KENDRIYA VIDYALAYA SANGATHAN, TINSUKIA REGION

PRE BOARD 2025-26

MATHEMATICS STANDARD (041)

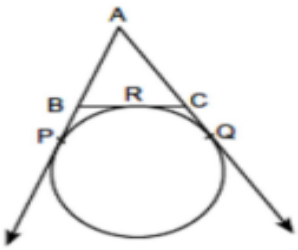
Maximum Marks: 80 **Time: 3 hours**

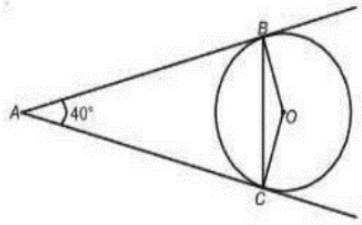
General Instructions:

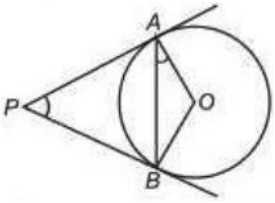
Read the following instructions carefully and follow them:

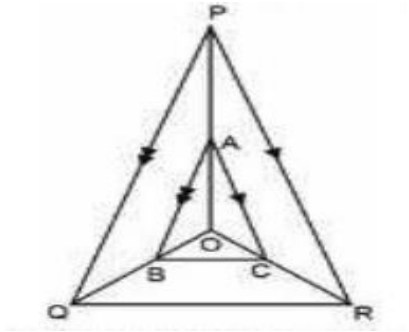
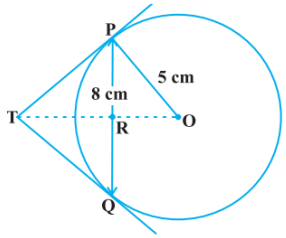
1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 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. There is no overall choice. However, an internal choice in 1 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 questions of Section E.
9. Draw neat and clean figures wherever required. Take $\pi = \frac{22}{7}$ 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 greatest possible speed at which a man can walk 135 km and 225 km in exact number of hours is: (A) 5 km/hr (B) 15 km/hr (C) 65 km/ hr (D) 45 km/hr	**1**
2.	The pair of linear equations 15x + 7y = 25 and 5x –21y= 7 represents two lines which are: (A) intersecting exectly at two point (B) intersecting exectly at one point (C) parallel (D) coincident	**1**
3.	If we express sin A in terms of cot A then sin A= (A) $\sqrt{1-\cot^2 A}$ (B) $1/\sqrt{1-\cot^2 A}$ (C) $1+\cot^2 A$ (D) $1/\sqrt{1+\cot^2 A}$	**1**
4.	If two numbers are in ratio of 3:7 and their LCM is 147 then numbers are (A) (15,35) (B)(18,42) (C) (21,49) (D) (24,56)	**1**

5.	If the roots of the equation $x^2 + bx + c$ are (1,2) then b and c are = (A) (-2,3) (B) (-3,2) (C) (-6,1) (D) (-1,6)	**1**
6.	In triangles ABC and triangle DEF , ∠B= ∠E , ∠C = ∠F and AB= 4 DE then triangles are (A) congruent but not similar (B) congruent as well as similar (C) neither congruent nor similar (D) not congruent but similar	**1**
7.	If the roots of quadratic equation x^2-kx+9 are real and distinct, then what can be the value of k? (A) k=6 (B) k<6 (C) k>6 (D)k = -6	**1**
8.	The distance between the points P (5, 2) and Q (7, y) is $2\sqrt{2}$ which are possible values of y? (A) -2 and 2 (B) 0 and 4 (C) 4 and -4 (D) 4 and -2	**1**
9.	If 3-4Sinx=1, $0^0 \leq x \leq 90^0$then x is equal to (A) 60° (B) 45° (C) 30° (D) 15°	**1**
10.	The mid-point of the line segment joining the points A(4, 5) and B(4, 6) lies on **(A)** x-axis **(B)**y-axis **(C)** at origin **(D)** neither x-axis nor y-axis	**1**
11	The difference of the areas of a minor sector of angle 120^0 and its corresponding major sector of a circle of radius 21 cm, is (A) 496 cm^2 (B)462 cm^2 (C) 346 cm^2 (D) 693 cm^2	**1**
12	A circular arc of length 22 cm subtends an angle **θ** at the centre of the circle of radius 21 cm. The value of **θ** is (A) 90° (B) 60° (C) 50° (D) 30°	**1**
13	If the radius of a sphere is doubled, then the ratio of the original and new surface volume is (A) 1 : 4 (B) 2 : 1 (C) 1 : 8 (D) 4 : 1	**1**
14	Two coins are tossed simultaneously. The probability of having atleast one head is (A) 3/4 (B) 1/4 (C) 2/4 (D) 1	**1**
15	In figure, AP, AQ and BC are tangents to the circle. If AP = 8 cm, CQ = 3 cm and BR = 2 cm, then the perimeter of triangle ABC is (A)16cm (B) 7.5cm (C) 20cm (D) 30cm 	**1**
16	The Probability that cannot exist among the following (A) 2/3 (B) 1.6 (C) 25% (D) 0.7	**1**

