KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD–32
SAMPLE PAPER 02 (2019–20)

SUBJECT: MATHEMATICS(241) (BASIC)

<u>BLUE PRINT : CLASS X</u>

Unit	Chapter	MCQ (1 mark)	FIB (1 mark)	VSA (1 mark)	SA–I (2 marks)	SA–II (3 marks)	LA (4 marks)	Total	Unit Total
Number system	Real Numbers	3(3)	--	--	**--**	3(1)*	--	**6(4)**	**6(4)**
Algebra	Polynomials	2(2)	--	--	2(1)	3(1)	--	**7(4)**	**20(9)**
Algebra	Pair of Linear Equations in two variables	--	1(1)*	--	--	3(1)	--	**3(1)**	**20(9)**
Algebra	Quadratic Equations	--		--	--	--	4(1)	**5(2)**	**20(9)**
Algebra	Arithmetic progression	--	--	1(1)	--	--	4(1)*	**5(2)**	**20(9)**
Coordinate Geometry	Coordinate Geometry	2(2)	1(1)	--	--	<mark>3(1)**</mark>	--	**6(4)**	**6(4)**
Trigonometry	Introduction to Trigonometry	--	2(2)	**1(1)***	**2(1)***	3(1)*	--	**8(5)**	**12(6)**
Trigonometry	Some Applications of Trigonometry	--	--	--	**--**	--	4(1)	**4(1)**	**12(6)**
Geometry	Triangles	--	1(1)	1(1)	**--**	**--**	4(1)*	**6(3)**	**15(7)**
Geometry	Circles	1(1)	--	**--**	2(1)	3(1)	--	**6(3)**	**15(7)**
Geometry	Constructions	--	--	--	--	3(1)*	**--**	**3(1)**	**15(7)**
Mensuration	Areas Related to Circles	--	--	1(1)	2(1)	3(1)	--	**6(3)**	**10(4)**
Mensuration	Surface Areas and Volumes	--	--	--	**--**	**--**	4(1)*	**4(1)**	**10(4)**
Statistics & probability	Statistics	1(1)	--	--	--	**--**	4(1)	**5(2)**	**11(6)**
Statistics & probability	Probability	1(1)	--	1(1)	2(1) 2(1)*	--	--	**6(4)**	**11(6)**
Total		**10(10)**	**5(5)**	**5(5)**	**12(6)**	**24(8)**	**24(6)**	**80(30)**	**80(40)**

Note: * - Internal Choice Questions and Yellow shaded with <mark></mark> - PISA type questions**

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SUBJECT: MATHEMATICS	**MAX. MARKS : 80**
CLASS : X	**DURATION : 3 HRS**

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

<u>SECTION – A</u>
Questions 1 to 20 carry 1 mark each.

1. If a and b are positive integers, then HCF (a, b) x LCM (a, b) =
   (a) a x b (b) a + b   (c) a – b   (d) a/b

2. If the HCF of two numbers is 1, then the two numbers are called
   (a) composite   (b) relatively prime or co-prime
   (c) perfect   (d) irrational numbers

3. The decimal expansion of $\dfrac{93}{1500}$ will be
   (a) terminating   (b) non-terminating   (c) non-terminating repeating
   (d) non-terminating non-repeating.

4. The number of zeroes of the polynomial from the graph is
   (a) 0   (b) 1   (c) 2   (d) 3
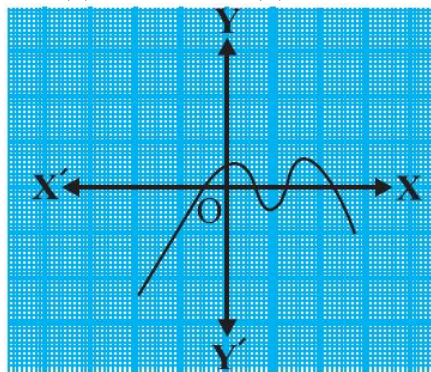
5. A quadratic polynomial whose sum and product of zeroes are –3 and 2 is
   (a) $x^2 – 3x +2$ (b) $x^2 + 3x + 2$ (c) $x^2 + 2x – 3$.   (d) $x^2 + 2x + 3$.

