

**AHMES SECONDARY SCHOOL**  
**PHYSICS HOLIDAY PACKAGE JUNE 2021**  
**FORM THREE**

1.
  - (a) List the factors that determine the resistance of a conductor
  - (b) Define resistivity of the material and state its SI Units
  - (c) Two resistors of  $2\Omega$  and  $5\Omega$  are connected in parallel, then connect in series to a  $3\Omega$  resistors. If a cell of  $4V$  is connected across the resistors, Calculate.
    - (i) Total resistance
    - (ii) Current through  $5\Omega$  resistor
    - (iii) Current through  $2\Omega$  resistor
2.
  - (a) Give any four factors affecting the rate of evaporation of a liquid
  - (b) What is the significance of the anomalous expansion of water?
  - (c) How much heat will be required to convert  $100g$  of ice at  $-10^{\circ}C$  to water at its boiling points?
3.
  - (a) Define the following terms as applied in physics
    - (i) Focal length
    - (ii) Principal focus
    - (iii) centre of curvature
    - (iv) radius of curvature
    - (v) a pole of curved mirror
  - (b) Distinguish between real and virtual image
  - (c) A converging lens of focal length  $15cm$  produces a real image four times larger than object. How far from lens is the object?
4.
  - (a) Why does metal seems colder to touch than the wood on a cold morning out door?
  - (b) It is found that  $9.2 \times 10^2J$  of heat is needed to heat  $2kg$  of iron from  $25^{\circ}C$  to  $35^{\circ}C$ . What is the specific heat capacity of iron?
  - (c) When cooking rice, Tanzanian house wives normally finish off by placing a cover on which there is burning charcoal over the pot containing rice. Explain why this method dries the rice better than when not used?
5.
  - (a) State the laws of refraction of light
  - (b) The refractive index of water is  $1.33$ . A tank  $5m$  deep is full of water. How much does the bottom appear to be?
  - (c) Find the refractive index of the liquid if the critical angle between a liquid and air interface is  $45^{\circ}$ .

6. Match the item in list **A** with the responses in list **B** by filling the chart below.

(a)

LIST A		LIST B	
(i)	Relation of pressure with boiling point	A)	Heat travels from hot parts to cold parts
(ii)	Refractive index	B)	Movement of water round a central heating system.
(iii)	Focal point	C)	The temperature at which the water vapour in the atmosphere is just sufficient to saturate it.
(iv)	Convection current	D)	The point at which amount of water vapour in the atmosphere is equal to the water in the container.
		E)	Ratio of weight of a substance to coefficient of friction.
		F)	Fast moving gas molecules diffuse to take as much space as possible.
		G)	Used in construction of pressure cooker.
		H)	Used in construction of hot pot.
		I)	The ratio of speed of light in air to speed of light in a medium.
		J)	Is radius of mirror from which the curved mirror is apart.
		K)	It is the middle point between centre of the curvature and the mirror.

(b)

LIST A		LIST B	
(i)	Relative humidity	A.	Temperature at which the water vapour present in the atmosphere/air is just sufficient to saturate it
(ii)	Dew point	B.	Formation of the thin film of water between the surface of the body and the ice
(iii)	Regelation	C.	The ratio of the mass of water vapour in a given volume of air to the mass of water vapour required to saturate the same volume of air at the air temperature is removed
(iv)	Bimetallic strip	D.	The process by which an ice melts when the pressure is applied on it and refreeze when the pressure is removed
(v)	Hygrometer	E.	Used in thermostats
		F.	Used to measure relative humidity
		G.	The process by which a solid substance is converted into liquid form

7. (a) (i) State conditions necessary for total internal reflection to occur.
- (ii) Why does an object appear coloured when light falls onto it.
- (b) (i) What is meant by the term complimentary colours.
- (ii) Explain why the result of mixing blue and yellow paints is very different from that of mixing blue and yellow lights.
- (c) A screen is placed 80cm from an object. A lens is used to produce on the screen an image with magnification 3. Calculate: -
- (i) The distance between the object and lens
- (ii) Focal length of the lens

8. (a) How much heat would be required to change 1.5 kg of ice at  $-10^{\circ}\text{C}$  to steam at  $100^{\circ}\text{C}$  ?
- (b) For what purpose is the following instrument?  
 (i) Edser's apparatus (ii) Calorimeter (iii) Leslie's cube (iv) Thermopile
9. (a) Why are convex mirrors used as driving mirrors? Give two reasons
- (b) Calculate the speed of light in kerosene of refractive index  $\frac{5}{4}$
- (c) Calculate the critical angle for light emerging from a glass of refractive index 1.65
10. (a) State and explain the three laws that explains thermal expansion of gases
- (b) To what temperature must  $2,000\text{cm}^3$  of a gas at  $27^{\circ}\text{C}$  be heated at constant pressure in order to raise its volume to  $2,500\text{cm}^3$ .
- (c) If  $100\text{cm}^3$  of a gas and its temperature falls from  $15^{\circ}\text{C}$  until the volume of the gas at constant pressure decreases to  $80\text{cm}^3$  what is the new absolute temperature?
- (d)  $150\text{cm}^3$  of dry gas at  $30^{\circ}\text{C}$  was heated until its volume became  $450\text{cm}^3$ . What was the final temperature?
11. (a) Given that the refractive index of glass is 1.5, calculate the angle of incidence for a ray of light travelling from air to glass if the angle of refraction is  $10^{\circ}$ .
- (b) The speed of light in medium  $m_1$  is  $2.0 \times 10^8\text{m/s}$  and in medium  $m_2$  its  $1.5 \times 10^8\text{m/s}$  calculate the refractive index of medium  $m_2$  with respect to  $m_1$
12. (a) Explain the factors affecting rate of heat transfer by conduction
- (b) State the process by which heat energy from the sun reaches the earth
- (c) 900J were used to heat mercury of mass M kg from  $-20^{\circ}\text{C}$  to  $-6^{\circ}\text{C}$ . Find the value of M.
13. (a) Why the freezer compartment in a fridge is placed at the top.
- (b) What is the effect on the melting point due to  
 (i) Pressure (ii) Impurities
- (c) (i) Define latent heat of fusion (ii) State one application of latent heat.
14. (a) Light is a part of the electromagnetic spectrum. Name the part of electromagnetic spectrum which is responsible for:  
 (i) Skin tanning.  
 (ii) TV remote control.  
 (iii) Treatment of cancer patients.  
 (iv) Cooking food.
- (b) Explain two ways in which eye lens differ from camera lens?
- (c) A pin is at the bottom of a vessel 32m deep. When the vessel is filled with water the pin appears to rise when viewed from above. Find how much the pin has been raised.