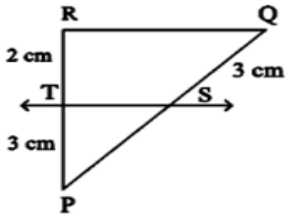
17	In given figure AB and AC are tangents to the circle with Centre O such that $\angle BAC=40^0$ then $\angle ABC$ is equal to (A) 90° (B) 70° (C) 140° (D) 105°  	**1**
18	The following distribution gives the daily income of 50 workers of the factory. The upper limit of the modal class is Income (in ₹): 400-424, 425-449, 450-474, 475-499, 500-524 Number of workers: 12, 14, 8, 6, 10 (A)25 (B) 424.5 (C) 449.5 (D) 425.5	**1**
	DIRECTIONS: 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):** The number 6^n cannot end with digit 0, where n is a natural number. **Reason(R)**: A number ends with digit zero, if its prime factorization contains both 2 and 5.	**1**
20	**Assertion(A):** $\sec^2 A - \tan^2 A = 1$ **Reason(R)**: $(\sec A + \tan A)^2 = 1$ for any angle A	**1**

	(Section – B) **Section B consists of 5 questions of 2 marks each.**	
21.	(A) Which term is the first negative number of the AP. 200, 192, 184, 176 …? **OR** (B) Find the number of term of the A.P. 6, 13, 20 …, 244?	**2**
22.	The perimeter of a sector of a circle of radius 15cm is 80cm. Find the area of sector.	**2**
23.	PA and PB are tangents drawn to the circle with centre O as shown in the figure. Prove that $\angle APB = 2\angle OAB$.  	**2**
24.	If $\sin(2A + 3B) = 1$, $\cos(2A - 3B) = \frac{1}{2}$, $0° < (2A + 3B) < 90°$, $A > B$, find A and B.	**2**

25.	In the adjoining figure, A, B and C are points on OP, OQ and OR respectively such that AB‖PQ and AC‖PR. Show that BC‖QR. 	**2**
	(Section – C) **Section C consists of 6 questions of 3 marks each.**	
26	PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T (as shown in figure). Find the length TP. 	**3**
27	A school has invited 84 Hindi teachers, 56 Physics English and 70 Art teachers to attend an art integrated workshop. Find the minimum number of tables required, if the same number of teachers are to sit at a table and each table is occupied by teachers of the same subject.	**3**
28	If α and β are the zeroes of the polynomial $2y^2 + 7y + 5$, find the value of $(\alpha^2 + \beta^2)(\alpha^2 - \beta^2)$.	**3**
29	The ratio of incomes of two persons is 9:7 and the ratio of their expenditures is 4:3. If each of them manages to save rupees 2000 per month, find their monthly incomes. **OR** Check whether given pair of linear has a solution or not. If solution exist solve them using substitution method: $\frac{3x}{2} + \frac{2y}{3} = -1$, $x - \frac{y}{3} = 3$.	**3**
30	From a pack of 52 playing cards, Jacks and Kings of red colour and Queens and Aces of black colour are removed. The remaining cards are mixed and a card is drawn at random. Find the probability that the drawn card is: (a) Not a face card. (b) Not getting a red card. (c) A Jack of heart.	**3**
31	(A) Prove that: $(1 + \cot A + \tan A)(\sin A - \cos A) = \sin A \tan A - \cot A \cos A$. **OR** (B) Prove that: $\frac{\tan A}{1-\cot A} + \frac{\cot A}{1-\tan A} = 1 + \sec A \operatorname{cosec} A$	**3**
	(Section – D) **Section D consists of 4 questions of 5 marks each**	
32	A train travels a distance of 480 kms at a uniform speed. If the speed had been 8 km/h less, it would have taken 3 hours more to cover the same distance. Find the original speed of the train. Also find the time taken by train to 480 kms with initial speed.	**5**

33 If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio. **5**

Using the above, find value of SP.



34 A gulab jamun, contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 gulab jamuns, each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm. **5**

OR

A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherical lead balls are dropped into vessel. One-fourth of the water flows out of the vessel. Find the radius and surface area of one spherical ball.

35 (A) The following data gives the distribution of total monthly household expenditure of 200 families of a village. **5**

Expenditure	1000-1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000-4500	4500-5000
No. of families	24	40	33	28	30	22	16	7

Find the modal monthly expenditure of the families. Also, find the mean monthly expenditure.

