CHINMAYA ENGLISH PRIMARY SCHOOL, HUBBALLI

Preparatory– II - 2024 - 25

Std : X   Mathematics (Basic)   Marks : 80
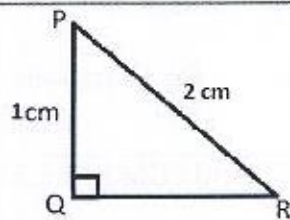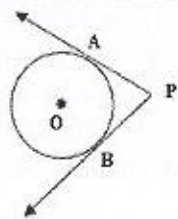
General Instructions:
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.
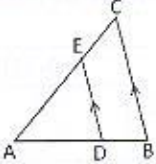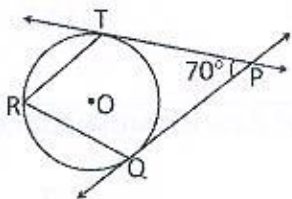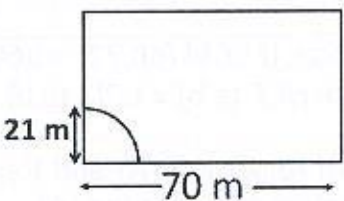
SECTION - A
Section A consists of 20 questions of 1 mark each.

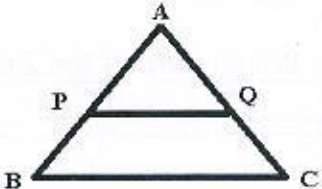| SNo		Marks
1.	The greatest possible speed at which a girl can walk 95m and 171m in an exact number of minutes is (a) 17 m/min (b) 19 m/min (c) 23 m/min (d) 13 m/min	1
2.	The sum of HCF and LCM of 12,21,15 is (a) 423 (b) 420 (c) 417 (d) 140	1
3.	If the sum of the zeroes of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to the product of its zeroes, then the value of k is (a) $\frac{1}{3}$ (b) $-\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $-\frac{2}{3}$	1
4.	If $19x-17y = 55$ and $17x-19y = 53$ then the value of $x-y$ is (a) - 3 (b) $\frac{1}{2}$ (c) 3 (d) 5	1
5.	Which of the following equations has the sum of its roots as 3? (a) $2x^2 -3x + 6 = 0$ (b) $-x^2 + 3x-3 = 0$ (c) $-2x^2-3x + \sqrt{2} = 0$ (d) $3x^2-3x + 3 = 0$	1
6.	One end of the diameter of the circle is (2 ,3) and its centre is (-2 , 5). If (-6,y)	1

	is the other end of the diameter, then the value of y is (a) 7 (b) -7 (c) 6 (d) -6	
7.	If in $\triangle ABC$ and $\triangle DEF$, $\dfrac{AB}{DE} = \dfrac{BC}{FD}$, then they will be similar, if (a))$\angle B = \angle E$ (b)$\angle A = \angle D$ (c) $\angle B = \angle D$ (d) $\angle A = \angle F$	1
8.	The ratio in which $(4,5)$ divides the line segment joining $(2,3)$ and $(7,8)$ is (a) $2:3$ (b) $3:2$ (c) $1:2$ (d) $1:3$	1
9.	Two tangents PA and PB are drawn from an external point P to a circle with centre O. If $\angle APB = 70°$, then $\angle AOB$ is (a) 100° (b) 110° (c) 120° (d) 90°	1
10.	In the figure, find $\tan P - \cot R$ (a) 0 (b) 1 (c) $\sqrt 3$ (d) $\dfrac{1}{\sqrt 3}$	1
11.	If $\tan\theta = \dfrac{3}{4}$ then $\cos^2\theta - \sin^2\theta =$ (a) $\dfrac{7}{25}$ (b) 1 (c) $\dfrac{-7}{25}$ (d) $\dfrac{4}{25}$	1
12.	If $\sec\theta + \tan\theta = x$, then $\sec\theta - \tan\theta =$ (a) x^2 (b) $\dfrac{1}{x}$ (c) x^3 (d) $\dfrac{x}{2}$	1
13.	If the circumference of a circle is 352m, then its area in sq.m. is (a) 5986 (b) 6589 (c) 7952 (d) 9856	1

