**FORM THREE MONTHLY TEST SEPTEMBER, 2021**

**PHYSICS**

**TIME: 3:00 HOURS**

**INSTRUCTIONS**

1. This paper consists of sections A, B and C with a total of eleven (11) questions
2. Answer ALL questions in sections A and B and only two questions from section C
3. Mathematical tables and non-programmable scientific calculators may be used
4. Where necessary use the following informations
5. Acceleration due to gravity g=10N/kg
6. Density of water = 1000kg/m3
7. Pie, 

**SECTION A**

1. For each of the items (i) – (xx), choose the correct answer from among the given alternatives and write its letter
2. Which pair of instruments would you use to correctly measure the diameter of a small bearing

A. measuring tape and vernier caliper

B. slide rule and micrometer screw gauge

C. vernier caliper and slide rule

D. micrometer screw gauge and vernier caliper

E. metre rule and micrometer screw gauge

1. A piece of cork of volume 100cm3 is floating on the surface of water. If the density of the cork is 0.25gm/cm3, what volume of the cork is immersed in the water?

A. 100cm3 B. 0.25cm3 C. 25cm3 D. 100.25cm3 E. 0.025cm3

1. A layer of colourless water floating on a blue copper (II) sulphate solution becomes blue after sometime. Which physical process supports the observation made?

A. diffusion B. cohesive C. surface tension

D. adhesive E. osmosis

1. A pin-hole camera 200mm long produces an image of 2mm diameter of the sun. If the sun’s distance from the earth is about 1.5 x 108km, what is the diameter of the sun

A. 1.5 x 108km B. 1.5 x 106km C. 3 x 105km

D. 7.5 x 104km E. 3.0 x 103km

1. Which phenomenon is a result of the earth being exactly along the same line between the centre of the sun and the moon?

A lunar eclipse B. penumbra C. solar eclipse

D. umbra E. reflection

1. Which metals become strongly magnetized when subjected to a magnetic field?

A. Nickel and copper B. zinc and aluminium

C. cobalt and iron D. alumuminum and lead E. iron and zinc

1. A body moved upward a distance of 20m. Calculate the time taken to reach the maximum height

A. 2s B. 5s C. 10s D. 15s E. 11s

1. The temperatures of a certain liquid is measured to be 300k. What will be its temperature in degree centigrade?

A. 273oC B. 100oC C. 57oC D. 37oC E. 27oC

1. Which factors influence friction between tyres of a car moving with constant speed and the surface of the road?

A. weight and speed B. speed and nature of the surface

C. nature of the surface and weight D. surface area of the tyres and speed E. acceleration and nature of the surface

1. When the sun shine on the dark-coloured driving wheel of a car, the wheel feels warm. Why?

A. it is because the sun warms the car by induction

B. it is because the sun gives energy to the wheel by convection

C. it is because the sun radiates thermal energy to the wheel

D. it is because the sun radiates heat to the glass windows

E. it is because the sun conducts thermal energy to the wheel

1. Match the items in List A with responses in List B by writing the letter of the correct response beside the item number in the answer booklet provided

|  |  |
| --- | --- |
| LIST A | LIST B |
| 1. Materials that can strongly be magnetized 2. The region around a magnet in which magnetic materials are attracted 3. The process of destroying the alignment in a magnetized material 4. The process of aligning the domains of atoms in one direction 5. Field line of force used for finding location of different places | 1. Paramagnetic 2. earth’s magnetic field 3. Permeable 4. Magnetization 5. Ferromagnetic 6. Induced magnetism 7. Demagnetization 8. Magnetic domains 9. Magnetic field |

**SECTION B**

1. (a) With the aid of a diagram, explain the function of a fuse in an electrical   
    appliance

(b) A circuit in a house is protected by a 10A fuse. The circuit is connected to the   
 240V mains. The following appliances are connected to the circuit.

|  |  |
| --- | --- |
| **Appliance** | **Power rating** |
| Bulb 1 | 100W |
| Bulb 2 | 75W |
| TV | 300W |
| Heater | 1500W |

Determine whether the fuse will blow on or off if all appliances are turned on.

1. (a) Give the meaning of the following terms
2. Heat capacity
3. Specific latent heat

(b) A brick at 20oC has a dimensions of 30cm, 18cm and 10cm for length, width   
 and height respectively. If the brick is heated to a new temperature of 220oC,   
 Calculate the new dimensions if the coefficient of linear expansivity of the   
 brick is 1.2 x 10-5/oC

(c) Calculate the amount of heat absorbed if 3kg of water is converted into steam   
 at constant temperature. Assume specific latent heat of vaporization

= 225KJ/kg.

1. (a) State Charle’s law, Boyles law and pressure law

(b) The volume of a given mass of a gas is 550cm3 when the pressure is 79cm   
 of mercury. What will be its volume when the pressure is 76cm of mercury if   
 the temperature remains constant.

(c) Mention methods used to transfer thermal energy in solid, liquid/gas and in   
 vacuum

1. (a) (i) State law of floatation

(ii) State two conditions that are necessary for a body to float

(b) (i) Differentiate between real weight and apparent loss in weight.

(ii) Calculate the apparent loss in weight if the volume of liquid displaced by a   
 body is 30m3. Assume the liquid displaced is water.

1. (a) (i) Give the meaning of gold leaf electroscope

(ii) Draw a well labeled diagram of gold leaf electronscope.

(b) (i) Mention types of charge

(ii) State fundamental law of charges

(c) A capacitance is allowed to charge. The P.d between its plates is 10V.   
 How much charge will accumulate on the plates during the period of   
 changing?

1. (a) Give the meaning of
2. Displacement
3. Velocity
4. Speed
5. Acceleration

(b) (i) State Newton’s laws of motion

(ii) Find the force exerted on a body of mass 20kg if its acceleration is 5m/s2

(c) If a body was moving with a velocity of 10m/s and then accelerated to 15m/s   
 in 1sec, find its acceleration.

**SECTION C**

**Answer any two questions**

1. (a) Explain three types of equilibrium

(b) (i) State the principle of moments

(ii) State conditions that are required for a body to be in equilibrium

(c) A uniform bar AB of length 5m weighs 60N. The bar is supported in a   
 horizontal position by two vertical strings X and Y. If string X is 0.6m from A   
 and string Y is 1.8m from B, find the tension in the strings.

1. (a) (i) Distinguish between primary and secondary cells, giving one example of   
    each

(ii) Identify two defects of a simple cell

(b) (i) Explain why lead-acid accumulators are used in car batteries rather than   
 dry cells.

(ii) A cell of unknown e.m.f E and internal resistance 2Ω is connected to a 5Ω   
 resistance. If the terminal p.d, V is 1.0V, Calculate the e.m.f E of a cell.

(c) (i) List two devices that are important when checking electrical faults in   
 domestic appliances.

(ii) Briefly explain why a very high voltage is necessary when transmitting   
 electrical energy from a power station.

1. (a) John is running eastwards at a speed of 10km/h and at the same time Tina is   
    running westwards at a speed of 9km/h. What is the velocity of John relative   
    to Tina?

(b) (i) What is the normal reaction of a body of mass 10kg placed on an inclined   
 plane of angle 30o?

(ii) Mention three methods used to reduce friction

(c) (i) The refractive index for light passing from air to water is equal to . Find   
 the refractive index for light travelling from water to air

(ii) State laws of refraction.