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SSC BOARD SAMPLE PAPER

SUBJECT:SCIENCE II **CLASS: X**
MAX.MARKS: 40 **SOLUTIONS** **Duration: 2 HRS.**

Q.1(A) **Choose and write correct option number as answer:** **5M**

i. Metaphase
ii. a)Aspergillus oryzae
iii. c) Increased brain size
iv. c) Corpus albicans
v. d) Uranium 235

Q.1(B) **Solve Answer the following :** **5M**

i. True.
ii. Vit B_2 (riboflavin is important for Vit B_2 formation)
iii. Intestine (It is a fully functional organ in humans while others are vestigial organs)
iv. Pluripotency is the self-multiplying ability of undifferentiated stem cells by which they are capable of giving rise to all types of human cells.
v. Leech

Q.2. A **Give scientific reasons (Attempt any 2)** **4M**

i.
i. Cell division is the property due to which a new organism (unicellular) is formed from an existing one.
ii. In case of multicellular organisms, the growth of the organisms is dependent on cell division.
iii. It is also essential for restoration of emaciated body.
iv. Cell division is an important aspect of wound healing, formation of blood cells, and other such important life processes.'

Hence, cell division is one of the important properties of cells and organisms.

ii.
i. A female has millions of oocytes at the time of birth and new ova are not formed thereafter.
ii. Menopause occurs at approximately 40-50 years of age and hence fewer numbers of eggs are present with reduced fertility since the oocytes have aged.
iii. Their ability to divide diminishes and they may not be able to complete meiotic division properly.
iv. Fertilization of such oocytes may result in production of genetic abnormalities (like Down's syndrome) in offspring.

Hence, birth defects are more common among children born to older women.

iii.
i. In a power plant, a turbine is used to rotate the generator in order to produce electrical energy.
ii. To drive the turbine, we need an energy source.

iii. The construction of the turbine in a power plant depends on the type of energy source used to rotate the turbine. For example; steam turbine is used in thermal power plant where steam is used to rotate the turbine while turbine with large fins is used in electricity generation using wind energy.

Hence, depending on the energy source the construction of turbine is different for different types of power plants.

Q.2. B Answer the following (Attempt any 3) **6M**

i

i. Environmental conservation is protection, preservation, management, or restoration of the natural environment.

ii. It is necessary to conserve our environment because any imbalance in the environment directly affects the existence of the biotic factors.

iii. The environment constitutes our food chain, thus, it is necessary for sustenance of life. However, population explosion has led to overconsumption of natural resources.

iv. Environmental conservation involves the use of natural resources rationally in order to avoid excessive degradation of environment.

v. Various rules, laws and regulations are been implemented by Government of India to conserve environment. UN has established UNEP to conserve the environment.

ii

	Flatworms	**Roundworms**
i.	They belong to phylum Platyhelminthes.	They belong to phylum Aschelminthes.
ii.	They are acoelomates.	They are pseudocoelomates.
iii.	Their body is slender and flat, like a leaf or strip.	Their body is long, thread like or cylindrical.
iv.	They are hermaphrodites. e.g. Planaria, liver fluke, tapeworm, etc	They are unisexual. e.g. Ascaris, filarial worm, Loa loa (eye worm), etc.

iii.

i. Disaster management involves either prevention of disaster or improving our ability to face disasters by making required arrangements.

ii. By careful observation and analysis of available scientific data, intensity of disasters can be predicted.

iii. Based on data, action plan is prepared in order to get quick response from general public as well as administration.

Thus, effective disaster management makes us well prepared for future.

iv.

ii. The radiation of mobile phones causes several problems like tiredness, headache, insomnia, forgetfulness, tinnitus (buzzing in the ears), joint pains as well as problems in vision.

iii. The radiations affect children more than adults.

iv. Also, continuous use of computers and internet makes a person solitary and incapable to establish harmonious relations with relatives and other members of the society.