14.	The area of a circle is numerically equal to twice its circumference. The diameter of the circle is	1
	(a) 4 units $\quad$ (b) π units $\quad$ (c) 8 units $\quad$ (d) 2 units	

15.	Two cubes each of side 3cm are joined end to end. The surface area of the resulting cuboid is	1
	(a) 180 cm^2 $\quad$ (b) 90 cm^2 $\quad$ (c) 270 cm^2 $\quad$ (d) 45 cm^2	

16	The lower limit of modal class of the following data is	1

C.I	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	13	7	6

(a) 10 $\quad$ (b) 30 $\quad$ (c) 20 $\quad$ (d) 50

17.	The mean of 20 numbers is 13. If each observation is increased by 5, the new mean is	1
	(a) 13 $\quad$ (b) 18 $\quad$ (c) 65 $\quad$ (d) 8	

18.	A pair of dice is thrown once. The probability of getting a doublet is	1
	(a) $\dfrac{5}{36}$ $\quad$ (b) $\dfrac{1}{6}$ $\quad$ (c) $\dfrac{7}{36}$ $\quad$ (d) $\dfrac{5}{6}$	

	Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.	1

| 19. | **Assertion:** If LCM (60,72) = 360 then HCF (60,72) = 12
Reason: HCF (a,b) × LCM (a,b) = a × b

(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 |
|---|---|---|

| 20. | **Assertion :**The x-axis divides the line segment joining (-4,3) and (8,-6) in the ratio 2 :3
Reason : The midpoint of the line segment joining (x_1,y_1) and (x_2,y_2) is $(\dfrac{x_1+x_2}{2}, \dfrac{y_1+y_2}{2})$
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct | 1 |
|---|---|---|

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

Section B

Section B consists of 5 questions of 2 marks each

21.	Find the value of m for which the pair of linear equations $2x + 3y - 7 = 0$ and $(m-1)x + (m+1)y = 3m-1$ has infinitely many solutions.	2
22.	In the figure DE // BC. If AD = x, DB = x-2, AE = x + 2 and EC = x-1, find x. [OR] A vertical stick 20m long casts a shadow 10m long on the ground. At the same time, a tower casts a shadow 50m long on the ground. Find the height of the tower.	2 2
23.	In the figure, O is the centre of the circle. PT and PQ are tangents to the circle from an external point P. If $\angle TPQ = 70°$, find $\angle TRQ$	2
24.	Evaluate : $\dfrac{3\cos^2 60° + \sec^2 30° - \tan^2 30°}{\sin^2 60° + \cos^2 60°}$	2
25.	A horse is placed for grazing inside a rectangular field 70m by 52m and is tethered to one corner by a rope 21m long. On how much area can it graze? 21 m —70 m— [OR] A circular wire of radius 42cm is cut and bent into the form of a rectangle whose sides are in the ratio 6 : 5. What is the length of the smaller side?	2

Section C

Section C consists of 6 questions of 3 marks each.

26.	Prove that $\sqrt{3}$ is an irrational number.	3

27.	If 2 and -3 are the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$, what are the values of a and b?	3
28.	A part of the monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Savitha takes food for 20days, she has to pay Rs.3000 as hostel charges where as Mansa who takes food for 25 days, has to pay Rs.3500 as hostel charges. Find the fixed charges and the cost of food per day.

[OR]

Find the four angles of a cyclic quadrilateral ABCD in which $\angle A = (2x-1)°$, $\angle B = (y + 5)°$, $\angle C = (2y + 15)°$ and $\angle D = (4x-7)°$ | 3 |
| 29. | Prove that the lengths of the tangents drawn from an external point to a circle are equal. | 3 |
| 30. | Prove that $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$

[OR]

Prove that $\tan \theta - \cot \theta = \dfrac{2 \sin^2 \theta - 1}{\sin \theta \cos \theta}$ | 3 |
| 31. | A box contains cards marked with numbers from 1 to 30. One card is drawn at random from the box. Find the probability that the card bears
    (i) a perfect square number
    (ii) a number divisible by 2 and 3
    (iii) a prime number. | 3 |

Section D
Section D consists of 4 questions of 5 marks each.

| 32. | The speed of a boat in still water is 11 km/hr. It can go 12km upstream and return downstream to the original point in 2 hours 45 minutes. Find the speed of the stream.

