CARMEL CONVENT SCHOOL, CHANDIGARH

PRE BOARD 2023-24

MATHS

CLASS: 10 **TOTAL MARKS: 80**

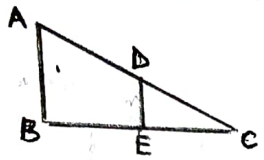
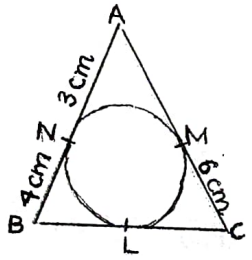
DATE: **TIME: 3 HOURS**

General Instructions:

(i) All questions are compulsory.
(ii) There are 3 questions in the paper.
(iii) The question paper has five sections: A, B, C, D and E.
Section–A has 20 questions (Q1 to 20) of 1 mark each.
Section–B has 5 questions (Q21 to 25) of 2 marks each.
Section–C has 6 questions (Q26 to 31) of 3 marks each.
Section D has 4 questions (Q32 and 35) of 5 marks each.
Section–E has 3 Case Study questions (Q36 to 38) of 4 (1+1+2) marks each.
(iv) All questions are compulsory . There is no overall choice. However, internal choices have been provided in some questions. A student must attempt only one of the alternatives in such questions.
(v) Draw neat figures wherever required.
(vi) Use = 22/7, if not mentioned in the question.

SECTION A

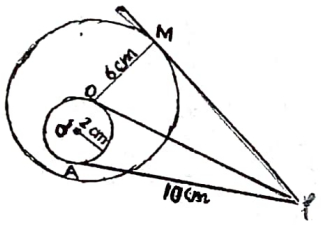
Q. No.	Question	Marks
1	If xy = 180 and HCF(x , y) = 3 , then the LCM (x ,y) is a) 45 b) 60 c) 30 d) 120	1
2	If α and β are zeros of x^2 - 6x + k what is the value k if 3α + 2 β = 20 a) -16 b) 8 c) -2 d) -8	1
3	The pair of equations x = 4 and y = 3 graphically represent lines which are a) parallel b) intersecting at (3 , 4) c) coincident d) intersecting at (4 , 3)	1
4	The discrimination of quadratic equation $9x^2$ + 7x - 2 = 0 a) -121 b) 23 c) -23 d) 121	1

5	The first four terms of an A.P. whose first term is - 2 and common difference is - 2 , are a) -2,0,2,4 b) -2,4,-8,16 c) -2,-4 ,-6 , -8 d) -2,-4,-8,-16	1
6	The points which divides the line segment (7,-6) and (3,4) in the ratio 1:2 internally lies in the a) Ist quadrant b) 2nd quadrant c) 3rd quadrant d) 4th quadrant	1
7	The points (-4,0) , (4 ,0) and (0 , 3) are the vertices of a a) right triangle b) isosceles triangle c) equilateral triangle d) scalene triangle	1
8	**In triangle ABC , DE ∥AB. If AB = a, DE = x , BE = b and EC = c , then x expressed in terms of a, b and c is :**  a) $\frac{ac}{b}$ b) $\frac{ac}{b+c}$ c) $\frac{ab}{c}$ d) $\frac{ab}{b+c}$	1
9	In figure, triangle ABC is circumscribing a circle. Then the length of BC is:  a) 7cm b) 8cm c) 9cm d) 10cm	1
10	If two tangents inclined at an angle 60° to a circle of radius 3 cm , then length of each tangent is equal to a) $\frac{3}{2}\sqrt{3}$ cm b) 6 cm c) 3cm d)$3\sqrt{3}$ cm	1
11	If tan x = sin 45° cos 45° + sin 30° , then x = a) 45° b) 90° c) 30° d) 1/2	1
12	$\frac{sin\theta}{1+cos\theta}$ is a) $\frac{cos\theta}{1-sin\theta}$ b) $\frac{1-cos\theta}{sin\theta}$ c) $\frac{1-sin\theta}{cos\theta}$ d) $\frac{1-cos\theta}{1+cos\theta}$	1

