

Q.P. SET CODE
C

MT - y

Seat No.

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2018 ____ 1100 - **MT - y** - MATHEMATICS (71) Geometry - SET - C (E)

Time : 2 Hours

(Pages 6)

Max. Marks : 40

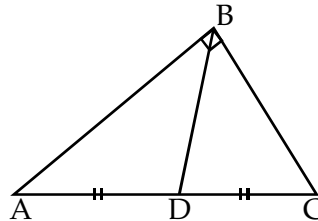
Note :

- (i) All questions are compulsory.
- (ii) Use of calculator is not allowed.
- (iii) Total marks are shown on the right side of the question.
- (iv) If necessary draw the figure to justify your answer.
- (v) Constructions marks should be distinct. Do not erase them.

Q.1.(A) Solve ANY FOUR of the following :

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- (i) Write converse of the following statement:
The diagonals of a rectangle are congruent.
- (ii) If a transversal intersects two parallel lines then the sum of interior angles on the same side of the transversal is _____.
- (iii) In $\triangle ABC$, $\angle ABC = 90^\circ$
Seg BD is the median
on hypotenuse AC
BD = 7 cm
Find : AC



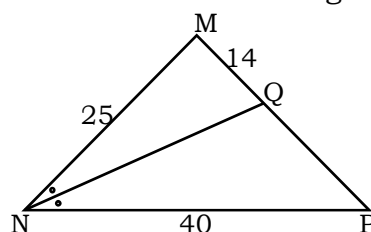
- (iv) Identify the correct statement:
A quadrilateral is a parallelogram if a pair of opposite sides is parallel.
A quadrilateral is a parallelogram if a pair of opposite sides is congruent.
A quadrilateral is a parallelogram if a pair of opposite angles is congruent.
A quadrilateral is a parallelogram if a pair of opposite sides is parallel and congruent.
- (v) What is the equation of the Y – axis?
- (vi) Find the value of $\frac{\tan 40^\circ}{\cot 50^\circ}$.

Q.1.(B) Solve ANY TWO of the following :**4**

- (i) Area of the base of a cone is 1386 sq. cm and its height is 28 cm. Find its volume.
- (ii) Length of a chord of a circle is 24 cm. If distance of the chord from the centre is 5 cm, then find radius of the circle.
- (iii) In $\triangle FAN$, $\angle F = 80^\circ$, $\angle A = 40^\circ$. Find out the greatest and the smallest side of the triangle.

Q.2.(A) Select the correct alternative answer and write it :**4**

- (i) Find QP using given information in the figure.

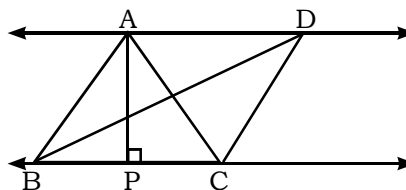


- (a) 36.8 (b) 18.2 (c) 22.4 (d) 28.6
- (ii) If $\triangle ABC$ is right angled at A, then $\cos (B + C)$ is
 (a) 1 (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{1}{2}$ (d) 0
- (iii) Find the curved surface area of a cone of radius 7 cm and height 24 cm.
 (a) 440 cm^2 (b) 550 cm^2 (c) 330 cm^2 (d) 110 cm^2
- (iv) Find the coordinates of centroid of the triangle whose vertices are $(-7, 6)$, $(2, -2)$, $(8, 5)$.
 (a) $(1, 3)$ (b) $(3, 1)$ (c) $(-1, 3)$ (d) $(-1, -3)$

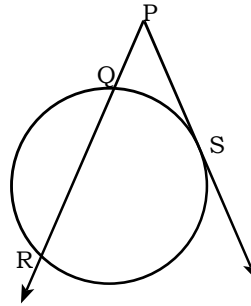
Q.2.(B) Solve ANY TWO of the following :**4**

- (i) Find k , if $PQ \parallel RS$ and $P(2, 4)$, $Q(3, 6)$, $R(3, 1)$ and $S(5, k)$.

