Kendriya Vidyalaya Sangathan, Chandigarh Region

Pre-Board-II Examination (2025-26)

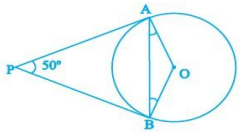
Class -X **MAX.MARKS: 80**
SUBJECT: MATHEMATICS -BASIC (241) **DURATION:3 Hours**

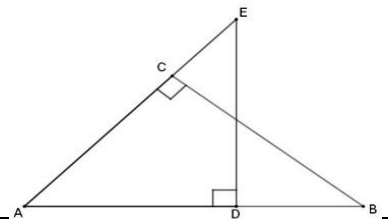
General Instructions:
Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of section B, 2 Questions of section C and 2 Questions of section D has been provided.An internal choice has been provided in all the 2 marks question of Section E
9. Draw neat and clean figures wherever required. Take π =22/7 wherever required if not stated.
10. Use of calculators is not allowed.

SECTION – A

Section A consists of 20 questions of 1 mark each.

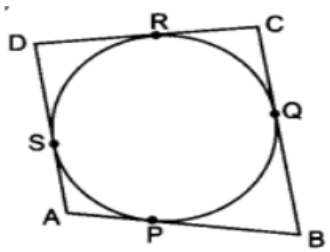
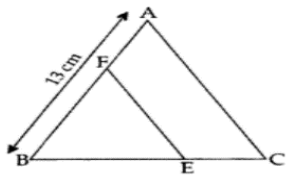
1	The exponent of 3 in the prime factorization of 2025 is (A) 1 (B) 2 (C) 3 (D) 4	**1**
2	Graphically, the pair of equations given by $6x - 3y + 10 = 0$, $2x - 4y + 9 = 0$ represents two lines which are (A) intersecting at exactly one point (B) parallel (C) coincidence (D) intersecting at exactly two point	**1**
3	The value of k for the quadratic equation $kx^2 - 5x + 1 = 0$ has equal roots, is (A) 0 (B) 25/4 (C) 4/25 (D) 7	**1**
4	The distance between the points (a, b) and $(-a, -b)$ is (A) $\sqrt{a^2+b^2}$ (B) a^2+b^2 (C) $2\sqrt{a^2+b^2}$ (D) $4\sqrt{a^2+b^2}$	**1**
5	In the figure, if PA and PB are tangents to the circle with centre O such that ∠APB = 50°, then ∠OAB is equal to (A) 25^0 (B) 30^0 (C) 40^0 (D) 50^0 	**1**

6	If $\sin\theta = \cos\theta$, then the value of $\tan^2\theta + \cot^2\theta$ is (A) 2 (B) 4 (C) 1 (D) 10/3	**1**
7	Which one of the following is not equal to Unity? (A) $\sin^2 x + \cos^2 x$ (B) $\cot^2 x - \text{cosec}^2 x$ (C) $\sec^2 x - \tan^2 x$ (D) $\tan x . \text{Cot}\, x$	**1**
8	If $\triangle ABC \sim \triangle PQR$ such that 3AB = 2PQ and BC=10 cm, then length QR is equal to (A) 10 cm (B) 15 cm (C) $\frac{20}{3}$ cm (D) 30 cm	**1**
9	What is the greatest possible speed at which a man can walk 52 km and 91 km in an exact number of hours? (A) 17 km/hour (B) 7 km/hour (C) 13 km/hour (D) 26 km/hour	**1**
10	What is the area of a semi-circle of diameter ' d '? (A) $\frac{1}{16}\pi d^2$ (B) $\frac{1}{4}\pi d^2$ (C) $\frac{1}{8}\pi d^2$ (D) $\frac{1}{2}\pi d^2$	**1**
11	In the given figure, ΔBAC is similar to (A) ΔAED (B) ΔEAD (C) ΔACB (D) ΔBCA  	**1**
12	The curved surface area of a cone having height 24 cm and radius 7 cm, is (A) 528 cm^2 (B) 1056 cm^2 (C) 550 cm^2 (D) 500 cm^2	**1**
13	The value of cos1° . cos2° . cos3° . cos4°. . . . . .. cos90° is (A) 1 (B) 0 (C) – 1 (D) 2	**1**
14	The circumferences of two circles are in the ratio 3 : 4. The ratio of their areas is: (A) 3:4 (B) 4:3 (C) 16:9 (D) 9:16	**1**
15	In a bag containing 30 balls, 4 are blue, 11 are green and the rest are white. One ball is drawn at random. The probability that drawn ball is white in colour is (A) 0.25 (B) 0.75 (C) 0.5 (D) 1	**1**
16	If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is (A) 10 (B) −10 (C) 5 (D) – 5	**1**
17	For the following distribution : Class: 0 – 10, 10 - 20, 20 - 30, 30 - 40, 40 - 50 Frequency: 17, 21, 19, 24, 9 the upper limit of the modal class is	**1**

