

ANY MISSING DATA CAN BE ASSUMED.

ANSWER ALL QUESTIONS: (Maximum Degree 100)

QUESTION 1: (15 points)

- 1- Engineer must use to determine wind speed, while the direction of wind can be determine by
- 2- The apron width is the distance from To
- 3- Coastal structures are subjected to the effect of,,,
- 4- Neap tide is while spring tide is
- 5- A fetch is defined as

QUESTION 2: (25 points)

- a) State the advantages of rubble mound breakwater.
- b) Design and draw a suitable section at a head of the main breakwater (Rubbel mound breakwater) where both the sea side and harbor side water depth = 15 m (sea side slope = 1 : 1.5) , $H_o = 3.5$ m , $T = 9.50$ sec , tidal range = 0.50 m and $K_r = 0.92$ at the given depth.
- c) If we use a composite breakwater instead of rubble mound breakwater, calculate the wave pressure diagram using a suitable method, also design rubble base.

QUESTION 3: (30 points)

- a) - Mooring lines are defined as
- Show by sketches the forces on cable element .
- b) (See Figure 1) A surface buoy is to be set in a uniform current of two knots with a 0.5 in. neutrally buoyant mooring line. The drag on buoy is estimated to be 400 Ib. The depth of the water is 656 ft. If the tension isn't to exceed 1000Ib., what is the minimum length of line required ? (Use $C_{DN} = 1.5$)

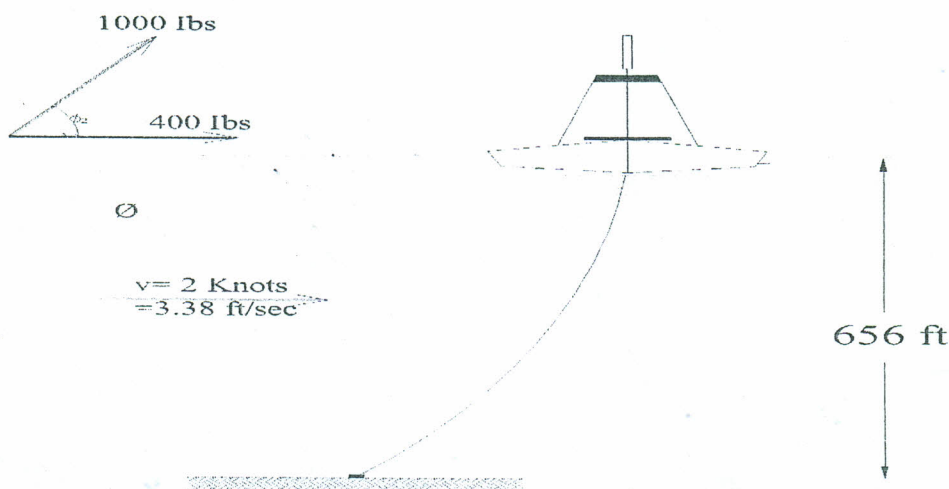


Figure 1

QUESTION 4: (30 points)

(See Figure 2) A surface float is moored with chain weighing 2.5 lb/ft. The depth is 145 ft and the drag on float is 225 lb. What should be the minimum length of chain if the allowable maximum angle of the mooring line with the horizontal is 30° at the anchor?

What is then the tension at the anchor and at the buoy?

What is the excursion of the buoy downstream?

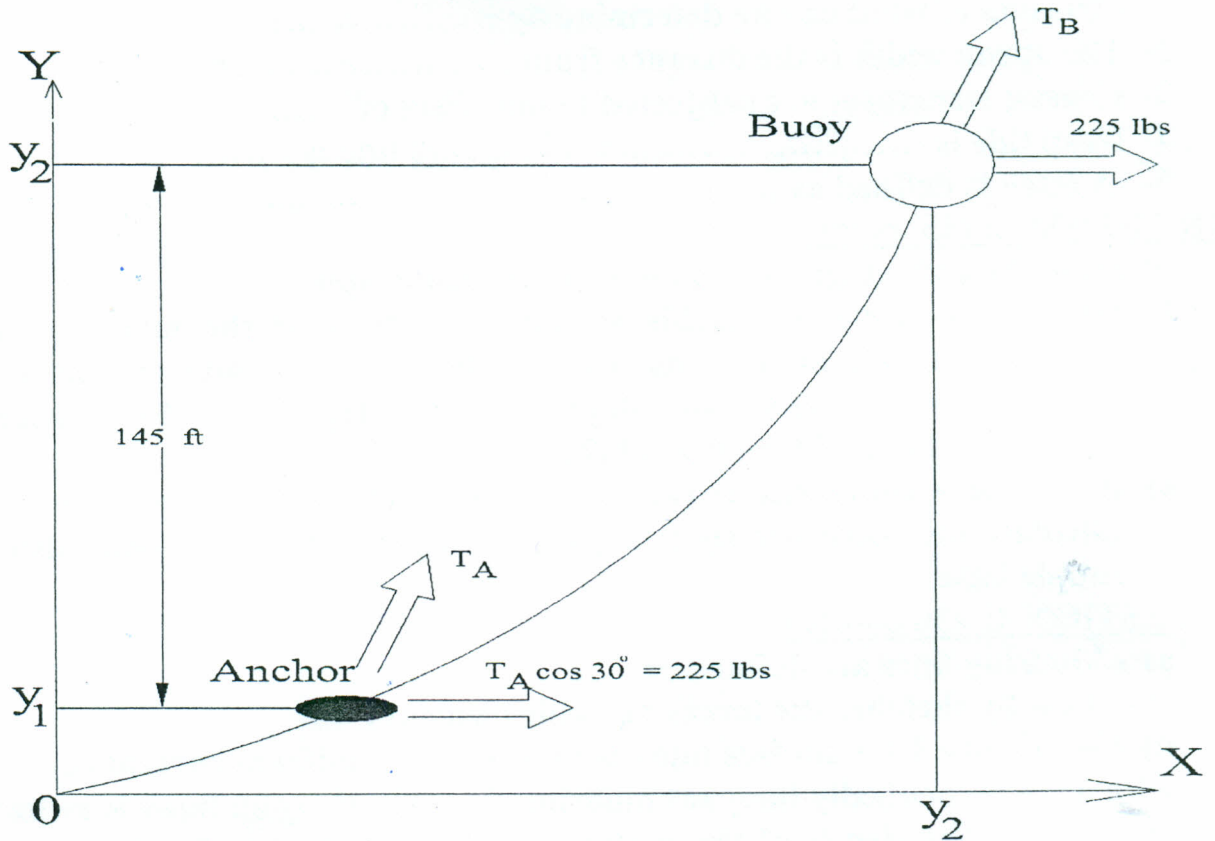


Figure 2

Good luck

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