PHYSCIS
FORM THREE,
END OF TERM 2
TIME: 2 ½ HOURS

NAME……ADM……CLASS……

SECTION A (25MKS)

1. **State two characteristics of image formed by plane mirrors. (2mks)**
   - Upright
   - Virtual
   - Same size as the object

2. **State two factors that affects the speed of sound air. (2mks)**
   - Wind
   - Humidity
   - Temperature
3. **What is a virtual image? (1mks)**
   An image that cannot be focused on the screen
4. **In the figure below, on the same diagram sketch the path of the ray after striking mirror AB.**

DIAGRAM

5. **An object is 25m tall is at a point 8m from the pin hole camera. If the image is 8.6m from the pin hole. Calculate the size of the image. (3mks)**
   $\frac{v}{u} = \frac{hi}{ho}$
   $\frac{8.6}{8} = \frac{push}{2.5}$
   $Hi = \frac{8.6 \times 2.5}{8}$
   $= \frac{21.5}{8} = 2.89m$
6. **A curve at the button of a jar glycerin appears to be 13,2cm below the surface glycerin. Calculate the height of the Colum of glycerin in the jar. (refractive index of glycerin is 1.47.**
   $n = \frac{\text{Real depth}}{\text{Apparent depth}}$
   $1.47 = \frac{Real}{13.2}$
   Real depth = 1.47 x 13.2
   = 19.40

7. State the law of electrostatics. (1mk)

Like charges repel while unlike charges attract.

8. The figure below shows resistor network.

From the figure determine

a) Total resistance. (3mks)

$RT = \frac{18 \times 8}{18 + 8} = \frac{144}{26} = 1.8A$

b) Total current. (3mks)

$I = \frac{v}{R} = \frac{6}{5.54} = 1.08A$

9. Distinguish between primary and secondary cells

Primary cells are not rechargeable, while secondary cells can be recharged

10. Give two uses of a gold leaf electroscope

i) Detect the sing of charge in a body
ii) Determine the quantity of charge in a body
iii) Test for insulating property of a material

11. Two mirrors are inclined at an angle 60^0c determine the number of images formed. (3mks)

$n = \frac{360}{Ø} - 1 = \frac{360}{60} - 1 = 5$ images

SECTION B (55MKS)

12. The figure below shows a transparent water tank containing water. An electric lamp surrounded by a shield with a narrow slit is fixed at corner A of the tank. A light ray from the slit shines on the water surface BC at an angle of 48^0 as shown. Refractive index of water is $^4/_3$

a) Determine the angle of retraction for the ray shown. (3mks)

b) Complete the ray diagram to show retracted ray (1mk)

c) Determine the angle of incidence for which the angle of retraction is 90^0 (3mks)

d) Calculate the speed of light in water given that the speed in air is 3.0×10^8mls

13. a) Draw magnetic field pattern between the following poles. (2mks)

N **N**

b)Using dormain theory, explain why it is not possible to magnetize a magnetic material beyond a certain limit. (3mks)

during magnetization the dipoles and the dormains align themselves in one direction such that when all the dormains and dipoles are in one direction the material is said to be magnetically saturated.

c) The figure below shows an electromagnet connected to a battery.

i) On the same diagram indicate the direction of the flow of current when the switch is closed. (1mk)

ii) State polarities A and B. (2mks)

A – North

B - South

iii) State three ways of increasing the strength of the electromagnet. (3mks)

- Increasing the number of turns
- Increasing the magnitude of current
- Using a u – shaped core

iv) State two uses of electromagnets (2mks)

Used in elective bells

14. a) Define the following terms

i) Amplitude (1mk)

Maximum displacement on either side of the wave

ii) Frequency (1mk)

No of oscillations made per second

b) state one difference between electromagnetic and mechanical waves give one example in each. (4mks)

Mechanical require medium fro transmission eg sound waves while electromagnetic waves do not require medium for transmission eg light waves

c) The wave shown in the figure below has a velocity of 200mls.

Determine

i) The period of the wave. (1mk)

$T = 10 \times 10^{-2}$

$= 0.15$

ii) The frequency of the wave. (3mks)

$F = {}^{1}/_{t}$

$= {}^{1}/_{0.1}$

$= 10Hz$

iii) The wavelength of the wave, (3mks)

$A = {}^{v}/_{f}$

$= {}^{200}/_{10}$

$= 20m$

15. a) The figure below shows circular waves approaching a concave reflector. Show the reflected waves. (2mks)

b)In the figure below water waves of one incident on an aperture which is greater than the wavelength of the waves. Show the pattern of the waves beyond the aperture. (2mks)

d) The figure below shows the set up to demonstrate interference of sound.
DIAGRAM

i)An observer moves along XY state and explain what the observer will hear. (3mks)

Loud and soft sound. Loud sound are due to constructive interference and soft sound is due to destructive interference

ii) State and explain what now the observers will hear if he moves along line 0C (2mks)

Loud sound throughout. The observers is equidistance from the two speakers at any given point.

16. a) State ohms law. (1mk)

Current through a conductor is directly proportional to potential difference across the end of a conductor provided temperature and other physical conditions one kept constant

b) Differentiate between potential difference (pd) and electromotive force (Emf) (2mks)

potential difference is the voltage across the ends of a conductor in a closed circuit while electromotive force is the voltage across the terminals of a cell in an open circuit.

c)A cell drives a current of 2.0A through 0.6 resistor. When the same cell is connected to 0.952 resistor the current that flows is 1.5A. find.

i) The internal resistance of the cell. (3mks)

E = IR + IV
E = (2 x 0.6) + 2r
E = 1.2 + 2reqn 1
E = (1.5 x 0.9) + 1.5r
E = 1.35 + 1.5r …Eqn2
1.2 + 2r = 1.35 + 1.5 v
0.5r = 0.15

R = 0.3R

ii)The electromotive force (Emf) of the cell. (3mks)

E = 1.2 + 2r

= 1.2 + 0.3 x2

= 1.2 + 0.6

= 1.8v

d)State two factors that affect the resistance of metallic conductor. (2mks)

- Length of conductor
-Cross – section area