V. Such habits further make a person self-centred in nature and thereby lead to problems like selfishness.

vi. The person tends to become less sensitive towards others and the long term effect of such tendency is that he stops helping others and is also not helped by other people when needed.

v. i. Oil spills of rivers and oceans can be cleaned by bacteria such as Pseudomonas spp. and Alcanivorax borkumensis, that have the ability to destroy pyridines and other chemicals.

ii. These bacteria are called hydrocarbonoclastic bacteria (HCB)

iii. HCB decomposes hydrocarbons and brings about the reaction of carbon with oxygen to form CO_2 and water.

Q.3. Answer the following (Attempt any 5) **15M**

i. i. Darwin's theory of natural selection is based on the concept of survival of the fittest.

ii. Organisms can reproduce prolifically.

iii. Under limited resources, organisms compete with each other in a life-threatening manner for their survival.

iv. According to this theory, only those organisms survive which show modifications for winning the competition. The selected organisms then give rise to new species with their specific set of characters.

v. Objections raised against Darwin's theory of natural selection:

1. Natural selection is not the only factor responsible for evolution.
2. In his theory, Darwin did not explain the inheritance of useful and useless modifications.
3. No explanation regarding slow and abrupt changes was provided in this theory.

ii. i. The process of glycolysis was discovered by three scientists Gustav Embden, Otto Meyerhof, and Jacob Parnas. Hence, glycolysis is also called as Embden-Meyerhof-Parnas pathway (EMP pathway).

ii. Glycolysis is the first step of aerobic/anaerobic respiration and occurs in the cytoplasm of the cell.

iii. In this process, a molecule of glucose is oxidized in a stepwise manner to form two molecules each of pyruvic acid, ATP, $NADH_2$ and water.

iv. Pyruvic acid formed during this process is converted into acetyl-coenzyme A with

the release of two molecules each of $NADH_2$ and CO_2. This acetyl-coenzyme A then enters the Krebs cycle.

iii.

i. Sexual reproduction involves the fusion of male gamete (sperm) and female gamete (egg), resulting in the formation of a zygote.

ii. Due to this the, offspring inherit characters from both parents, displaying a mix of similarities and differences in their characteristics.

iii. For example, if a father has black hair and a mother has brown hair, their offspring may exhibit either black or brown hair due to this genetic combination.

iv.

i. Electrical energy generation and its effects on the environment depend on the process that is used to produce the electrical energy.

   a. **Electricity generation using fossil fuels:** Burning of fossil fuels like coal, natural gas lead to emission of harmful gases like carbon monoxide, nitrogen dioxide. This causes air pollution. These gases also lead to environmental hazards such as global warming and acid rain. Soot particles generated due to incomplete combustion of fossil fuels can cause respiratory problems like asthma. Thus, electricity generation using fossil fuels is not environmental friendly.

   b. **Electricity generation using nuclear fuels:** Improper nuclear-waste storage and disposal results in environmental contamination. Accidental leakage of nuclear radiation can lead to lethal disaster.

   c. **Electricity generation using green energy sources:** Electricity generation using sources like water reservoir, wind, sunlight, bio-fuel etc. does not cause any pollution. Thus, electricity generation using these green energy sources is environmental friendly.

ii. Considering the merits and demerits of all the above processes, the world is now heading towards environmental friendly energy is green energy.

v. Based on body symmetry, animals can be classified into three groups:

i. **Asymmetrical body:** In this type of symmetry, there is no such imaginary axis of the body through which we can get two equal halves.
E.g. Amoeba, Paramecium, some sponges.

ii. **Radial symmetry:** In this type of symmetry, if an imaginary cut passes through the central axis of any plane of the body, it gives two equal halves. E.g. starfish.
In starfish, there are five different planes passing through the central axis of the body, through which we can get two equal halves.

iii. **Bilateral symmetry:** In this type of symmetry, there is only one such imaginary axis of the body through which we can get two equal halves. E.g. Insects, fishes, frog, birds, human, etc.

vi.

i. The changes that occur in a home having a chronically ill old person are as follows:
   a. Other members of the house become more alert about health related issues. Ensuring that the patient takes the medicines on time is a priority.
   b. They tend to maintain extreme cleanliness in the house.
   c. Family members may feel emotions like frustration, stress, and tension.

