

**KENDRIYA VIDYALAYA GACHIBOWLI , GPRA CAMPUS HYD - 32**  
**SAMPLE TEST PAPER 05 FOR CLASS X (2020-21)**

**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.

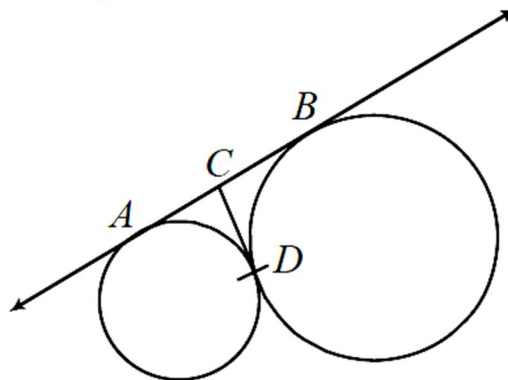
**Part – B:**

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 value(s) of k for which the quadratic equation  $2x^2 + kx + 2 = 0$  has equal roots.
2. Find the number of solutions of the linear equations  $\frac{3}{2}x + \frac{5}{3}y = 7$  and  $9x + 10y = 14$ .
3. In the below figure, AB and CD are common tangents to circle which touch each other at D. If AB = 8 cm, then find the length of CD.



4. The first term of an A.P. is 5 and the last term is 45. If the sum of all the terms is 400, find the number of terms.

**OR**

Find the 9th term of the A.P. – 15, –11, –7, ..., 49

5. Form a quadratic polynomial, the sum and product of whose zeros are (–3) and 2 respectively.
6. If  $x = p$ ,  $y = q$  is a solution of the equations  $x + 2y + 1 = 0$  and  $2x - 3y - 12 = 0$ , then find the values of p and q.
7. Given that  $\text{HCF}(135, 225) = 45$ , find the  $\text{LCM}(135, 225)$ .

**OR**

After how many decimal places will the decimal representation of the rational number

$\frac{229}{2^2 \times 5^7}$  terminate?

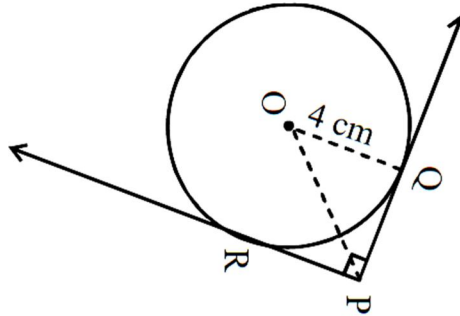
8. Find the value of  $k$  for which the quadratic equation  $x^2 - 4x + k = 0$  has distinct real roots.  
 $x^2 - 4x + k = 0$

**OR**

Find the roots of the equation  $6x^2 + 11x + 3 = 0$ .

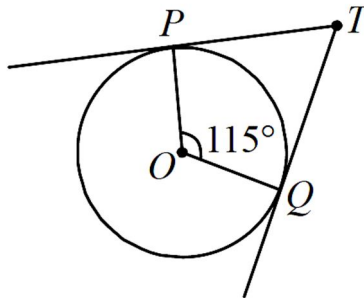
9. If  $\tan A = 1$ , then find the value of  $2 \sin A \cos A$ .

10. In the 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 length of  $PQ$



**OR**

In the below figure,  $TP$  and  $TQ$  are tangents drawn to the circle with centre at  $O$ . If  $\angle POQ = 115^\circ$  then find  $\angle PTQ$ .



11. If the diameter of semicircular protractor is 14cm, find its perimeter.
12. Find the radius of a sphere (in cm) whose volume is  $12\pi \text{ cm}^3$ .
13. Let  $\Delta ABC \sim \Delta DEF$  and their areas be respectively  $81 \text{ cm}^2$  and  $144 \text{ cm}^2$ . If  $EF = 24 \text{ cm}$ , then find the length of side  $BC$ .
14. To draw a pair of tangents to a circle which are inclined to each other at an angle  $x^\circ$ , what is the angle to be constructed between the two radii which are drawn at the points of contact?
15. If  $\sqrt{3} \sin \theta - \cos \theta = 0$  and  $0^\circ < \theta < 90^\circ$ , find the value of  $\theta$ .
16. Two dice are thrown simultaneously. What is the probability that the sum of the two numbers appearing on the top is 13?

**OR**

A letter is chosen at random from the letters of the word "RHYTHM". Find the probability that the letter chosen is a vowel.

## 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-1: Safety Board

Aditya is celebrating his birthday. He invited his friends. He bought a packet of toffees/candies which contains 120 candies. He arranges the candies such that in the first row there are 3 candies, in second there are 5 candies, in third there are 7 candies and so on.



