Marine Engineer Class 3

Marine Engineering Mechanics (Mock Test)

Date: **07th September 2018**

Time: **1030 hours**

Time Allowed: **90 minutes (5 minutes extra for reading the examination paper)**

Passing Marks: **30 out of 50**

Weighting: **50% of final applied mechanics grade**

Number of Questions: **All Questions are compulsory**

Instructions:

1) **Do not start writing until you are told to do so by the Supervisor**
2) **Candidates may bring drawing instruments and non-programmable calculators to the examination.**
3) **All written answers must be in ink.**
4) **Drawings can be done in pencil.**
5) **ALL working must be shown for full marks to be given**

NO CELLPHONES/SMARTWATCHES ARE PERMITTED IN THE EXAMINATION ROOM

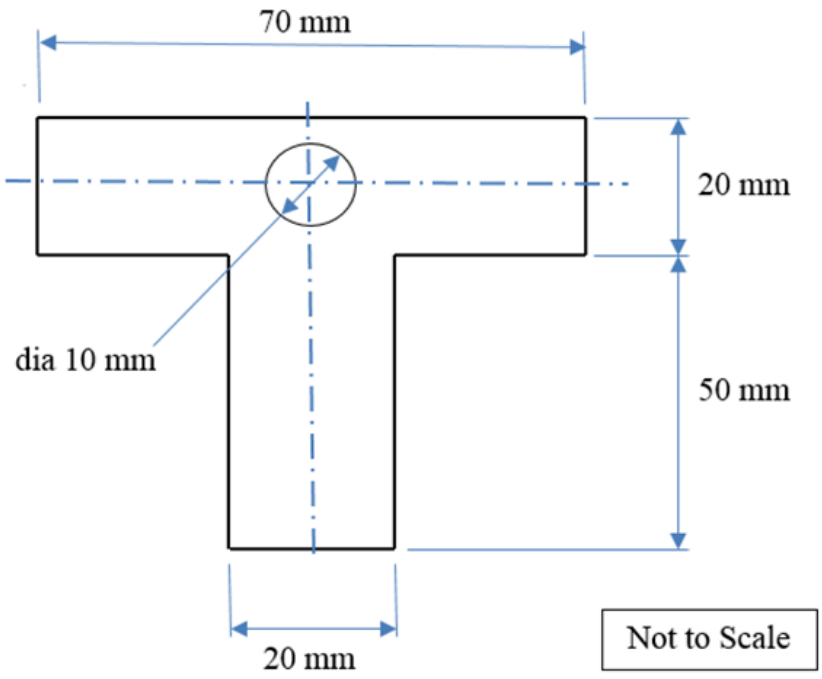
Question 1 — Total: 15 marks

Three forces pulling on a body are in equilibrium. The direction of one is due North, the direction of another is 65^0 East of South, and the third force acts in the direction 45^0 West of south. If the magnitude of the northerly force is 155KN, find the magnitude of the other two. Draw the space diagram with Bow's notation and represent vectorally.

Question 2 — Total: 15 marks

a) A beam of uniform cross section is 10 m long and carries loads of 20KN, 30KN and 15 KN at 1m, 4m and 6m from the right end. It is simply supported at the left end and at a distance of 3m from the right end. Find the reactions at the supports. **(9 marks)**

b) Find the centroid of the area shown below with a hole, relative to the bottom edge.



(6 marks)

Question 3 — Total: 10 marks

(a) Chuck wagon travels with a constant velocity of 20 m/s for 10 seconds. Chuck then decelerates at 2 m/s^2 for 5 seconds. Determine the total distance travelled by Chuck Wagon during the 15 seconds of motion.

(Use a velocity-time graph).

Given that, $V = U + at$

Question 4 — Total: 10 marks

(a) A load of 700 kg mass is pulled along a level ground at constant speed by a pull of 2.5KN for a distance of 20 m. Calculate the coefficient of sliding friction and the work done.

Given that, $F = \mu.N$ and

Work done = Force x distance

(b) Also, calculate its acceleration and distance travelled from rest, if an additional force of 0.5 KN was applied for 5 seconds.

Where, $\mathbf{S = u\,t + \frac{1}{2}\,a\,t^2}$