APPLICATIONS OF TRIGONOMETRY
(Examination)

Time: 1.5 Hrs **Maximum Marks: 50**

SUBJECTIVE

Q1.Write 'True' or 'False' and justify your answer in each of the following: (4 M)

(a)The angle of elevation of the top of a tower is 30°. If the height of the tower is doubled, then the angle of elevation of its top will also be doubled.

(b)If the height of a tower and the distance of the point of observation from its foot, both, are increased by 10%, then the angle of elevation of its top remains unchanged.

(c) If the length of the shadow of a tower is increasing, then the angle of elevation of the sun is also increasing.

(d)If a man standing on a platform 3 meters above the surface of a lake observes a cloud and its reflection in the lake, then the angle of elevation of the cloud is equal to the angle of depression of its reflection.

Q2.An observer 1.5 meters tall is 20.5 meters away from a tower 22 meters high. Determine the angle of elevation of the top of the tower from the eye of the observer. (2M)

Q3.A spherical balloon of radius r subtends an angle θ at the eye of an observer. If the angle of elevation of its center is φ, find the height of the center of the balloon. (5M)

Q4.From a balloon vertically above a straight road, the angles of depression of two cars at an instant are found to be 45° and 60°. If the cars are 100 m apart, find the height of the balloon. (4M)

Q5.The angle of elevation of the top of a tower from a certain point is 30°. If the observer moves 20 meters towards the tower, the angle of elevation of the top increases by 15°. Find the height of the tower. (4M)

Q6.A ladder rests against a vertical wall at an inclination α to the horizontal. Its foot is pulled away from the wall through a distance p so that its upper end slides a distance q down the wall and then the ladder makes an angle β to the horizontal. (5M)

Show that $\frac{p}{q} = \frac{cos\beta - cos\alpha}{sin\alpha - sin\beta}$

Q7.The angle of elevation of the top of a tower 30 m high from the foot of another tower in the same plane is 60° and the angle of elevation of the top of the second tower from the foot of the first tower is 30°. Find the distance between the two towers and also the height of the other tower. (5M)

Q8.The angle of elevation of the top of a vertical tower from a point on the ground is 60 degrees . From another point 10 m vertically above the first, its angle of elevation is 45 degrees . Find the height of the tower. (2M)

Q9.The lower window of a house is at a height of 2 m above the ground and its upper window is 4 m vertically above the lower window. At certain instant the angles of elevation of a balloon from these windows are observed to be 60 and 30 , respectively. Find the height of the balloon above the ground. (5M)

Q10.A window of a house is h meters above the ground. From the window, the angles of elevation and depression of the top and the bottom of another house situated on the opposite side of the lane are found to be α and β, respectively. Prove that the height of the other house is $h (1 + \tan \alpha \cot \beta)$ meters. (5M)

Q11.From the top of a tower h m high, the angles of depression of two objects, which are in line with the foot of the tower are α and β (β > α). Find the distance between the two objects. (5M)

Q12..From the top of a cliff 50 m high, the angles of depression of the top and bottom of a tower are observed to be 30° and 45° respectively. Find the height of the tower. (4M)

Best of Luck!!!