

Preliminary Examination

Geometry

Time : 2½ Hrs.

(Pages 4)

Marks : 60

- NOTE :** 1. All questions are compulsory.
2. Use of calculators is not allowed.

Q.1. Attempt any six of the following sub-questions :

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- (i) In $\triangle DEF \sim \triangle MNK$. If $DE = 5$ and $MN = 6$, then find the value of $\frac{A(\triangle DEF)}{A(\triangle MNK)}$.
- (ii) Draw an equilateral triangle of side 6cm.
- (iii) The side of a cube is 60cm. Find the total surface area of the cube.
- (iv) Find x and y intercepts of each of the line $y = 2x - 3$
- (v) $\triangle APQ \sim \triangle ABC$, $AP = 6$, $AB = 15$, $AQ = 4$. Find AC .
- (vi) If $\sin\theta = \frac{7}{5}$ then find $\operatorname{cosec}\theta$.
- (vii) Find the value of $\frac{\tan 49^\circ}{\cot 41^\circ}$

Q.2. Attempt any five of the following sub-questions :

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- (i) Find the side of a square whose diagonal is $16\sqrt{2}$ cm.
- (ii) Draw an arc with seg $MN = 8.9$ cm, inscribing $\angle MPN = 125^\circ$
- (iii) If $\sin\theta = \frac{5}{13}$, where θ is an acute angle, find the value of $\cos\theta$.

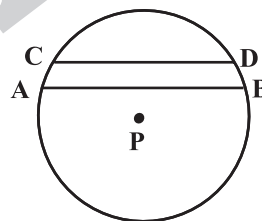
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- (iv) Find the value of k if $(-3, 11)$, $(6, 2)$ and $(k, 4)$ are collinear points.
- (v) The total surface area of a cuboid is 166cm^2 . Find its length if breadth and height are 5cm and 4cm respectively.
- (vi) If the volume of cube is 0.027cm^3 then find the length of its sides.

Q.3. Attempt any four of the following sub-questions :

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- (i) A ladder 10m long reaches a window 8m above the ground. Find the distance of the foot of the ladder from the base of the wall.
- (ii) As shown in figure, two chords AB and CD of the same circle are parallel to each other. P is the centre of the circle.



Show that $\angle CPA = \angle DPB$

- (iii) If A, B, C are the interior angles of a triangle ABC , show that

$$\sin\left(\frac{B + C}{2}\right) = \cos\frac{A}{2}$$

- (iv) Convert the given equation in $y = mx + c$ form. $\frac{x}{2} + \frac{y}{3} = 1$

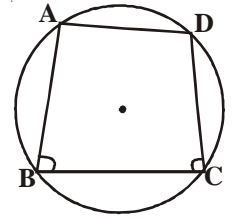
- (v) The surface area of a sphere is 616cm^2 . What is its volume? ($\pi = \frac{22}{7}$)

Q.4. Attempt any three of the following sub-questions :

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- (i) If a line parallel to a side of a triangle intersect the other sides in two distinct points, then the line divides those sides in proportion.

- (ii) If two consecutive angles of cyclic quadrilateral are congruent, then prove that one pair of opposite sides is congruent and other is parallel. More precisely :



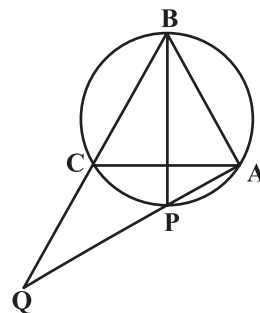
Given : $\square ABCD$ is cyclic quadrilateral in which $\angle ABC \cong \angle BCD$.
To prove side $DC \cong$ side AB , $AD \parallel BC$.

- (iii) Draw a tangent to the circle with centre 'O' and radius 3.3cm from a point A such that $d(O, A) = 7.5$ cm. Measure the length of tangent segments.
- (iv) A cone and a hemisphere have equal bases and equal volumes. Find the ratio of their heights.

Q.5. Attempt any four of the following sub-questions :

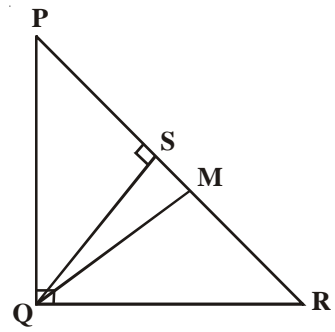
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- (i) $\triangle SHR \sim \triangle SVU$, In $\triangle SHR$, $SH = 4.5$ cm., $HR = 5.2$ cm. $SR = 5.8$ cm. and $\frac{SH}{SV} = \frac{3}{5}$; Construct $\triangle SVU$.
- (ii) A ship of height 24m is sighted from a light house. From the top of the light house, the angle of depression to the top of the mast and base of the ship is 30° and 45° respectively. How far is the ship from the lighthouse? ($\sqrt{3} = 1.73$)
- (iii) Write down the equation of a line whose slope is $\frac{3}{2}$ and which passes through point P, where P divides the line segment joining $A(-2, 6)$ and $B(3, -4)$ in the ratio 2:3.
- (iv) $\triangle ABC$ is an equilateral triangle. Bisector of $\angle B$ intersects circumcircle of $\triangle ABC$ in point P. Prove that $CQ = CA$.



- (v) In $\triangle PQR$, $m\angle PQR = 90^\circ$,
seg $QS \perp$ seg PR ,
seg QM is anglebisector
of $\angle PQR$.

Prove that : $\frac{PS}{SR} = \frac{PM^2}{MR^2}$



SAMPLE