

PRACTICE EXAMINATION 2021-22

Grade: X

Subject : PHYSICS

Marks : 40

Date : 11/03/2022

Time : 1 hour 30 min

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during the first 10 minutes.

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

This paper consists of 5 printed pages

Attempt all questions from Section A and any three questions from Section B.

The intended marks for questions or parts of questions are given in brackets [].

Section A (10 Marks) (Attempt all questions.)

Question 1

Choose the correct answers to the questions from the given options. (Do not copy the question. Write the correct answer only.)

- (i) The frequency of vibration of a forced vibration is: [1]
(a) less than the frequency of applied force.
(b) equal to frequency of applied force.
(c) more than frequency of applied force.
(d) constant
- (ii) When a potential of 6 volt is applied across the ends of a wire of 2 m length, a current of 2A flows through it. Calculate the resistance per unit length of the wire. [1]
(a) 3Ω
(b) 12Ω
(c) 1.5Ω
(d) 2Ω
- (iii) The material used to make fuse wire is: [1]
(a) copper
(b) aluminium
(c) an alloy of lead and tin
(d) tungsten
- (iv) A strong permanent magnet can be made by: [1]
(a) using a piece of steel in the solenoid.
(b) using a piece of soft iron in the solenoid
(c) by increasing the strength of current in the coil.
(d) by increasing the number of turns in the coil.

- (v) The number of magnetic field lines linked with a conductor is called
 (a) solenoid
 (b) induced e.m.f.
 (c) induced current
 (d) magnetic flux
- (vi) A piece of iron of mass 2 kg has a heat capacity of $900 \text{ J/}^\circ\text{C}$. The heat required to warm it by 10°C is [1]
 (a) 1800 J
 (b) 90 J
 (c) 9000 J
 (d) 180 J
- (vii) The heat energy supplied to a body during change of phase is utilised [1]
 (a) in increasing kinetic energy of the body.
 (b) in increasing potential energy of the body.
 (c) in increasing temperature of the body.
 (d) for converting into chemical energy.
- (viii) The atoms having same number of neutrons but different number of protons are called [1]
 (a) radioactive substance
 (b) isotopes
 (c) isobars
 (d) isotones
- (ix) Two notes are sounded on the same instrument with the same amplitude. Their pitch depends on the following characteristics of sound: [1]
 (a) frequency
 (b) loudness
 (c) intensity
 (d) quality
- (x) Name the radioactive radiation which has maximum ionising power: [1]
 (a) alpha
 (b) beta
 (c) gamma
 (d) infra-red radiation

SECTION B (30 Marks)

(Attempt **any three** questions from this Section.)

Question 2

- (i) Draw a graph between displacement from mean position and time for a body executing free vibrations in a vacuum. [2]
- (ii) State two factors on which internal resistance of a cell depends. [2]
- (iii) What are acoustically measurable quantities related to timbre and loudness? [2]
- (iv) On heating a substance, how do the following parameters change during its change in phase [2]
 - (i) average kinetic energy
 - (ii) average potential energy
- (v) Two coils of resistance $6\ \Omega$ and $12\ \Omega$ are connected in series across a battery of potential difference 9 V . Calculate total electrical energy supplied by the battery in 1 minute. [2]

Question 3

- (i) A radioactive source is kept in a thick lead walled container having a narrow opening. The radiations pass through a magnetic field in a direction perpendicular to the plane of the paper inwards. Draw a diagram to show the paths of alpha, beta and gamma radiations emitted from the source. [2]
- (ii) A man playing a flute is able to produce notes of different frequencies. If he closes the holes near his mouth, will the pitch of note produced, increase or decrease? Give a reason. [2]
- (iii) An atomic nucleus A is composed of 84 protons and 128 neutrons [3]
 - i) The nucleus A emits an alpha particle and transformed into a nucleus B. What is the composition of the nucleus B?
 - ii) The nucleus B emits a beta particle and is transformed into a nucleus C. What is the composition of nucleus C?
 - iii) Does the composition of nucleus C change if it emits gamma radiations?
 - iv) Name and state characteristics of materials to make:
 - (i) Fuse wire
 - (ii) Filament of a bulb
 - (iii) Heating element of oven

