Seat No. | | | | | | | |

Nayak's Tutorials

Way to Excellence

Practice Paper -2

Mathematics– Paper II

Marks: 40

Duration: 2 Hrs.

Q.P Set CODE - A

Instructions :

(1) All questions / activities are compulsory.

(2) Use of calculators is not allowed.

(3) The numbers to the right of the question indicate full marks.

(4) In case of MCQs, only the first attempt will be evaluated and will be given credit

5) For every MCQ, the correct alternative (A), (B), (C) or (D) of answers with subsequent number is written as an answer.

Q.1A) Multiple Choice Questions **4**

1 Altitude on the hypotenuse of a right angled triangle divides it in two parts of lengths 4 cm and 9 cm. Find the length of the altitude.

a. 9 cm b. 4 cm c. 6 cm d. $2\sqrt{6}$ cm

2 A line makes an angle of 30° with the positive direction of X- axis. So the slope of the line is ……

a. $\frac{1}{2}$ b. $\frac{\sqrt{3}}{2}$ c. $\frac{1}{\sqrt{3}}$ d. $\sqrt{3}$

3 Complete the trigonometric identity $\sin^2\theta + \cos^2\theta$ = ?

a. 1 b. $\sqrt{2}$ c. -1 d. 0

4 Two circles having diameters 8 cm and 6 cm touch each other internally. Find the distance between their centres.

a. 2 b. 14 c. 7 d. 1

Q1B)Answer the following. **4**

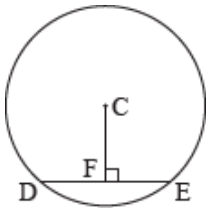
1 Prove the following

$\cos^2\theta\,(1 + \tan^2\theta) = 1$

2 Find the distance between the points P(-1, 1) and Q (5,-7) .

3 Identify, with reason, if the following is Pythagorean triplet. (10, 24, 27)

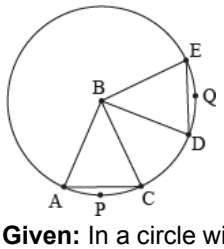
4 In the adjoining figure, seg DE is the chord of the circle with center C. Seg CF ⊥ seg DE and DE = 16 cm, then find the length of DF.



Q2A)Attempt the following (Activity)(Any Two) **4**

1 The chords corresponding to congruent arcs of a circle are congruent.

Prove the theorem by completing following activity.



Given: In a circle with centre B, arc APC ≅ arc DQE

To Prove: chord AC ≅ chord DE.

Proof:

In ΔABC and ΔDBE,

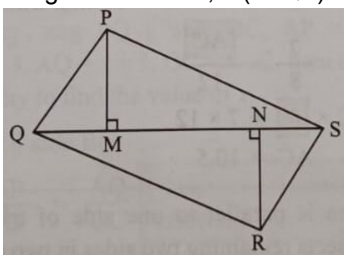
side AB $\cong$ side DB .....

side BC $\cong$ side .....

$\angle ABC \cong \angle DBE$ (Measure of congruent arcs)

$\therefore$ $\Delta ABC \cong \Delta DBE$ .....

2 In fig. PM = 10 cm, A (ΔPQS) = 100 sqcm A (ΔQRS) = 110 sqcm then NR = ?



3 A washing tub in the shape of a frustum of a cone has height 21cm. The radii of the circular top and bottom are 20cm and 15cm respectively. What is the capacity of the tub? ($\pi = \frac{22}{7}$)

Volume of washing tub = $\frac{1}{3} \times \pi h$ (_____)

= $\frac{1}{3} \times \frac{22}{7} \times 21\ (20^2 + 15^2 + 20 \times 15)$

= 22 (_____)

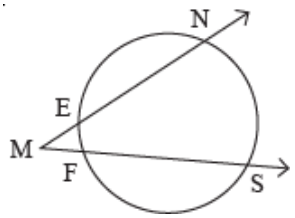
= 22 × _____

Volume of washing tub =_____cm^3

∴Capacity of washing tub is_____cm^3

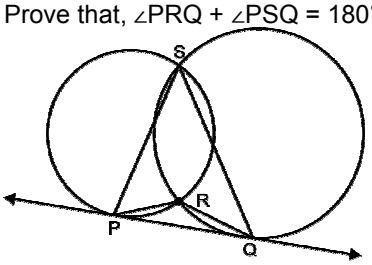
Q2B)Answer the following (Any Four) **8**

1 Prove that : $\sqrt{\frac{1 - \sin\theta}{1 + \sin\theta}} = \sec\theta - \tan\theta$



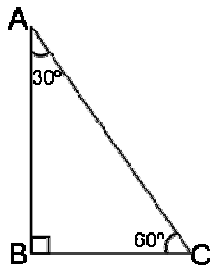
2 In figure, *m*(arc NS) = 125°, m(arc EF) = 37°, find the measure ∠NMS.

3 If two circles intersect each other at points S and R. Their common tangent PQ touches the circle at points P, Q. Prove that, ∠PRQ + ∠PSQ = 180°



4 Find the centroids of the triangles whose vertices are given below.
(4, 7), (8, 4), (7, 11)

5



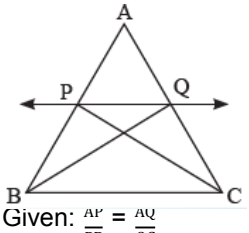
In ₀ ABC, ∠B= 90°, ∠A= 30°, AC=14, then find AB and BC.

