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Paper prepared by

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**Section A MCQ – 1 Mark Each**

- Q.1 When a point is observed, the angle formed by the line of sight with the horizontal where the point being viewed is above the horizontal level is known as
- (a) angle of elevation (b) angle of depression  
(c) angle of a triangle (d) right angle
- Q.2 The angle of elevation of the top of a tower from a point 40 meters away from its base is  $45^\circ$ . The height of the tower is
- (a) 20 m (b) 40m (c) 30 m (d) None of these
- Q.3 A portion of a 30m long tree is broken by wind and the top struck up the ground making an angle of  $60^\circ$  with the ground level. The height of the point where the tree is broken is equal to
- (a) 20m (b) 7.5 m (c) 10m (d) None of these
- Q.4 The length of the shadow of a tower standing on level ground is found to be  $2x$  meters longer when the sun's altitude is  $30^\circ$  than when it was  $45^\circ$ . Prove that the height of tower is  $x(\sqrt{3} + 1)$  meters.

**Section B – 2 Mark Each**

- Q.5 A round balloon of radius 'a' subtends an angle  $\theta$  at the eye of the observer while the angle of elevation of its centre is  $\phi$ . Prove that the height of the centre of the balloon is  $a \sin \phi \operatorname{cosec} \theta / 2$ .
- Q.6 An aeroplane flying horizontally at a height of 2500 m. above the ground is observed at an elevation of  $60^\circ$ , and after 15 seconds, the elevation is observed to be  $30^\circ$ . Find the speed of the aeroplane in km/hr.

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**Section B – 3 Mark Each**

- Q.7 An aeroplane when 3000 m high, passes vertically above another plane at an instant, when the angle of the elevation of the two aeroplanes from the same point on the ground are  $60^\circ$  and  $45^\circ$  respectively. Find the vertical distance between aeroplanes.
- Q.8 If the angle of elevation of the cloud from a point  $h$  m above a lake is  $\alpha$  and the angle of depression of its reflection in the lake is  $\beta$ , prove that the height of the cloud is  $\frac{h(\tan\beta + \tan\alpha)}{\tan\beta - \tan\alpha}$
- Q.9 The angle of elevation of a cliff from a fixed point is  $\theta$ . After going up a distance of  $k$  metres towards the top of the cliff at an angle of  $\phi$ . It is found that the angle of elevation is  $\alpha$ , show that the height of the cliff is  $\frac{k(\cos\phi - \sin\phi \cot\alpha)}{\cot\theta - \cot\alpha}$

**Section B – 4 Mark Each**

- Q.10 A man standing on the deck of a ship, which is 10m above water level, observes the angle of elevation of the top of a hill as  $60^\circ$  and angle of depression of the base of the hill as  $30^\circ$ . Find the distance of the hill from the ship and height of the hill.
- Q.11 As observed from the top of a light house, 100m high above sea level, the angle of depression of a ship, sailing directly towards it, changes from  $30^\circ$  to  $60^\circ$ . Determine the distance travelled by the ship during the period of observation.

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