Question 4

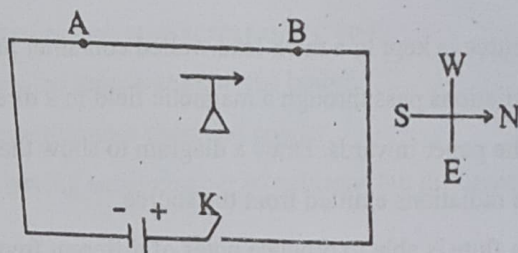
- (a) A hot iron ball of mass 0.2 kg is added into 0.5 kg of water at 10°C . The resulting temperature is 30°C . Calculate the temperature of hot ball. Specific heat capacity of iron = $336 \text{ J kg}^{-1}\text{K}^{-1}$, specific heat capacity of water = $4200 \text{ J kg}^{-1}\text{K}^{-1}$. [3]

- (b) The melting point of naphthalene is 80°C and the room temperature is 30°C .

A sample of liquid naphthalene at 100°C is cooled down to the room temperature. Draw a temperature time graph to represent this cooling. In the graph, mark the region which corresponds to the freezing process. [3]

(c)

The diagram below shows a magnetic needle kept just below the conductor AB [4]
which is kept in North South direction.



- In which direction will the needle deflect when the key is closed?
- Why is the deflection produced?
- What will be the change in the deflection if the magnetic needle is taken just above the conductor AB?
- Name one device which works on this principle.

Question 5

- Explain the meaning of the statement 'the current rating of a fuse is 5A '.
 - Name the colour code of neutral and earth wires as per new convention.
 - Name the wire in a household electrical circuit to which the switch is connected
- Explain the change in the nucleus of a radioactive element when a beta particle is emitted with the help of a nuclear equation.
 - Which type of elements are produced in beta decay
 - Under which condition does the nucleus of an atom tend to be radioactive?
 - What are background radiations?

[4]

A battery of e.m.f. 15V and internal resistance 3 ohm is connected to two resistors 3ohm and 6 ohm connected in parallel. Find

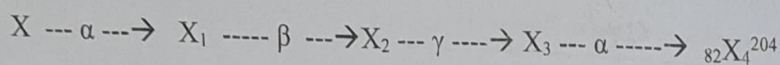
[3]

- the current through the battery.
- the p.d. between the terminals of the battery.
- the current in 3 ohm resistor.

Question 6

- Complete the following nuclear changes:

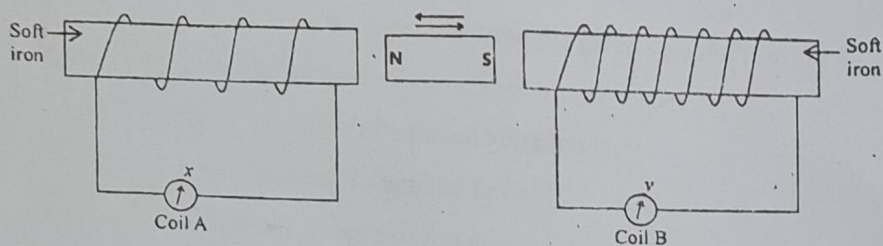
[4]



(b)

- A magnet kept at the centre of two coils A and B is moved to and fro as shown in the diagram. The two galvanometers show deflection.

[2]



State with a reason whether:

$$x > y$$

or

$$x < y.$$

[x and y are magnitudes of deflection.]

- Differentiate between heat capacity and specific heat capacity.
 - Why does stone lying in the sun get heated up much more than water lying for the same duration of time?

[4]

*****THE END*****