ii. In order to maintain good atmosphere in such a situation one can do the following things:
   a. Increase communication among the members of the family so as to maintain good atmosphere at home.
   b. Take care that the needs of other members of the house are not neglected while dealing with the chronically ill old person.
   c. Help by doing small chores like bringing medicines, etc.

vii.

i. Terrorism: Man-made disaster, Intentional

ii. Soil Erosion: Geophysical, Geological disaster

iii. Hepatitis: Biological disaster of animal-origin (caused by viruses)

iv. Forest fire: Biological disaster of plant-origin

v. Famine: Geophysical disaster, Atmospheric

vi. Theft: Man-made disaster, Intentional

viii.

i. Medicinal plants are considered rich resources age-old traditions like Ayurveda, with as they can be used to treat diseases through minimum side effects.

ii. In the olden days, medicinal plants were collected from the forests.

iii. Nowadays, they are being cultivated due to the depletion of the forest areas.

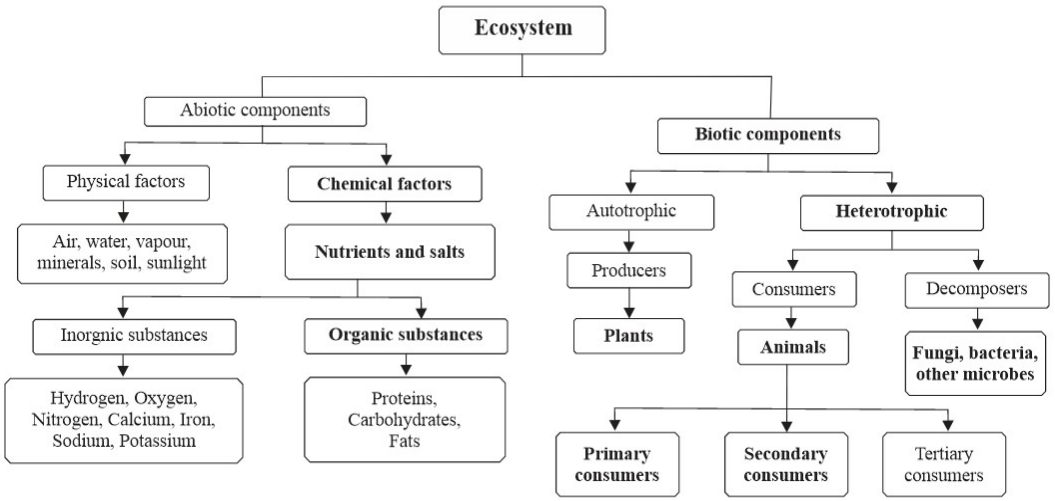
iv. Adhatoda vasica (Adulsa), a medicinal plant found in India has applications in treating respiratory disorders.

v. Another medicinal important plant, Azadirachta indica (neem) is used to treat intestinal worm infections, skin conditions and various other problems.

vi. Medicinal plants like Ashwagandha, Tulsi, Shatavari, Amla, etc. have applications as home remedies to treat various ailments and strengthen the body, or commercially for the synthesis of drugs and cosmetic products.

Q.4. **Attempt the following (Any ONE):** **5M**

i.



ii

i. Oil spills severely affect aquatic organisms as it cuts the connection of water with air and does not allow oxygen to dissolve in water.

ii. Chemical compounds like pyridines and hydrocarbons are degraded by microbes used for clearing oil spills.

iii. Rubber degrading microbes: Actinomycetes, Streptomyces, Nocardia, Actinoplanes [Any two examples]

iv. Plastic bags are non-biodegradable.

- They can cause land and water pollution as they remain in the environment for a very long time.
- Animals may die after eating plastic bags, due to choking.
- Plastic bags can also clog drains and thereby cause problems in the sewage system. This may also cause problems of flooding due to heavy rainfall in cities.
- Marine animals are affected adversely, as plastic bags block sunlight or can be hazardous to the life of the animal if ingested.

