FORM 4 PHYSICS

NAME:……..……..ADM:……..DATE:……..

1. Some students wish to determine the focal length of a convex lens of thickness 0.6cm using an optical pin and a plane mirror. Figure 6 shows the experimental set up when there is no parallax between the pin and the image.

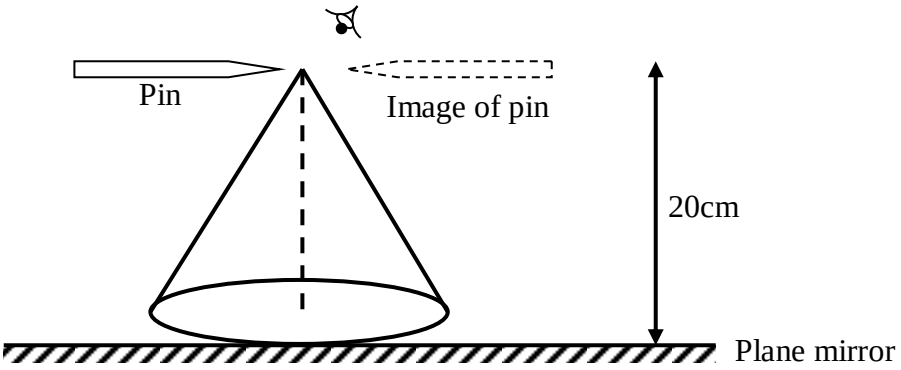


Fig. 1
Determine the focal length of the lens (2 marks)

(b) **Figure 2** shows an object O placed in front of a diverging lens whose principal focus is F.

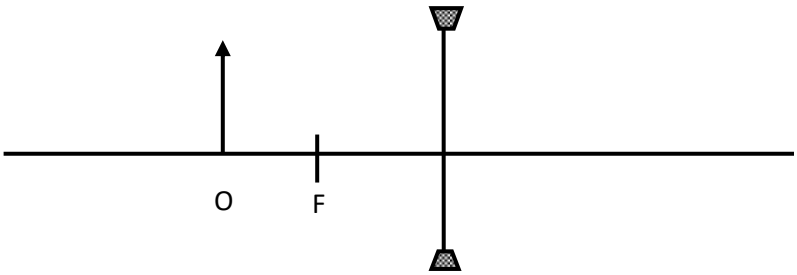


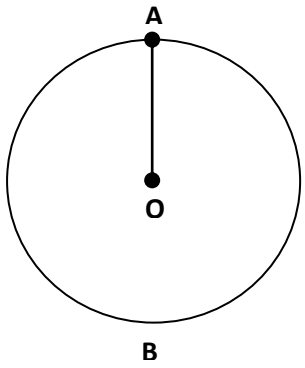
Figure 2

On the diagram, draw rays diagram to locate the image formed. (3marks)

(c) A lens forms an image four times the size of an object on a screen. The distance between the object and the screen .is 100cm when the image is sharply focused.
i) State with reason what type of lens is used. 1mk

ii) Calculate the focal length of the lens 3mks

2. The figure below shows a stone of mass 450g rotated in a vertical circle at 3 revolutions per second. If the string has a length of 1.5m, determine:



(i) The linear velocity (3mks)

(ii) The tension of the string at position **A** (3mks)

b) On the same diagram indicate the path that the stone will follow if the string snaps at point B (1 Mk)

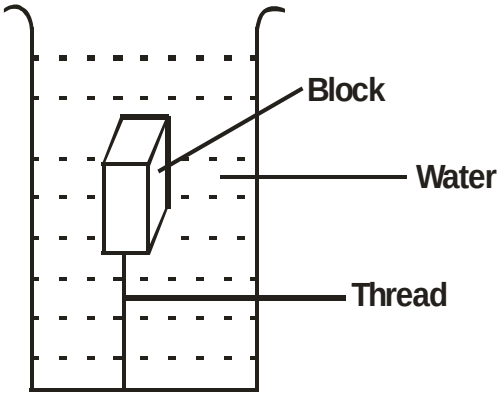
(c) A stone is whirled with uniform speed in horizontal circle having radius of 10cm. It takes the stone 10 seconds to describe an arc of length 4cm. Determine:

(i) The angular velocity ω (3mks)

(ii) The period **T** (3mks)

3. a) State Archimede's principle. (1 mark)

b) The figure below shows a cubic block of sides 4cm and density 800kg/m^3 attached to the base of water by means of an inextensible thread. (Take g = 10m/s^2 and density of water as 1000kg/m^3)



Determine;

i) The weight of the block. (3 marks)

