INDIAN SCHOOL AL WADI AL KABIR

Sample Paper 2022-23

SUB: Mathematics (Basic)(241)

Date: 07/11/2022 **Time Allowed :3 hours**

Class: X **Maximum Marks:80 marks**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.

2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.

3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.

4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.

5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.

6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

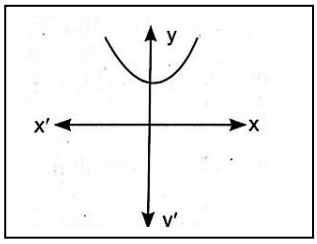
7. All Questions are compulsory. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$, wherever required if not stated.

SECTION A

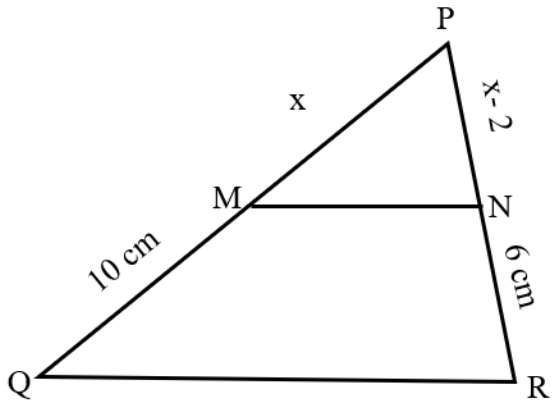
Section A consists of 20 questions of 1 mark each.

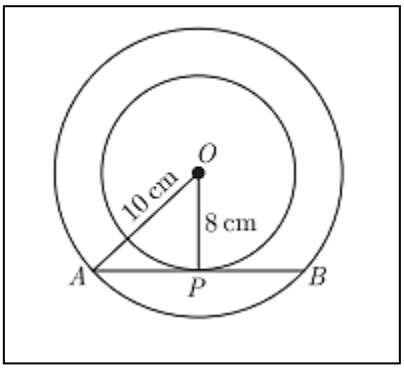
SN								
1	In a bag, there are 100 bulbs of which 30 are bad ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is:							
	A	0.7	**B**	0.5	**C**	0.3	**D**	0.1
2	The lines represented by the equations x – 2y = 0 and 4x + 3y = 0 are:							
	A	Parallel			**B**	intersecting at two different points		
	C	intersecting exactly at one point			**D**	Coincident		

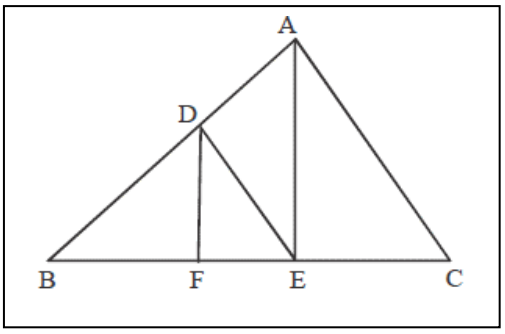
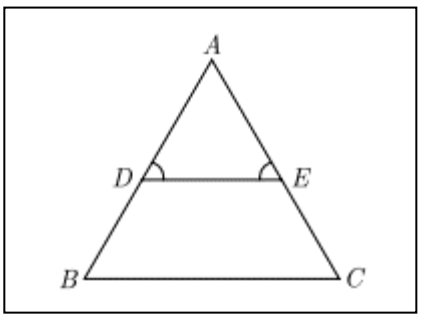
3	The graph of y = f(x) is given. The number of zeroes of f(x) is:  						
	A	0	**B**	1	**C**	2	**D** 3
4	If $\sec\theta = \frac{13}{5}$, then $\tan\theta$ is:						
	A	$\frac{5}{13}$	**B**	$\frac{12}{5}$	**C**	$\frac{5}{12}$	**D** $\frac{12}{13}$
5	The point on the x-axis which is equidistant from (–4, 0) and (10, 0) is						
	A	(7, 0)	**B**	(5, 0)	**C**	(0, 0)	**D** (3, 0)
6	The value of $(1 + \tan^2\theta)(1 - \sin\theta)(1 + \sin\theta)$ is:						
	A	0	**B**	$\cot\theta$	**C**	$\sec\theta$	**D** 1
7	The roots of the quadratic equation $x^2 + x - 5 = 0$ are:						
	A	0	**B**	real and distinct			
	C	real and equal	**D**	no real roots			
8	For the following distribution, the sum of lower limits of the median class and modal class is:						

