

# PHYSICS

## FORM 2

TIME: 1 HR 10 MINS

1. (a) State the laws of reflection. (2 marks)

- (i) Angle of incidence is equal to the angle of reflection.
- (ii) Incident ray, reflected ray and the normal all lie on the same plane

b) State two application of electrostatics. (2 marks)

- Electrostatic Precipitators
- Finger printing
- Spray painting
- Photocopying

(2) accept 2 correct

a) List 3 advantages of alkaline accumulators over lead-acid accumulators. (3 marks)

- They have a much longer life than the lead-acid ones
- They supply larger amounts of current for longer period
- Can be left unused for months without any damage.

any other accept.

b) A battery circulated charge round a circuit for 1.5 minutes. If the current is held at 25 A, what quantity of charge passes through the wire. (3 marks)

$$Q = It$$

$$= 25 \times 1.5 \times 60$$

$$= \underline{\underline{2,250 \text{ C}}}$$

(3)

2. (a) Explain the meaning of the following: (3 marks)

(i) Magnetic field-

- This is the space around a magnet where magnetic influence is felt.

(ii) Magnetic lines of force-

Are uniform patterns found around a magnet that starts from north pole to south pole.

(3)

(b) Describe three methods of demagnetizing a permanent magnet. (3 marks)

- (i) Hammering - The magnet is hammered while facing East-West direction. This makes the dipoles in the domain to be disoriented and face in different direction and hence it loses magnetism.
- (ii) Heating - The magnet is strongly heated while facing

- (c) Use the domain theory to explain the difference between magnetic and non-magnetic material. (3 marks)

magnetic materials contain dipoles in each domain face in the same direction. While the dipole in non-magnetic material face in different direction.

3. (a) Write the following to 2 significant figures.

7321769

(1 mark)

73

0.0008996

(1 mark)

0.00090

- (b) If an oil drop of diameter 0.5mm spreads on the surface of water to form an oil patch of diameter 0.2m. Estimate the thickness of the oil molecule. Write your answer to 3 significant figures. (3 marks)

$$\frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times \frac{0.5}{2} \times \frac{0.5}{2} \times \frac{0.5}{2} = 0.0654498 \text{ mm}^3$$

$$\pi r^2 = \frac{22}{7} \times 100 \times 100 = 31,428.57$$

$$\text{Thickness} = \frac{\frac{4}{3}\pi r^3}{\pi r^2} = \frac{0.0654498}{31,428.57}$$

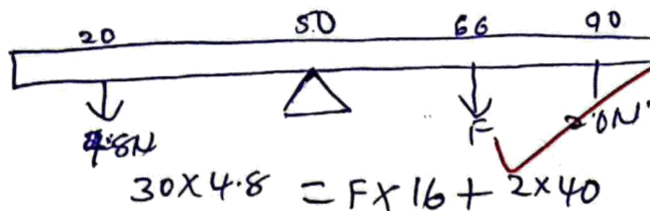
$$= 2.0825 \times 10^{-6}$$

4. (a) Define moment and state its SI unit.

is the turning effect of force S.I unit Newton metre

- (b) A uniform metre rule pivoted at its centre is balanced by a force 4.8 N at 20cm mark and some other two forces F and 2.0N at the 66cm and 90cm marks respectively. Calculate F.

(3 marks)



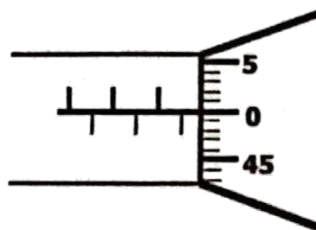
$$30 \times 4.8 = F \times 16 + 2 \times 40$$

$$144 = 16F + 80$$

$$\frac{64}{16} = \frac{16F}{16}$$

$$F = 4 \text{ N}$$

5. Figure below shows part of a micrometer screw gauge. Use the information and the figure to answer questions (i) and (ii)



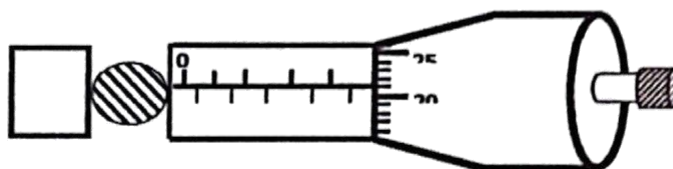
- (i) State the pitch of the micrometer screw gauge (1 mark)

0.05

- (ii) What are the two limitations of the micrometer screw gauge (2 marks)

- It cannot measure large objects  
- It has zero errors

6. A spherical ball bearing of mass 0.0024 kg is held between the anvil and spindle of a micrometer screw gauge. The reading on the gauge when the jaws are closed without anything in between is 0.11 mm.



- a) What is the diameter of the ball bearing? (2 marks)

S.S.R = 4.5  
F.S.R = 0.21

$\therefore = 4.5 + 0.21 = 4.71$   
A.R = 4.71 - 0.11 = 4.60 mm

- b) Find the density of the ball bearing correct to 3 significant figures. (3 marks)

$V = \frac{4}{3} \pi r^3$

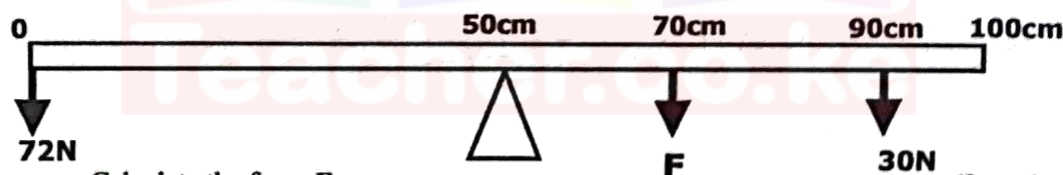
$\frac{4}{3} \times \frac{22}{7} \times 2.30^3$

50.9855

$\frac{0.0024}{50.9855 \times 10^{-6}}$

$= 47100 \text{ kg/m}^3$

7. Three forces are applied on a meter-ruler as shown.



- (i) Calculate the force F. (3 marks)

$72 \times 50 = 20 \times F + 40 \times 30$

$2160 = 20F + 1200$

$\frac{960}{20} = \frac{20F}{20}$   $F = 48 \text{ N}$  (2 marks)

- (ii) What is the reaction at the pivot?

$72 + 48 + 30$

$= 150 \text{ N}$

8. Given a bar magnet, an iron bar and a string.

- (i) Describe an experiment to distinguish between a magnet and the iron bar (3 marks)



State with a reason the observations that would be made in the experiment

(2 marks)

It settles in North - South direction

9. Explain the following observations

i. Brownian motion is exhibited by small particles

(2 marks)

accept any two

ii. Solids expand when heated.

(2 marks)

When solids are heated they gain kinetic energy and vibrate.

10. When a bar magnet is placed inside a solenoid carrying an alternating current, it loses its magnetism.

i. What is the name given to this process?

(2 marks)

Demagnetisation

ii. Explain using domain theory how this process is achieved.

(2 marks)

Alternating current disorients the dipoles in domain hence the material becomes demagnetised.

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