

**FORM 3**  
**PHYSICS THEORY**  
**END OF TERM EXAMS – MARCH 2016**  
**TIME: 2HRS**

NAME.....ADM. NO.....CLASS.....

DATE..... SIGNATURE.....

**INSTRUCTIONS TO CANDIDATES**

1. This paper consists of two sections A and B and section A (25mks) section B(55mks).
2. Attempt all the questions in each section in the spaces provided after every question.
3. All working must be clearly shown.
4. Electronic calculators may be used.
5. Take  $g = 10\text{ms}^{-2}$

**EXAMINER'S USE ONLY**

SECTION	QNS	MARKS	CANDIDATES SCORE
A	1-11	25	
B	12	17	
	13	10	
	14	16	
	15	07	
	16	05	
TOTAL		80	

## SECTION A(25MKS)

**Attempt all the questions in this section**

1. The water level in a burette is  $40.6\text{cm}^3$ . 50 drops of water each of volume  $0.4\text{cm}^3$  are added to the water in the burette. What is the final reading of the burette? (2mks)

2. The figure 1 shows a U- tube manometer used to measure lung pressure

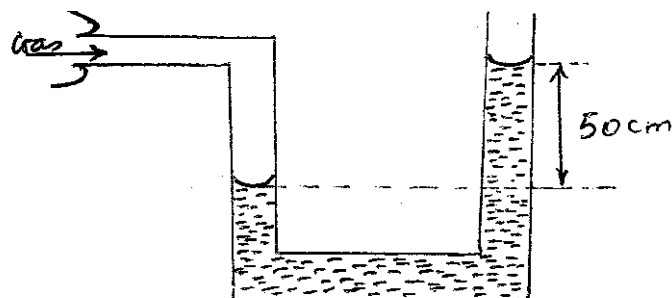


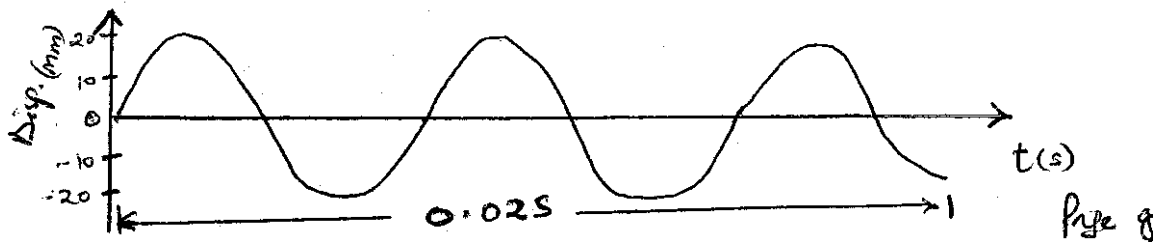
Figure 1.

Determine the lung pressure given that atmospheric pressure  $1.03 \times 10^5 \text{ Nm}^{-2}$  and density of water  $1\text{g/cm}^3$  (3mks)

3. A boy observes his face in a concave mirror of focal length  $100\text{cm}$ . If the mirror is  $80\text{cm}$  away, state one characteristic of the image observed. (1mk)
4. The coil of an electric motor is usually wound on a soft iron armature. State two purposes by this armature (2mks)

5. The element of an electric hot plate has a resistance of  $800\Omega$ . What is the energy dissipated when the element is kept on for 20 minutes on a 240v Supply (2mks)

6. The figure below shows a displacement –time graph for a wave motion



What is the frequency of the wave?

(2mks)

7. i) What is meant by the term inelastic collision

(1mks)

- ii) A car of mass 80kg moving with a speed of  $10\text{ms}^{-1}$  crashes into a wall and comes to rest in 0.4s. Find the:

a) Impulse

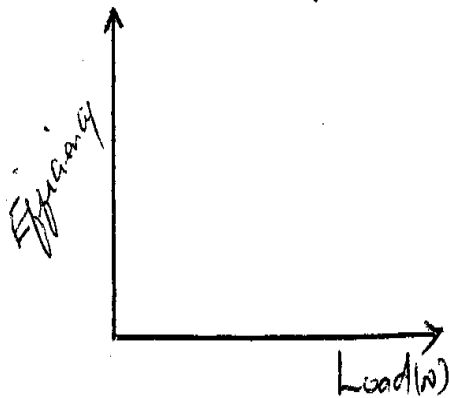
(2mks)

b) Average force by the wall

(2mks)

