Kendriya Vidyalaya Sangathan, Bhopal Region

First Pre Board Exam – (2025-26)

Subject: - Mathematics (SET-3)

Time: 3 hours **Max. Marks : 80**

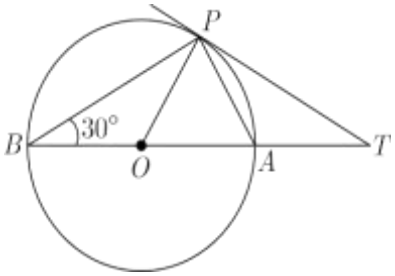
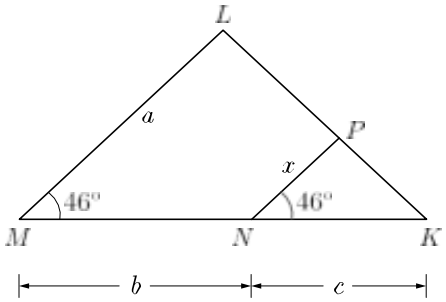
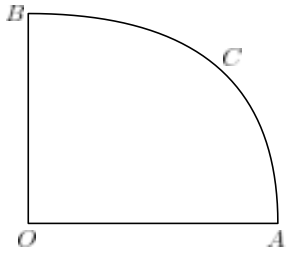
General Instructions:

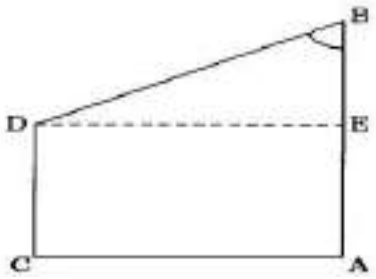
Read the following instructions carefully and follow them:

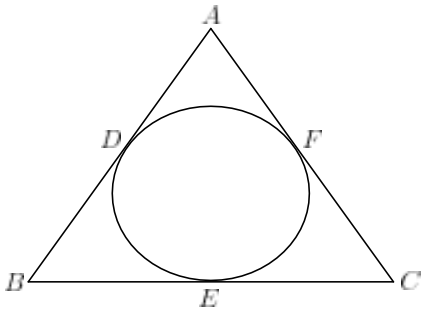
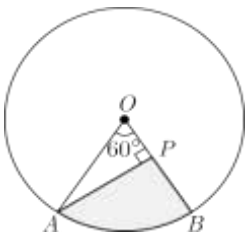
1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1 - 18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion - Reason based questions of 1 mark each.
4. In Section B, Questions no. 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 questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

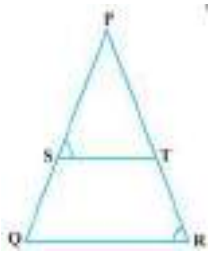
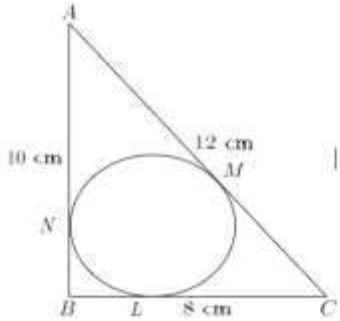
Section A

Q.1	What is the common difference of an AP in which $a_{18} - a_{14} = 32$? (a) 8 (b)-8 (c) -4 (d)4	1
Q.2	A card is drawn from a deck of 52 cards. The event *E* is that card is not an ace of hearts. The number of outcomes favorable to *E* is? (a) 4 (b)13 (c) 48 (d)51	1
Q.3	Two chords *AB* and *CD* of a circle intersect at *E* such that *AE*=2.4cm, *BE*=3.2cm and *CE*=1.6cm.The length of *DE* is? (a)1.6cm (b)3.2cm (c) 4.8cm (d) 6.4 cm	1
Q.4	The zeroes of the polynomial $x^2 - 3x - m(m+3)$ are? (a)m, m+3 (b) -m, m+3 (c) m , - (m+3) (d) -m ,- (m+3).	1
Q.5	The point on the *x*-axis which is equidistant from the points *A*(-2,3) and *B*(5,4) is? (a) (0,2) (b)(2,0) (c)(3,0) (d)(-2,0)	1
Q.6	The distance between the points $(a\cos\theta + b\sin\theta, 0)$ and $(0, a\sin\theta - b\cos\theta)$is ? *(a)* $a^2 + b^2$ (b)$a^2 - b^2$ (c)$\sqrt{a^2 + b^2}$ (d)$\sqrt{a^2 - b^2}$	1