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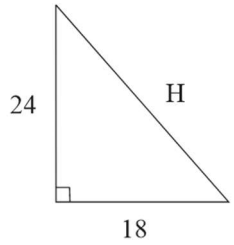
SSC BOARD SAMPLE PAPER

SUBJECT:MATHS-II (GEOMETRY) **CLASS: X**

MAX.MARKS: 40 **SOLUTIONS** **Duration: 2 HRS.**

Q.1 A **Four alternative answers are given for every sub question. Select the correct alternative and write the alphabet of that answer:** **4M**

i)



$H=\sqrt{24^2+18^2}=\sqrt{576+324}$

$=\sqrt{900}=30$

ii) b) rhombus

iii) Slope $=\tan\theta=\tan 45^\circ=1$

iv) $l^2=r^2+h^2$

$41^2=9^2+h^2$

$1681=81+h^2$

$h^2=1681-81=1600$

$h=40$

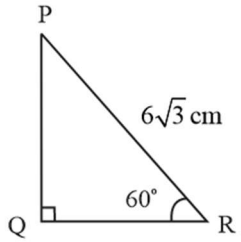
Q.1 B **Solve the following questions.** **4M**

i. $\frac{A_1}{A_2}=\frac{2}{3}$, $b_1=6\text{cm}$, $b_2=?$

$\frac{A_1}{A_2}=\frac{b_1}{b_2} \Rightarrow \frac{2}{3}=\frac{6}{b_2}$

$\Rightarrow b_2=6\times\frac{3}{2}=9\text{cm}$

ii.



$PQ=\frac{\sqrt{3}}{2}\times PR$ .....side opposite to 60°

$= \frac{\sqrt{3}}{2} \times 6\sqrt{3}$

$= 9\text{cm}$

iii. $2m\angle A = 3m\angle C$

$m\angle A = \frac{3}{2} m\angle C$

$m\angle A + m\angle C = 180^{o}$ …….opposite angles of cyclic quadrilateral

$\frac{3}{2}\angle C + \angle C = 180^{0}$

$\angle C = 72^{0}$

iv. A(6, 8), 0(0, 0)

$d = \sqrt{(6-0)^2 + (8-0)^2} = \sqrt{36+64}$

$= \sqrt{100} = 10 \text{ units}$

Q.2 A Complete the following activities. (Any two) **4M**

i. $\angle STQ = \angle SPQ + \angle PSR$ …. Exterior angle theorem

$= \frac{1}{2} m(\text{arc SQ}) + \frac{1}{2} m(\text{arc PR})$

$= \frac{1}{2}[m(\text{arc P R}) + m(\text{arc SQ})]$

ii. We have,

$1 + \tan^2\theta = \boxed{\sec^2\theta}$

$\therefore \quad 1 + \tan^2\theta = \left(\frac{25}{7}\right)^2$

$\therefore \quad \tan^2\theta = \boxed{\frac{625}{49}} - 1$

$= \frac{625 - 49}{49}$

$= \boxed{\frac{576}{49}}$

$\therefore \quad \tan\theta = \boxed{\frac{24}{7}}$

iii. (r) = 2.8m, (h) = 3.5m, $\pi = \frac{22}{7}$

Capacity of the water reservoir = Volume of the cylindrical reservoir

$= \pi r^2 h$

$= \frac{22}{7} \times \boxed{(2.8)^2 \times 3.5}$

$= 86.24 m^3$

$= 86.24 \times \boxed{1000}$ $(\because\ 1m^3 = 1000 \text{ litre})$

$=$ 86240.00 litre.

$\therefore$ The reservoir can hold 86240 litre of warter.

The daily requirement of water of a person is 70 litre.

$\therefore$ Water in the tank is sufficient for $\frac{\boxed{86240}}{70} = \boxed{1232}$ persons.

