MODEL QUESTION PAPER

Time : 2 Hours]   **[Total Marks : 40**
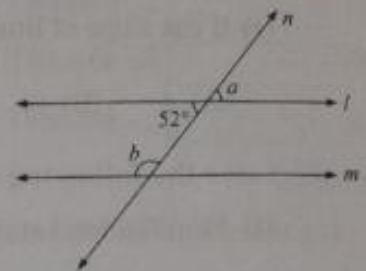
Q. 1. (A) Solve the following questions : (Any four)   **(4 Marks)**
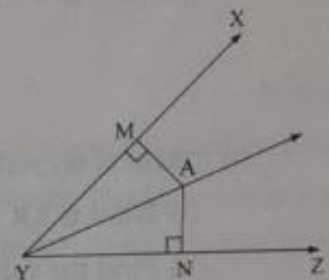
(1) In the figure, if line $l \parallel$ line m and line n is the transversal, then find the values of a and b.

(2) Write the following statement in conditional form, "Angles in a linear pair are supplementary."

(3) In the figure, ray YA is the bisector of $\angle XYZ$ if AM = 2 cm then, find AN. Justify.

(4) $\square$ ABCD is a parallelogram. If $\angle A = 3x°$ and $\angle C = 120°$, then find the value of x.

(5) Write the equation of a line parallel to X-axis at a distance of 3 units from it and above the X-axis.

(6) If $\sin (A + 20)° = \dfrac{\sqrt{3}}{2}$, then find the value of A.

                                                                                                                              (4 Marks)

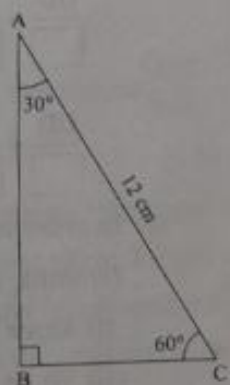**(B) Solve the following questions : (Any two)**

(1) Volume of the cone is 6280 cm³ and its base radius is 20 cm. Find its perpendicular height.
                                                                                                                       $(\pi = 3.14)$

(2) If the radius of the circumcircle of an equilateral triangle is 6 cm, then find the radius of its incircle.

(3) In the figure, AC = 12 cm, $\angle ABC = 90°$, $\angle BAC = 30°$, $\angle ACB = 60°$, then find the length of seg AB and seg BC.

                                                                                                                              (4 Marks)

Q. 2. (A) Choose the correct alternatives :

(1) The diagonal of a square of side 10 cm is ....

    (A) $10\sqrt{3}$ cm   (B) $10\sqrt{2}$ cm   (C) 10 cm   (D) $5\sqrt{2}$ cm

(2) If the value of $\tan \theta = \dfrac{3}{5}$, then the value of $\sec \theta$ is ....

    (A) $\dfrac{5}{4}$ (B) $\dfrac{5}{3}$ (C) $\dfrac{\sqrt{34}}{5}$ (D) $\dfrac{5}{\sqrt{34}}$

(3) If the radius of the sector is 5 and the length of its corresponding arc is 14, then area of the sector is .... unit².

(A) 35   (B) 10   (C) 70   (D) 14

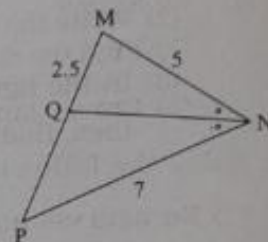(4) If the slope of line joining points A $(x, 0)$ and Q $(-3, -2)$ is $\frac{2}{7}$ then the value of x is ....

(A) 4   (B) 16   (C) -3 (D) -2

(B) Solve the following questions : (Any two)   **(4 Marks)**

(1) Find the total surface area of the cylinder, if the radius of its base is 5 cm and height is 40 cm.

(2) In $\triangle$MNP, NQ is a bisector of $\angle$N. If MN $= 5$, PN $= 7$, MQ $= 2.5$, then find QP.

(3) $\square$MRPN is cyclic, $\angle R = (5x - 13)°$ and $\angle N = (4x + 4)°$ then,

(i) What is $\angle R + \angle N$? State reason.

(ii) Find the value of x.

Q. 3. (A) Complete the following activities : (Any two)   **(4 Marks)**

(1) In trapezium ABCD, side AB $\|$ side DC, diagonals AC and BD intersect in point O. If AB $= 20$, DC $= 6$, OB $= 15$ then complete the following activity to find OD.

