

**PHYSICS-X**  
**(SCIENCE PAPER 1)**

Maximum Marks: 40

Time allowed: One and a half hours

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.

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

**SECTION A**

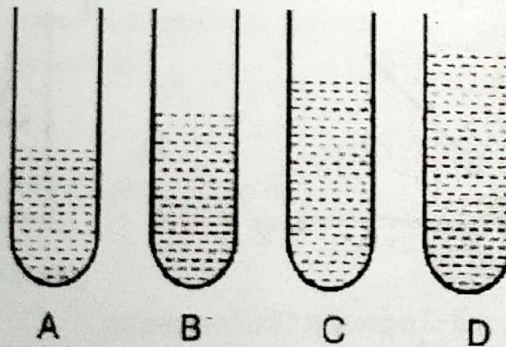
(Attempt all questions.)

**Question 1**

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

- i A fuse has a/an [1]  
 a) Low melting point  
 b) Alloy of 50% lead and 50 % tin  
 c) High resistance  
 d) All of these

- ii A, B, C and D represent test tubes each of height 20 cm which are filled with water up to the height of 12 cm, 14 cm, 16 cm and 18cm respectively. If a vibrating tuning fork is placed over the mouth of test tube D, a loud sound is heard. Which of the following statement is true? [1]

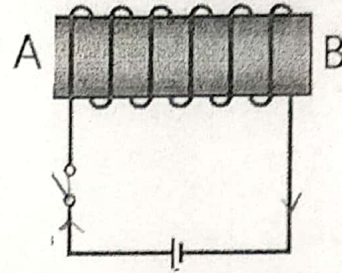


- a) Frequency of air column in the tube D is equal to the frequency of the tuning fork.  
 b) Frequency of the water column in the test tube D is equal to the frequency of the tuning fork.  
 c) Only (a) is correct.  
 d) (a) and (b) both are correct.



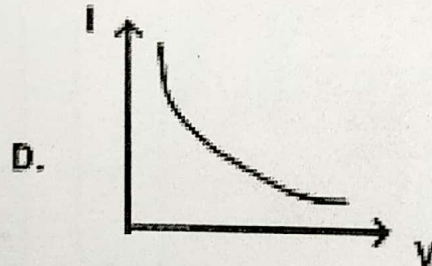
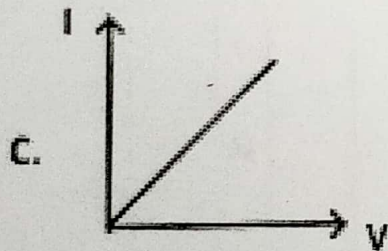
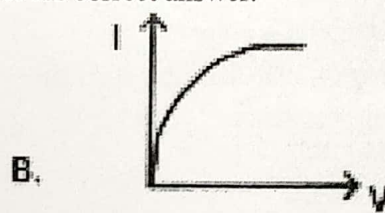
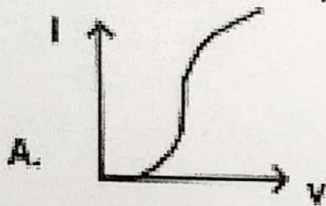
- iii The rate of flow of charge in an electric circuit is called: [1]
- Electric energy
  - ☒ Electric current
  - Electric potential
  - None of these

- iv. Diagram given below shows a solenoid carrying current when the switch is on. Identify the poles formed at A and B when the battery is switched on and the battery poles are reversed. [1]



- ☒ A- South, B -North
- A – North, B – South
- None
- Reversing poles

- v Observe the diagram carefully and select the correct answer. [1]



- Graph A and C represent Ohmic resistors.
- Graph A, B and C are non Ohmic resistors.
- ☒ Graph C is the only Ohmic resistor.
- Graph D is the only Ohmic resistor.

- vi The meaning of the statement 'Specific latent heat of fusion of Copper is  $43 \text{ cal g}^{-1}$ ' [1]  
is:
- 1 kg copper gives 43 calories to solidify without any change in the temperature.
  - 1 g copper brings 1 kelvin change in temperature by absorbing 43 calories of heat energy.
  - ☒ 1 g of copper absorbs 43 calories at melting point to convert into liquid state copper without changing the temperature.
  - 1 g of copper absorbs or liberates 43 calories of heat energy to raise its temperature by 1 kelvin.
- vii A solid of mass 0.15 kg is heated from  $10^\circ\text{C}$  to  $90^\circ\text{C}$ . If the specific heat capacity of solid is  $390 \text{ J kg}^{-1}\text{C}^{-1}$ , the heat absorbed by solid is: [1]
- 4680 J
  - ☒ 4860 J
  - 4608 J
  - 6480 J
- viii Which of the following radiation is most ionising? [1]
- Beta particle
  - ☒ Alpha particle
  - Gamma particle
  - UV radiation
- ix A particle naturally tends to be radioactive if: [1]
- Its atomic number is more than 82
  - It has excess of neutron as compared to protons
  - ☒ Both (a) and (b) are correct.
  - None of these
- x By increasing the amplitude of a sound wave, its [1]
- Pitch increases
  - ☒ Loudness increases
  - Pitch decreases
  - Loudness decreases



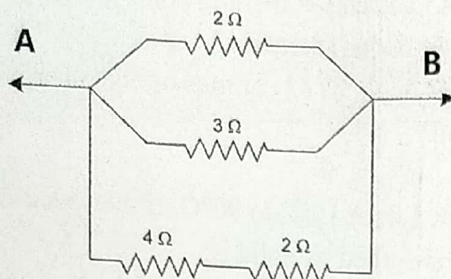
### Section B

(Attempt any three questions from this Section)

#### Question 2

- i a) Calculate the total resistance across AB.

