मंगलाबाई भागवत फाऊंडेशन

Time-2 Hrs. **Mathematics Part - II** **Marks 40**

Note :-
- **i) All questions are compulsory.**
- **ii) Use of calculator is not allowed.**
- **iii) The numbers to the right of the questions indicate full marks.**
- **iv) In case of MCQ's [Q. No. 1(A)] only the first attempt will be calculated and will be given credit.**
- **v) For every MCQ, the correct alternative (A), (B), (C), or (D) with sub question number is to be written as an answer.**
- **vi) Draw proper figures for answers wherever necessary.**
- **vii) The marks of construction should be clear. Do not erase them.**
- **viii) Diagram is essential for writing the proof of the theorem.**

Q.1. A) For each of the following sub questions for alternative answers are given. (4) Choose the correct alternative and write its alphabet.

i) $1 + \cot^2 Q$ = ……..

(A) $\tan^2\theta$ (B) $\cos^2\theta$ (C) $\text{cosec}^2\theta$ (D) $\sec^2\theta$

ii) The curved surface area of a right circular cone of height 15cm and base diameter 16 cm is ……..

(A) 160 πcm^2 (B) 168πcm^2, (C) 120πcm^2(d) 136$\pi cm2$

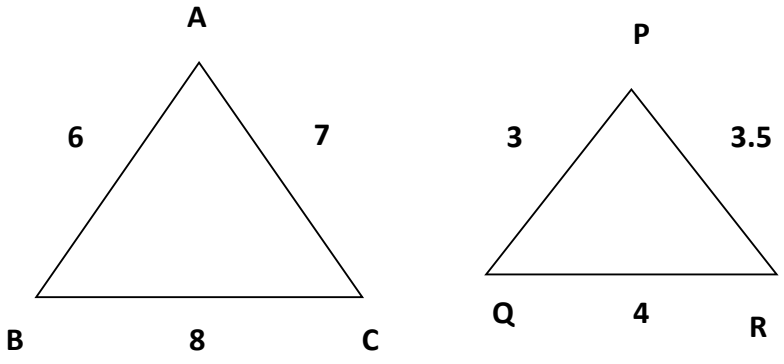
iii) How many tangents can be drawn on two circles which are touching externally ?

a) One b) two c) three d) four

iv) In an equilateral triangle length of side is 8cm. Find its height.

A) $2\sqrt{3}cm$ B) $4\sqrt{8}cm$ C) $8\sqrt{4}cm$ B) $4\sqrt{3}cm$

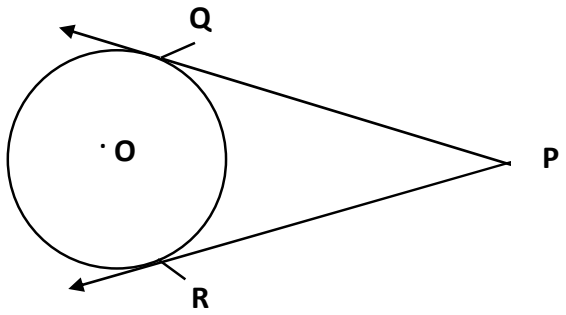
B) Solve the following sub questions. ()



Observe the figure and state whether △ ABC is similar to △ PQR or not ? why ?

ii) State whether (4,5,8) is a Pythagorean triplet or not.

iii) From point P, two tangents are drawn on a circle with centre. O, touching circle at Q and R. It PQ=5cm, then what is the length of PR. Give reason.



iv) If cos $(45^0 + \chi)$ = sin 30^0 then find the value of χ.

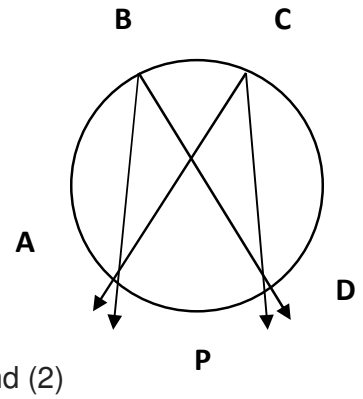
Q.2. A) Complete the following activities and rewrite it. (Any two) **(4)**

i) Observe the figure and complete the following activity :

Activity :-

∠ABD = $\frac{1}{2}$ m (arc ☐) } (Inscribed angle…… (1)

∠ACD = $\frac{1}{2}$ m (arc ☐) } Theorem) …… (2)



∴ From (1) and (2)

∠ABD = ☐

∴ Angles inscribed in the same arc are ☐

ii) If PC (-6, -3) and QC (-1 9) then complete the following activity to find PQ.

Activity :

Let P (χ_1, y_1) and Q (χ_2, y_2)

χ_1 = -6, y_1 = -3, χ_2 = -1, and y_2 = q

∴ PQ = $\sqrt{\square}$ …… (Distance Formula)

PQ = $\sqrt{\square}$ + 144

∴ PQ = $\sqrt{\square}$

∴ PQ = ☐

iii) How many solid cylinders of radius 6cm and height 12cm can be made by melting a solid sphere of radius 18cm ?

