

Bombay Scottish School, Mahim

PRELIMINARY ASSESSMENT

PHYSICS

Grade : 10

Date : 09.03.2022

Duration : 1½ hr

Max. Marks : 40

No. of questions : 06

No of printed sides : 07

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 [].

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

This time to be spent reading the question paper

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

SECTION A

[Attempt all questions]

Question 1

(10x1= 10)

Choose the correct answers to the questions from the given options.

(Do not copy the question, Write the correct answer only.)

1. The main fuse is connected in :

[1]

(a) Live wire

(b) Neutral wire

(c) Both the live and earth wires

(d) Both earth and the neutral wire. ✓

2. 2000 J of energy is needed to heat 1kg of paraffin through 1°C. How much energy is needed to heat 10kg of paraffin through 2°C? **[1]**

(a) 4000 J

(b) 10,000 J

(c) 20,000 J

(d) 40,000 J

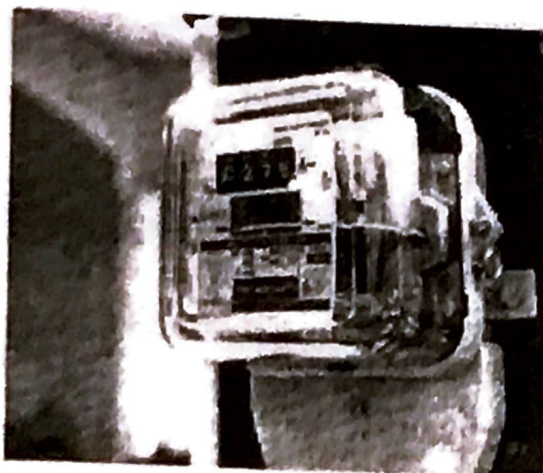
3. A radioactive substance emits radiations:

[1]

- a. α , β and γ simultaneously
- b. In the order α , β and γ one by one
- c. X-rays and γ -rays
- d. α or β

4. The electric meter in a house records :

[1]



- (a) Electric Charge x
- (b) Electric Current x
- (c) Electric Energy x
- (d) Electric Power x

5. The specific heat capacity of a body

[1]

- (a) changes with the mass of a given substance
- (b) changes with the volume of a given substance
- (c) changes with the rise or fall in temperature
- (d) is a constant quantity for a given substance.

6. The direction of magnetic lines of force produced by passing a direct current through a the conductor is

[1]

- (a) Perpendicular to the conductor and coming outwards
- (b) parallel to conductor
- (c) concentric circular around the conductor
- (d) all the above

7. A wire of length 'L' is placed in a magnetic field 'B'. If the current in the wire is 'I', then maximum magnetic force on the wire is: [1]

- (a) BIL
- (b) B/IL
- (c) IL/B
- (d) I/BL

8. In β - emission from a radioactive substance, an electron is ejected. This electron comes from: [1]

- (a) The outermost orbit of an atom
- (b) The inner orbits of an atom
- (c) The surface of substance
- (d) The nucleus of an atom

9. With increase in temperature the density of a substance in general: [1]

- (a) Increases
- (b) decreases
- (c) First increases then decreases
- (d) first decreases then increases

10. Calculate the quantity of heat that will be produced in a coil of resistance $75\ \Omega$ if a current of 2A is passed through it for 2 minutes. [1]

- (a) 3600J
- (b) 1500J
- (c) 300J
- (d) 9000J

SECTION B

[Attempt any 3 questions]

Question 2

(a) i) For earthing an electrical appliance, one has to remove the paint from the metal body of the appliance where the electrical contact is to be made. Explain the statement with reason.

ii) An electric kettle is rated 3 kW, 250 V. Give reason whether this kettle can be used in a circuit which contains a fuse of current rating 13 A. [3]

b) (i) In what unit does the domestic electric meter measure the electrical energy consumed? State the value of this unit in S.I. [3]

(ii) Why should switches always be connected to the live wire?

(iii) Give one precaution that should be taken while handling switches.

c) i) Name the device used to protect the electric circuits from overloading and short circuiting. On what effect of current does it work?

ii) An electric iron is rated 220 V, 2 kW. If the iron is used for 2 hours daily, find the cost of running it for one week if it costs ₹ 4.25 per kWh. [4]

Question 3

a) i) A liquid X has the maximum specific heat capacity and is used as a coolant in Car radiators. Name the liquid X.

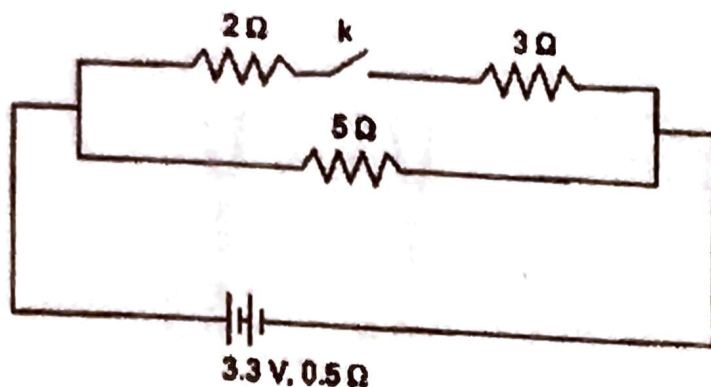
ii) 200 g of hot water at 80 °C is added to 300 g of cold water at 10 °C. Calculate the final temperature of the mixture of water. Consider the heat taken by the container to be negligible, [specific heat capacity of water is 4200 J kg⁻¹ °C⁻¹] [3]

b) (i) State two factors on which the strength of an induced current depends.

(ii) When a solenoid that is carrying current is freely suspended, it comes to rest along a particular direction. Why does this happen? [3]

c) The diagram shows a circuit with the key k open.

