COMMON PRE-BOARD EXAMINATION 2022-23

Subject: Mathematics (Basic) (241)

Class: X

Time: 3 Hours

Date:

Max. Marks: 80

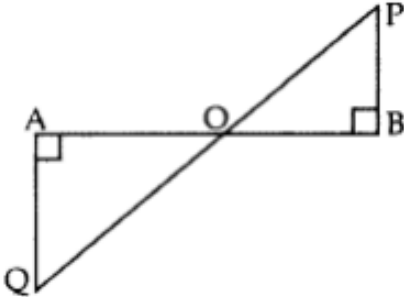*General Instructions:*

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 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 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

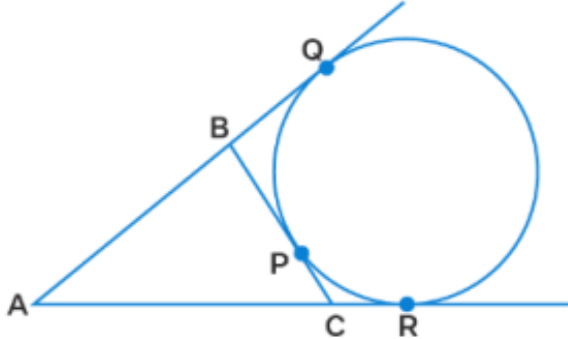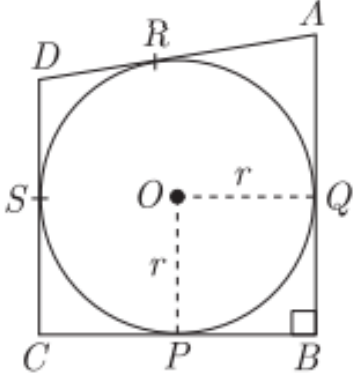|	SECTION A	
	Section A consists of 20 questions of 1 mark each.	
S. No.		Marks
1.	If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is (a)4　　　　(b)1　　　　　　　(c) 2　　　　(d)3	1
2.	If the sum of the zeroes of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to their product, then k equals (a) $\frac{1}{3}$　　(b) $\frac{-1}{3}$　　　　　(c) $\frac{2}{3}$　　　　　　(d) $\frac{-2}{3}$	1
3.	The pair of equations $x = 1$ and $x = 2$ has (a) no solution　　　　　　　(b) unique solution (c)infinitely many solution　　(d) two solutions	1
4.	The value of x for which $DE \parallel AB$ in the given figure is (a) $x = -2$　　　(b) $x = 2$　　　(c) $-x = 4$　　　(d) $x = 4$	1
5.	The median and mode respectively of a frequency distribution are 26 and 29, Then its mean is (a) 27.5　　(b) 24.5　　(c) 28.4　　(d) 25.8	1
6.	The discriminant of the quadratic equation $3x^2 - \sqrt{3}\,x - 5 = 0$ is: (a) 40　　(b) 20　　(c) 60　　(d) 63	1

7.	$2\sqrt{3}$ is (a) an integer (b) a rational number (c) an irrational number (d) a whole number	1
8.	The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is (a) 10 (b) 100 (c) 504 (d) 2520	1
9.	The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is (a) 7 (b) 14 (c) 21 (d) 28	1
10.	If $\tan \theta = \sqrt{3}$, then $\sec \theta =$ (a)2 (b)$\frac{2}{\sqrt{3}}$ (c)$\frac{\sqrt{3}}{\sqrt{2}}$ (d)$\frac{1}{\sqrt{3}}$	1
11.	The point which divides the line segment joining the points (8 , -9) and (2, 3) in the ratio 1 : 2 internally lies in the (a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant	1
12.	For the following distribution | Marks	Number of students
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Below 10	3
Below 20	12
Below 30	27
Below 40	57
Below 50	75
Below 60	80 | The modal class is: (a) 10 – 20 (b) 20 - 30 (c) 30 − 40 (d) 50 − 60	1
13.	If ΔABC is right angled at C , then the value of cos (A+B)is (a)0 (b) 1 (c)$\frac{1}{2}$ (d)$\frac{\sqrt{3}}{2}$	1
14.	$\sqrt{3} \cos^2 A + \sqrt{3} \sin^2 A$ is equal to (a) 1 (b) 2 $\sqrt{3}$ (c) $\sqrt{3}$ (d) 0	1
15.	The area of the largest circle that can be drawn inside a square of side 14cm in length is (a)$121 cm^2$ (b) $154\ cm^2$ (c) $169 cm^2$ (d) $196 cm^2$	1
16.	If two solid hemispheres of same radius r are joined together along their bases, then curved surface area of the new solid is (a)$4\pi r^2$ (b) $3\pi r^2$ (c) $\frac{4}{3}\pi r^3$ (d) $2\pi r^2$	1
17.	If P $(\frac{a}{3}, 4)$ is the mid-point of the line segment joining the points Q(-6 ,5) and R(-2, 3), then the value of a is (a) -6 (b)6 (c)12 (d)-12	1
18.	A wheel makes 1000 revolutions in covering a distance of 0.88 km .The radius of the wheel is (a)7 cm (b)14cm (c)21 cm (d)28cm	1
19.	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	1