- (ii) In adjoining figure $AP \perp BC$, $AD \parallel BC$, then find $A(\triangle ABC) : A(\triangle BCD)$



- (iii) In figure, seg PS is a tangent segment.
Line PR is a secant.
If PQ = 3.6, QR = 6.4,
find PS.



Q.3.(A) Carry out ANY TWO of the following activities :

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- (i) Given : In $\triangle ABC$, $\angle B = 90^\circ$
seg $BD \perp$ hypotenuse AC
To prove : $\triangle ADB \sim \triangle BDC$
Proof :

In $\triangle ADB$ and $\triangle ABC$

$\angle A \cong \angle A$



$\angle ADB \cong \angle ABC$

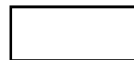
(each 90°)

$\therefore \triangle ADB \sim \triangle ABC$... (i)



In $\triangle BDC$ and $\triangle ABC$

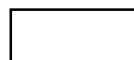
$\angle C \cong \angle C$



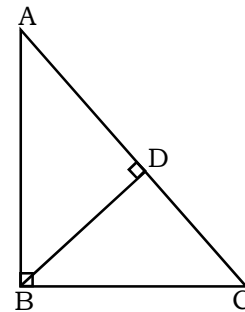
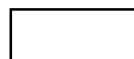
$\angle BDC \cong \angle ABC$

(each 90°)

$\therefore \triangle BDC \sim \triangle ABC$... (ii)



$\therefore \triangle ADB \sim \triangle BDC$



- (ii) Given : In trapezium $ABCD$, side $AB \parallel$ side CD , diagonal AC and BD intersect each other at point P .

To prove : $\frac{A(\triangle ABP)}{A(\triangle CPD)} = \frac{AB^2}{CD^2}$

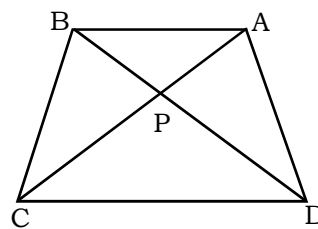
Proof : $\square ABCD$ is a trapezium (Given)

side $AB \parallel$ side CD (Given)

on transversal AC

$\angle BAC \cong \angle ACD$

... (i)



In ΔAPB and ΔCPD ,

$$\boxed{} \cong \boxed{} \quad \text{[from (i)]}$$

$$\therefore \angle APB \cong \angle CPD \quad \boxed{}$$

$$\therefore \Delta APB \sim \Delta CPD \quad \boxed{}$$

$$\therefore \frac{A(\Delta ABP)}{A(\Delta CPD)} = \frac{AB^2}{CD^2} \quad \boxed{}$$

(iii) Given : Line ET is the tangent at T and EAB is the secnt.

To prove : $EA \times EB = ET^2$

Construction : Draw seg AT and seg BT

Proof :

In ΔEAT and ΔETB ,

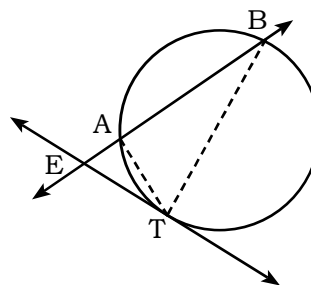
$$\angle E \cong \angle E \quad \boxed{}$$

$$\angle ETA \cong \angle EBT \quad \boxed{}$$

$$\therefore \Delta EAT \sim \Delta ETB \quad \boxed{}$$

$$\therefore \frac{ET}{\boxed{}} = \frac{\boxed{}}{ET} \quad \dots(\text{c.s.s.t})$$

$$\therefore EA \times EB = ET^2$$



Q.3.(B) Solve ANY TWO of the following :

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(i) Draw a circle with centre O and radius 3.5 cm. Take a point P at a distance 5.7 cm from the centre. Draw tangents to the circle from point P.