Q.7	In the given figure, *BOA*is a diameter of a circle and the tangent at a point *P*meets *BA*when produced at *T*.If $\angle PBO = 30^o$, what is the measure of $\angle PTA$?  (a)30^0 (b) 60^0 (c) 90^0 (d) 45^0	1
Q.8	Probability of 53 Mondays in a leap year? (a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) 1.	1
Q.9	In the given figure, *x* is  (a) $\frac{ab}{a+b}$ (b)$\frac{ac}{b+c}$ (c) $\frac{bc}{b+c}$ (d) $\frac{ac}{a+c}$	1
Q. 10	In the given figure, *OACB* is a quadrant of a circle of radius 7cm. The perimeter of the quadrant is  (a) 11cm (b)18cm (c)25cm (d)36cm	1
Q. 11	Consider the data: Class 65-85 85-105 105-125 125-145 145-165 165-185 185-205 Frequency 4 5 13 20 14 7 4 The difference of the upper limit of the median class and the lower limit of the modal class is (a)0 (b)19 (c)20 (d)38	1

Q. 12	The length of a string between a kite and a$_8$ point on the ground is 85m. If the string makes an angle θ with level ground such that $\tan\theta = \frac{15}{8}$ then the height of kite is? (a)75m (b)78.05m (c)226m (d)None of these	1
Q. 13	If $\sqrt{2}\sin(60° - \alpha) = 1$ then α is (a) 45° (b) 15° (c) 60° (d) 30°	1
Q.14	In the given figure, if AB = 14 cm, BD = 10 cm and DC = 8 cm, then the value of tan B is?  (a) 4/3 (b)14/3 (c) 5/3 (d) 13/3	1
Q. 15	The area of a circle that can be inscribed in a square of side 10 cm is (a) 40π cm² (b) 30π cm² (c) 100π cm² (d) 25π cm²	1
Q. 16	The ratio between the LCM and HCF of 5,15,20 is (a)9:1 (b) 4:3 (c) 11:1 (d) 12:1	1
Q. 17	Values of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots is (a) 0 only (b) 4 (c) 8 only (d) 0, 8	1
Q. 18	The value of k, for which the system of equations $x + (k + 1)y = 5$ and $(k + 1)x + 9y = 8k - 1$ has infinitely many solutions is (a) 2 (b) 3 (c) 4 (d) 5	1
Q. 19	**Assertion:**Total surface area of the cylinder having radius of the base 14 cm and height 30cm is 3872cm^2 **Reason:**If *r* be the radius and *h* be the height of the cylinder, then total surface area=$(2\pi rh+2\pi r^2)$. (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 but 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

Q. 20	**Assertion:** If n^{th} term of an AP is $7-4n$, then its common differences is -4. **Reason:** Common difference of an AP is given by $d=a_{n+1}-a_n$. (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 but 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	
Q. 21	In the given figure, if $AB=AC$, then prove that $BE=CE$.  	2
Q.22	Find the smallest number which leaves remainder 8 and 12 when divided by 28 and 32 respectively. OR In a school, the duration of a period in junior section is 40 minutes and in senior section is 1 hour: If the first bell for each section ring at 9:00 a.m., when will the two bells ring together again?	2
Q.23	If 3 cot A = 4, check whether $\frac{1-tan^2 A}{1+tan^2 A}$= $\cos^2$ A – $\sin^2$ A or not.	2
Q.24	The circumference of a circle exceeds the diameter by 16.5cm. Find the radius of the circle. Use$\pi=\frac{22}{7}$ OR In the given figure, AOB is a sector of angle 60^0 of a circle with center O and radius 17cm. If AP $\perp$ OB. And AP=15cm, find the area of the shaded region.  	2

Q.25	In Fig. $\frac{PS}{SQ} = \frac{PT}{TR}$ and ∠ PST = ∠ PRQ. Prove that PQR is an isosceles triangle 	2
	SECTION C	
Q.26	A die is thrown twice. Find the probability that (i) 5 will come up atleast once. (ii) 5 will not come up either time.	$1\frac{1}{2}$ $1\frac{1}{2}$
Q.27	In figure, a circle is inscribed in ▲*ABC* having sides *BC*=8cm, *AB*=10cm and *AC*=12cm. Find the length *BL*, *CM* and *AN*. 	3
Q.28	Prove that $\frac{CosA - SinA + 1}{CosA + SinA - 1}$ = CosecA +CotA by using suitable Identity.	3
Q.29	Draw the graphs of the equations x – y + 1 = 0 and 3x + 2y – 12 = 0. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region. OR Students are made to stand in rows if one student Extra in a row there would be two Rows less, if one student is less in a Row there would be three Rows more. Find the number of students in the class.	3
Q.30	Find the zeroes of the quadratic polynomial $\sqrt{3}x^2 - 8x + 4\sqrt{3}$ and verify relation with coefficients **OR** Find a quadratic polynomial, the sum and product of whose zeroes are 6and 9 respectively. Hence find the zeroes.	3
Q.31	Prove that √3 is irrational.	3

SECTION D

Q.32 (5)

A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

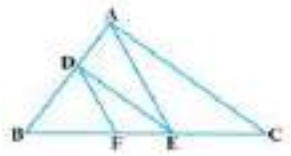
OR

A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.

