Mathematics
CLASS X

| | | | | |
|---|---|---|---|---|
| TNo: 21 | Nq: 16 | MM:80 | Ta: hrs | Dt. 06.02.06 |
| Tc: Mensuration & Trigonometry. | | | | |

## PART- I (4 marks each).

Q1. Evaluate $\tan 5^o.\cos 85^o + Sin 85^o Cos 5^o - Cos 0^o$

OR

$$Sec\theta + 1 + \tan\theta + Sin\theta = \frac{Sin\theta + 1}{Sec\theta - 1}$$

Q2. A hemispherical tank full of water is emptied by a pipe at the rate of 25/7 liters per second. How much time will take to half empty the tank, if the tank is 3 m in diameter.

Q3. Prove the identity $\dfrac{Sec\theta - 1 + \tan\theta}{1 + Sec\theta + \tan\theta} = \dfrac{Sin\theta + 1}{\cos\theta}$

Q4 If $Cos\theta + Sin\theta = \sqrt{2}Cos(90 - \theta)$ find the value of $Cos\theta - Sin\theta$

Q5 Bottom of a pot in the convex of hemispherical high by 2 cm and top concave with same dept if the distance between the cap depth and tip bottom is 3cm. Find the capacity of the pot.

Q6 500 persons took dip in a rectangular tank, which is 80m long and 50 m broad what is rise of water level in the tank, if the average displacement of the water by a person is 0.04 cubic meter.

Q7 In a cylinder of height 4 cm and diameter is 6cm two cones fitted in it. As the height of first cone is equal to that of cylinder and second cone having curved surface area equal to $3\sqrt{13}\pi$. Find the volume inscribed between these two cones in cylinder.

Q8 Evaluate

$$\frac{\sin 39^o}{\cos 51^o} + 2\tan 11^o \tan 31^o \tan 45^o \tan 79^o - 3(Sin^2 21^o + \sin^2 69^o)$$

## PART- II (6 marks each).

Q9 An aeroplane when 3000m high passes vertically above another aeroplane at an instant when the angles of elevation of the two aeroplanes from the same point on the ground are 60 and 45 respectively. Find the vertical distance between the two aeroplanes.

Q10 The radii of the internal and external surfaces of a hollow spherical shell are 3cm and 5cm respectively. If it is melted and recast into a solid cylinder of height is $2\frac{2}{3}$cm. Find the diameter of the cylinder.

Q11 The angle of elevation , $\theta$ of a vertical tower from a point on ground is such that its tangent is $\frac{5}{12}$. On walking 192 meters towards the tower in the same straight line, the tangent of the angle of elevation, $\phi$ is found to be $\frac{3}{4}$. Find the height of the tower.

Q12 A solid toy is in the form of a hemi-sphere surmounted by a right circular cone. Height of the cone is 2cm and diameter of the base is 4cm. If a right circular cylinder circumscribes the solid. Find how much more space it will cover.

Q13 From the top of a tower angle of depression to the top of a pole, which is unit distance from the bottom of the tower, is $60^o$.going away from pole another point makes angle of elevation to the top of pole is $30^o$ and angle of depression of this point from the top of tower is $45^o$. Find distance of this point from tower & also find the height of tower and pole.

Q14 An funnel of tin sheet consists of a cylindrical portion 10cm long attached to a frustum of a cone. If the total height is 22cm., diameter of the cylindrical portion be 8cm and the diameter of top of the tunnel is 18cm, find the area of the tin required to make the funnel.

Q15 If the radii of the ends of a bucket 45 cm high are 28 cm and 7 cm, determine the capacity and surface area.

Q16 The horizontal distance between two towers is 140 m. The angle of elevation of the top of the first tower when seen from the top of the second tower is $30^{\circ}$. If the height of the second tower is 60 m, find the height of the first tower.