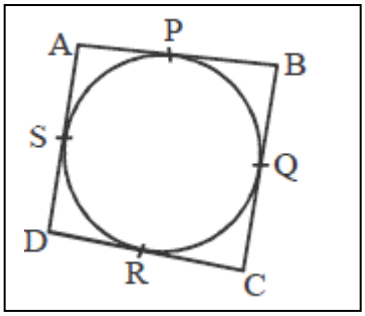
Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

	A	15	**B**	25	**C**	30	**D** 35
9	If the perimeter of one face of a cube is 20 cm, then its surface area is:						
	A	120 cm^2	**B**	150 cm^2	**C**	125 cm^2	**D** 400 cm^2
10	The median and mode respectively of a frequency distribution are 26 and 29, Then its mean is:						
	A	24.5	**B**	27.5	**C**	28.4	**D** 25.8

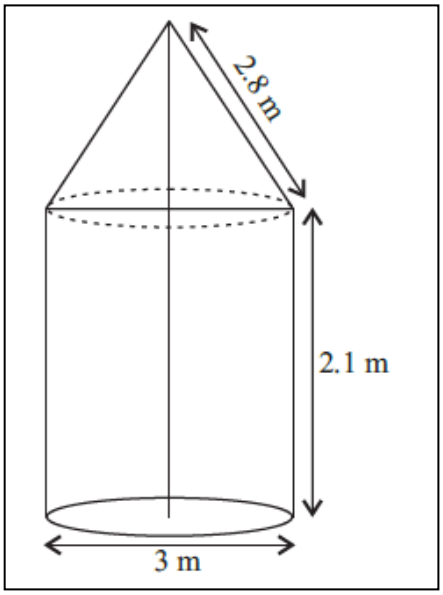
11	In the given figure, MN ∥ QR. If PM = x cm, PN = (x – 2) cm, NR = 6 cm, then the value of x is:  							
	A	5 cm	**B**	7 cm	**C**	8 cm	**D**	12
12	If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM (p, q) is							
	A	ab	**B**	a^2b^2	**C**	a^3b^2	**D**	a^3b^3
13	If the point P(k, 0) divides the line segment joining the points A(2, -2) and B(- 7, 4) in the ratio1 : 2, then the value of k is:							
	A	1	**B**	2	**C**	-2	**D**	-1
14	Evaluate: $\frac{2\tan 45° \times \cos 60°}{\sin 30°}$							
	A	0	**B**	1	**C**	2	**D**	3
15	The minute hand of a clock is 12 cm long. The area of the face of the clock described by the minute hand in 35 minutes is:							
	A	148 cm^2	**B**	264 cm^2	**C**	132 cm^2	D	198 cm^2
16	The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, the other number is:							
	A	720	**B**	648	**C**	1800	**D**	72

<table>
<tr><td>17</td><td colspan="8">The perimeter of a sector of a circle whose central angle is 90º and radius 7 cm is:</td></tr>
<tr><td></td><td>A</td><td>50π cm</td><td>B</td><td>35π cm</td><td>C</td><td>50 cm</td><td>D</td><td>25cm</td></tr>
<tr><td>18</td><td colspan="8">Two concentric circles are of radii 10 cm and 8 cm, then the length of the chord of the larger circle which touches the smaller circle is:
 
