

S.2 PHYSICS HOLIDAY WORK

END OF TERM 1 2016

HOLIDAY STARTING 12th MAY.

INSTRUCTIONS

- Assume where necessary, **gravitational field strength**, $g = 10\text{Nkg}^{-1}$
- Get a new 96-page book and do this work in that book.
- Ensure that you do the work with minimal help, from other students or teachers, to test your understanding of the term's work.
- Hand in to your Physics teacher on the very day you report.

1.(a) Define the following terms as applied to curved mirrors;

(i) **Centre of Curvature** (1)

(ii) **Focal Length.** (1)

(b) State the differences between the image formed *by a plane mirror* and the image formed *by a convex mirror*. (2)

(c) An object 3cm high is placed on the principal axis of a concave mirror of focal length 7.5cm. If the object is 30cm from the pole of the mirror, construct a ray diagram to obtain the position of the image. Determine the nature and size of the image formed.(use a scale 1cm represents 2.5cm) **Strictly use graph paper** (6)

(d) State one application of each of the following:

(i) **A plane mirror** (1)

(ii) **Convex mirror** (1)

(iii) **A parabolic mirror** (1)

2.(a) You are provided with the following: A torch bulb,switch,screen with wire gauze at the centre, a concave mirror, a mirror holder and a metre rule.

Describe an experiment you can carry out using all the apparatus above to determine the focal length of the mirror. (5)

- (b) State three differences between a *real image* and a *virtual image*. (3)
- 3.(a)(i) State the *laws of reflection of light*. (2)
- (ii) State *four characteristics* of images formed by a plane mirror. (4)
- (iii) With the aid of diagrams, explain the difference between *regular* and *irregular* reflection. (3)
- (b) If the angle between the incident and reflected ray in a plane mirror is 100° , calculate the angle of reflection. (2)
- 4.(a) Describe the nature of the image formed *by a pinhole camera*. (3)
- (b) What would be the effect on the image formed by a pinhole camera when the object distance *is reduced*? (1)
- (c) Calculate the height of a tree 500m away from a pin hole camera which produces an image 2.5cm high given the length of a camera is 20cm. (3)
- 5.(a) State *the conditions of equilibrium* when a body is acted upon by a number of parallel forces. (2)
- (b) Describe how you would determine, by experiment *the centre of gravity* of a piece of uniform cardboard of irregular shape. (5)
- (c) A uniform metal tube of length 5m and mass 9kg is suspended horizontally by two vertical wires attached at 50cm and 150cm respectively from either end of the tube.
- (i) Draw a diagram showing all forces acting on the tube. (2)
- (ii) Find the tension in each wire. (4)
- 6.(a) State the *principal of moments*. (1)
- (ii) Describe an experiment you can carry out to determine the mass of a metre rule using the principal of moments. (5)
- (b) A uniform half meter rule is pivoted at the 15cm mark and it balances horizontally when a body of mass 40g is hung from the 2cm mark. Calculate the mass of the metre rule in grams. (5)
- © Give two applications of the *principal of moments* in daily life. (2)

- 7.(a) Define the terms *work* and *energy*. (2)
- (ii) Mention any *four sources* of energy. (4)
- (b) State energy changes which occur in the following devices;
- (i) Microphone (ii) Loud speaker
- (iii) Bicycle dynamo (iv) Hydroelectric power dam (4)
- (c) A brick of mass 2kg is dropped from a tall building, its kinetic energy just before impact with the ground is 1600joules. Calculate
- (i) The velocity of the ball just before it hits the ground. (3)
- (ii) The height of the building. (3)
- 8.(a) Distinguish between *renewable* and *non-renewable* sources of energy. Give two examples of each. (4)
- (b) A girl of mass 60kg runs up a flight of 50 stairs each of height 20cm in 15seconds. Calculate the
- (i) Work done (3)
- (ii) average power of the girl. (3)
- (c)(i) What energy changes occur in the petrol engine of a motor car? (2)
- (iii) Mention the four stages of combustion of Petrol-air mixture in the car engine, in order of occurrence. (2)

End.

God bless your Holiday.

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