In $\triangle$COD and $\triangle$AOB,

$\angle CDO \cong \angle ABO$ ... $\boxed{}$

$\angle COD \cong \angle AOB$ ... $\boxed{}$

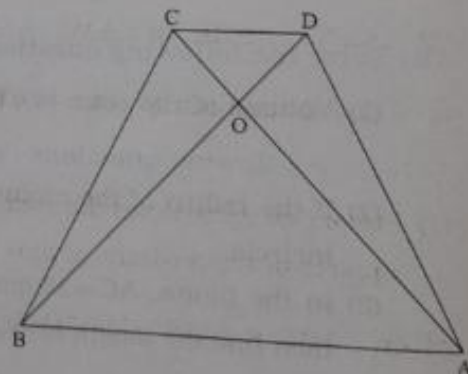$\therefore \triangle COD \sim \triangle AOB$ ... $\boxed{}$

$\therefore \dfrac{OD}{\square} = \dfrac{DC}{\square}$ ... Corresponding sides of similar triangles are in proportion

$\therefore \dfrac{OD}{\square} = \dfrac{6}{\square}$ $\therefore$ OD $= \square$

(2) In order to prove, "In a triangle, if the square of one side is equal to the sum of the squares of the remaining two sides, then the triangle is right angled triangle."
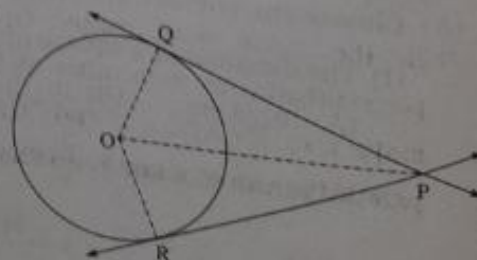
(i) Draw the triangle and name it.

(ii) Write 'Given' and 'To prove' from the figure drawn by you.

(3) Given : In the figure, point P is in the exterior of the circle with centre O. Lines PQ and PR are tangents to the circle at points Q and R as shown.

To prove : Seg PQ $\cong$ Seg PR.

Construction : Draw seg OQ, seg OR and seg OP.

Write the proof by completing the activity.

Proof :

In △OQP and △ORP, ∠OQP = ∠ORP = 90°   ... [Reason ... ▭]

Hypotenuse OP ≅ Hypotenuse OP   ... [Common side]

Side OQ ≅ Side OR   ... [Reason ... ▭]

∴ △OQP ≅ △ORP   ... [Reason ... ▭]

∴ seg PQ ≅ seg ▭   ... [Reason ... ▭]

(B) Solve the following questions : (Any two)   (4 Marks)

(1) Draw a circle of radius 3.6 cm. Draw a tangent to the circle at any point on it without using the centre.

(2) Find the coordinates of midpoint of the segment joining the points (22, 20) and (0, 16).

(3) Prove : $\tan^4 \theta + \tan^2 \theta = \sec^4 \theta - \sec^2 \theta$.

Q. 4. Solve the following questions : (Any three)   (9 Marks)

(1) Roshani saw an eagle on the top of a tree at an angle of elevation 61°, while she was standing at the door of her house. She went on the terrace of the house so that she could see it clearly. The terrace was at a height of 4 m. While observing the eagle from there the angle of elevation was 52°. At what height from the ground was the eagle? Give your answer upto nearest integer.

$(\tan 61° = 1.80, \tan 52° = 1.28, \tan 29° = 0.55, \tan 38° = 0.78)$

(2) The radii of ends of a frustum are 14 cm and 6 cm respectively and its height is 6 cm. Find its

(i) Curved surface area (ii) Total surface area (iii) Volume. $(\pi = 3.14)$

(3) △AMT ~ △AHE. In △AMT, AM = 6.3 cm, ∠TAM = 50°, AT = 5.6 cm, $\dfrac{AM}{AH} = \dfrac{7}{5}$. Construct △AHE.

(4) Show that points A(−4, −7), B(−1, 2), C(8, 5) and D(5, −4) are the vertices of rhombus.

   (4 Marks)

Q. 5. Solve the following questions : (Any one)

(1) Prove that three times the sum of the squares of the side of a triangle is equal to four times the sum of squares of the medians of that triangle.

(2) In △ABC, seg MN ∥ side AC. Seg MN divides △ABC into two parts equal in area. Determine $\dfrac{AM}{MB}$.