</td></tr>
<tr><td></td><td>A</td><td>6cm</td><td>B</td><td>12cm</td><td>C</td><td>18cm</td><td>D</td><td>9cm</td></tr>
<tr><td></td><td colspan="8">DIRECTION: In the question number 11 and 12, a statement of assertion (A) is followed by statement of Reason (R). Choose the correct option.</td></tr>
<tr><td>19</td><td colspan="8">Assertion: The HCF of two numbers is 5 and their product is 150, then their LCM is 30.
Reason: For any two positive integers a and b, HCF (a, b) + LCM (a, b) = a × b
(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.</td></tr>
<tr><td>20</td><td colspan="8">Assertion: The point (–1, 6) divides the line segment joining the points (–3, 10) and (6, –8) in the ratio 2: 7 internally.
Reason: Given three points, i.e. A, B, C form an equilateral triangle, then AB = BC = AC.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)</td></tr>
</table>

	(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.
	SECTION B
	Section B consists of 5 questions of 2 marks each.
21	Solve by elimination: $3x = y + 5$ $5x - y = 11$
22	In the given Figure 5, DE || AC and DF || AE. Prove that $\frac{BF}{EF} = \frac{BE}{EC}$.  **OR** In Figure ∠D = ∠E and $\frac{AD}{DB} = \frac{AE}{EC}$, prove that ΔBAC is an isosceles triangle. 
23	If $\sqrt{3}$ sin θ – cos θ = 0 and 0 ° < θ < 90°, find the value of θ.
24	The areas of two circles are in the ratio 9: 4, then what is the ratio of their circumferences? **OR**

	A horse is tethered to one corner of a rectangular field of dimensions 70 m × 52 m, by a rope of length 21m. How much area of the field can it graze?
25	In Figure, a quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = BC + AD. 
	SECTION C
	Section C consists of 6 questions of 3 marks each.
26	Three different coins are tossed together. Find the probability of getting (i) exactly two heads (ii) at least two heads (iii) at least two tails.
27	Prove that the lengths of the tangents drawn from an external point to a circle are equal.
28	A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay ₹ 3,000 as hostel charges whereas Mansi who takes food for 25 days ₹ 3,500 as hostel charges. Find the fixed charges and the cost of food per day. **OR** Solve the following pair of linear equations graphically: x +2y = 8; 2x - 3y =2 Also shade the triangular region formed by the lines obtained in the graph and *y* – axis.
29	Prove that $3 + 2\sqrt{3}$ is an irrational number.
30	If tan (A + B) = 1 and tan (A – B) = $\frac{1}{\sqrt{3}}$, 0° < A + B < 90°, A > B, then find the values of A and B.

<table>
<tr><td></td><td>OR
Prove that (1 + cot A – cosec A) (1 + tan A + sec A) = 2</td></tr>
<tr><td>31</td><td>Find the zeroes of the quadratic polynomial $5x^2 + 8x – 4$ and verify the relationship between the zeroes and the coefficients of the polynomial.</td></tr>
<tr><td></td><td>SECTION D</td></tr>
<tr><td></td><td>Section D consists of 4 questions of 5 marks each.</td></tr>
<tr><td>32</td><td>Prove that If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.</td></tr>
<tr><td>33</td><td>Find x: $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}$; x ≠ 0, 1, 2
OR
A motorboat whose speed in still water is 9 km/h, goes 15 km downstream and comes back to the same spot, in a total time of 3 hours 45 minutes. Find the speed of the stream.</td></tr>
<tr><td>34</td><td>The distribution given below shows that the number of wickets taken by bowler in one-day cricket matches. Find the mean and the median of the number of wickets taken.
<table>
<tr><td>No. of wickets</td><td>20-60</td><td>60-100</td><td>100-140</td><td>140-180</td><td>180-220</td><td>220-260</td></tr>
<tr><td>No. of bowlers</td><td>7</td><td>5</td><td>16</td><td>12</td><td>2</td><td>3</td></tr>
</table></td></tr>
<tr><td>35</td><td>A solid toy in the form of a hemisphere surmounted by a right circular cone of same radius. The height of the cone is 10 cm and the radius of its base is 7 cm. Determine the volume of the toy. Also find the area of the coloured sheet required to cover the toy.
OR
In fig., a tent is in the shape of a cylinder surmounted by a conical top of same diameter.
If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of ₹ 500/sq. metre. (Use $\pi = \frac{22}{7}$)</td></tr>
</table>



