

**BANGLADESH INTERNATIONAL TUTORIAL LIMITED**

**Physics Worksheet**

**Class XI**

**Subject Teacher: P.K. Saha**

**WEEK 02**

**MARKS: 28**

**STUDENT'S NAME:** \_\_\_\_\_

**DATE: 4/4/2020**

1 Which of the following is an SI unit for electromotive force (e.m.f)?

- A coulomb
- B joule
- C newton
- D volt

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**(Total for Question 1 = 1 mark)**

2 A filament lamp is a source of unpolarised light.

A polarising filter is placed between a filament lamp and an observer. The filter is rotated in the plane perpendicular to the direction of travel of the light.

Which of the following is observed as the filter is rotated through an angle of  $90^\circ$ ?

- A The light intensity changes from maximum to minimum.
- B The light intensity changes from minimum to maximum.
- C The light intensity does not change.
- D The light intensity is zero throughout the rotation.

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**(Total for Question 2 = 1 mark)**

3 When a guitar string is plucked, a sound of constant frequency is heard.

The wave produced on the vibrating guitar string is

- A longitudinal and progressive.
- B longitudinal and stationary.
- C transverse and progressive.
- D transverse and stationary.

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**(Total for Question 3 = 1 mark)**

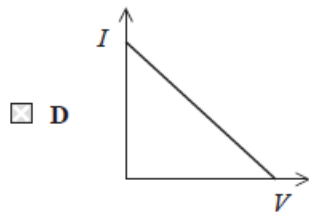
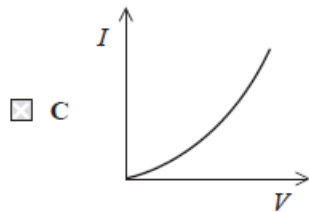
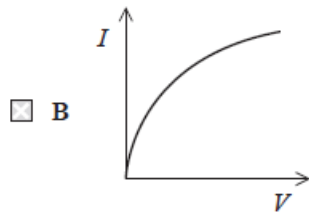
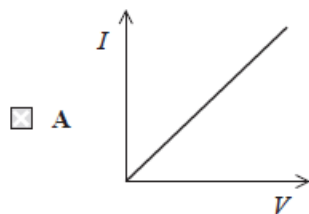
4 Which of the following has the largest de Broglie wavelength?

- A an electron travelling at  $3.0 \times 10^5 \text{ m s}^{-1}$
- B an electron travelling at  $4.0 \times 10^5 \text{ m s}^{-1}$
- C a neutron travelling at  $3.0 \times 10^5 \text{ m s}^{-1}$
- D a neutron travelling at  $4.0 \times 10^5 \text{ m s}^{-1}$

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(Total for Question 4 = 1 mark)

5 Which of the following graphs shows how current  $I$  varies with potential difference  $V$  for a negative temperature coefficient thermistor?



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(Total for Question 5 = 1 mark)

6 A string is stretched between two fixed points and set into oscillation.

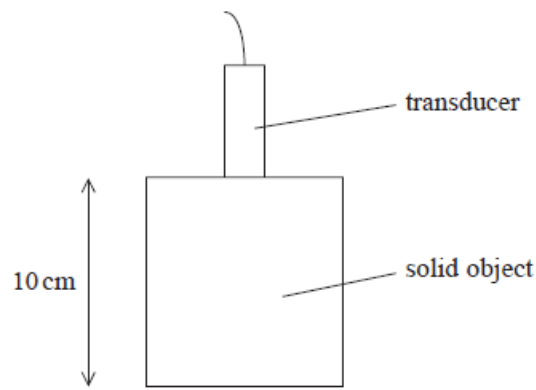
The frequency of the vibrating string is **not** dependent on

- A the amplitude of the string's vibration.
- B the length of the string.
- C the mass per unit length of the string.
- D the tension in the string.

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(Total for Question 6 = 1 mark)

7 An ultrasound transducer is placed on the surface of a solid object as shown.



A pulse of ultrasound is transmitted into the object. The pulse is received at the transducer  $50\ \mu\text{s}$  after it is emitted.

Which of the following can be used to calculate the speed of sound in this object?

- A  $\frac{0.10}{50 \times 10^{-6}}$
- B  $\frac{0.10}{25 \times 10^{-6}}$
- C  $\frac{0.10}{100 \times 10^{-6}}$
- D  $\frac{0.20}{25 \times 10^{-6}}$

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(Total for Question 7 = 1 mark)

8 Two copper wires of identical cross-sectional area are placed in series in a circuit.

Which of the following could be different for the two wires?

- A charge carrier density
- B current
- C drift velocity
- D potential difference

(Total for Question 8 = 1 mark)

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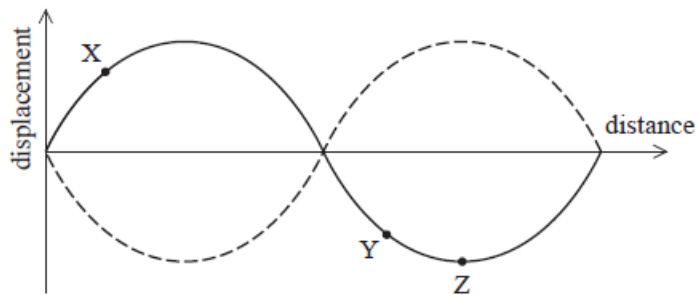
9 The definitions for current and potential difference both include

- A charge.
- B resistance.
- C time.
- D work done.

(Total for Question 9 = 1 mark)

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10 The diagram shows how the displacement varies with distance along a stationary wave at two instants of time.



Which of the following statements is **not** correct?

- A Points X and Z are in antiphase with each other.
- B Points Y and Z have the same amplitude of vibration.
- C Points Y and Z have the same frequency of vibration.
- D Point Z is an antinode.

- 11 A student carried out an experiment to determine the resistivity of a metal in the form of a wire. She made the following measurements:

length of wire = 0.20 m  
resistance of wire = 50 mΩ  
diameter of wire = 0.36 mm

Determine the metal of the wire using information from the table below.

Metal	Resistivity / Ω m
aluminium	$2.7 \times 10^{-8}$
tungsten	$5.6 \times 10^{-8}$
iron	$1.0 \times 10^{-7}$

(3)

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(Total for Question 11 = 3 marks)

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12 The equation  $I = nqvA$  can be used to establish the drift velocity  $v$  of electrons in a copper wire.

(a) State what is meant by drift velocity.

(1)

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(b) A copper wire has a cross-sectional area of  $2.64 \times 10^{-7} \text{m}^2$  and carries a current of 1.31 A. Calculate the drift velocity of the electrons in this copper wire.

$$n = 8.49 \times 10^{28} \text{m}^{-3}$$

(2)

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Drift velocity = .....

**(Total for Question 12 = 3 marks)**

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13 The orbits of planets around the Sun are elliptical.

The intensity of radiation received at the top of the Earth's atmosphere is monitored during one orbit of the Earth around the Sun.

The following data is recorded:

maximum intensity of radiation =  $1.41 \text{ kW m}^{-2}$

minimum intensity of radiation =  $1.32 \text{ kW m}^{-2}$

(a) Calculate the minimum distance between the Earth and the Sun.

power of the Sun =  $3.83 \times 10^{26} \text{ W}$

(3)

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Minimum distance = .....

(b) As Mars orbits the Sun, the intensity of radiation received at the top of its atmosphere varies from  $491 \text{ W m}^{-2}$  to  $711 \text{ W m}^{-2}$ .

Explain two differences between the orbits of Mars and Earth that can be deduced from this data.

(3)

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(Total for Question 13 = 6 marks)

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