AHMES SECONDARY SCHOOL

PHYSICS HOLIDAY PACKAGE DECEMBER 2021

FORM ONE

INSTRUCTIONS

Write this work in a holiday package counter book, don't use your class book.

1. (a) State Newton's first law of motion.

   (b) List down three (3) Newton's equations of motion for a body falling freely from a certain height.

   (c) A car starts from rest and accelerates uniformly at a rate of $4m/s^2$ for five seconds. It maintains a constant speed for 20 seconds. The brakes are then applied and the car stops in the next 3 seconds. Find

      (i) Maximum speed attained.

      (ii) Total displacement.

2. (a) List three (3) differences between distance and displacement

   (b) Mention three (3) factors affecting capacitance of a capacitor.

   (c) Sketch an electric circuit by composing **ammeter, opened switch, a voltmeter, fixed resistor connecting wire and battery (2 cells).**

3. (a) A block of metal (density = 4g/cm^3) was dropped in water with volume of 40cm^3 and volume raised to 65cm^3. Find the mass of the block.

   (b) A clean dry beaker has a mass of 400g. 112cm^3 kerosene is poured into the beaker with help of burette, if the mass of beaker and kerosene rise to 500g, find density of kerosene.

4. (a) A ball of mass 0.5kg is dropped from a height of 10 m and on impact with the ground it losses 30J of energy. Calculate the height it reaches on the rebound.

   (b) Give the name of the following devices

      (i) A device used to compare the densities of two liquids which mix…….

      (ii) A device used for measuring fluid (gas) pressure……..

      (iii) An instrument used to measure atmospheric pressure……...

      (iv) A device used to compare the densities of two liquids which do not mix…….

5. (a) The mass of an empty density bottle was 50g. When filled with a certain liquid of volume 20 cm^3 its mass became 75g. Find

      (i) Density of the liquid

(ii) Relative density of the liquid

(b) What are two (2) applications of density and relative density in daily life?

6. (a) A rectangular object whose dimensions are 1.4m by 0.1m by 2.0m has a density of 20kg/m^3. Calculate

(i) Minimum pressure

(ii) Maximum pressure

(b) Why do people suffer from nose breeding at high altitudes?

(c) A column of mercury is 700 mm high and the area of its base is 2.00 cm^2. Find
(i) The pressure it exerts

(ii) The force it exerts (use 10 m/s^2 and density of mercury 13.6 g/cm^3)

7. (a) Mention any three (3) uses of current electricity in daily life

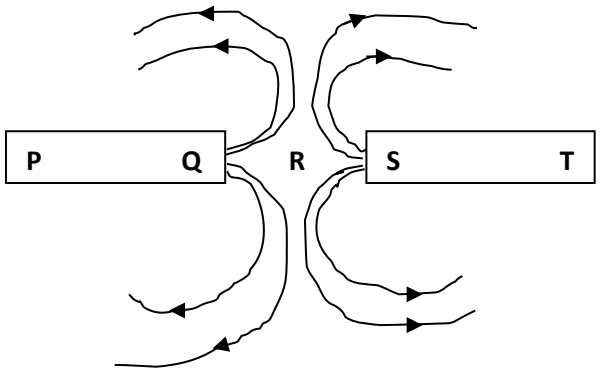
(b) A man lifts a load of 20kg through a height of 4m in 10 seconds. Calculate
(i) Work done
(ii) Power developed by the man

8.

9. (a) Newton pair forces are equal in size and opposite in direction and yet they do not cancel each other out. Explain?

(b) Give two examples (applications) of conservation of linear momentum

(c) Study the figure below showing magnets facing each other and answer the questions that follows;



Name parts labeled P, Q, R, S and T

(i) P is…… (ii) Q is…… (iii) S is …..… (iv) T is …..… (v) R is …….

10. (a) A body of mass 100kg moving with a velocity of 10m/s within 5s determine linear momentum.

(b) An object starts from rest to a velocity of 20m/s for 5 seconds; it maintains this speed for 20seconds before applying brakes and come to rest after 10seconds.

(i) Sketch the velocity time graph of this motion

From the graph above, find

(ii) Acceleration

(iii) Distance covered by whole motion

11. (a) Why is a hydrometer graduated with minimum reading at the bottom?

(b) An aluminium ball weights 6 N in air, 4 N when immersed in water and 3 N when immersed in honey.

Calculate;

(i) Up thrust of honey on the ball

(ii) Relative density of aluminum ball.

(iii) Relative density of honey

(iv) Density of honey in kg/m^3

12. (a) (i) You are provided with plane mirror, concave and convex mirrors. Which mirror will you prefer for make up?

(ii) Where is the convex mirror used?

(b) A concave mirror with a radius of curvature 30cm produces an inverted image 4 times the size of an object placed on its principal axis. Determine the position of the object and that of the image.

13. (a) List (3) factors that determine the resistance of a conductor

(b) Two resistors of 2Ω and 5Ω are connected in parallel, then connected in series to a 3Ω resistor. If a cell of 4v is connected across the resistors, calculate

(i) Total resistance

(ii) Current through 5Ω resistor

(iii) Current through 2Ω resistor

14. (a) (i) Explain why racing cars should have wide wheel tracks

(ii) Why should a mechanic choose a long spanner to undo a tight nut?

(b) A uniform half meter rule is pivoted at its 30cm mark. A mass of 50kg hung at the 45cm mark keeps the rule horizontal. Determine the mass of the half meter rule.

15. A piece of wood floats in pure water with ¾ of its volume submerged. If the same piece of wood is thrown into an ocean whose salty water has relative density of 1.025, what fraction of its volume would be submerged in the salty water?

16. A pendulum bob of mass 50g is pulled aside to a vertical height of 20cm from the horizontal and then released. Find

(i) The maximum potential energy of the bob.

(ii) The maximum speed of the bob

(iii) The K.E of the bob when it is at a height of 8cm from the horizontal

17. Concave mirror has a focal length of 40cm. How far from the mirror must an object be placed to produce an image that is

(i) Half the size of the object

(ii) 40 times the size of the object

18. Parallel light rays of a distant star are incident on a concave mirror with a radius of curvature 120cm. How far from the mirror will the star's image be formed?

19. (a) What type of mirror wil you prefer for

(i) Shaving or make up?

(ii) Seeing the traffic behind at your back?

(b) What is the difference between virtual image formed by plane, concave and convex mirror?

20. (a) (i) State flotation law

(ii) What is the apparent weight of a floating object?

(b) A block of glass of mass 250g floats in mercury of density 13600kg/m^3

(i) What volume of the glass lies under the surface?

(ii) What volume of the glass remaining above the surface.