                      (ii) 280000                      (iii) 320000                      (iv) 350000

(e) The total surface area of a hemisphere of radius  $r$  is

- (i)  $2/3 \pi r^3$                       (ii)  $4/3 \pi r^3$                       (iii)  $2\pi r^2$                       (iv)  $3\pi r^2$

### 18. Case Study based-1:

Aditya works as a librarian in Bright Children International School in Indore. He ordered for books on English, Hindi and Mathematics. He received 96 English books, 240 Hindi Books and 336 Maths books. He wishes to arrange these books in stacks such that each stack consists of the books on only one subject and the number of books in each stack is the same. He also wishes to keep the number of stacks minimum.



Based on the above situation, answers the following questions.

(a) Find the number of books in each stack.

- (i) 24                      (ii) 48                      (iii) 54                      (iv) 72

(b) Find the total number of stacks formed.

- (i) 7                      (ii) 10                      (iii) 14                      (iv) 16

(c) How many stacks of mathematics books will be formed?

- (i) 7                      (ii) 8                      (iii) 9                      (iv) 10

(d) If the thickness of each english book is 3 cm, then the height of each stack of english books is

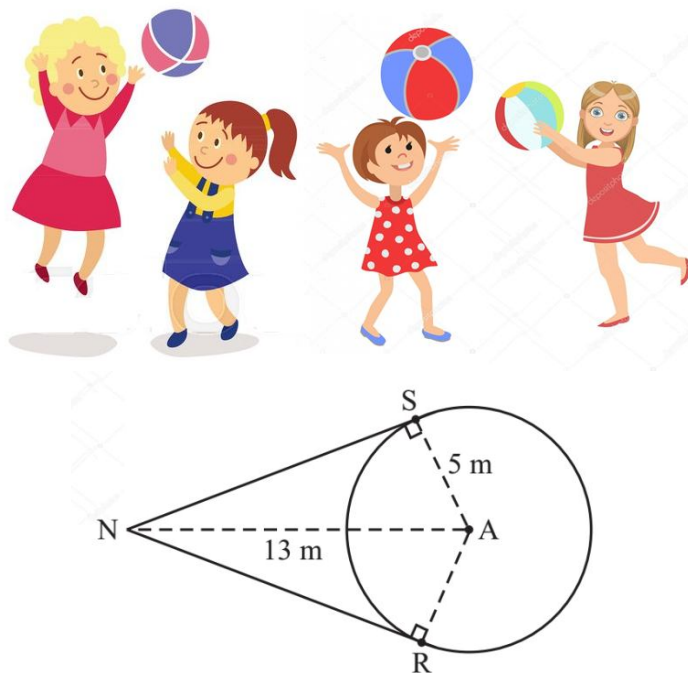
- (i) 120 cm                      (ii) 124 cm                      (iii) 136 cm                      (iv) 144 cm

(e) If each hindi book weighs 1.5 kg, then find the weight of books in a stack of hindi books.

- (i) 24 kg                      (ii) 48 kg                      (iii) 72 kg                      (iv) 96 kg.

### 19. Case Study based-3:

In an international school in Hyderabad organised an Interschool Throwball Tournament for girls just after the pre-board exam. The throw ball team was very excited. The team captain Anjali directed the team to assemble in the ground for practices. Only three girls Priyanshi, Swetha and Aditi showed up. The rest did not come on the pretext of preparing for pre-board exam. Anjali drew a circle of radius 5 m on the ground. The centre A was the position of Priyanshi. She marked a point N, 13 m away from centre A as her own position. From the point N, she drew two tangential lines NS and NR and gave positions S and R to Swetha and Aditi. Anjali throws the ball to Priyanshi, Priyanshi throws it to Swetha, Swetha throws it to Anjali, Anjali throws it to Aditi, Aditi throws it to Priyanshi, Priyanshi throws it to Swetha and so on.



(a) What is the measure of  $\angle NSA$ ?

- (i)  $30^\circ$                       (ii)  $45^\circ$                       (iii)  $60^\circ$                       (iv)  $90^\circ$

(b) Find the distance between Sonia and Niharika.

- (i) 8 m                      (ii) 12 m                      (iii) 15 m                      (iv) 18 m

(c) How far does Niharika have to throw the ball towards Riya?

- (i) 18 m                      (ii) 15 m                      (iii) 12 m                      (iv) 8 m

(d) If  $\angle SNR$  is equal to  $\theta$ , then which of the following is true?

- (i)  $\angle ANS = 90^\circ - \theta$                       (ii)  $\angle SAN = 90^\circ - \theta$   
(iii)  $\angle RAN = \theta$                               (iv)  $\angle RAS = 180^\circ - \theta$

(e) If  $\angle SNR$  is equal to  $\theta$ , then  $\angle NAS$  is equal to

- (i)  $90^\circ - (\theta/2)$       (ii)  $180^\circ - 2\theta$                       (iii)  $90^\circ - \theta$                       (iv)  $90^\circ + \theta$

#### 20. Case Study based-4:

In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that each section of each class would plant twice as many plants as the class standard. There were 3 sections of each standard from 1 to 12. So, if there are three sections in class 1 say 1A, 1B and 1C, then each section would plant 2 trees. Similarly, each section of class 2 would plant 4 trees and so on. Thus, the number of trees planted by classes 1 to 12 formed an AP given by 6, 12, 18,...



(a) What is the common difference of the AP formed?