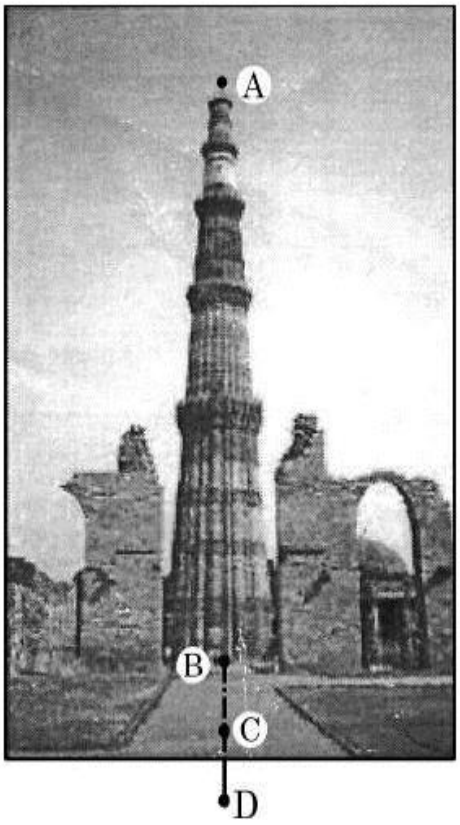
SECTION E

Case Study Based Questions are compulsory.

36 **Case Study -1**

Qutab Minar, located in South Delhi, India, was built in the year 1193.It is 72 m high tower. Working on a school project, Charu and Daljeet visited the monument. They used trigonometry to find their distance from the tower. Observe the picture given below. Points C and D represent their positions on the ground in line with the base of the tower,

The angles of elevation of the top of the tower(Point A) are 60° and 45° from points C and D respectively.

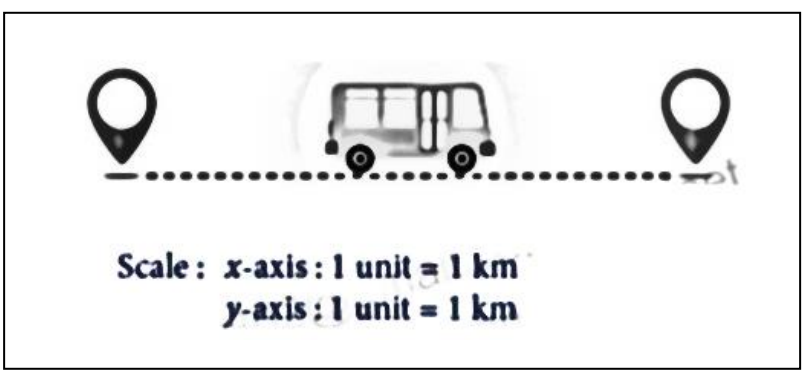


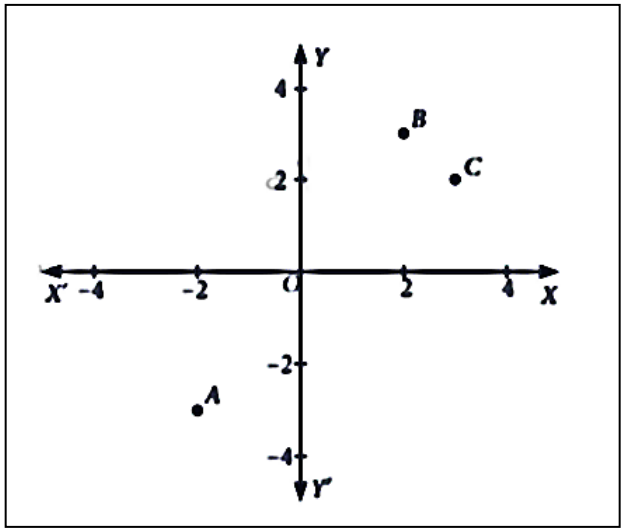
Based on the above information answer the following questions.