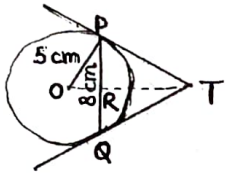
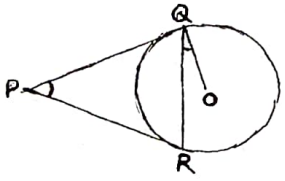
13	If 6 m pole casts a shadow $2\sqrt{3}$ m long on the ground then the sun's elevation is a) 60° b) 45° c) 30° d) 90°	1
14	Length of arc of sector of angle 90° and radius 14 cm is a) 11cm b) 33cm c) 11/2 cm d) 22cm	1
15	The number of revolutions made by the circular wheel of radius 0.7 m in rolling a distance of 176 m is a) 22 b) 24 c) 75 d) 40	1
16	2 cards of hearts and 4 cards of spades are missing from a pack of 52 cards. A card is drawn at random from the remaining pack. The probability of getting a black card is a) 22/52 b) 22/46 c) 24/52 d) 24/46	1
17	A single letter is selected at random from the word ' TRIGONOMETRY' . The probability that it is a vowel is a) 3/8 b) 1/8 c) 1/3 d) 2/3	1
18	The mean of first 7 odd natural numbers is a) 5 b) 7 c) 9 d) 11	1
19	In this question, 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 **Assertion:** If the radius of a cone is halved and volume is not changed, then height remains the same. **Reason:** If the radius of a cone is halved and volume is not changed then height must become four times of the original height.	1
20	In this question, 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	1

	Assertion : If $a_7 - a_{11} = 300$ then d = -75 **Reason :** nth term of an A.P. = a + (n-1)d, where a, d and n are the first term, common difference and number of terms respectively.	

SECTION – B

Q. No.	Question	Marks
21	Given that $\sqrt{3}$ is an irrational number, prove that $2 + \sqrt{3}$ is an irrational number.	2
22	Diagonals AC and BD of trapezium ABCD with AB parallel to DC intersect each other at point O. Using similarity criterion of two triangles show that $\frac{OA}{OC} = \frac{QB}{OD}$	2
23	In figure PM is a tangent to a circle with center O radius 6 cm and PA is a tangent to a circle with center O' and radius 2 cm. Find PM.  	2
24	Express sin A in terms of cot A. **OR** If $\sin\theta - \cos\theta = 0$, then find the value of $\sin^4\theta + \cos^4\theta$	2
25	Chord of a circle of radius 12 cm subtends an angle of 120° at the center. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$.) **OR** If the perimeter of a protractor is 108 cm, find the radius of the protractor.	2

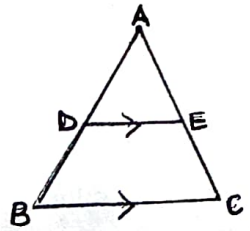
SECTION – C

Q. No.	Question	Marks
26	For what value of k will the following pair of linear equations have 'No solution' ? $3x + y = 1$ $(2k - 1)x + (k - 1)y = 2k + 1$	3
27	Find the zeros of the quadratic polynomial $7y^2 - 11/3\,y - \frac{2}{3}$ and verify the relationship between the zeros and the coefficient.	3
28	In a competitive examination, one mark is awarded for each correct answer while half mark is deducted for each wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly? **OR** 7 times a two digit number is equal to 4 times the number obtained by reversing the order of its digits. If the difference of digits is 3 , determine the number.	3
29	In figure, PQ is a chord of a length 8 cm of a circle of radius 5 cm. The tangents at point P and Q intersect at point T. Find the length of TP.  **OR** In Figure, two tangents, PQ and PR are drawn to a circle with center O from an external point P. Prove that $\angle QPR = 2\angle OQR$.  	3
30	Prove that $\frac{1-\cos\theta+\sin\theta}{\cos\theta+\sin\theta-1} = \frac{1+\sin\theta}{\cos\theta}$	3

31	Find the missing frequencies in the following frequency distribution table, if N = 100 and median = 32	3

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	Total
No. of students	10	X	25	30	Y	10	100