   (3 Marks)

Q. 6. Solve the following questions : (Any one)

(1) There are floods in Chennai. The 'Divine Society Charitable Trust' plans to distribute 7392 litres of milk to the victims. The milk is packed in many conical cups of radius 7 cm and height 12 cm. Estimate the number of cups that can be distributed to the victims. What gesture of the trust is reflected with this act? If the cost of one conical cup is ₹ 2 and cost of milk is ₹ 10 per litre estimate the total cost to the trust.

(2) In the circle with centre O, chords AB and CD are perpendicular to each other at M. Arcs ABD and CAB are major arcs. if ∠ABD = x° and ∠CAB = y° then suggest any two pairs of values of x and y. Justify your answer.
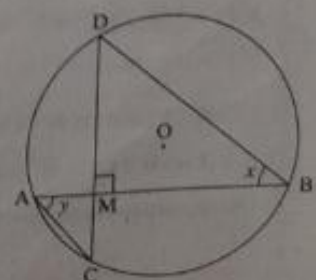
—— (**ANSWERS**) ——

Q. 1. (A) (1) $a = 52°$ and $b = 128°$.

(2) If the angles are in linear pair then they are supplementary.

(3) AN = 2 cm. Angle bisector theorem.

(4) $x = 40$ (5) $y = 3$ (6) A = 40

(B) (1) $h = 15$ cm.   (2) radius of incircle is 3 cm.   (3) $AB = 6\sqrt{3}$ cm, $BC = 6$ cm.

Q. 2. (A) (1) (B) $10\sqrt{2}$ cm   (2) (C) $\dfrac{\sqrt{34}}{5}$ (3) (A) 35   (4) (A) 4.

(B) (1) 1413 cm²   (2) $QP = 3.5$

(3) (i) $\angle R + \angle N = 180°$, opposite angles of cyclic quadrilateral are supplementary   (ii) $x = 21$.

Q. 3. (A) (1) In $\triangle COD$ and $\triangle AOB$,

$\angle CDO \cong \angle ABO$ ... $\boxed{\text{Alternate angles}}$

$\angle COD \cong \angle AOB$ ... $\boxed{\text{Vertically opposite angles}}$

$\therefore \triangle COD \sim \triangle AOB$ ... $\boxed{\text{AA test of similarity}}$

$\therefore \dfrac{OD}{\boxed{OB}} = \dfrac{DC}{\boxed{AB}}$ ... Corresponding sides of similar triangles are in proportion

$\therefore \dfrac{OD}{\boxed{15}} = \dfrac{6}{\boxed{20}}$ $\therefore OD = \boxed{4.5}$.

(2) Given : In $\triangle ABC$, $AC^2 = AB^2 + BC^2$

To prove : $\triangle ABC$ is right angled triangle.
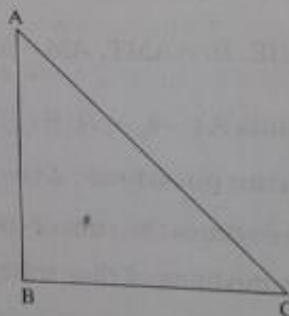
(3) Proof :

In $\triangle OQP$ and $\triangle ORP$,

$\angle OQP = \angle ORP = 90°$ ... [Reason ... $\boxed{\text{Tangent theorem}}$]

Hypotenuse OP $\cong$ Hypotenuse OP   ... [Common side]

Side OQ $\cong$ Side OR   ... [Reason ... $\boxed{\text{Radii of same circle}}$]

$\therefore \triangle OQP \cong \triangle ORP$ ... [Reason ... $\boxed{\text{Hypotenuse side test}}$]

$\therefore$ seg PQ $\cong$ seg $\boxed{PR}$ ... [Reason ... $\boxed{\text{c.s.c.t.}}$]

Q. 3. (B) (2) (11, 18)

Q. 4. (1) 14 m   (2) (i) 628 sq. cm. (ii) 1356.48 sq. cm, (iii) 1984.48 cm³.

Q. 5. (2) $\dfrac{AM}{MB} = \dfrac{\sqrt{2}-1}{\sqrt{2}}$

Q. 6. (1) 12000 cups can be distributed, Value : Humanity, Cost : ₹ 97920.

(2) $x + y = 90°$, $(x = 40°$ and $y = 50°)$, $(x = 35°$ and $y = 55°)$ are the two pairs of possible values of x and y.

[**Note** : Student can select any values of x and y satisfying the equation $x + y = 90°$.]