Q.2 B **Solve the following questions. (Any four)** **8M**

i. $\frac{AC}{CE} = \frac{BD}{DF}$ ….Property of three parallel lines and transversal

$\frac{12}{x} = \frac{8}{4}$

$x = \frac{12 \times 4}{8}$

$x = 6$

ii. l = 40cm, d = 41cm

$d^2 = l^2 + b^2$

$b^2 = d^2 - l^2 = 41^2 - 40^2$

$b^2 = 1681 - 1600 = 81$

b = 9cm

Perimeter = 2(l + b) = 2(40 + 9) = $2 \times 49 = 98$ cm

The breadth pf rectangle is 9cm and its Perimeter is 98cm.

iii $\angle R + \angle N = 180^o$ ……opposite angles of cyclic quadrilateral

$(5x - 13)^o + (4x + 4)^o = 180^o$

$9x - 9 = 180^o$

$9x = 180 + 9$

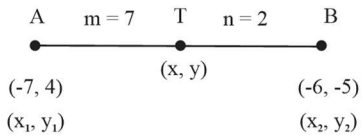
$9x = 189$

$x = 21$

$\angle R = 5x - 13 = 5(21) - 13 = 105 - 13 = 92^o$

$\angle N = 4x + 4 = 4(21) + 4 = 84 + 4 = 88^o$

iv. By section formula



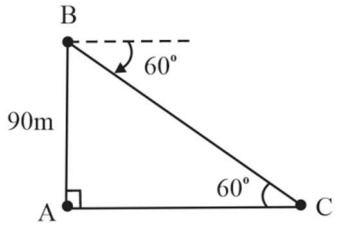
$x = \frac{mx_2 + nx_1}{m + n}, \quad y = \frac{my_2 + ny_1}{m + n}$

$$x=\frac{7(-6)+2(-7)}{7+2},\quad y=\frac{7(-5)+2(4)}{7+2}$$

$$x=\frac{-56}{9}=-8,\quad y=\frac{-27}{9}=-3$$

$$T(x,y)\equiv(-8,-3)$$

v. Let AB be the lighthouse and C be the position of ship.



In ΔBAC,

$$\tan 60^\circ=\frac{AB}{AC}$$

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

$$AC=\frac{90}{\sqrt{3}}=\frac{90\sqrt{3}}{3}=30\sqrt{3}\,m$$

$$AC=30\times1.73=52.9\,m$$

The ship is 52.9 from the lighthouse .

Q.3 A Complete the following activities (Any one) **3M**

i In ΔXDE, PQ || DE .....given

$\therefore$ $\frac{XP}{PQ}=\frac{XQ}{QE}$ ……(I) (Basic proportionality theorem)

In ΔXEF, QR || EF .....given

$\therefore$ $\frac{XQ}{QE}=\frac{XR}{RF}$ .....(II) (Basic proportionality theorem)

$\therefore$ $\frac{XP}{PD}=\frac{XR}{RF}$ …….. from (I) and (II)

$\therefore$ seg PR || seg DE ……(converse of basic proportionality theorem)

ii Suppose co-ordinates of point P are (x_1, y_1) and of point Q are (x_2, y_2).

$x_1=-1,\ y_1=1,\ x_2=5,\ y_2=-7$

According to distance formula, $d(P, Q)=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$$=\sqrt{[5-(-1)]^2+[-7-1]^2}$$

$$= \sqrt{(6)^2 + \boxed{(-8)^2}}$$

$$= \sqrt{36 + \boxed{64}}$$

$$d(P,Q) = \boxed{\sqrt{100}} = 10$$

$\therefore$ Distance between point P and Q is $\boxed{10 \text{ units}}$.

Q3.B Solve the following questions (Any two) **6M**

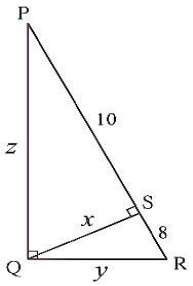
i. In ΔPQR,

$QS^2 = PS \times SR$ .....geometric mean theorem

$x^2 = 10 \times 8$

$x^2 = 80$ i.e., $x = \sqrt{80} = \sqrt{16 \times 5}$

$x = 4\sqrt{5}$



In ΔQSR,

$QR^2 = QS^2 + SR^2$ .....Pythagoras theorem

$y^2 = \left(4\sqrt{5}\right)^2 + 8^2$

$= 80 + 64$

$= 144$

$y = 12$

In ΔPSQ,

$PQ^2 = PS^2 + QS^2$ .....Pythagoras theorem

$z^2 = 10^2 + \left(4\sqrt{5}\right)^2$

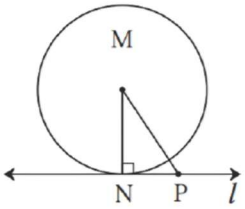
$z^2 = 100 + 80$

$z^2 = 180$ i.e., $z = \sqrt{180} = \sqrt{36 \times 5}$

$z = 6\sqrt{5}$

ii. **Given :** M is the centre of a circle seg MN is a radius.