	(A) 50 (B) 20 (C) 30 (D) 40	
18	For a frequency distribution, mean, median and mode are connected by the relation (A) Mode = 3 Mean – 2 Median (B) Mode = 2 median - 3 Mean (C) Mode = 3Median -2 Mean (D) Mode = 3 Median + 2 Mean	**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 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.	
19	Assertion (A): HCF of any two consecutive even natural numbers is always 2. Reason (R): Even natural numbers are divisible by 2	**1**
20	Assertion (A): Point $P(0,2)$ is the point of intersection of y-axis with the line $3x + 2y = 4$. Reason (R): The distance of point $P(0,2)$ from x-axis is 2 units	**1**

SECTION – B

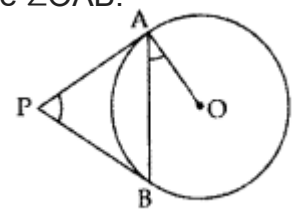
Section B consists of 5 questions of 2 marks each.

21	Find the value of p if the pair of equations 2x + 3y – 5 = 0 and px – 6y – 8 = 0 has a unique solution.	**2**
22	Evaluate : $2\sin 30° \tan 60° - 3\cos^2 60° \sec^2 30°$	**2**
23	A quadrilateral $ABCD$ is drawn to circumscribe a circle. Prove that $AB + CD = BC + AD$  	**2**
24	The perimeters of two similar triangles ABC and PQR are 32 cm and 24 cm respectively. If PQ = 12 cm, find AB.. **or** In the figure, FE || AC, BC = 10 cm, AB = 13 cm and EC = 2 cm, find AF.  	**2**

25	A chord of a circle of radius 14 cm subtends an angle of 60∘ at the centre. Find the area of the corresponding minor sector of the circle. **Or** AB is a chord of a circle, with centre O and radius 10 cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment [Use π = 3.14]	**2**

SECTION – C

Section C consists of 6 questions of 3 marks each.

26	Prove that $\sqrt{2}$ is an irrational number.	**3**
27	Find the zeroes of the quadratic polynomials $p(x) = 5x^2 + 12x + 7$ and verify the relationship between the zeroes and its coefficients.	**3**
28	Prove that: $\sec A (1 - \sin A)(\sec A + \tan A) = 1$ **Or** Prove that $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$	**3**
29	The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages. **Or** A part of monthly hostel charges in a college hostel are fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 25 days, he has to pay ₹ 4,500, whereas a student B who takes food for 30 days, has to pay ₹5,200. Find the fixed charges per month and the cost of food per day.	**3**
30	In the given figure, PA and PB are tangents to the circle with centre O. If ∠APB = 60°, then calculate ∠OAB.  	**3**
31	One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting: (i) A red face card (ii) Either king or red card (iii) Neither king nor Ace	**3**

SECTION – D

Section D consists of 4 questions of 5 marks each

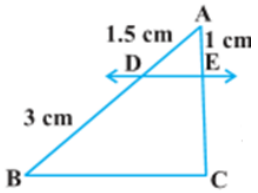
32	A train travels at a certain average speed for a distance of 132 km and then travels a distance of 140 km at an average speed of 4 km/h more than the initial speed. If it takes 4 hours to complete the whole journey, what was the initial average speed? Determine the time taken by train to cover the distances separately.	**5**

OR

In a flight of 600 km, an aircraft was slowed due to bad weather. Its average speed for the trip was reduced by 200 km/hr and the time of flight increased by 30 minutes. Find the original duration of the flight.

33 **a)** State and prove Basic Proportionality Theorem. **5**

b) In the given figure, DE || BC. Find EC.