Q3A)Attempt the following (Activity)(Any One) **3**

1 A line is parallel to one side of triangle which intersects remaining two sides in two distinct point then that line divides sides in same proportion.

Given:

In ΔABC line *l* || side BC & line *l* intersect side AB in P & side AC in Q.



Given: $\frac{AP}{PB} = \frac{AQ}{QC}$

Construction : Draw CP and BQ.

Proof: ΔAPQ and ΔPQB have equal height.

∴ $\frac{A(\Delta APQ)}{A(\Delta PQB)} = \frac{\cdots\cdots}{PB}$ (areas in proportion of base) ... (I)

$\frac{A(\Delta APQ)}{A(\Delta PQC)} = \frac{\cdots\cdots}{QC}$ (areas in proportion of base) ... (II)

ΔPQC and ΔPQB have common base.....and seg

PQ || seg BC

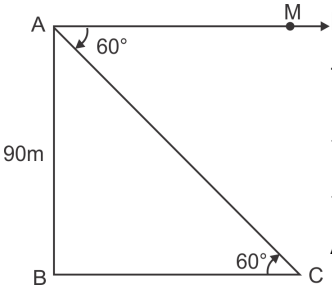
Hence height of ΔPQC and ΔPQB is same.

∴ A(ΔPQC) = A(Δ.....).....(III)

∴ $\frac{A(\Delta APQ)}{A(\Delta PQB)} = \frac{A(\Delta\ldots\ldots\ldots)}{A(\Delta\ldots\ldots\ldots)}$ ... [From (III)]

∴ $\frac{AP}{PB} = \frac{AQ}{QC}$ [From (I) and (II)]

2 From the top of a lighthouse, an observer looking at a ship makes an angle of depression of 60^0. If the height of the lighthouse is 90 m then find how far is the ship from the lighthouse. ($\sqrt{3}$ = 1.73)



Let AB be the light house.

The ship is at C and observer is at A.

∠MAC is the angle of depression.

∠MAC = ∠ACB = _____ ..... Alternate angle

AB =_____.

From the figure, tan 60° = _____

$\sqrt{3} = \frac{90}{BC}$

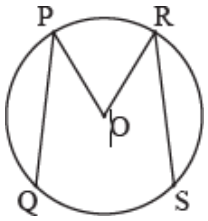
BC = $\frac{90}{\sqrt{3}}$ = _____ = $\frac{\ldots\ldots}{3}$ = _____

∴ BC = 30 × 1.73

∴ The ship is at a distance of_____from the light house.

Q3B)Solve the following (Any Two) **6**

1 In figure, O is the centre of a circle, chord PQ ≅ chord RS. If ∠POR = 70° and (arc RS) = 80°.
Find (1) m(arc PR) (2) m(arc QS) (3) m(arc QSR)



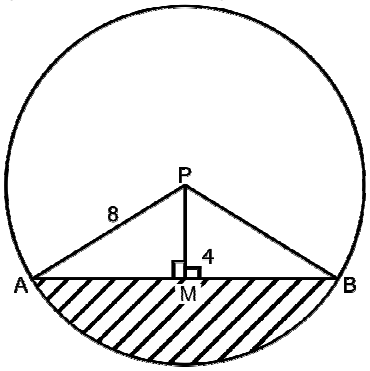
2 Ratio of areas of two triangles with equal heights is 2 : 3. If base of the smaller triangle is 6 cm then what is the corresponding base of the bigger triangle?

3 ΔABC is an equilateral triangle. Point P is on base BC such that PC = $\frac{1}{3}$BC, if AB = 6 cm find AP.

4 Draw a circle with centre O and radius 3.5 cm. Take point P at a distance of 5.7 cm. from the centre. Draw a tangent to the circle from point P.

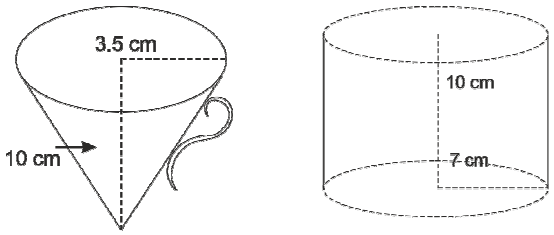
Q4)Answer the following(Any Two) **8**

1 In the figure, seg AB is a chord of a circle with centre P.
If PA = 8 cm and distance of chord AB from the centre P is 4 cm, find the area of the shaded portion.
(π = 3.14, $\sqrt{3}$ = 1.73)



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

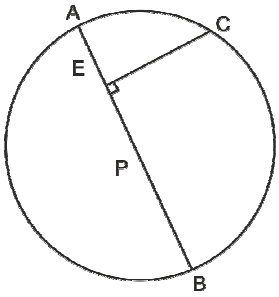
3



Observe the measures of pots in the above figures.
How many jugs of water can the cylindrical pot hold?

Q5)Creative questions(Any One) **3**

1



In the above figure, seg AB is a diameter of a circle with centre P.C is any point on the circle. seg CE ⊥ seg AB.
Prove that CE is the geometric mean of AE and EB. Write the proof with the help of following steps :

i. Draw ray CE. It intersects the circle at D.
ii. Show that CE = ED.
iii. Write the result using theorem of intersection of chords inside a circle.
iv. Using CE = ED, complete the proof.

2 **Δ** ABC is a triangle where ∠C = 90°.
Let BC = a, CA = b, AB = c and let 'p' be the length of the perpendicular C on AB.
i) With the help of area of triangle, prove cp = ab,
ii)with the application of Pythagoras theorem, prove $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$