Q.33 (3+2) = 5

State and prove Basic Proportionate Theorem. And solve following problem

In FOLOWING FIG., DE || AC and DF || AE. Prove that BE/FE = BE/EC



Q.34 (5)

Daily wages of 110 workers, obtained in a survey, are tabulated below

Daily Wages(inRs.)	100-120	120-140	140-160	160-180	180-200	200-220	220-240
Number of Workers	10	15	20	22	18	12	13

Compute the mean daily wages and modal daily wages of these workers

OR

If the median of the following frequency distribution is32.5. Find the values of f_1,f_2

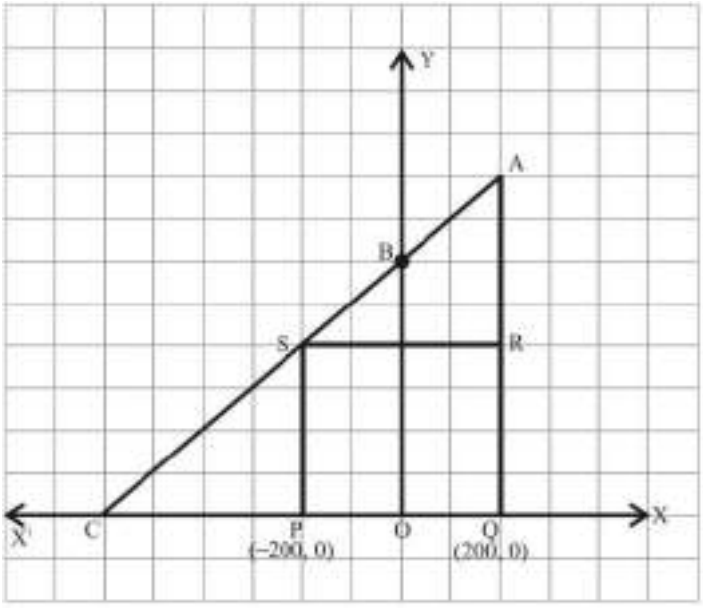
Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	f_1	5	9	12	f_2	3	2	40

Q.35 (5)

A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volume of the cylinder and toy.(Use π=3.14)

SECTION E

Q.36 Jagdish has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O.



Based on the above information, answer the following questions :

(i) Taking O as origin, coordinates of P are (–200, 0) and of Q are (200, 0). PQRS being a square, what are the coordinates of R and S ? 1

(ii) (a) What is the area of square PQRS ? 2

OR

(b) What is the length of diagonal PR in square PQRS ? 2

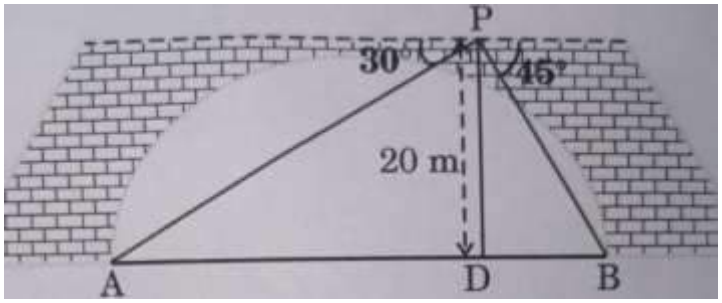
(iii) If S divides CA in the ratio K:1, what is the value of K, where point A is (200, 800) ? 1

Q.37 In a society, a yoga instructor was hired to train the people of the society to live a healthy lifestyle. Yoga sessions were held daily from 5 p.m. to 7 p.m. in the society park. On day one, 5 people joined the yoga session., on day two, 3 more people joined, on day three, another 3 people joined and in this manner every next day, 3 more people kept on joining.

Based on the given information, answer the following questions:

(i) On which day did 59 people join the yoga session ? 1

(ii)How many people joined the yoga session on the 31st day ? 1

	(iii) (a) The yoga instructor was paid 100 for each person attending the yoga session. On which day would he earn Rs. 5,000 ? OR (b) What was the total amount earned by the yoga instructor in 16 days ?	2 2
Q.38	Two motorboats A and B are waiting at the opposite banks of a river in order to reach the opposite side. From a point P on the bridge, 20 m above the river, the angles of depression of the boats are 30° and 45° respectively, as shown in the figure given below. Both the boats leave at the same time at the speed of 10 m/s and 5 m/s, respectively  Based on the above information. answer the following questions : (i) Find the distance travelled by boat A to reach point D in the river, vertically below the point P. (Use $\sqrt{3}$ =1.73). (ii) What is the width of the river ? (iii) a. Which boat will reach point D first, and how much earlier, than the other boat ? OR b. What is the distance between the two boats after 3 seconds ?	 1 1 2 2