केन्द्रीय विद्यालय संगठन, *कोलकाता संभाग*

KENDRIYA VIDYALAYA SANGATHAN, KOLKATA REGION

प्री-बोर्ड परीक्षा/**PRE- BOARD EXAMINATION-2024-25**

कक्षा / CLASS - X अधिकतम अंक / MAX.MARKS-80

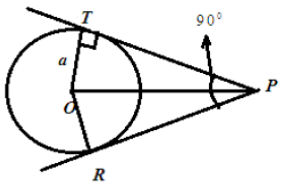
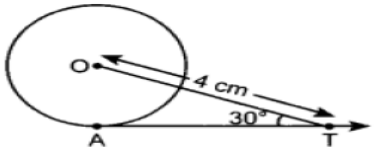
विषय / SUBECT-MATHEMATICS समय / Time : 3 Hours

General Instructions:

Read the following instructions carefully and follow them:

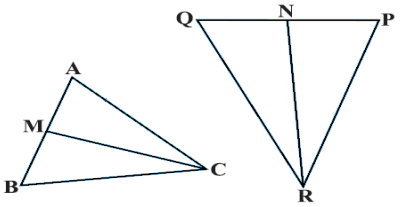
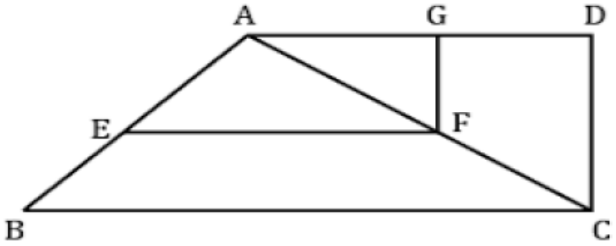
1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 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. And internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take π =22/7 wherever required if not stated
11. Use of calculators is not allowed.

	Section A	
Q.No.	**Section A Consists of 20 questions of 1 mark each.**	
1.	If the sum of the zeroes of the quadratic polynomial $ky^2 + 2y – 3k$ is equal to twice their product, then the value of k is: (a) 3 (b)$\frac{1}{3}$ (c) 2 (d) 1	1
2.	If α and β are zeroes of the polynomial $f(x) = x^2 – p(x + 1) – c$, then the value of $(\alpha + 1)(\beta + 1)$ is: (a) 1 + c (b) $\frac{1}{C}$ (c) c (d) 1 – c	1
3.	If the lines $3x+2ky – 2 = 0$ and $2x+5y+1 = 0$ are parallel, then what is the value of k? (a) $\frac{4}{15}$ (b) $\frac{15}{4}$ (c)$\frac{4}{5}$ (d) $\frac{5}{4}$	1
4.	If one root of quadratic equation $ax^2+bx+c = 0$ is the reciprocal of the other, then: (a) a = c (b) a = b (c) ac = 1 (d) b= c	1

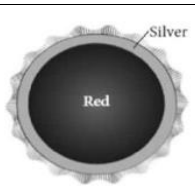
5.	If m-1, m+1 and 2m+3 are in AP, then the value of m is: (a) -2 (b)2 (c)0 (d) 4	1
6.	The point P on x-axis is equidistant from the points A(-1, 0) and B(5, 0) is: (a) (2, 0) (b) (0, 2) (c) (3, 0) (d) (2, 2)	1
7.	The distance of the point P(−6,8) from the origin is- (a) 8 units (b)$2\sqrt{7}$ units (c) 10 units (d) 6 units	1
8.	If angle between two tangents drawn from a point P to a circle of radius 'a' and centre 'O' is 90°, then OP = …… (a) 2a√2 (b) a√2 (c) a/√2 (d) 5a√2 	1
9.	If cosA =$\frac{4}{5}$, then the value of tanA is: (a)$\frac{3}{4}$ (b) $\frac{3}{5}$ (c)$\frac{4}{3}$ (d) $\frac{5}{3}$	1
10.	In figure AT is a tangent to the circle with centre O such that OT = 4 cm and ∠OTA =30°. Then AT is equal to: (a)8cm (b)$2\sqrt{2}$cm (c) $2\sqrt{3}$cm (d)None of these 	1
11.	If sin θ + cos θ =$\frac{7}{5}$, then sinθ cosθ is: (a)$\frac{12}{25}$ (b)$\frac{11}{25}$ (c) $\frac{15}{25}$ (d)$\frac{14}{25}$	1
12.	How many tangents can be drawn from the external point towards the circle? (a) 0 (b) 1 (c) 2 (d) infinite	1
13.	Two cubes of volume 8 cm^3 are joined end to end, then the surface area of resulting cuboid is: (a) 20cm^2 (b) 10 cm^2 (c) 80 cm^2 (d) 40 cm^2	1
14.	The following distribution shows the marks distribution of 90 students. The modal class is: (a) 20-25 (b) 15-20 (c) 10-15 (d)25-30	1