OR

(B) The distribution below gives the marks of 40 students of a class, if the median marks are 32.5, find the frequencies f1 and f2.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
No. of students	f_1	5	9	12	f_2	3	2	40

(Section – E)

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

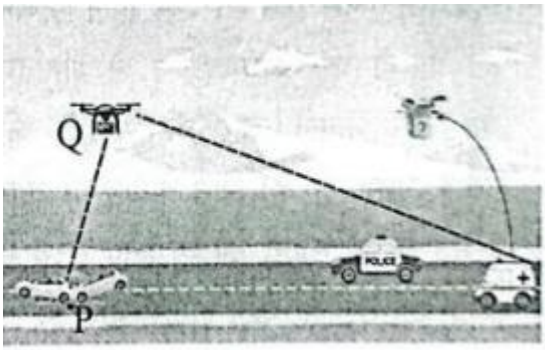
36 A drone was used to facilitate movement of an ambulance on the straight highway to a point P on the ground where there was an accident. The ambulance was travelling at the speed of 60 km/h. The drone stopped at a point Q, 100 m vertically above the point P. The angle of depression of the ambulance was found to be 30° at a particular instant.

Based on above information, answer the following questions:

(i) Represent the above situation with the help of a diagram. **1**

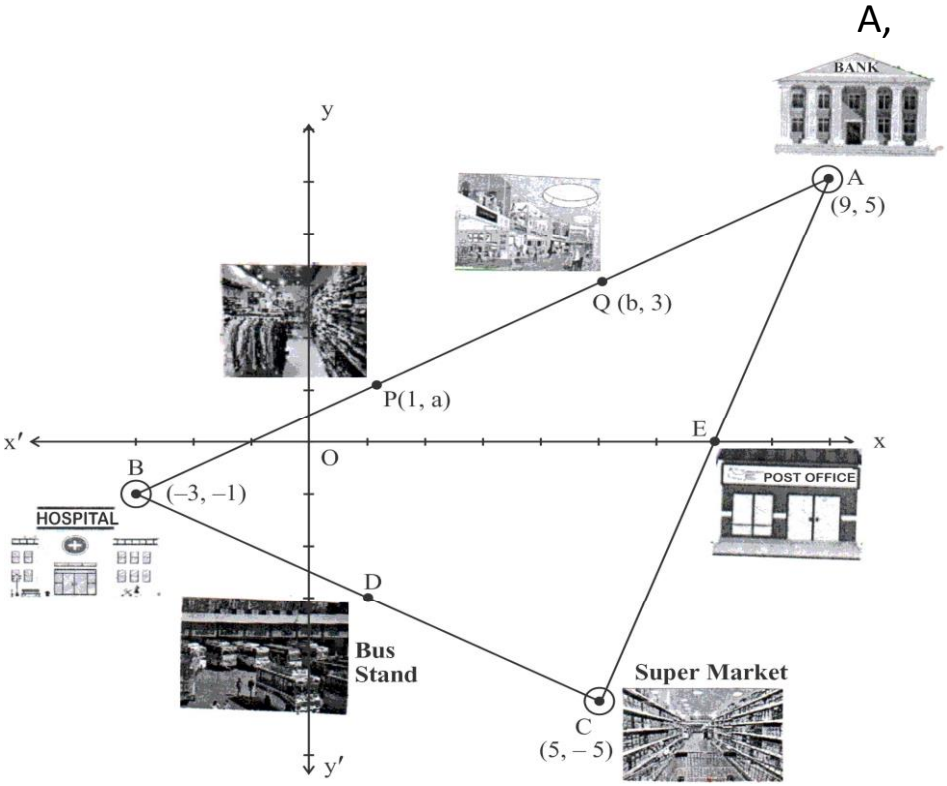
(ii) Find the distance between the ambulance and the site of accident (P) at the particular instant, (Use √3= 1.73) **1**

(iii) Find the time (in seconds) in which the angle of depression changes from 30° to 45°. **2**



OR

(iii) How long (in seconds) will the ambulance take to reach point P from a point T on the highway such that angle of depression of the ambulance at T is 60° from the drone?

37	A librarian arranges books on a shelf in such a way that the first shelf has 10 books, the second has 15 books, the third has 20 books, and so on, increasing by 5 books per shelf. (i) How many books will be there in the 10 shelfs? (ii) If he increases no of books in each shelf then how many books are in 10th shelfs? (iii) If the middle shelf has 95 books, how many shelves are there? **OR** (iii)What is the difference between the number of books on the 17th and 11st shelves? 	**1** **1** **2**
38	Partha, a software engineer, lives in Bengaluru for his work. He lives in the most convenient area of the city from where bank, hospital, post office and supermarket can be easily accessed.  **Based on the above information answer the following question.** **(i)** Find the distance between bank and super market? **(ii)** In between the bank and the supermarket, there is a post office plotted at E which is their mid-point. Find the coordinates of E. **(iii)** In between the hospital and the supermarket, there is a bus stop plotted as D, which is their mid-point. If Partha wants to reach the bus stand from the bank, then how much distance does he need to cover **OR** **(iii)** P and Q are two different garment shops lying between the bank and the hospital, such that BP = PQ = QA. If the coordinates of P and Q are (1, a) and (b, 3) respectively, then find the values of ‘a’ and ‘b’	 **1** **1** **2**