[OR]

Rohan's mother is 26 years older than him. The product of their ages 3 years from now will be 360. Find Rohan's present age. | 5 |
|---|---|---|
| 33. | (i) If a line is drawn parallel to one side of a triangle to intersect the other two sides in a distinct points, the other two sides are divided in the same ratio - Prove.

(ii)In $\triangle ABC$, AP = 4cm, PB = 6cm, AC = 15cm, AQ = 7cm. State whether PQ // BC . Justify. | 5 |

34.	A vessel full of water is in the form of an inverted cone of height 8cm and the radius of its top which is open is 5cm. 100 spherical lead balls are dropped into vessel. One fourth of the water flows out of the vessel. Find the radius of a spherical ball.	
	[OR]	5
	Madan made a bird bath for his garden in the shape of a cylinder with a hemispherical depression at one end. The height of the cylinder is 1.45 m and its radius is 30cm. Find the total surface area of the bird bath in m^2 (use $\pi = \frac{22}{7}$)	

35.	Find the mode and the median of the following distribution	

C.I	0 – 15	15 - 30	30 - 45	45 - 60	60 - 75	75 - 90	Total	
Frequency	6	7	5	15	10	8	51	5

Section E
Case study based questions are compulsory.

| 36.	**Case study – 1**	
	In a class the teacher asks every student to write an example of AP. Two friends Raja and Akshay write their progressions as -5, -2, 1, 4,... And 187, 184, 181,... respectively. Now the teacher asks various students of the class the following questions on these 2 progressions.	

Based on the information given, answer the following questions

(i) Find the 34th term of the progression written by Akshay.	1
(ii) Find the 19th term of the progression written by Raja.	1
(iii)Find the sum of the first 10 terms of progression written by Raja.	2

[OR]
Which term of the 2 progressions will have the same value?

37.	Case study – 2

Field Trip: A school decides to take the students to a science park and a museum. P, Q and R denote the positions of the museum, science park and school respectively.


Best Field Trip Ever!
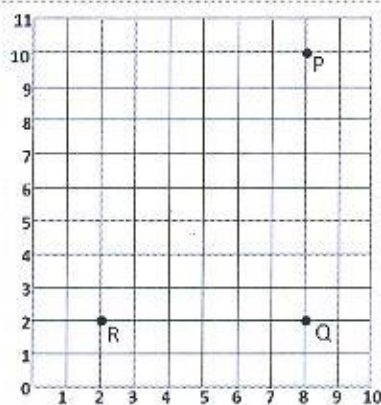
Based on the information given, answer the following questions

(i) If the students decide to go to the restaurant for lunch located at the point S such that PQRS forms a rectangle. Find the coordinates of S.	1
(ii) Find the perimeter of PQRS.	1
(iii) Find the coordinates of the position of a shop which divides PR in the ratio 2 :3.	2

[OR]

If A and B are the centroids of ΔPQR and ΔSQR respectively, find the midpoint of AB.

38.	Case study – 3

A guard stationed at the top a 240m tall tower PQ, observes a boat A coming towards it at an angle of depression 30°. After 10 minutes he observes that the boat reaches the point C and its distance from the tower reduces by $240(\sqrt{3}-1)m$. At the same time he observes another boat B approaching the tower from the opposite direction and found the angle of depression to be 60°. The tower and the boats are in the same straight line.
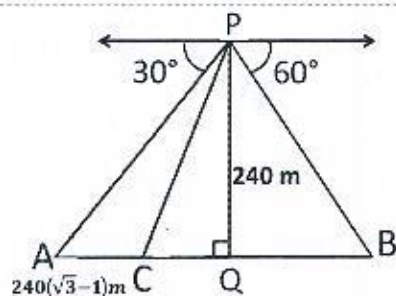
Based on the information given, answer the following questions (Use $\sqrt{3}$ = 1.73).

(i) Find the distance between the initial position of the boat A from the foot of the tower.	1
(ii) Find the distance of boat B from the foot of the tower	1
(iii) What is the angle of depression of boat A from the top of the tower when it is at the point C?	2

[OR]

Find the distance between boat B and the second position of boat A, if the angle of depression of boat B is 30°.