COMMON PRE-BOARD EXAMINATION

MATHEMATICS (BASIC)–Code No. 241

CLASS-X-(2025-26)

SET: 2

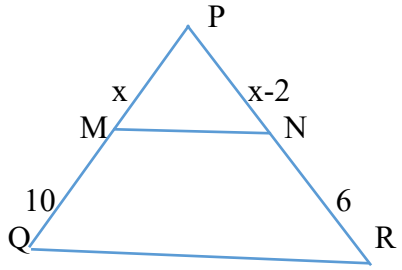
Time allowed: 3 Hrs. **Maximum Marks: 80**

General Instructions:

Read the following instructions very carefully and follow them:

1. This Question Paper has 5 Sections A - E.
2. Section **A** has 20 Multiple Choice Questions (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 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 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	
1.	In an AP, $a_{17} - a_{12} = 45$. Find d. a) -9 b) $45/27$ c) $-45/27$ d) 9	1
2.	$7sec^2x - 7tan^2x$ equal to a) 1 b) -7 c) 7 d) none of these	1
3.	Which among the following line is parallel to the line 2x - 3y = 6 ? a) $4x - 6y = 12$ b) $4x + 6y = 12$ c) $4x - 6y = 3$ d) $4x + 6y = 3$	1

4.	What is k if the quadratic equation $5x^2 - 2x + k = 0$ has equal roots ? a) 5 b) $1/5$ c) -5 d) $-1/5$	1
5.	How many zeroes does the number 24 x 25 x 17 x 15 x 2^3 x 5^2 end with ? a) 6 b) 5 c) 4 d) 3	1
6.	Find k if 5k+1, 8k-3 and 9k+7 are in AP. a) 7 b) 1 c) 2 d) -7	1
7.	The shadow of a pole of height 10 m is 16 m. At the same time, what is the length of shadow of a tower of 25 m high ? a) 30 m b) 35m c) 40 m d) 45 m	1
8.	In the given figure, MN || QR. If PM = x cm, MQ = 10 cm, PN = x − 2 cm and NR = 6 cm , then the value of x is  a) 5cm b) 4 cm c) 6 cm d) 3 cm	1
9.	The ratio in which the line segment joining A(1,4) and B(2,-7) is divided by the x- axis is a) 7:4 b) 3: 2 c) 2: 3 d) 4: 7	1
10.	Which among the following can not be the probability of any event ? a) 0 b) 1	1

	c) $\frac{3}{5}$ d) $\frac{5}{3}$	
11.	The length of the tangent from a point A at a distance 5 cm from the centre of the circle is 4 cm. The radius of the circle is a) 9 cm b) 1 cm c) 6 cm d) 3 cm	1
12.	TP and TQ are tangents to a circle with centre O from an external point T. $< POQ = 115°, then < PTQ\ is$ a) 75° b) 35° c) 65° d) 55°	1
13.	The length of arc of a circle with central angle 90° is 11 cm. The radius of the circle is a) 3.5 cm b) 7 cm c) 14 cm d) 10.5 cm	1
14.	In a class of 40 students, 25 are girls. One student is chosen at random. The probability that the student is a boy is a) $\frac{3}{8}$ b) $\frac{5}{8}$ c) $\frac{1}{2}$ d) $\frac{3}{4}$	1
15.	The distance between (a, 0) and (0, a) is a) 0 b) 2a c) √2 a d) 4a	1
16.	Which among the following is the relation between mean, median and mode ? a) 3 Mode = 2 Median + Mean b) 3 Mean = 2 Mode + Median c) 3 Median = Mode + 2 Mean d) 3 Median = 2 Mode + Mean	1

