SENIOR FOUR PHYSICS EXERCISE

(50 marks)

1. The product of mass and acceleration is

   A. force.

   B. inertia

   C. velocity

   D. momentum.

2. A dull black surface is a good

        (i)   absorber of heat energy.

        (ii)   emitter of heat energy

        (iii)   reflector of heat energy.

   A. (i) only

   B. (ii)and(ii)only

   C. (ii) and (iii) only.

   D. (i),(ii) and (iii).

3. When an inflated ballon is released in air with its neck opened, it will

   A. rise up.

   B. drop to the ground instantly

   C. move in the opposite direction to the escaping air.

   D. remain in one position.

4. A force of 20 N extends a spring by 10 mm. Find the extension, in mm, caused by a mass of 0.5 kg.

   A. 0.25

   B. 1.00

   C. 2.50

   D. 10.00

5. A piece of metal of mass 120 g is placed in a 100 ml measuring cylinder containing 20 ml of water. Find the density of the metal if the water level rises to the 50 ml mark.

   A. 1.2 g cm^{-3}

   B. 2.4 g cm^{-3}

   C. 4.0 g cm^{-3}

   D. 6.0 g cm^{-3}

6. Surface tension in a liquid may be weakened by

   A. lowering the temperature.

   B. adding soap solution

   C. increasing the amount of liquid.

   D. increasing the density of the liquid.

7. Radiation is the transfer of heat

   A. in a liquid which involves the movement of the molecules.

   B. from one place to another by means of electromagnetic waves.

   C. through a material medium without the bulk movement of the medium.

   D. through a fluid which involves the bulk movement of the fluid itself.

8. When potassium dichromate dissolves at the bottom of a water container, it spreads slowly throughout water by a process called

   A. evaporation.

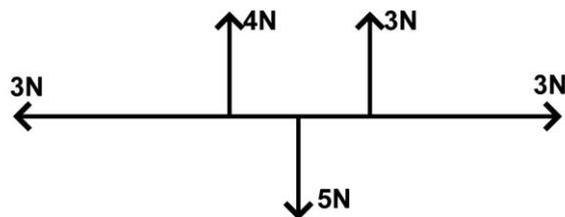   B. diffusion.

   C. capillarity

   D. convection.

9.

Fig. 6

Five forces of 5N, 3N, 4N, 3N and 3N act on a body as shown in Figure 6. Find the resultant force on the body.

 A. 2N

 B. 7N

 C. 12N

 D. 18N.

10. When a steadily increasing force is applied to a moving object, all the following change except

    A. acceleration.
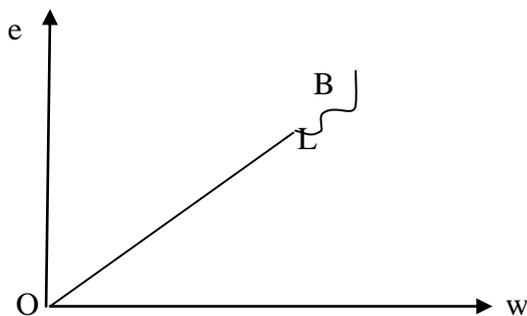
    B. momentum.

    C. speed.

    D. mass.

11. (a) State **Hooke's law of elasticity**. (01 mark)

  (b) Different loads, w, are applied to the end of an elastic wire and the corresponding extension, e, of the wire recorded.

    (i) Sketch a labelled graph of e against w. (03 marks)

    (ii) Describe briefly the features of the graph in (b) (i). (02 marks)

  (c) A spring of natural length 5.0×10^{-2} m extends by 2.0×10^{-3} m when a force of 1.8 N acts on it.

    Calculate the extension when a force of 10N is applied to the spring. (06marks)

(d) Describe an experiment to demonstrate the existence of surface tension
(2marks)

12. (a) State Newton's laws of motion. (03 marks)

(b) A block of mass 50 kg is pulled from rest along a horizontal surface by a rope tied to one face of the block as shown in Figure 1.
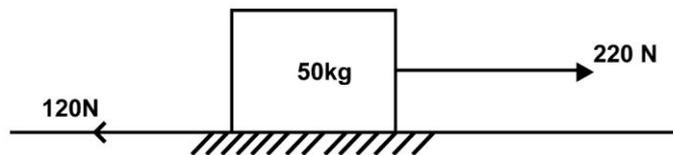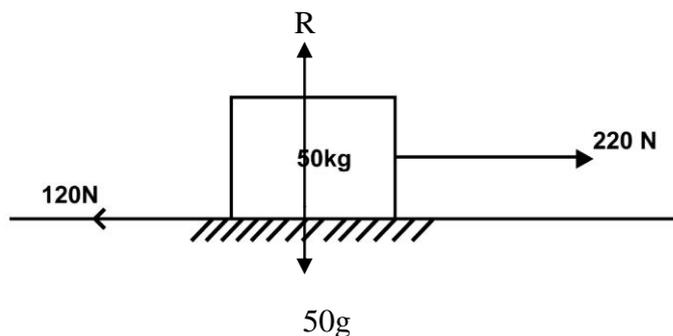

Fig 1

The tension in the rope is 220 N. The frictional force between the block and the horizontal surface is 120 N.

(i) Find the acceleration of the block. (03 marks)

(ii) Calculate the distance moved by the block in 4.0 s. (02 marks)

(iii) What is the reaction of the surface on the block? (02marks)

50g

(iv) Compare the work done by the tension in the rope during the 4.0 s interval with kinetic energy gained. (06 marks)

13. (a) What is meant by **pressure**? (01 mark)

   (b) (i) Explain why one feels more pain when pricked with a needle than when pricked with a nail. (05 marks)

      (ii) State the **assumption made**. (01 mark)

  (C) Calculate the pressure exerted on the ground by a box of mass 10 kg when corresponding area of contact is 2 m^2 (03 marks)