Marks	Below 5	Below 10	Below 15	Below 20	Below 25	Below 30
No.of students	2	6	24	45	78	90

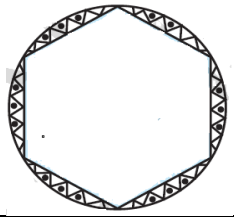
15.	If a solid sphere with total surface area 48cm^2 is bisected into two hemispheres, then the total surface area of any one of the hemisphere is: (a) 48 cm^2 (b) 60 cm^2 (c) 264 cm^2 (d) 36 cm^2	1
16.	The mean of first five whole numbers is: (a) 10 (b) 2 (c) 7.5 (d) 5	1
17.	Two different dice are rolled together, the probability of getting a sum of 10 of the numbers on the two dice is: (a) $\frac{2}{13}$ (b) $\frac{5}{14}$ (c) $\frac{1}{12}$ (d) $\frac{1}{13}$	1
18.	A right circular cylinder base area is 176 cm^2 and it has volume 1408 cm^3 then the height of the cylinder is: (a) 5cm (b) 16cm (c) 8cm (d)7cm	1
	DIRECTION: In the question 19 and 20 ,a statement of **Assertion(A)** is followed by a Statement of **Reason(R)** (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): If product of two numbers is 12960 and their HCF is 12, then their LCM is 108. Reason(R): HCF is always a factor of LCM.	1
20.	Assertion (A): If ΔABC and ΔPQR are congruent triangles, then they are also similar triangles. Reason (R): All congruent triangles are similar but the similar triangles need not be congruent.	1
	Section B	
	Section B Consists of 5 questions of 2 marks each.	
21.	(A).The LCM of two numbers is 64699, their HCF is 97 and one of the numbers is 2231. Find the other. **OR** (B). Explain why 7 × 11 × 13 + 13 and 7 × 6 × 5 × 4 × 3 × 2 × 1 + 5 are composite numbers.	2
22.	Find the ratio in which the segment joining the points (1, −3) and (4, 5) is divided by *x*-axis. Also find the coordinates of this point on *x*-axis.	2

23.	(A).Find the probability that a non-leap year selected at random will contain 53 Sundays. **OR** (B).100 tickets of a lottery were sold and there are 5 prizes on these tickets. If Saket has purchased one lottery ticket, what is the probability of winning a prize?	2
24.	Find the distance between the points P(acosθ + bsinθ, 0) and Q (0, asinθ – bcosθ).	2
25.	Evaluate: $\frac{5cos^2 60^0+4sec^2 30^0-tan^2 45^0}{sin^2 30^0+cos^2 30^0}$.	2
	Section C	
	Section C Consists of 6 questions of 3 marks each.	
26.	A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.	3
27.	(A). In given Fig.CM and RN are respectively the medians of ΔABC andΔ PQR. If ΔABC ~ΔPQR, prove that : (i) ΔAMC ~ ΔPNR (ii) $\frac{CM}{RN}=\frac{AB}{PQ}$  **OR** (B) If BC ||EF and FG||CD then prove that $AE\times$ AD=AB$\times AG$  	3
28.	If p(x) = ax^2 -8x + 3, where 'a' is a non-zero real number. One zero of p(x) is three times the other zero. (a) Find the value of a. Show your work. (b) What is the shape of the graph of p(x)? Give reason for your answer.	3
29.	If x = p sec θ + q tan θ and y = p tan θ + q sec θ, then prove that $x^2 – y^2 = p^2 – q^2$.	3
30	(A). Annual function badges are circular in shape with two colour area red and silver as shown in picture. The diameter of region representing red colour is 22 cm and silver colour is filled in 10.5 cm wide ring. Find the area of silver region.	3

