**PHYSICS**

**30/06/2021**

**8:30 am – 11:30 am**



**SENIOR ONE END OF YEAR EXAMINATIONS, 2021**

**SUBJECT: PHYSICS THEORY**

|  |
| --- |
|  **/100** **Marks:** |

**DURATION: 3 HOURS**

**INSTRUCTIONS:**

1. Do not open this question paper until you are told to do so.
2. Answer all questions: **100 marks**

 3) Use only a **blue** or **black** pen.

**PART I: MULTIPLE CHOICE QUESTIONS (30 MARKS)**

 Choose the letter that corresponds to the correct answer

**1)** Magnetic force is

 a)contact force b) non-contact force c)friction force d)power

 **(3 marks)**

**2)** Graph of velocity v of an object against time t is shown in the

 figure below. What is the best description for this graph?

 

 a) The object is moving with constant speed

 b) The motion is not rectilinear

 c) The object is at rest

 d) The object is accelerating

 **(3 marks)**

**3)** Determine the acceleration that results when a net force of 100 N is

 exerted on a 50 kg object.

 a) 5 000 m/s2  b) 50 m/s2 c) 9.81 m/s2  d) 2 m/s2

 **(3 marks)**

**4)** The point through which the whole weight of the body acts is called

 a) inertial point b) centre of gravity c) centroid d)central point

  **(3 marks)**

**5)** Energy that object possesses due to its position is called

 a) kinetic energy b)nuclear energy c)potential energy

 d)chemical energy

 **(3 marks)**

**6)** Trapped heat inside the Earth is known as

 a) heat energy b)solar energy c) electrical energy d) geothermal energy

 **(3 marks)**

**7)** Which of the following is a simple machine?

 a) Chair b) candle c) pulley d)horizontal table

 **(3 marks)**

**8)** Temperature of water in a beaker is 40˚C.Its value in Kelvin scale

 is a)104K b) 313K c)-233K d) 104 ˚F

 **(3 marks)**

**9)** An example of magnetic material is

 a) water b)plastic c)wooden chair d) iron

 **(3 marks)**

**10)** Two bar magnets are placed closer with their North poles facing each

 other (see diagram).

 

 a) They repel each other b)they attract each other c) both a and b

 d) none of these.

 **(3 marks)**

**PART II: ATTEMPT ALL QUESTIONS (70 MARKS)**

**11)** Copy and complete the following table

|  |  |  |  |
| --- | --- | --- | --- |
| Physical quantity | Fundamental physical quantity. Answer yes or no  | Symbol of S I unit | Measuring instrument |
| Time |  |  |  |
|  | Yes  |  |  |
| Density |  |  |  |
|  | Yes  |  | Ammeter |
| Weight |  | N  |  |

  **(12 marks)**

**12)** a)(i) Why a passenger travelling in a bus found himself/herself

 kicking forward when the bus stopped abruptly? **(2 marks)**

 (ii) State a Newton’s second law of motion. **(2 marks)**

 b) A box of 50 kg is put on a horizontal table.

 Acceleration due to gravity g=10 m/s2

 (i)Determine the weight of this box. **(2 marks)**

 (ii)Determine the magnitude and direction of the force exerted on

 the box by the table. **(2 marks)**

 c)A body A of mass 0.16 kg exerts a gravitational force of 6.2x10-10 N

 on a body B when the distance between their centres is 0.37 m.

 What is the mass of body B?

 The gravitational constant G=6.67x10-11 m3/kg s2 **(2 marks)**

**13)** a)Use arrow to match each of the following physical properties of liquid

 (first column) with its meaning(second column). Example:

 

|  |  |
| --- | --- |
| Physical property of liquid  | Meaning  |
| 1)Viscosity | i)Temperature at which the vapour pressure of liquid equals the pressure surrounding the liquid and the liquid changes into a vapour.  |
| 2)Melting point | ii)Temperature at which a liquid turns into solid when cooled.  |
| 3)Boiling point | iii)Resistance of fluid to a change in shape or movement of neighbouring portions relative to one another.  |
| 4)Freezing point  | iv)Temperature at which a substance changes state from solid to liquid.  |

 **(4 marks)**

 b) State any two properties of

 (i) liquid state **(4 marks)**

(ii) solid state **(4 marks)**

**14)** a) A small charge is found in uniform electric field E= 3 N/C

 (i)Is electric field a vector quantity? Explain **(3 marks)**

 (ii)Determine the electrostatic force on the charge. **(3 marks)**

 b) Two electric charges Q1 and Q2 carry positive charges of  and

 respectively.

 Calculate the distance between the charges if the electrostatic force

 between them is 60N.

 Take the Coulomb constant k=9x109 Nm2/C2  **(3 marks)**

 c) A charge Q=1x10-11 C acts as a positive point charge to create an

 electric field at a distance of 0.05 m away.

 (i) Draw the electric field line created by Q at a distance of 0.05 m away

 **(1mark)**

 (ii) Determine the electric field strength created by Q at a distance

 of 0.05 m. Coulomb’s law constant k=9x109 Nm2/C2 **(2 marks)**

**15)** Below is a simple electric circuit.

 

 a) (i)Copy the electric circuit above and name any 3 symbols used

 to draw this electrical circuit. **(3 marks)**

 (ii)Redraw the electric circuit above so that it is closed.

 Use arrows to show the direction of the electric current I and

 the direction of electrons e. **(2 marks)**

 b) A current of 0.4 A passes through a resistor of 5 Ω in 2minutes when

 connected to a battery.

 (i)Find the voltage /potential difference across the resistor of 5 Ω.

 **(3 marks)**

 (ii) Convert 2 minutes in seconds. **(1 mark)**

 (iii)Determine the electric energy dissipated by the 5 Ω resistor.

 **(3 marks)**

**16)** a)(i) Draw a

 1.divergingbeamof light  **(1mark)**

 2. converging light beam **(1mark)**

3. parallel light beam **(1mark)**

 (ii) What is the type of light beams produced by car headlamps?

 **(1 mark)**

 b) Analyze the diagram below showing the image formation in a pinhole

 camera.

 

 (i)What does the symbol B represent? **(1 mark)**

 (ii)Suggest any three characteristics of the image formed by the pinhole

 camera shown above. **(3 marks)**

 (iii) What is the actual size of the object, if the magnification of the

 pinhole camera is 0.2 and the image size is 3.5 cm high?

 **(2 marks)**

 c) (i)What happens when a ray of light is incident on a plane mirror?

 **(1 mark)**

 (ii)Is a plane mirror opaque or transparent? **(1mark)**