I	Based on the above information, draw a well labelled diagram.	1
II	Find the distance BC.	1
III	Find the distance CD. **OR** Find the distance AC.	2

37 **Case Study – 2**

There are two routes to travel from source A to destination B by bus. First bus reaches at B via point C and second bus reaches from A to B directly. The position of A, B and C are represented by the following graph.





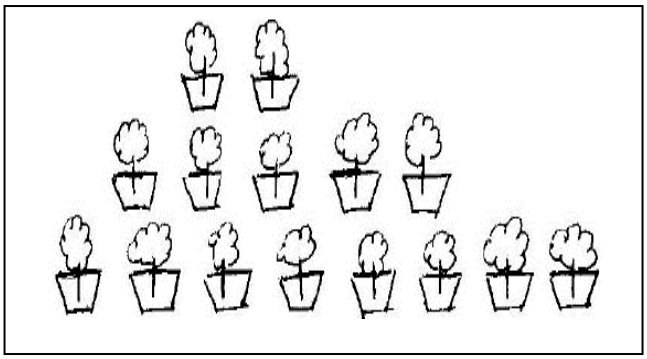
Based on the above information answer the following questions.

I	What is the distance between B and C?	
II	What is the distance between A and C?	
III	If the fare for the first bus is ₹10 per km, what is the fare for the journey from A to B by that bus?(Take $\sqrt{2}$ = 1.41) **OR**	

		If the fare for the second bus is ₹15 per km, what is the fare for the journey from A to B by that bus?(Take $\sqrt{13}$ = 3.61)	

38 **Case Study Based-3**

Roshni being a plant lover decides to start a nursery. She bought few plants with pots. She placed the pots in such a way that the number of pots in the first row is 2, in the second is 5, in the third row is 8 and so on.



Based on the above information answer the following questions.

I	How many pots were placed in the 7th row?	
II	If Roshni has sufficient space for 12 rows, then how many pots are placed by her with the same arrangement?	
III	If Roshni wants to place 100 pots in total, what is the total number of rows formed in the arrangement? **OR** What is the difference in number of pots placed in the 4^{th} row and the 2^{nd} row?	

****

Answers

Answers	**1**	A	**2**	C	**3**	A	**4**	B
	5	D	**6**	D	**7**	B	**8**	B
	9	B	**10**	A	**11**	A	**12**	C
	13	D	**14**	B	**15**	B	**16**	D
	17	B	**18**	B	**19**	c	**20**	b
	21	x=3, y=4	**22**	Proof	**23**	30°	**24**	3: 2 **OR** 346.5 m^2
	25	Proof	**26**	$\frac{3}{8}$, $\frac{1}{2}$, $\frac{1}{2}$	**27**	Proof	**28**	1000, 100 **OR** x=4, y = 2
	29	Proof	**30**	37.5°, 7.5°	**31**	$\frac{2}{5}$, -2	**32**	Proof
	33	$\frac{4}{3}$, 3 **OR** 3 km/hr	**34**	125.33,126.25	**35**	1232cm^3, 576.4cm^2 **OR** ₹16500	**36**	(II)$24\sqrt{3}$ m (III) $24(3-\sqrt{3})$m **OR** $48\sqrt{3}$ m
	37	I. $\sqrt{2}$ m, II.$5\sqrt{2}$ m III. 84.6 ₹ **OR** 108.3 ₹			**38**	I. 20, II. 222, III. 8 **OR** 6		