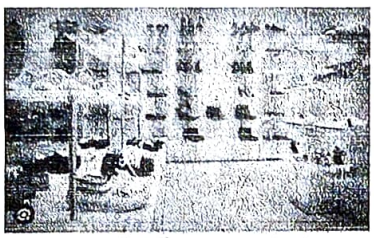
SECTION – D

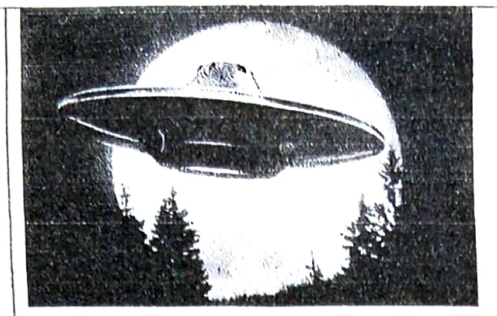
Q. No.	Question	Marks
32	Mr Gupta buys 4 chairs and 5 tables for ₹3400. Later he buys another chair and 4 tables more of the same type for ₹2500. Write the pair of equations and find the solution graphically. Also write the coordinates of the triangle formed by both the lines along with the y - axis.	5
33	State and prove Basic Proportionality theorem . Hence find the length of AD in △ ABC, where AB = 6 cm and **DE ll BC such that AE= ¼ AC** 	5
34	A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2cm and the diameter of the base is 4 cm. Determine the volume of the toy. If the right circular cylinder circumscribes the toy, find the difference of volume of cylinder and the toy. (π =3.14) **OR** Due to heavy floods in the state, thousands were rendered homeless. 50 schools collectively offered to the state government to provide a place and canvas for 1500 tents to be fixed by the government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of the base radius 2.8 m and height 3.5 m, with the conical upper part of the same base radius but height 2.1 m. If the canvas used to make the tent cost ₹120 per square meter, find the amount shared by each school to set up the tents.	5

35	Find the mean and mode of the following distribution: Class Interval: Above 10 | Above 20 | Above 30 | Above 40 | Above 50 | Above 60 | Above 70 | Above 80 | Above 90 Frequency: 100 | 92 | 85 | 73 | 50 | 39 | 26 | 18 | 12	5

Section E

Question number 36 to 38 are Case based questions. Each question has 3 sub parts with internal choice in one sub part.

Q. No.	Question	Marks
36	Shoe Shop : Meena's mother starts a new shoe shop. To display the shoes, she put 3 pairs of shoes in the first row, 5 pairs in the second row, 7 pairs in the third row and so on.  Based on the above information, answer the following questions. i) Find the pairs of shoes in the 30th row. ii) On the next day she arranges x pairs of shoes in 15 rows, then find the value of x. iii) If she puts a total of 120 pairs of shoes, then find the number of rows. **OR** Find the difference of pairs of shoes in 17 th row and 10 th row.	4
37	Vidushik, an alien, is visiting planet earth to acquire buffalo's specimen for her research work on this four-legged big animal living on planet Earth for millions of years. He got his spaceship landed in a huge grass field. The spaceship's sensors are generating coordinates of buffaloes in meters given below. (0, 0) is the location of the spaceship. Location of buffalo 1 is B1 (2,4). Location of buffalo 2 is B2 (5, 3/2) . Location of buffalo 3 B3 (-1, 3/2) . Location of buffalo 4 is B4 (2, -1). Spaceship can suck any animal, however huge, within a radius of 5 m from it .	4



Answer the following questions:

I) Which buffalo is grazing nearest to the spaceship?

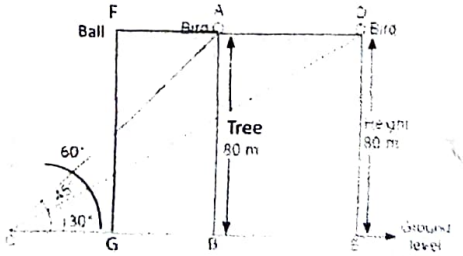
II) Which buffalo(es) is/are nearest to buffalo B4?

III) Spaceship's monitor immediately joined the location coordinates of the buffaloes to have a better understanding for Vidushik. What kind of geometrical figure is seen on the monitor?

OR

Vidushik gets out of the spaceship and stands at the midpoint of the line segment joining B2 and B3. What is the location of Vidushi recorded by the sensors in the monitor?

38 One evening Atul was in a park. Children were playing cricket. Birds were singing from the nearby tree of height 80 m. He observed a bird on the tree at an angle of elevation of 45°. When a sixer was hit, a ball flew through the tree frightening the bird to fly away. In 2 seconds, he observed the bird flying at the same height at an angle of elevation of 30° and the ball flying towards him at the same height at an angle of elevation of 60°. 4



I) At what distance from the foot of the tree was he observing the bird sitting on the tree?

II) What is the speed of the bird in m/min if the bird had flown $20(\sqrt{3}+1)$ m?

III) How far did the bird fly in the mentioned time?

OR

After hitting the tree, how far did the ball travel in the sky when Atul saw the ball?

'The End"'