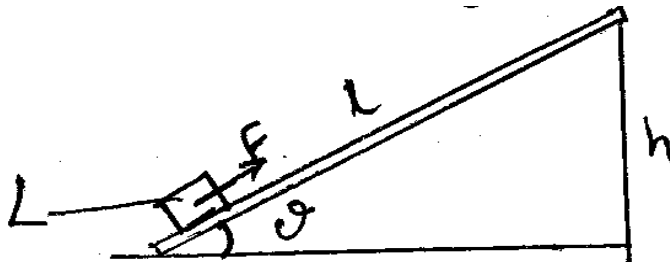
8. Calculate the refractive index of diamond, if the critical angle for the diamond is  $24^\circ$ . (2mks)

9. On the axes provide a sketch graph of efficiency ( $\eta$ ) against load ( $N$ ) for a pulley system. (1mk)



10. The figure 3 below shows an inclined machine, shows that V.R of the machine is given as;

$$V.R = \frac{1}{\sin \theta} \quad (2mks)$$



11. Given that in fig 3 above  $\theta = 30^\circ$ ,  $h = 2\text{m}$ , effort ( $E$ ) = 250N and efficiency ( $\eta$ ) = 90%. Calculate the load ( $L$ ) (3mks)

### SECTION B (55MKS)

Attempt all the questions in this section

12. a) i) State Hooke's law (1mk)

ii) The following readings were obtained when masses were hung on a certain spring.

Mass kg	0	0.02	0.04	0.06	0.08
Pointer reading (mm)	110	119	137	163	198
Extension (mm)					

- I. Complete the table above (2mks)

- II. Plot a graph of force (N) against extension (mm) (5mks)

III. From the graph find:

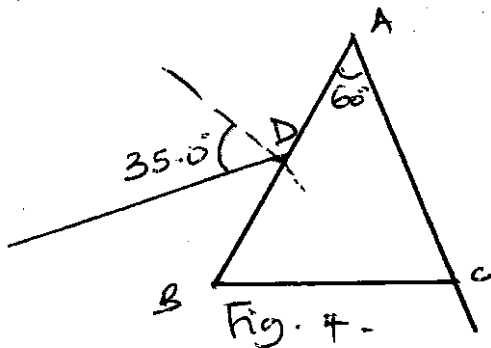
- The extension by a mass of 0.03kg (1mk)
- The force needed to produce an extension of 30mm (1mk)
- The spring constant (3mks)



- b) A vertical spring of unstretched length of 30cm has a pan attached to its lower end. When an object of mass 100g is placed on the pan, its length becomes 36cm. When another object of mass 200g is placed on the pan, the length of the spring becomes 40cm. Calculate the mass of the pan. (4cm)

13. a) The refractive index of glass is  $\frac{3}{2}$  and that of water is  $\frac{4}{3}$ . Calculate the refractive index of glass with respect to water. (3mks)

- b) The figure 4 below shows a ray of light incident at angle of  $35.0^\circ$  at point D on the first face of a glass prism ABC. The refractive index of the prism is 1.5.



- i) Determine the angle of refraction at point D. (3mks)

- ii) Complete the diagram to show the emergent ray from the face AC. (2mks)

