

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1964.

MECHANICS AND HEAT.

WEDNESDAY, 17th JUNE - 2.30 to 4.30 p.m.

INSTRUCTIONS.

Four questions to be attempted.
All questions carry equal marks.
Illustrate your answers with sketches and diagrams where possible.

1. Define specific gravity.

Describe how you would determine the specific gravity of sand using a specific gravity bottle.

A specific gravity bottle full of water weighs 55 grams. When 11 grams of sand are poured into it, the bottle and contents then weighs 62 grams. Calculate the specific gravity of sand.

2. What is a barometer ?

Describe, with diagram, how you would set up a simple mercury barometer. Explain how it works.

What would be the effect of air over the mercury in the barometer ?

3. State the Principle of Moments.

A uniform beam, AB, 12 ft. long, weighs 20 lbs, and is supported at the ends A and B. If a load of 120 lbs is suspended from the beam at a point 5 ft. from end B, calculate the reactions at the supports.

4. Define (a) Work, (b) Power.

How many gallons of water will a 2 H.P. pump raise through a height of 30 ft. in one hour if the efficiency of the pump is 75% ? (1 gallon of water weighs 10 lbs.)

5. Given an ungraduated thermometer describe fully with diagrams of apparatus, how you would graduate it in degrees Centigrade.

Convert (a) 20°C to $^{\circ}\text{F}$ (b) 59°F to $^{\circ}\text{C}$.

6. Define specific heat.

Describe how you would determine the specific heat of a solid. State the main precautions to be taken.

A piece of metal of mass 150 gm. at a temperature of 100°C is placed in a copper calorimeter of mass 100 gm. containing 120 gm. of water at a temperature of 10°C . The final temperature of the mixture is 15.4°C . Calculate the specific heat of the metal. (specific heat of copper = 0.1).

7. Answer any five of the following:-

- (a) Distinguish between evaporation and boiling.
- (b) Why does a metal pendulum clock tend to go fast in winter and slow in summer ?
- (c) Why is alcohol preferred to Mercury for a thermometer used to measure low temperature ?
- (d) Why does a body immersed in a liquid experience an upthrust ?
- (e) What is the velocity ratio of the inclined plane shown in Fig. 1 ?
- (f) What is the resultant of the two forces shown in Fig 2 ?
- (g) Which of the liquids, A or B, in the U-tube shown at Fig. 3, has the higher density ? Give a reason for your answer.

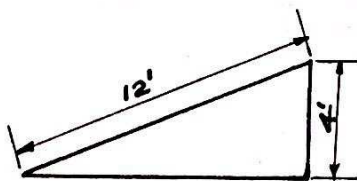


Fig. 1



Fig. 2

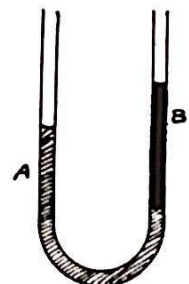


Fig. 3