Line l $\perp$ seg MN at N.



To prove : Line l is a tangent to the circle.

Proof : Take any point P, other that N, on the line l. Draw seg MP.

Now in ΔMNP, $\angle N$ is a right angle.

∴ seg MP is the hypotenuse.

∴ seg MP > seg MN.

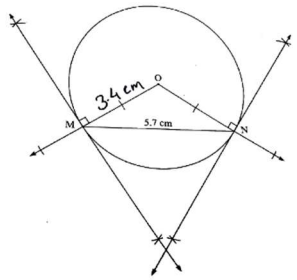
As seg MN is radius, point P can't be on the circle.

∴ no other point, except point N, of line I is on the circle.

∴ line / intersects the circle in only one point N.

∴ line l is a tangent to the circle.

iii.



iv. The radii of two circular ends of frustum shape bucket are 14cm and 7cm.

∴ R_1 = 14cm and r_2 = 7cm its height (h) = 30cm

Volume of the bucket = $\frac{1}{3}\times\pi(r_1^2+r_2^2+r_1\times r_2)\times h$

$$\frac{1}{3}\times\frac{22}{7}\times(14^2+7^2+14\times7)\times30$$

$$=1\times\frac{22}{7}\times(196+49+98)\times10=\frac{22}{7}\times343\times10=10780\,cm^3$$

$$=\frac{10780}{1000}\text{ litres}.....(1\,\text{litre}=1000cm^3)$$

= 10.78 litres

Q.4 Solve the following questions (Any two): **8M**

i. **Given :** 2QA = QC

2QB = QD

To prove : CD = 2AB

Proof : $2QA=QC \;\therefore \frac{QA}{QC}=\frac{1}{2}$ .....(I)

$2QB=QD \;\therefore \frac{QB}{QD}=\frac{1}{2}$ .....(II)

$\therefore \frac{QA}{QC}=\frac{QB}{QD}$ …… from (I) and (II)'

In ΔAQB and ΔCQD,

$\frac{QA}{QC}=\frac{QB}{QD}$ ……..Proved

$\angle AQB \cong \angle DQC$ ……..opposite angles

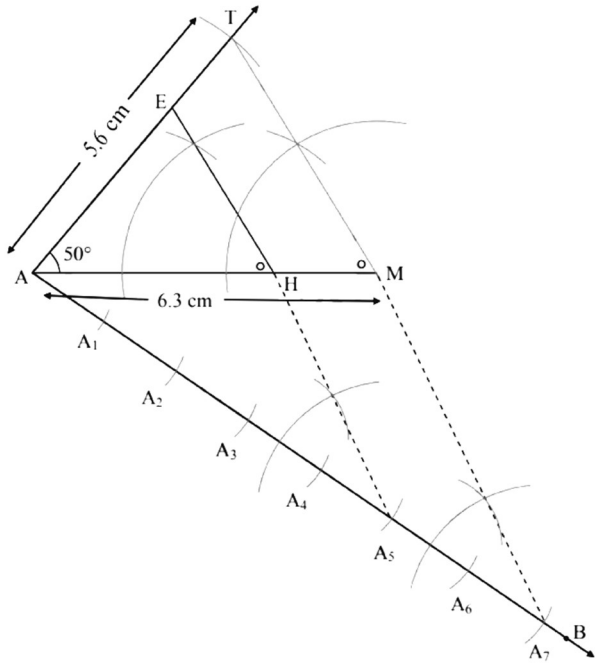
$\therefore \Delta AQB \sim \Delta CQD$ ……...(SAS test of similarity)

$\therefore \quad \frac{AQ}{CQ}=\frac{QB}{QD}=\frac{AB}{CD}$ ….. corresponding sides are proportional

But, $\frac{AQ}{CQ}=\frac{1}{2} \quad \therefore \quad \frac{AB}{CD}=\frac{1}{2}$

$\therefore \quad 2AB = CD$

ii.