- (a) Find the total number of rows of candies.  
(i) 12            (ii) 10            (iii) 14            (iv) 8
- (b) How many candies are placed in last row?  
(i) 22            (ii) 21            (iii) 24            (iv) 18
- (c) Find the difference in number of candies placed in 7th and 3rd row.  
(i) 8            (ii) 10            (iii) 12            (iv) 14
- (d) If Aditya decides to make 15 rows, then how many total candies will be placed by him with the same arrangement?  
(i) 200            (ii) 150            (iii) 255            (iv) 210
- (e) Find the number of candies in 12th row.  
(i) 21            (ii) 30            (iii) 25            (iv) 19

### 18. Case Study based-2:

Ruby and Rita are best friends. They are staying in the same colony. Both are studying in the same class and in the same school. During Winter vacation Ruby visited Rita's house to play Ludo. They decided to play Ludo with 2 dice.



- (a) To win a game, Ruby wanted a total of 7.  
What is the probability of winning a game by Ruby?

- (i)  $\frac{1}{6}$             (ii)  $\frac{7}{12}$             (iii)  $\frac{5}{18}$             (iv)  $\frac{1}{9}$

(b) To win a game, Rita wanted 8 as the sum. What is the probability of winning a game by Rita?

- (i)  $\frac{1}{12}$                       (ii)  $\frac{7}{36}$                       (iii)  $\frac{5}{36}$                       (iv)  $\frac{1}{4}$

(c) What is the probability that the sum of the numbers on the both the dice is divisible by 4 or 6?

- (i)  $\frac{7}{18}$                       (ii)  $\frac{7}{15}$                       (iii)  $\frac{5}{18}$                       (iv)  $\frac{2}{9}$

(d) The probability of getting a total of atleast 10 is:

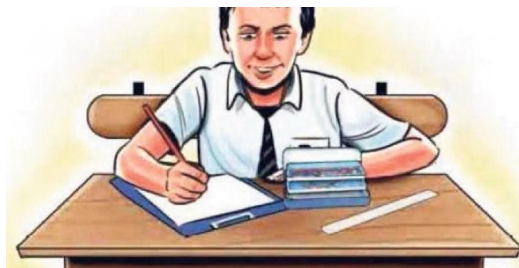
- (i)  $\frac{1}{6}$                       (ii)  $\frac{1}{3}$                       (iii)  $\frac{2}{3}$                       (iv)  $\frac{1}{4}$

(e) The probability that 5 will come up at least in 1 die is:

- (i)  $\frac{7}{36}$                       (ii)  $\frac{11}{36}$                       (iii)  $\frac{25}{36}$                       (iv)  $\frac{2}{9}$

### 19. Case Study based-3:

In a school, Class X B and C students appeared for Sunday Sample paper test 05 and marks obtained out of 80 are formulated in a table as follows:



Marks	Number of students
Less than 10	8
Less than 20	20
Less than 30	30
Less than 40	50
Less than 50	60
Less than 60	70
Less than 70	75
Less than 80	80

(a) How many students secured less than 40 marks?

- (i) 50                      (ii) 40                      (iii) 60                      (iv) 30

(b) What is the upper limit of modal class?

- (i) 20                      (ii) 30                      (iii) 40                      (iv) 50

(c) The median class is :

- (i) 10-20                      (ii) 20-30                      (iii) 30-40                      (iv) 40-50

(d) The mean marks of the students is :

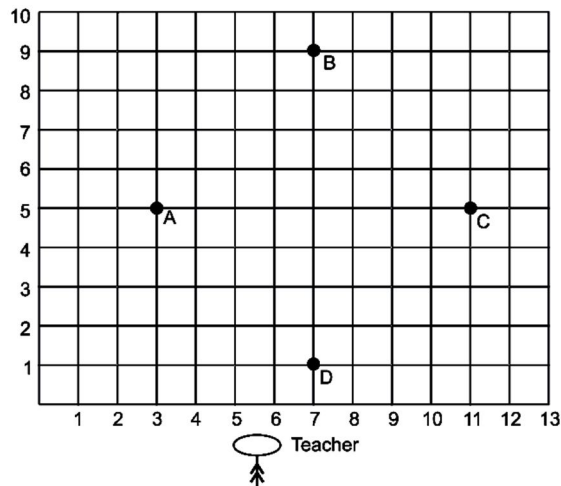
- (i) 35.8                      (ii) 35.9                      (iii) 36                      (iv) 36.5

(e) Class mark of the class preceding the modal class is :

- (i) 35                      (ii) 30                      (iii) 25                      (iv) 45

### 20. Case Study based-3:

Students of a school are standing in rows and columns in their playground for a drill practice. A, B, C and D are the positions of four students as shown in the figure.



Answer the following questions.

(a) What are the coordinates of A and B respectively?

- (i) A(3, 5); B(7, 8) (ii) A(5, 3); B(8, 7) (iii) A(3, 5); B(7, 9) (iv) A(5, 3); B(9, 7)

(b) What are the coordinates of C and D respectively?

- (i) C(11, 5); D(7, 1) (ii) C(5, 11); D(1, 7) (iii) C(5, 11); D(7, 1) (iv) C(5, 11); D(-1, 7)

(c) Is it possible to place Ram(R) in the drill in such a way that he is equidistant from all the four students A, B, C and D?