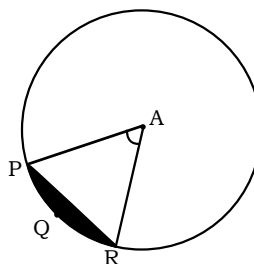
(ii) Find the ratio in which point P(k, 7) divides the segment joining A(8, 9) and B(1, 2). Also find k.

(iii) Prove that : $\left(1 + \frac{1}{\tan^2 A}\right) \left(1 + \frac{1}{\cot^2 A}\right) = \frac{1}{\sin^2 A - \sin^4 A}$.

Q.4. Solve ANY THREE of the following :**9**

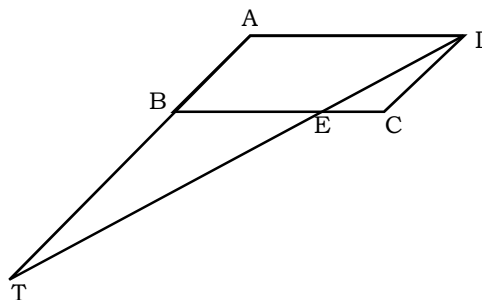
- (i) While landing at an airport, a pilot made an angle of depression of 20° . Average speed of the plane was 200 km/hr. The plane reached the ground after 54 seconds. Find the height at which the plane was when it started landing. ($\sin 20^\circ = 0.342$)

- (ii) In the adjoining figure, if A is the centre of the circle. $\angle PAR = 30^\circ$ $AP = 7.5$, find the area of segment PQR. ($\pi = 3.14$)

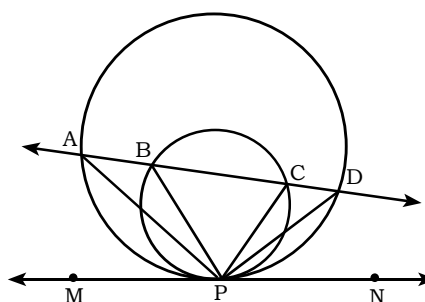


- (iii) Construct $\triangle PYQ$ such that $PY = 6.3$ cm, $YQ = 7.2$ cm, $PQ = 5.8$ cm. If $\frac{YZ}{YQ} = \frac{6}{5}$, then construct $\triangle XYZ$ similar to $\triangle PYQ$.

- (iv) $\square ABCD$ is a parallelogram. Point E is on side BC, line DE intersects Ray AB in point T. Prove that : $DE \times BE = CE \times TE$.

**Q.5. Solve ANY ONE of the following :****4**

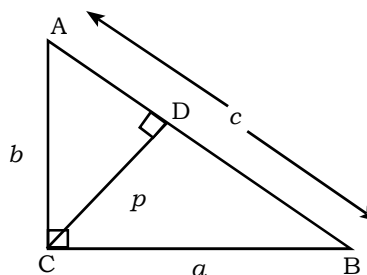
- (i) If two circles are internally touching at point P. A line intersect those two circles in points A, B, C, D respectively. Line MN is a tangent at P. Then prove that $\angle APB \cong \angle CPD$.



- (ii) $\triangle ABC$ is a triangle where $\angle C = 90^\circ$.
Let $BC = a$, $CA = b$, $AB = c$ and
let 'p' be the length of the
perpendicular from C on AB.

Prove that : (i) $cp = ab$

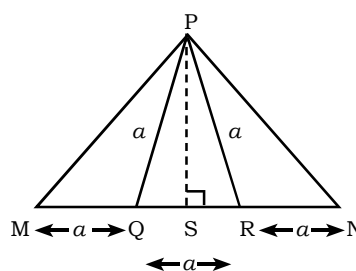
$$(ii) \frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$$



Q.6. Solve ANY ONE of the following :

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- (i) From the information
given in the figure,
Prove that : $PM = PN = \sqrt{3} \times a$



- (ii) The radius of a metallic sphere is 9 cm. It was melted to make a wire of diameter 4 mm. Find the length of the wire.

Best Of Luck 🍀