	Statement A (**Assertion**): The value of y is 6, for which the distance between the points P(2,-3) and Q(10, y), is 10 Statement R (**Reason**): Distance between two given points $A(x_1, y_1)$ and $B(x_2, y_2)$ is given by AB $=\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ (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.	
20.	Statement A (**Assertion**): PA and PB are two tangents to a circle with centre O. Such that ∠AOB = 110° , then ∠APB = 90° Statement R (**Reason**): The length of two tangents drawn from an external point are equal. (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 B consists of 5 questions of 2 marks each.	
21.	If $\sin(A + B) = 1$ and $\sin(A - B) = \frac{1}{2}$, $0° \le A + B \le 90°$ and $A > B$,then find A and B.	2
22.	In the given figure, QA ⊥ AB and PB ⊥ AB. If AO = 20 cm, BO = 12 cm, PB = 18 cm, find AQ 	2
23.	In what ratio does the point P(-4 ,6), divides the line segment joining the points A(-6 ,10) and B(3, -8) ?	2
24.	Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident: $8x - 3y + \frac{1}{4} = 0$; $16x - 6y + \frac{1}{2} = 0$ OR Find the value of α and β for which the following pair of linear equations has infinite number of solutions: $2x + 3y = 7$; $\alpha x + (\alpha + \beta)y = 28$.	2
25.	Two concentric circles are of radii are 5cm and 3cm.Find the length of the chord of the larger circle which touches the smaller circle. OR Prove that the lengths of two tangents drawn from an external point to a circle are equal	2

	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
26.	Prove that $7 + \sqrt{3}$ is an irrational number	3
27.	One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting (i) a king of black colour (ii) a face card (iii) An ace (iv) the jack of hearts (v) a spade (vi) the queen of diamonds	3
28.	Evaluate : $\dfrac{5\cos^2 60° + 4\cos^2 30° - \tan^2 45}{\sin^2 30° + \cos^2 60°}$	3
29.	A fraction become $\dfrac{9}{11}$ if 2 is added to both numerator and denominator. If 3 is added to both numerator and denominator it becomes $\dfrac{5}{6}$. Find the fraction	3
30.	If a circle touches the side BC of a triangle ABC at P and extended sides AB and AC at Q and R respectively, prove that AQ $= \dfrac{1}{2}(BC + CA + AB)$ OR In figure, a circle with centre O is inscribed in a quadrilateral ABCD such that , it touches the sides BC, AB , AD and CD at points P, Q, R and S respectively. If AB =29cm, AD = 23cm ∠B =90° and DS = 5cm , find the radius of the circle 	3
31.	If α and β are the zeroes of the polynomial $f(x) = x^2 - 6x + k$,find the value of k such that $\alpha^2 + \beta^2 = 40$ OR Find the zeroes of the quadratic polynomial $x^2 - 3\sqrt{3}x + 2$ and verify the relationship between the zeroes and the coefficients	3

	SECTION D	
	Section D consists of 4 questions of 5 marks each.	
32.	In a flight of 600 km, an aircraft was slowed down due to bad weather. The average speed of the trip was reduced by 200 km/hr and the time of flight increased by 30 minutes. Find the duration of flight	5
33.	If the median of the distribution given below is 28.5 then, find the value of x and y.	5

Class Interval	Frequency
0-10	5
10-20	x
20-30	20
30-40	15
40-50	y
50-60	5
Total	60