Activity :

Radius of the sphere, r = 18cm

For cylinder, radius R = 6cm, height H = 12cm.

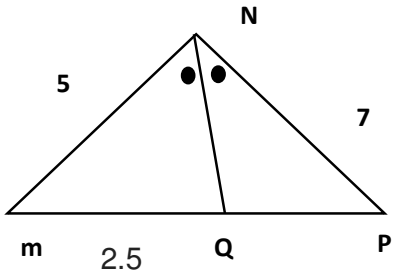
∴ Number of cylinders can be made,

$$= \frac{\text{Volume of the Sphere}}{\square}$$

$$= \frac{\frac{4}{3}\pi r^3}{\square} = \frac{4}{3} \times \frac{18 \times 18 \times 18}{\square} = \square$$

Q.2. B) Solve any four of the following questions. **(8)**

i) In $\triangle$ MNP,
NQ is a bisector of ∠N
If MN = 5, PN = 7, MQ = 2.5
Then Find QP



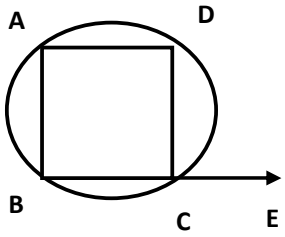
ii) In $\triangle$ PQR, PQ = $\sqrt{8}$, QR = $\sqrt{5}$, PR = $\sqrt{3}$. Is $\triangle$PQR is right angled triangle ? If yes, which angle is of 90^0 ?

iii) Construct of a tangent to a circle with centre P and radius 3.5cm at any point M on it.

iv) Find the volume of a cone if the radins of its base is 1.5cm and its perpendicular height is 5cm.

Q.3. A) Complete any one activity of the following and rewrite it. **(3)**

i) □ ABCD is cyclic, ∠ DCE is an exterior angle of □ABCD,
Complete the following activity
to prove ∠ DCE ≅ ∠BAD
Activity :-



∠ DCE + m∠ BCD = (Linear pair of angles) **(1)**

□ABØ is □

∠ BAD + ∠ BCD = 180^0 = (□) **(2)**

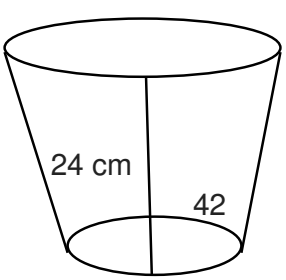
From (1) and (2), we get,

∠ DCE +□ =□ + ∠ BCD

∴ ∠ DCE =□

∴ ∠DCE ≅ ∠ BAD

ii) The circumferences of circular faces of a frustum are 132cm and 88cm and it is height is 24cm. To find the curved surface area of the frustum complete the following activity (π = 22/7)



Activity :-

Circumference 1 = $2\pi r_1$

= 132

$r_1 = \frac{132}{2\pi}$ = ☐

Circumference 2 = $2\pi r_2$

= 88

$r_2 = \frac{88}{2\pi}$ = ☐

Slant height of frustum, $\ell = \sqrt{h2 + (r1 - r2)^2}$

$= \sqrt{24^2 + \quad ^2}$

= ☐ cm

Curved surface area of the frustum

= π x 35 x ☐

= ☐ Sq.cm.

B) Solve any two of the following sub questions. **(6)**

i) To prove :- When two triangles are similar the ratio of areas of those triangles is equal to the ratio of the squares of their corresponding sides.

ii) The sum of the squares of adjacent sides of a parallelogram is 130 sq.cm. and length of one its diagonals is 14cm. Find the length of other diagonal.

iii) Show that the point A(1,2), B (1,6) and C (1+2 $\sqrt{3}$,4) are the vertices of an equilateral triangle.

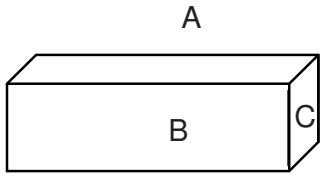
iv) $\triangle$ AMT $\sim\triangle$ AHE, In$\triangle$ AMT, AM = 6.3 cm, $\angle$TAM = 50^0

AT = 5.6 cm, $\frac{AM}{AH} = \frac{7}{5}$ construct $\triangle$ AHE.

Q.4. Solve any two of the following sub questions. (8)

i) Draw a circle with centre m and radins 2.7cm. Take a point P such that PM = 7.5 cm. Construct tangents to the circle from point P. construct a circle touching the tangent and the circle with centre M.

ii) The angle of eleven of a cloud from a point 60m above a lake is 30^0 and the angle of depression of the reflection of the cloud in the lake is 60^0. Find the height of the cloud from the surface of the lake.

iii) 

In the figure, the areas of surface, A. B and C are 450cm^2, 600cm^2, and 300 cm^2 respectively. Find the Volume of the object.

Q.5. Solve any one of the following sub questions. (3)

i) In $\triangle$ ABC, D and E are the mid points of side AB and side AC respectively a) Draw the figure with respect to given information. B) Prove : DE || BC.

ii) If 3 tan ∅ = sec ∅ then find the value of Cot Q.

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