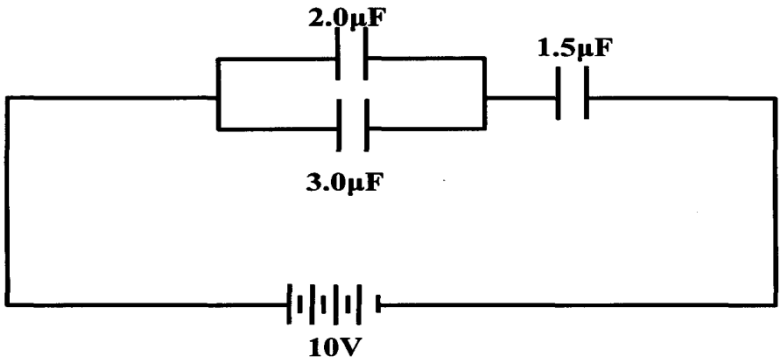
ii) Upthrust on the block. (3 marks)

iii) Tension in the thread. (2 marks)

4. A 180w heater is immersed in a copper calorimeter of mass 100g containing 200g of alcohol. When the heater is switch on for 36 seconds the temperature of the calorimeter and its contents raises by 12^0C. Determine the specific heat capacity of alcohol (Take specific heat capacity of copper = 400Jkg^{-1}K^{-1}). (3mks

5. A bubble of air rising from the bottom of a bond doubles its volume just as it reaches the surface of the pond. Explain this observation. (2marks)

6. The figure below shows a capacitor network setup.



Calculate the charge stored by the 1.5 µ. F capacitor. (3mks)

7. A box of mass 300kg is pulled along an inclined plane by a force of 2000N as show in figure 6

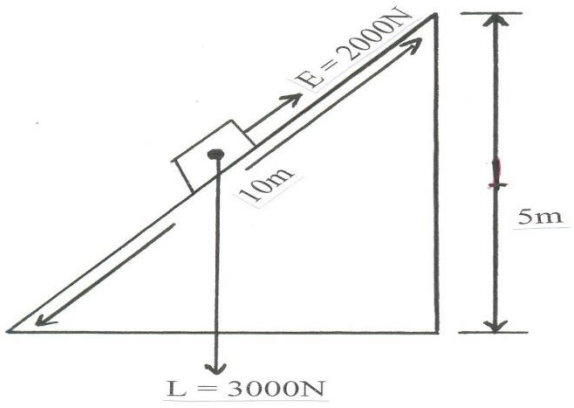
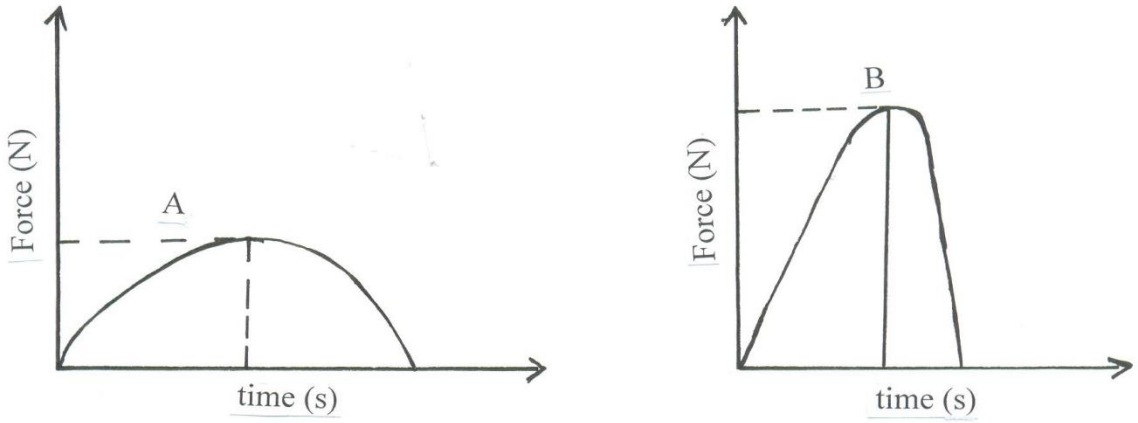


Fig 6

Determine the efficiency of the inclined plane. (3mks)

8. State one importance of anomalous expansion of water. (1mk)

9. Figure 15 below shows graphs of two objects A and B of the same mass dropped from the same height. Object A landed on a foam mattress while B landed on a concrete floor



(i) State which object had a higher force of impact. (1mk)

(ii) What does the area under each curve represent (1mk)

10. (i) What is the difference between stationary and progressive waves (1mk)

(ii) State two distinctions between the way sound waves and electromagnetic waves are transmitted. (2mks)