6. A point P divides the join of A(5, –2) and B(9, 6) are in the ratio 3 : 1. The coordinates of P are
   (a) (4, 7)   (b) (8, 4)   (c) $(\dfrac{11}{2}, 5)$ (d) (12, 8)

7. The distance of the point P(4, –3) from the origin is
   (a) 1 unit   (b) 7 units   (c) 5 units   (d) 3 units

8. A point P is 26 cm away from the centre of a circle and the length of the tangent drawn from P to the circle is 24 cm. Find the radius of the circle.

    (a) 11 cm   (b) 10 cm   (c) 16 cm   (d) 15 cm

9. A bag has 4 red balls and 2 yellow balls. A ball is drawn from the bag without looking into the bag. What is probability of getting a yellow ball?

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

10. Which measure of central tendency is given by the x – coordinate of the point of intersection of the more than ogive and less than ogive?

    (a) mode   (b) median   (c) mean   (d) all the above three measures

11. If the points (1, x), (5, 2) and (9, 5) are collinear then the value of x is _____

12. Value of θ, for $\sin 2\theta = 1,\ where\ 0^0 < \theta < 90^0$ is _____

13. Product $\tan 1^0.\tan 2^0.\tan 3^0……\tan 89^0$ is _____

14. If ABC and DEF are similar triangles such that $\angle A = 47^0$ and $\angle E = 83^0$, then $\angle C =$ _____

15. The values of k for which the quadratic equation $2x^2 + kx + 3 = 0$ has real equal roots is ____

<div align="center">**OR**</div>

The value of k for which the system of equations $x + 2y = 3$ and $5x + ky + 7 = 0$ has no solution is _____

16. If A, B and C are the interior angles of triangle ABC, find $\tan\left(\dfrac{B+C}{2}\right)$

<div align="center">**OR**</div>

Write the value of $\cot^2\theta - \dfrac{1}{\sin^2\theta}$

17. How many three-digit numbers are divisible by 7?

18. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

19. It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

20. In figure DE || BC then find the value of AD.
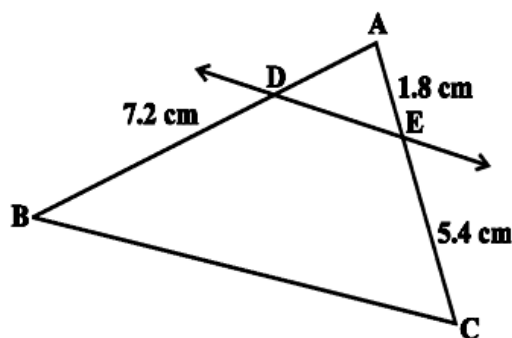
SECTION – B
Questions 21 to 26 carry 2 marks each.

21. A die is thrown twice. What is the probability that (i) 5 will not come up either time? (ii) 5 will come up at least once?

OR

A lot of 20 bulbs contain 4 defective ones. One bulb is drawn at random from the lot. What is the probability that this bulb is good?

22. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 8? (ii) 13?

23. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

24. If sec 4A = cosec (A – 20°), where 4A is an acute angle, find the value of A.

OR

In Δ PQR, right-angled at Q, PQ = 3 cm and PR = 6 cm. Determine ∠ QPR and ∠ PRQ.

25. Find a quadratic polynomial, the sum and product of whose zeroes are – 3 and 2, respectively.

26. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC

SECTION – C
Questions 27 to 34 carry 3 marks each.

27. Prove that $\sqrt{3}$ is an irrational number.

OR

The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they change simultaneously at 7 a.m., at what time will they change simultaneously again?

28. Find the zeroes of the quadratic polynomial $x^2 - 3x - 10$ and verify the relationship between the zeroes and coefficient.