OR



A round table cover has six equal designs as shown in Fig. If the radius of the cover is 28 cm, find the cost of making the designs at the rate of Rs.0.35 per cm^2. (Use$\sqrt{3}$ = 1.7)



31. Prove that $\sqrt{5}$ is irrational number. 3

Section D

Section D Consists of 4 questions of 5 marks each.

32. (A).On reversing the digits of a two digit number, number obtained is 9 less than three times the original number. If difference of these two numbers is 45, find the original number. 5

OR

Solve the following pair of equations graphically:
x + 2y = 8,
4x-y – 5=0.

33. Prove that the lengths of tangents drawn from an external point to a circle are equal. With the help of this result if two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ. 5

34. From the top of a 7 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Find the height of the tower. 5

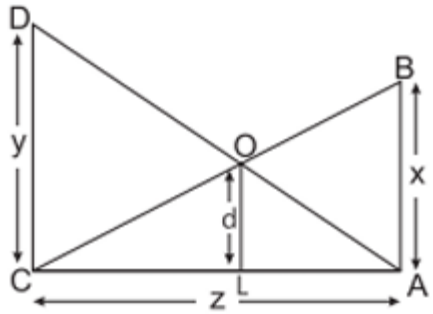
35 (A).If the median of the following frequency distribution is 32.5. Find the values of f_1 and f_2. 5

Class Interval	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

OR

Find the mean and mode of the following data:

Class Interval	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	25	38	15	40	35	22	36

	Section E	
36.	In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line.  A competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in, and she continues in the same way until all the potatoes are in the bucket. On the basis of the above information answer the following questions: (i) Write an A.P. whose terms represent the distance of potatoes from the bucket. Also, find the common difference. (ii) Find a_7 of this A.P. (iii) (A) What is the total distance the competitor has to run? **OR** (B) If there will be 12 potatoes then what is the total distance the Competitor has to run?	 1 1 2 2
37.	Anika is studying in class X. She observes two poles DC and BA. The heights of these poles are x m and y m respectively as shown in figure:  These poles are z m apart and O is the point of intersection of the lines joining the top of each pole to the foot of opposite pole and the distance between point O and L is d. Few questions came to his mind while observing the poles. Based on the above information, solve the following questions: (i) Which similarity criteria is applicable in ΔCAB and ΔCLO? (ii) If x=y, prove that BC: DA = 1 : 1. (iii) (A) If CL = a, then find a in terms of x, y and d. **OR** (B) If AL = b, then find b in terms of x, y and d.	 1 1 2 2

38.	Avantika join four cubical open boxes of edge 20 cm each to make a pot for planting saplings of pudina in her kitchen garden. The saplings are cylindrical in shape with diameter 14.2 cm and height 11 cm.  Based on the above information, solve the following questions: (i) If Avantika wants to paint the outer surface of the pot, then how much area she needs to paint? (ii) What is the volume of the pot formed? (iii) (A) Find the volume of 1 sapling. OR (B) If Avantika planted 4 saplings in the pot with some soil and compost up to the brim of the pot, then how much soil and compost are there in the pot?	 1 1 2 2