- (i) 6                      (ii) 5                      (iii) 3                      (iv) 2

(b) What will be the  $n$ th term of the AP formed?

- (i)  $5n$                       (ii)  $6n$                       (iii)  $5n + 6$                       (iv)  $6n + 6$

(c) How many trees will be planted by the students of all the sections of class 8?

- (i) 42                      (ii) 48                      (iii) 54                      (iv) 60

(d) Find the total number of trees planted by class 12 students.

- (i) 54                      (ii) 60                      (iii) 66                      (iv) None of these

(e) What will be the third term from the end of the AP formed?

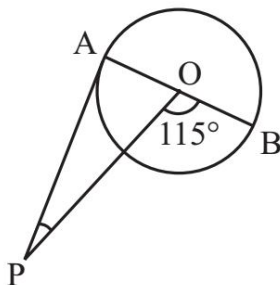
- (i) 72                      (ii) 66                      (iii) 60                      (iv) 54

### PART – B

(Question No 21 to 26 are Very short answer Type questions of 2 mark each)

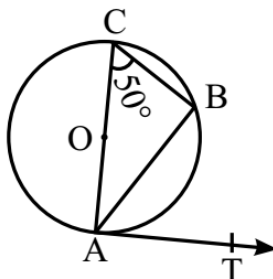
21. Prove that:  $\tan \theta - \cot \theta = \frac{2 \sin^2 \theta - 1}{\sin \theta \cos \theta}$

22. In the given figure, PA is a tangent from an external point P to a circle with centre O. If  $\angle POB = 115^\circ$ , find  $\angle APO$ .



OR

In the given figure, O is the centre of a circle, AOC is its diameter such that  $\angle ACB = 50^\circ$ . If AT is the tangent to the circle at the point A then find  $\angle BAT$ .



23. Show that  $3 + 2\sqrt{5}$  is irrational, given that  $\sqrt{5}$  is an irrational.

OR

Show that any number of the form  $8^n$ , where  $n \in \mathbb{N}$  can never end with the digit 0.

24. The base radius and height of a right circular solid cones are 2 cm and 8 cm respectively. It is melted and recast into spheres of diameter 2 cm each. Find the number of spheres so formed.

25. ABC is a right triangle right angled at A. If  $AD \perp BC$ , prove that  $AB^2 + CD^2 = BD^2 + AC^2$ .

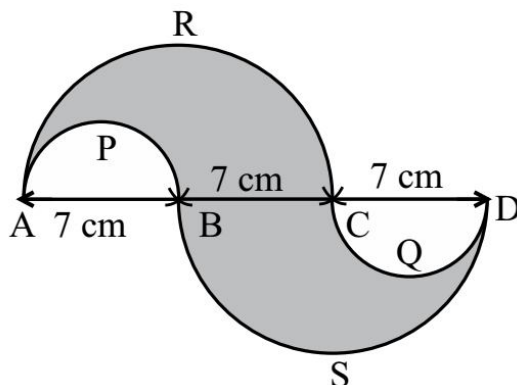
26. Draw a circle of radius 3 cm. Take a point P at 10 cm from the centre. Construct a pair of tangents from the point P.

(Question no 27 to 33 are Short Answer Type questions of 3 marks each)

27. If  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$ , show that  $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$ .

28. The sum of first n terms of an AP is  $5n^2 + 3n$ . If its mth term is 168, find the value of m. Also, find the 20th term of this AP.

29. In the given figure, APB and CQD are semi-circles of diameter 7 cm each, while ARC and BSD are semi-circles of diameter 14 cm each. Find the perimeter of the shaded region.



30. A bag contains 18 balls out of which  $x$  balls are red and remaining balls are white.  
 (i) If a ball is drawn at random from the bag. What is the probability that it is not red?  
 (ii) If 2 more white balls are put in the bag, then the probability of drawing a white ball will be  $\frac{9}{8}$  times the probability of drawing a white ball in the first case. Find the value of  $x$ .
31. Find the ratio in which the  $y$ -axis divides the line segment joining the points  $(5, -6)$  and  $(-1, -4)$ . Also, find the coordinates of the point of intersection.
32. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

**OR**

The perimeters of two similar triangles are 25 cm and 15 cm respectively. If one side of the first triangle is 9 cm, find the length of the corresponding side of the second triangle.

33. If 1 is added to both the numerator and the denominator of a fraction, it becomes  $\frac{4}{5}$ . If, however, 5 is subtracted from both the numerator and the denominator, the fraction becomes  $\frac{1}{2}$ . Find the fraction.

**OR**

Two years ago, a man was five times as old as his son. Two years later, his age will be 8 more than three times the age of his son. Find their present ages.

**(Question no 34 to 36 are Long Answer Type questions of 5 marks each.)**

34. The median of the following data is 20.75. Find the missing frequencies  $x$  and  $y$ .

C.I.	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	Total
$f$	7	10	$x$	13	$y$	10	14	9	100

35. If  $ad \neq bc$ , then prove that the equation  $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$  has no real roots.

**OR**

A faster train takes 3 hours less than a slower train for a journey of 600 km. If the speed of the slower train is 10 km/hour less than that of the faster train, find the speed of the two trains.

36. An aeroplane flying horizontally 1 km above the ground is observed at an elevation of  $60^\circ$ . After 10 seconds, its elevation is observed to be  $30^\circ$ . Find the speed of the aeroplane in km/hr.

.....