- (i) yes (ii) not possible (iii) not sure (iv) none

(d) What are the coordinates of the position of Ram?

- (i) (7, 5) (ii) (5, 7) (iii) (7, 7) (iv) (5, 5)

(e) What is the distance between B and D?

- (i) 5 units (ii) 14 units  
(iii) 8 units (iv) 10 units

### PART – B

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

21. If the point C(-1, 2) divides internally the line segment joining A(2, 5) and B(x, y) in the ratio 3 : 4, find the coordinates of B.

OR

If A(2, 3), B(0, 2), C(3, 3) and D(x, 4) are the vertices of a ||gm ABCD, then what is the value of x?

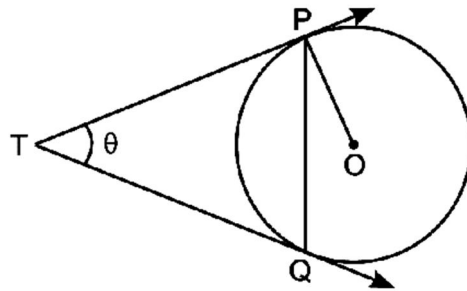
22. Find the greatest possible speed (in km/hr) at which a bird should fly to cover a distance of 45 km and 336 km in exact number of hours.

23. If  $\sin A + \sin^2 A = 1$ , then find  $\cos^2 A + \cos^4 A$ .

OR

Simplify:  $\sqrt{\frac{1 - \sin^2 A}{\tan^2 A + 1}}$

24. Find a quadratic polynomial whose zeroes are reciprocals of the zeroes of the polynomial  $f(x) = ax^2 + bx + c$ ,  $a \neq 0$ ,  $c \neq 0$ .
25. In the below figure, two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that  $\angle PTQ = 2\angle OPQ$ .



26. Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as centre, draw another circle of radius 2 cm. Construct tangents to each circle from the centre of the other circle.

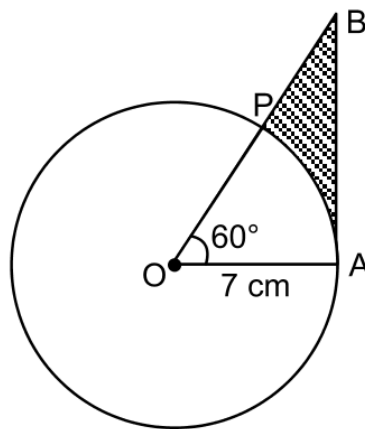
**(Question no 27 to 33 are Short Answer Type questions of 3 marks each)**

27. Prove that  $2 - \sqrt{7}$  is an irrational number, given that  $\sqrt{7}$  is irrational.
28. In a flight of 600 km, an aircraft was slowed due to bad weather. Its average speed for the trip was reduced by 200 km/hr and time of flight increased by 30 minutes. Find the original duration of flight.

**OR**

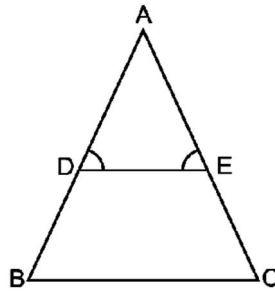
A train covers a distance of 480 km at a uniform speed. If the speed had been 8 km/hr less, then it would have taken 3 hours more to cover the same distance. Find the original speed of the train.

29. Find the perimeter and area of the shaded region in the below figure.



30. Prove that  $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1 = 0$ .

31. In the below figure,  $\angle D = \angle E$  and  $\frac{AD}{DB} = \frac{AE}{EC}$ , prove that BAC is an isosceles triangle.



32. Find the mean of the following distribution:

Class	3 – 5	5 – 7	7 – 9	9 – 11	11 – 15
Frequency	5	10	10	7	8

OR

Find the mode of the following distribution:

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120	120 – 140
Frequency	6	8	10	12	6	5	3

33. The median of the following data is 525. Find the values of x and y, if total frequency is 100:

Class	0 – 100	100 – 200	200 – 300	300 – 400	400 – 500	500 – 600	600 – 700	700 – 800	800 – 900	900 – 1000
Frequency	2	5	x	12	17	20	y	9	7	4

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

34. From the top of a 7 m high building the angle of elevation of the top of a tower is  $60^\circ$  and the angle of depression of its foot is  $45^\circ$ . Determine the height of the tower.

OR

A vertical tower stands on a horizontal plane and is surmounted by a vertical flag-staff of height 6 m. At a point on the plane, the angle of elevation of the bottom and top of the flag-staff are  $30^\circ$  and  $45^\circ$  respectively. Find the height of the tower. (Take  $\sqrt{3} = 1.73$ )

35. Water is flowing through a cylindrical pipe of internal diameter 2 cm, into a cylindrical tank of base radius 40 cm at the rate of 0.7 m/sec. By how much will the water rise in the tank in half an hour?
36. Determine graphically the coordinates of the vertices of a triangle, the equations of whose sides are given by  $2y - x = 8$ ,  $5y - x = 14$  and  $y - 2x = 1$ .