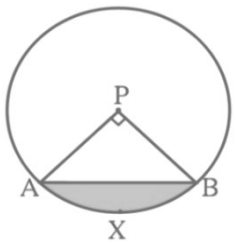
iii. r = 10cm, $\theta = 90$, $\pi = 3.14$

$$A(P-AXB) = \frac{\theta}{360}\times\pi r^2$$

$$= \frac{90}{360}\times 3.14\times 10^2$$

$$= \frac{1}{4}\times 314$$

$$= 78.5\,cm^2$$



$$A(\Delta APB) = \frac{1}{2}\text{base}\times\text{height}$$

$$= \frac{1}{2}\times 10\times 10 \qquad = 50cm^2$$

A(minor segment)= $A(P-AXB) - A(\Delta PAB)$

$= 78.5 - 50 \qquad = 28.5\,cm^2$

A(major segment)= S(circle) – A(minor segment)

$= 3.14\times 10^2 - 28.5$

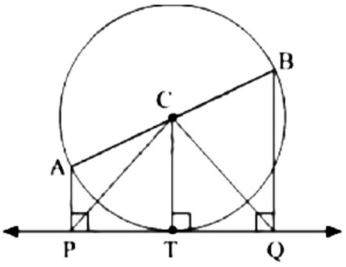
$= 314 - 28.5 \qquad = 285.5\,cm^2$

Q.5 Solve the following questions. (Any one) **3M**

i. Seg AB is a diameter of a circle with centre C.

$\therefore \quad AC = CB$ …..(Radii of the circle)

Join CP, CT and CQ.



It is given that line PQ is a tangent, which touches the circle at point T.

$\therefore$ $\angle CTP = \angle CTQ = 90°$ ...(Tangent at any point of a circle is perpendicular to the radius through the point of contact)

$\Rightarrow$ $\text{seg}CT \perp \text{line}PQ$

Also, $\text{seg}AP \perp \text{line}PQ$ and $\text{seg}BQ \perp \text{line}PQ$.

$\therefore$ seg AP || seg CT || seg BQ

We know, the ratio of the intercepts made on a tranversal by three parallel lines is equal to the ratio of the corresponding intercepts made on any other transversal by the same parallel lines.

$\therefore \quad \frac{PT}{TQ} = \frac{AC}{CB}$

$\Rightarrow \quad \frac{PT}{TQ} = 1 \ (AC = CB)$

$\Rightarrow \ PT = TQ \qquad .....(1)$

In ΔCPT and ΔCQT,

$\text{seg}PT \cong \text{seg}TQ$ .....[From(1)]

$\angle CTP = \angle CTQ$ ……(Tangent theorem)

$\text{seg}CT \cong \text{seg}CT$ ……(Common)

$\therefore \quad \Delta CPT \cong \Delta CQT$ ……(SAS congruence criterion)

$\Rightarrow$ $\text{seg}CP \cong \text{seg}CQ$ …..(corresponding parts of congruent triangles)

Hence proved.

ii.

$\cos\theta = \frac{\sqrt{3}}{2} \quad \therefore \quad \sec\theta = \frac{2}{\sqrt{3}}$

$\sin^2\theta + \cos^2\theta = 1$

$\therefore \quad \sin^2\theta + \left(\frac{\sqrt{3}}{2}\right)^2 = 1$

$\therefore \quad \sin^2\theta = 1 - \frac{3}{4} = \frac{1}{4}$

$\therefore \quad \sin\theta = \frac{1}{2} \quad \therefore \quad \text{cosec}\theta = 2$

$\therefore \quad \frac{1-\sec\theta}{1+\text{cosec}\theta} = \frac{1-\frac{2}{\sqrt{3}}}{1+2}$

$= \frac{\frac{\sqrt{3}-2}{\sqrt{3}}}{3} \qquad = \frac{\sqrt{3}-2}{3\sqrt{3}}$