Class - X Session- 2022-23
Subject- Mathematics (Standard)
CBSE Model Sample Question Paper – 02
Math Magic - CBSE

Time Allowed: 3 Hrs. 10 January 2023 Maximum Marks : 80

General Instructions:
1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated

	Section - A	
	"Section A consists of 20 questions of 1 mark each"	
Q1.	If the sum of the ages of a father and his son in years is 65 and twice the difference of their ages in years is 50, then the age of father is (a) 40 years (b) 45 years (c) 55 years (d) 65 years	1
Q2.	The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one number is 280, then the other number is (a) 20 (b) 28 (c) 60 (d) 80	1
Q3.	The line segment joining the points P(-3, 2) and Q(5, 7) is divided by the y-axis in the ratio is (a) 3:1 (b) 3:4 (c) 3:2 (d) 3:5	1
Q4.	The radius of a circle whose circumference is equal to the sum of the circumference of the two circles of diameters 36cm and 20cm is (a) 56cm (b) 42cm (c) 28cm (d) 16cm	1

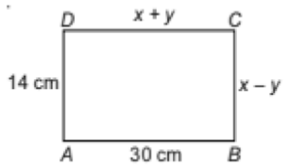
Q5.	A bag contains 5 red balls and n green balls. If the probability of drawing a green ball is three times that of a red ball, then the value of n is (a) 18 (b) 15 (c) 10 (d) 20	1
Q6.	If for a data, Mean:Median = 9:8, then Median:Mode = (a) 8:9 (b) 4:3 (c) 7:6 (d) 5:4	1
Q7.	f the product of the zeroes of the quadratic polynomial 3x2 + 5k + k is −2/3, then value of k is (a) -3 (b) -2 (c) 2 (d) 3	1
Q8.	The distance between the points (a cosα + b sinα, 0) and (0, a sinα – b cosα) is (a) $a^2 + b^2$ (b) a + b (c) $a^2 - b^2$ (d) $\sqrt{a^2 + b^2}$	1
Q9.	AB and CD are two common tangents to circles which touch each other at C. If D lies on AB such that CD = 4cm, then AB = (a) 4cm (b) 6cm (c) 8cm (d) 12cm	1
Q10.	The mean and median of the data a, b and c are 50 and 35 respectively, where a < b < c. If c – a = 55, then b – a is (a) 8 (b) 7 (c) 3 (d) 5	1
Q11.	The probability of guessing the correct answer to certain question is m/n. If the probability of not guessing the correct answer to this question is 2/3, then (a) n = 4m (b) n = 3m (c) n = 2m (d) m = n	1
Q12.	In ΔABC, right-angled at B, AB = 5 cm and ∠ACB = 30° then the length of the side AC is (a) 5√3 cm (b) 2√3cm (c) 10cm (d) None of these	1
Q13.	A solid is hemispherical at the bottom and conical above. If the surface areas of the two parts are equal, then the ratio of its radius and height of its conical part is (a) 1: √2 (b) √2:1 (c) 1: √3 (d) √3:1	1

Q14.	A system of two linear equations in two variables has infinitely many solutions, if their graphs a) cut the x-axis b) intersect only at a point c) coincide with each other d) do not intersect at any point	1
Q15.	If 2 is a root of the equation $x^2 + ax + 12 = 0$ and the quadratic equation $x^2 + ax + q = 0$ has equal roots, then q = a) 20 b) 16 c) 12 d) 8	1
Q16.	The number is $(\sqrt{3}+\sqrt{5})^2$ a) an irrational number b) an integer c) a rational number d) not a real number	1
Q17.	If a and b are two positive integers such that the least prime factor of a is 3 and the least prime factor of b is 5. Then, the least prime factor of (a + b) is a) 5 b) 3 c) 2 d) 8	1
Q18.	If P(E) = 0.05, what will be the probability of 'not E'? a) 0.55 b) 0.59 c) 0.95 d) 0.095	1
	DIRECTION: "In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option"	
Q19.	**Statement A (Assertion):** If a number x is divided by y(x, y) (both x and y are positive) then remainder will be less than x. **Statement R(Reason) :**. Dividend = Divisor Quotient + Remainder. (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.	1
Q20.	**Statement A (Assertion):** If product of two numbers is 5780 and their HCF is 17, then their LCM is 340. **Statement R(Reason) :** HCF is always a factor of LCM. (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.	1

Section – B

"Section A consists of 5 questions of 2 mark each"

21 In figure, ABCD is a rectangle. Find the values of x and y — 2



22 Find the relation between x and y such that the point P(x, y) is equidistant from the points A(1, 4) and B (-1, 2). — 2

OR

Find the distance between the points (0, 0) and (36, 15). Also, find the distance between towns A and B if town B is located at 36 km east and 15 km north of town A.

23 Find the mode of the following frequency distribution. — 2

Class	0- 10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	10	10	16	12	6	7

OR

The data regarding marks obtained by 48 students of a class in a class test is given below. Calculate the modal marks of students.