[4]



Calculate:

- the resistance of the circuit when the key k is open,
- the current drawn from the cell when the key k is open,
- the resistance of the circuit when the key k is closed.
- the current drawn from the cell when the key k is closed.

Question 4

(a) Arrange α , β and γ rays in ascending order with respect to their:

[3]

- Penetrating power.
- Ionizing power.
- Biological effect.

(b) (i) Represent the change in the nucleus of a radioactive element

${}_Z^AX$

X

A when an β particle is emitted.

[3]

(ii) What is the name given to elements with the same mass number and different atomic number?

(iii) Under which conditions does the nucleus of an atom tend to be radioactive?

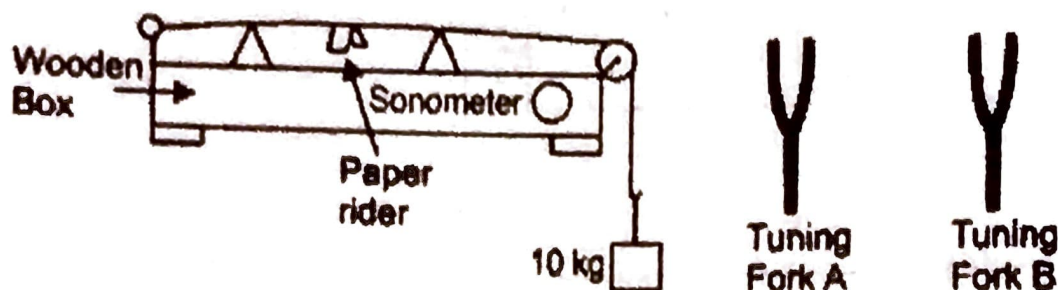
(c) i) An element ${}_Z^SA$ decays to ${}_{85}R_{222}$ after emitting 2 α particles and 1 β particle. Find the atomic number and atomic mass of the element S.

ii) A radioactive substance is oxidized. Will there be any change in the nature of its radioactivity? Give a reason for your answer.

[4]

Question 5

a)



The diagram above shows a wire stretched over a sonometer. [3]
Stems of two vibrating tuning forks A and B are touched to the wooden box of the sonometer. It is observed that the paper rider (a small piece of paper folded at the center) present on the wire flies off when the stem of vibrating tuning fork B is touched to the wooden box but the paper just vibrates when the stem of vibrating tuning fork A is touched to the wooden box.

- (i) Name the phenomenon when the paper rider just vibrates.
- (ii) State the phenomenon when the paper rider flies off.
- (iii) Why does the paper rider fly off when the stem of tuning fork B is touched to the box?

b) What do you understand by the following statements:

- (i) The heat capacity of the body is 60 JK^{-1}
- (ii) The specific heat capacity of lead is $130 \text{ Jkg}^{-1} \text{ K}^{-1}$
- (iii) The current rating of a fuse is 5 A

[3]

c) A refrigerator converts 100g of water at 20°C to ice at -10°C in 35 minutes. Calculate the average rate of heat extraction in terms of watt.

Given : Specific heat capacity of ice = $2.1 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$.

Specific heat capacity of water = $4.2 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$.

Specific Latent heat of fusion of ice = 336 Jg^{-1} .

[4]

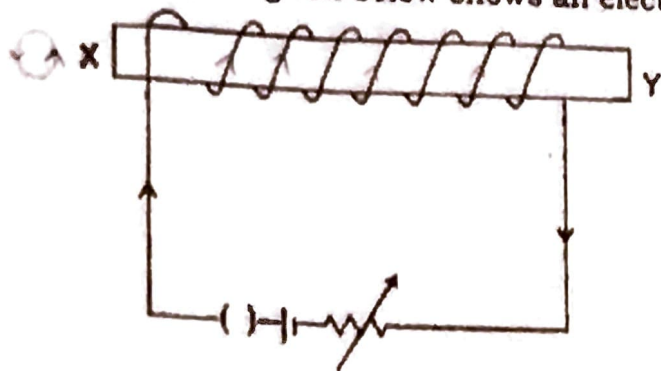
Question 6

a) (i) Give two characteristic properties of copper wire which makes it unsuitable for use as fuse wire.

(ii) Name the material which is used as a fuse wire ?

[3]

b) The figure given below shows an electromagnet.

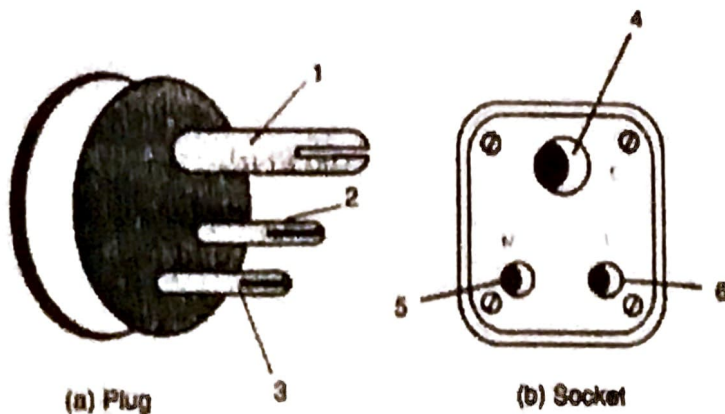


(i) What will be the polarity at the end X ?

(ii) Suggest 2 ways by which the strength of the electromagnet referred to in the question, may be increased.

[3]

c) (i) The diagram (a) and (b) given below are of a plug and a socket with arrows marked as 1, 2, 3 and 4, 5, 6 respectively on them. Identify and write Live (L), Neutral (N) and Earth (E) against the correct number.



(ii) Calculate the electrical energy consumed when a bulb of 40 W is used for 12.5 hours everyday for 30 days.

[4]