17.	Which is the modal class ? | Class	0-10	10-20	20-30	30-40	40-50
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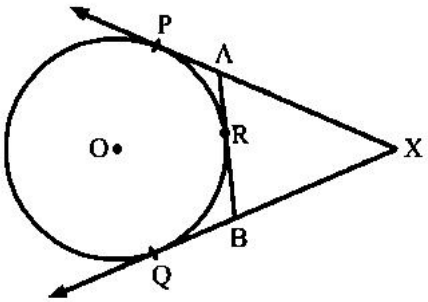
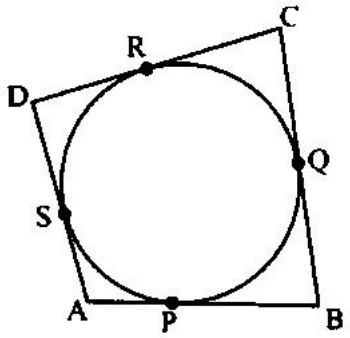
Frequency	17	11	21	23	18 | a) 10-20 b) 20-30 c) 30-40 d) 40-50	1
18.	Which is the quadratic polynomial whose zeroes are -5 and -1? a) x^2-6x+5 b) x^2-6x-5 c) x^2+6x+5 d) x^2+6x-5	1
	Assertion - Reason **For questions 19 and 20, choose the correct option from the following :** **a) Both A and R are true and R is the correct explanation of A** **b) Both A and R are true and R is not the explanation of A** **c) A is true but R is false** d) **A is false but R is true**	
19.	**Assertion (A)** : If Δ ABC and Δ PQR are congruent triangles, then they are similar triangles. **Reason (R)** : All congruent triangles are similar, but all similar triangles need not be congruent.	1
20.	**Assertion (A)** : In the given figure, XA + AR = XB + BR , where XP , XQ and AB are tangents .  **Reason (R)** : A tangent to a circle is perpendicular to the radius through the point of contact.	1
	Section B	
21.	Sum of a number and its reciprocal is $10/3$. Find the number.	2

22.	A) One zero of the polynomial $(5k - 2)x^2 - 3x + 3k$ is reciprocal of the other, find the value of k. **OR** B) If α *and* β are the zeroes of the polynomial $2x^2 - 3x + 6$, then evaluate $2\alpha + 2\beta + \alpha\beta$.	2
23.	A) If $sin(A + B) = \frac{\sqrt{3}}{2}$ and $sin(A - B) = ½$, find A and B. **OR** B) If 4 tanθ = 3, evaluate $\frac{sin\theta - cos\theta}{sin\theta + cos\theta}$.	2
24.	HCF $(a, 80) = 40$ and LCM $(a, 80) = 120$. Find a.	2
25.	Prove that tangents from an external points to a circle are equal in length.	2
	Section C	
26.	A) Evaluate using trigonometric table : $\frac{3sin^2 60^0 + 5tan^2 45^0 - cos60^0}{2cos^2 30^0 + sin30^0 + tan^2 60^0}$. **OR** **B)** Prove that $(sec\theta - tan\theta)^2 = \frac{1 - sin\theta}{1 + sin\theta}$.	3
27.	ABCD is a quadrilateral circumscribing a circle. Prove that $AB + CD = BC + AD$.  	3
28.	Find the median of the following data : 	Class	0-20	20-40	40-60	60-80	80-100	Total
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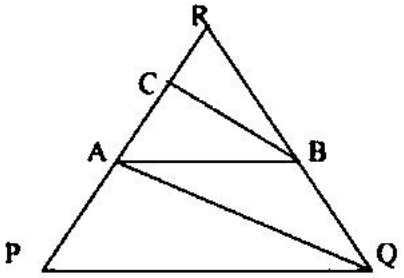
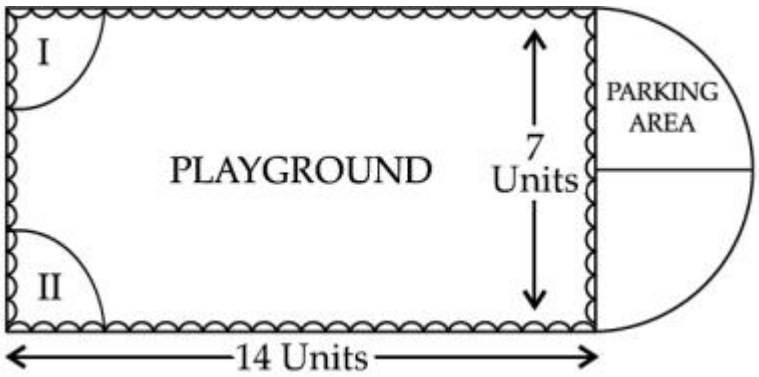
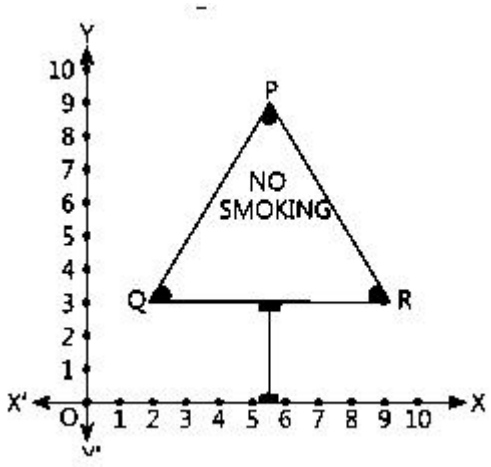
Frequency	7	6	9	10	8	40		3
29.	A fraction is such that if the numerator is multiplied by 2 and the denominator is increased by 2, we get $5/4$. If the numerator is increased by 1 and the denominator is doubled, we get ½. Find the fraction.	3

