

1. CALCULATE THE VOLUME OF WATER THAT ESCAPES

14.0 m<sup>3</sup>min<sup>-1</sup>

2. TWO BLOCKS A AND B OF MASSES 2KG...

1.37 ms<sup>-2</sup>; 62.54 N

3. Heat transfer in fluids occur basically through the process of \_\_\_\_\_  
convection

4. A truck of mass  $M = 5000$  kg is crossing a uniform horizontal bridge of mass  $m = 1000$  kg and length  $l = 100$  m. The bridge is supported at its two end-points. What are the reactions at these supports when the truck is one third of the way across the bridge?

2.13  $\times 10^4$  N; 3.76  $\times 10^4$  N

5. Which of the following fundamental forces is responsible for the radioactive  $\beta^+$ -decay of a particle?

Electro-weak or weak nuclear force

6. Calculate the percentage error in a steel tape used for measurement on a cold day when the temperature is  $-5^\circ\text{C}$  if it was calibrated at  $20^\circ\text{C}$ . [ $\alpha_{\text{steel}} = 1.1 \times 10^{-5} \text{ }^\circ\text{C}^{-1}$ ]

0.025 %

7. The cross-sectional area of a copper wire of length 1.1 m is 1.0 mm<sup>2</sup>. It is loaded with a 1-kg mass. Calculate the increase in length of the wire. [Take Young's modulus of copper as  $1.1 \times 10^{11} \text{ Nm}^{-2}$  and  $g = 10 \text{ ms}^{-2}$ ].

0.10 mm

8. The spread of covid-19 can be prevented by wearing face-masks. Which physical principle can be applied to correctly explain this statement?

Surface tension

9. A rocket of mass 1000 kg exhausts gases at a rate of 4 kg/sec with a velocity 3000 m/s. The thrust developed on the rocket is:

12000 N

10. An object is thrown straight upward from the edge of a building with a velocity of 20 ms<sup>-1</sup>. Where will the object be 5 s after it was thrown?

22.5 m below the point from which it was thrown

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