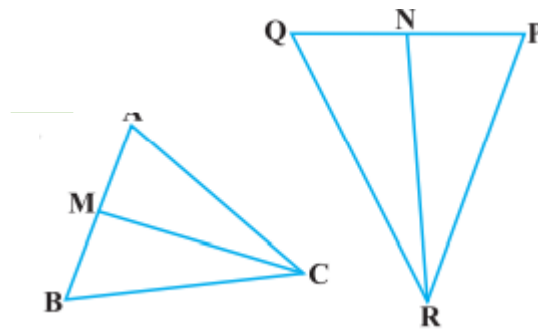|		
34.	A solid wooden toy is in the form of a hemisphere surmounted by a cone of same radius. The radius of hemisphere is 3.5 cm and the total wood used in the making of toy is $166\frac{5}{6}$ cm³. Find the height of the toy. Also, find the cost of painting the hemispherical part of the toy at the rate of ₹10 per cm². [Use $\pi = 22/7$] **OR** A vessel full of water is in the form of an inverted cone of height 8cm and the radius of its top, which is open is 5cm. 100 spherical lead balls are dropped into the vessel. One –fourth of the water flows out of the vessel. Find the radius of the spherical ball	5
35.	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. Also prove that a line drawn through the mid-point of one side of a triangle parallel to another side bisects the third side **OR** In the given figure, CM and RN are respectively the medians of Δ ABC and Δ PQR. If Δ ABC ~ Δ PQR, prove that : (i) Δ AMC ~ Δ PNR (ii) $\frac{CM}{RN} = \frac{AB}{PQ}$ 	5
	SECTION E	
	Case study based questions are compulsory.	
36.	Rohit is the captain of his school football team. He has decided to use a 4-4-2-1 formation in the next match. The figure below shows the position of the players in a 4-4-2-1 formation on a coordinate grid	
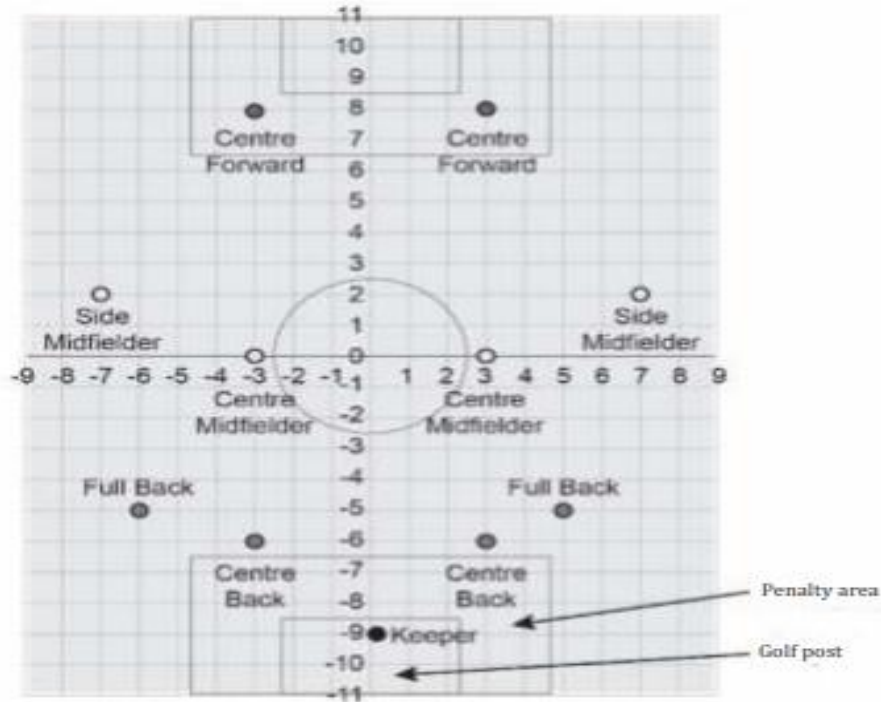
(i) Which coordinate represents the position of the goalkeeper?   1

(ii) What is the distance between the two centre forward positions in Rohit's plan?   1

(iii) What are the coordinates of the point on the y-axis which is equidistant from the left centre forward and the right centre midfielder   2

OR

What are the coordinates of the point on the X-axis which is equidistant from the left centre back and the right full back

37.	A 1.5 m tall boy is standing at some distance from a 120 m high light house. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building.	

Based on the given information answer the following questions   1

(i) Draw the required figure for the given situation.

(ii). Find the distance between the second position and the light house   1

(iii) Find the distance he walked towards the building.

OR   2

Find the distance from the first position to the light house.

38.	Sales Goals: At the time that I was newly hired, 100 sales per month was what I required. Each following month—the last plus 20 more, as I work for the goal of top sales award. When 2500 sales are thus made, I got a holiday package.	
	(i) How many sales were made by this person in the seventh month?	1
	(ii) Was the goal of 2500 total sales met after the 12th month?	1
	(iii) What were the total sales after the 12th month?	2
	OR	
	What is the sum of sales in the 10th month?	

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