Marks obtained	0-5	5- 10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Number of students	1	0	2	0	0	10	25	7	2	1

24 If the sum of first m terms of an AP is the same as the sum of its first n terms, show that the sum of its first (m+n) terms is zero — 2

25 A circle is inscribed in a Triangle ABC touching AB , BC and AC at P, Q and R respectively. If AB = 10 cm AR = 7 cm and CR = 5 cm, then find the length of BC — 2

Section – C

"Section C consists of 6 questions of 3 mark each"

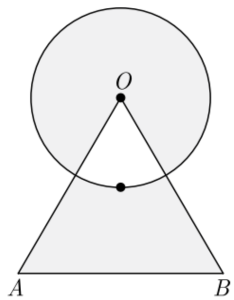
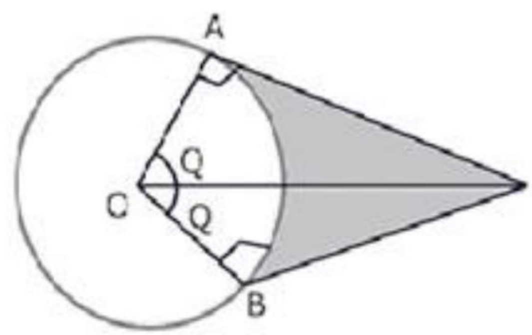
26 The horizontal distance between two trees of different heights is 60 m. The angle of depression of the top of the first tree, when seen from the top of the second tree is 45°. If the height of the second tree is 80 m, find the height of the first tree. — 3

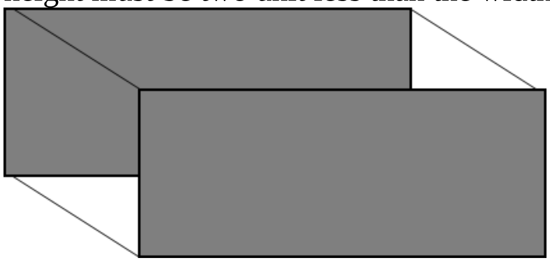
27 Check graphically whether the pair of linear equations $4x – y – 8 = 0$ and $2x – 3y + 6 = 0$ is consistent. Also, find the vertices of the triangle formed by these lines with the x-axis. — 3

OR

Ten years ago, father was 12 times as old as his son and ten years hence, he will be twice as old as his son will be, find the present ages.

28 Find the area of shaded region shown in the given figure where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre. — 3

	 	
29	Find the ratio in which the point -3.p divides the line segment joining the points -5,-4 and -2,3 .Hence find the value of p.	3
30	Prove that $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$	3
31	Find the middle term of the AP 7, 13, 19, ..., 247.	3
	Section – D ***"Section D consists of 4 questions of 5 mark each"***	
32		5
33	A vertical tower stands on horizontal plane and is surmounted by a vertical flag-staff of height 6 m. At a point on the ground, angle of elevation of the bottom and top of the flag-staff are 30c and 45c respectively. Find the height of the tower. (Take Root 3 as 1.73) OR From the top of tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression 30c and 45c respectively. Find the distance between the cars. (Take Root 3 as 1.73)	5
34	A person on tour has ₹.360 for his expenses. If he extends his tour for 4 days, he has to cut down his daily expenses by ₹.3. Find the original duration of the tour. OR A plane left 30 minutes later than the schedule time and in order to reach its destination 1500km away in time it has to increase its speed by 250 km/hr from its usual speed. Find its usual speed.	5
35	An elastic belt is placed around therein of a pulley of radius 5cm. One point on the belt is pulled directly away from the center O of the pulley until it is at P, 10cm from O. Find the length of the best that is in contact with the rim of the pulley. Also, find the shaded area.  	5
	Section – E ***"Case based questions are compulsory" Attempt any 4 parts in each question***	

36	For the box to satisfy certain requirements, its length must be three unit greater than the width, and its height must be two unit less than the width  (i) If width is taken as w , find the polynomial that represent volume of box. (ii) Find the polynomial that represent the area of paper sheet used to make box. (iii) If it must have a volume of 36 unit, what must be its length and height ? OR If box is made of a paper sheet which cost is Rs 150 per square unit, what is the cost of paper?	4
37	Roopa wants to make the curtains for her window as shown in the figure. The window is in the shape of a rectangle, whose width and height are in the ratio 2 3: . The area of the window is 9600 square cm. (i) What is the shape of the window that is uncovered? (ii) What will be the ratio of two sides of each curtain (other than hypotenuse) ? (iii) What are the dimensions of the window ? OR How much window area is covered by the curtains?	4
38	Family Structures : For a recent year, 51% of the families in the United States had no children under the age of 18; 20% had one child; 19% had two children; 7% had three children; and 3% had four or more children. If a family is selected at random, find the following probability. (i) Find the probability that the family has two or three children. (ii) Find the probability that the family has more than one child. (iii) Find the probability that the family has less than three children. OR Find the probability that the family has more than three children	4

---------- END OF QUESTION PAPER ----------

All the Best !