34 The mean of the following frequency distribution is 62.8 and the sum of all the frequencies is 50. Compute the missing frequencies *X* and *Y*. **5**

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	X	10	*Y*	7	8

35 A tent is in the shape of a right circular cylinder up to a height of 3 m and then a right circular cone, with a maximum height of 13.5 m above the ground. Calculate the cost of painting the inner side of the tent at the rate of ₹ 4 per square metre, if the radius of the base is 14 m. **5**

OR

A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere of same radius. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of the wooden toy.

SECTION – E

Section E consists of 3 case study based questions of 4 marks each

36 India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6th year and 22600 in 9th year. **4**

Based on the above information answer the following questions

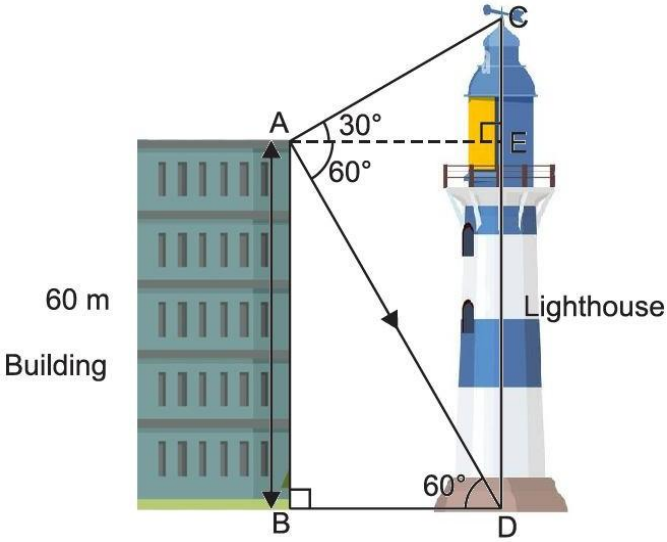
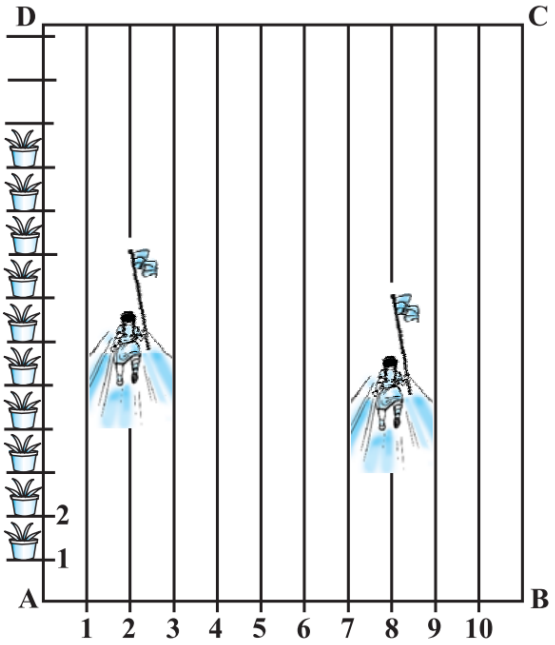
(i) Find the fixed number increase in production of factory every year ?

(ii) What is the production during first year ?

(iii) (a) Find the total production in first 3 years

OR

(b) Find the nth term in terms of n.

37	Ram is watching the top and bottom of a lighthouse from the top of the building. The angles of elevation and depression of the top and bottom of a lighthouse from the top of a 60 m high building are 30° and 60° respectively.  Find (i)The distance between the lighthouse and the building (II) The height of lighthouse (iii)(a)The difference between the heights of the lighthouse and the building OR (b) If the ratio of the height of a light house and the length of its shadow on the ground is √3 : 1 What is the angle of elevation?	**4**
38	To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1m each. 100 flower pots have been placed at a distance of 1m from each other along AD, as shown in Figure. Niharika runs $\frac{1}{4}$th of the distance AD on the 2nd line and posts a green flag. Preet runs $\frac{1}{5}$th the distance AD on the eighth line and posts a red flag. Assume A as the origin AB along x-axis and AD along y-axis, answer the following questions:  Based on the above information answer the following questions (i) Find the coordinates of the green flag. (ii) Find the distance between both the flags? (iii) (a) If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag? OR (b) If position of green flag is named as P and that of red flag as Q, then find the ratio in which R $(6, \frac{65}{3})$ divides the join of PQ.	**4**

********END OF THE PAPER ********