30.	A) The 18^{th} term of an AP is 63 and the 11^{th} term is 42. Find its 25^{th} term. **OR** B) Which term of the AP 8, 14, 20, ... will be 72 more than the 41^{st} term ?	3
31.	Given $\sqrt{2}$ is irrational. Hence prove $9 - 7\sqrt{2}$ is irrational	3
	Section D	
32.	A man standing on the deck of a ship 10 m high, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30°.Find the height of the hill.	5
33.	A) A toy is in the form of a solid cylinder with two hemispherical ends. The radii of cylinder and hemisphere being 7 cm. The total length of the toy is 24 cm. Find the volume and surface area of the toy. **OR** B) A cylindrical vessel of radius 14 cm and height 20 cm is full of water. An iron solid in the shape of a cone surmounted by a hemisphere is dropped in the water so that certain amount of water flows out. The common radii of cone and hemisphere is 7 cm and height of cone is 10 cm. What is the volume of water remaining in the cylindrical vessel ?	5
34.	**Prove that**: In a triangle, if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the two sides are divided in the same ratio. Using the above result, prove the following:  In the figure, AB parallel to PQ and BC parallel to AQ. Prove that $AR^2 = PR \cdot CR$.	5
35.	A) A train covers 360 km at a uniform speed, If the speed had been 5 km/h more, it would have taken 1 hour less for the journey. Find the speed of the train. **OR** B) Solve for x: $\frac{1}{x+1} + \frac{3}{5x+1} = \frac{5}{x+4}, where\ x \neq -1, -4, -\frac{1}{5}$	5

	.	
	Section E	
36.	**Case Study 1:** Anu and Saj decided to have game with numbers. Anu wrote numbers from 5 to 40 on cards such a way that each number on different cards. She asked Saj to choose a number. He chose a card randomly from the cards of numbers.  Based on the following information, answer the following questions : (i) What is the probability that the card drawn contains an even number ? (ii) What is the probability that the drawn card contains a number which is a perfect square ? (iii) A) What is the probability that the drawn card contains a prime number ? **OR** B)What is the probability that the drawn card contains a number which is a multiple of 3 or 4.	1 1 2
37.	**Case Study 2:** Governing council of a local public development authority decided to build a playground on the valley of a hill which will have adequate space for parking.  After survey it was decided to build a rectangular play ground with a semi circular parking area at one end . The length and breadth of play grounds are 14 and 7 units respectively. There are two quadrants of radius 2 units each at both corners of one end to reserve for VIP seats. Based on the above information, answer the following questions :	

	(i) What is the area of the semi circular parking space ? (ii) How much area is reserved for VIP seats ? (iii) A) What is the total perimeter of the rectangular play ground and the parking space ? **OR** B)What is the total area of the play ground including VIP space and parking space ?	1 1 2
38.	**Case Study 3:** All of the persons know that smoking is injurious to health. So, some college students decided to start a campaign. To raise social awareness about hazards of smoking, they started NO SMOKING campaign. Some students were asked to prepare banners in the shape of triangle which is shown in the figure  Based on the above information, answer the following questions : (i) Find the coordinates of Q and R (ii) Find the mid point of QR (iii) A)Find a point on X- axis which is equidistant from Q and R **OR** B)Find the area of triangle PQR	1 1 2