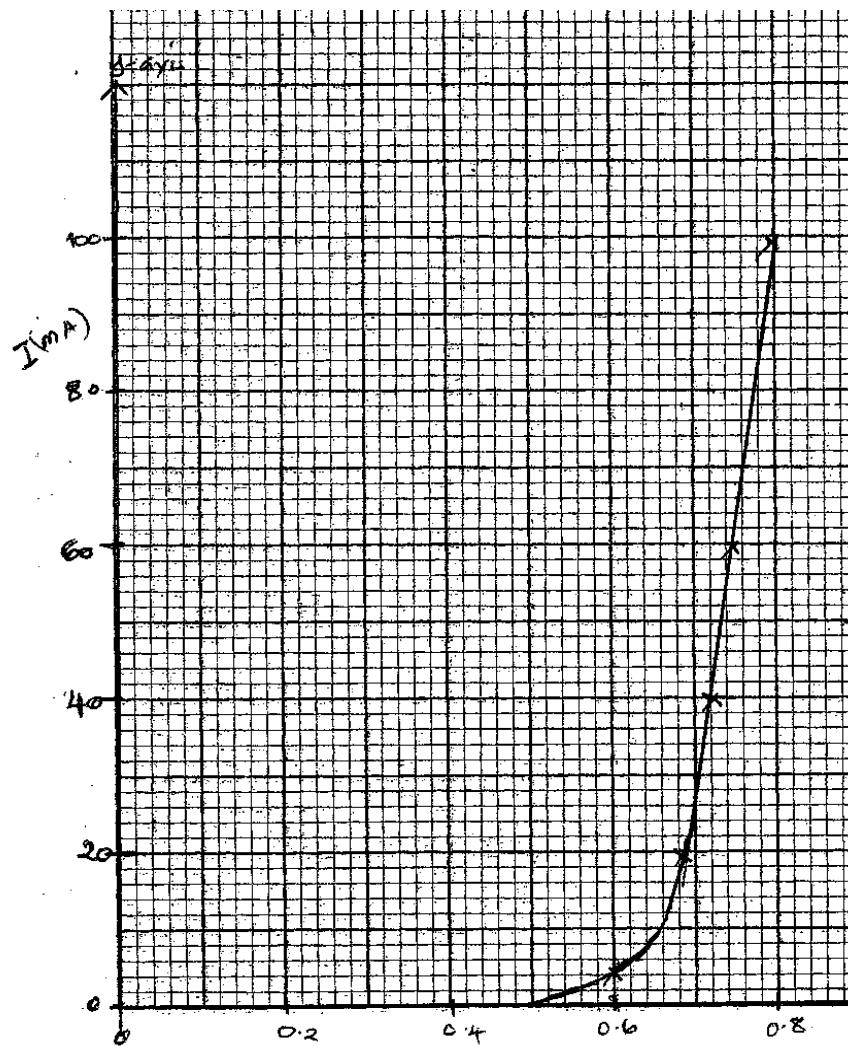
iii) State two (2) factors that contribute total internal reflection.

(2mks)

14. a) State Ohm's law

(2mks)

b) The figure 5 shows the current – voltage characteristics of a certain device X





i) State with a reason whether the device obeys Ohm's law (2mks)

ii) Determine the resistance of the device X when the current through it is 60mA (3mks)

c) The figure 6 has an e.m.f of 2.1V and negligible internal resistance.

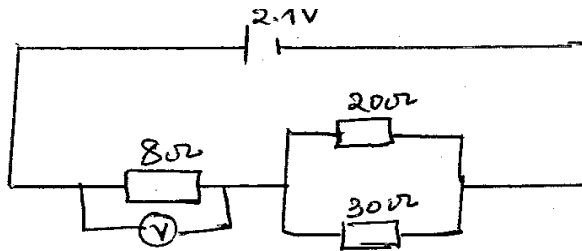


Fig. 6.

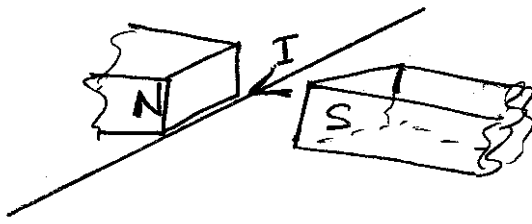
Determine the

i) Total resistance of the circuit (3mks)

ii) Current in the circuit (2mks)

iii) Reading of the rollmeter (2mks)

- d) i) Show in the current carrying conductor below the direction of force it experiences while in the magnetic field (1mk)



- ii) Give the rule you have used to indicate the direction in (i) above. (1mk)

15. a) A convex mirror of focal length 9cm produces an image on its axis 6cm away from the mirror. If the image is 3cm high, determine by scale drawing on the grid provided. ( 3mks)

i) The object distance from the mirror (1mk)

ii) The size of the object (1mk)

b) A dentist has a choice of three mirrors, a concave, a convex and a plane one to examine the back of your teeth. State which one he should use to give the best views. Give reasons for your answer (2mks)

16. a) State the Principle of Moments (2mks)

b) A uniform metal strip is 3.0 cm wide, 0.6cm thick and 100cm long. The density of the metal is  $2.7\text{g/cm}^3$ . Determine the weight of the strip. (2mks)

*END.*