29. Draw the graphs of the equations x – y + 1 = 0 and 3x + 2y – 12 = 0. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

30. Express the trigonometric ratios sin A, sec A and tan A in terms of cot A.

OR

Prove that: $\dfrac{\cos A}{1+\sin A}+\dfrac{1+\sin A}{\cos A}=2\sec A$

31. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length.

OR

Draw a line segment of length 8 cm and divide it in the ratio 3 : 4. Measure the two parts.

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

33. Find the area of the shaded region in he below figure, where ABCD is a square of side 14 cm.
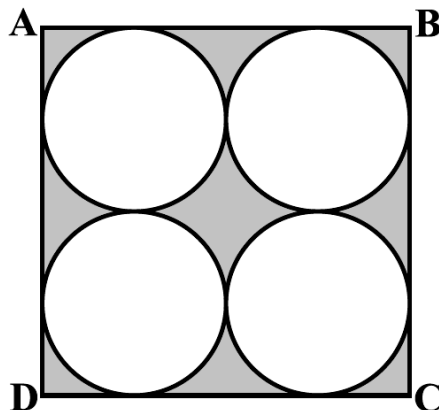
34. Students of a school are standing in rows and columns in their playground for a drill practice. A, B, C and D are the positions of four students as shown in below figure. Check the name the type of quadrilateral formed ABCD.
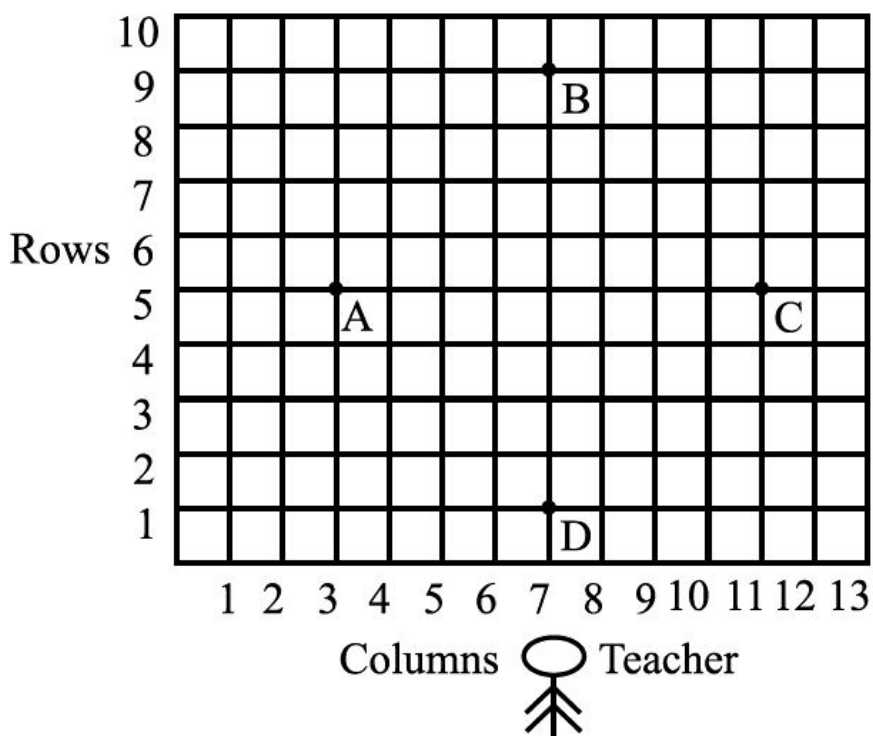
SECTION – D
Questions 35 to 40 carry 4 marks each.

35. 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.

36. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

37. If the sum of first 14 terms of an A.P. is 1050 and its first term is 10, find the 20 th term.

OR

The first term of an A.P. is 5, the last term is 45 and sum is 400. Find the number of terms and the common difference.

38. 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

State and prove Pythagoras theorem.

39. The radii of the ends of a frustum of a cone 45 cm high are 28 cm and 7 cm. Find its volume, the curved surface area and the total suface area

OR

How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm $\times$ 10 cm $\times$ 3.5 cm?

40. Draw less than ogive for the following frequency distribution:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students	5	8	6	10	6	6

Also find the median from the graph.