[3]



- b) State Ohm's law.

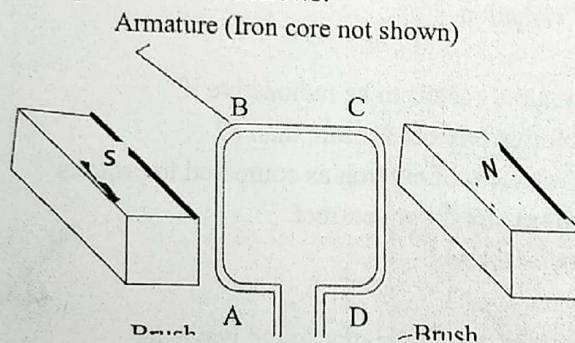
ii

- a) Name the law on which "the principle of method of mixtures" is based.  
b) Which among land and water cools at a faster rate? Give reason for your answer.

[3]

- iii Observe the diagram carefully in which a current carrying coil is placed between the two strong magnets. Answer the questions that follows:

[4]



- a) Name the device that can use this arrangement?  
b) If current flows from B to A, in which direction will the coil rotate?  
c) Name the law used in (b)?  
d) State the energy conversion in the above case, keep condition (b) in mind.

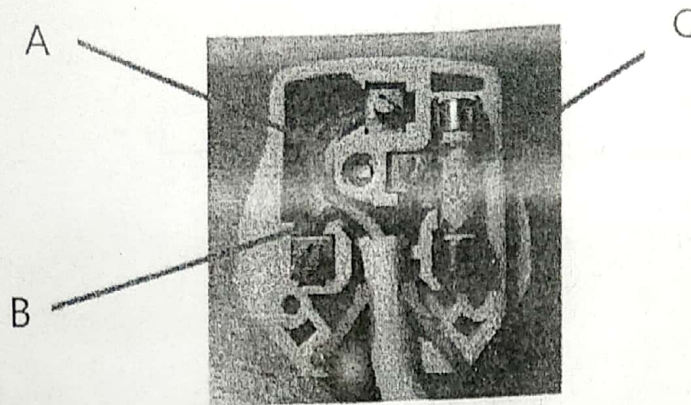
#### Question 3

- i a) Define heat capacity of the substance.  
b) Write the SI unit of heat capacity.  
c) What is the relation between the heat capacity and specific heat capacity of a substance?

[3]

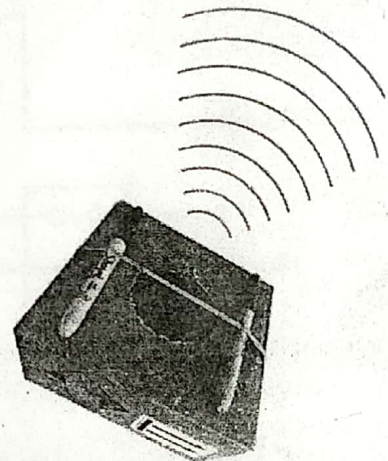


- ii a) Name the electrical appliance shown in the diagram below. [3]



- b) Identify A, B and C.  
c) Name the material used to enclose the wires shown.
- iii Observe the diagram shown below with a hollow box and stretched rubber band. When the rubber band is plucked it vibrates to produce sound. Answer the following questions: [4]

- a) State the purpose of hollow box in the given arrangement.  
b) What will happen if two more rubber bands are added?  
c) How can one improve the shrillness of the sound in the above (b)?  
d) The hollow box is filled with 10 ping pong balls. Will this affect the sound produced? Justify.

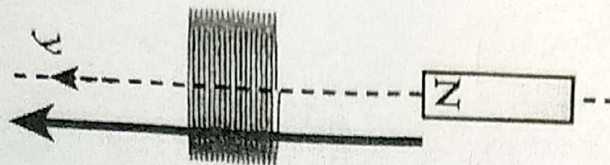


#### Question 4

- i a) A nucleus  ${}^A_ZX$  emits an alpha particle followed by a  $\gamma$  emission; thereafter emits two  $\beta$  particles to form  $X_3$ . [3]  
Copy and complete the values of A and Z  
 ${}^A_ZX \rightarrow X_1 \rightarrow X_2 \rightarrow X_3$   
b) Name the radioisotope used as fuel for the atomic energy reactor.
- ii a) What is calorimeter? [4]  
b) Name the material used to make a calorimeter.  
c) What arrangement is made to avoid loss of heat in a Calorimeter.  
d) A calorimeter of mass 25.5 g has specific heat capacity of  $0.42 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ .  
Calculate its heat capacity.



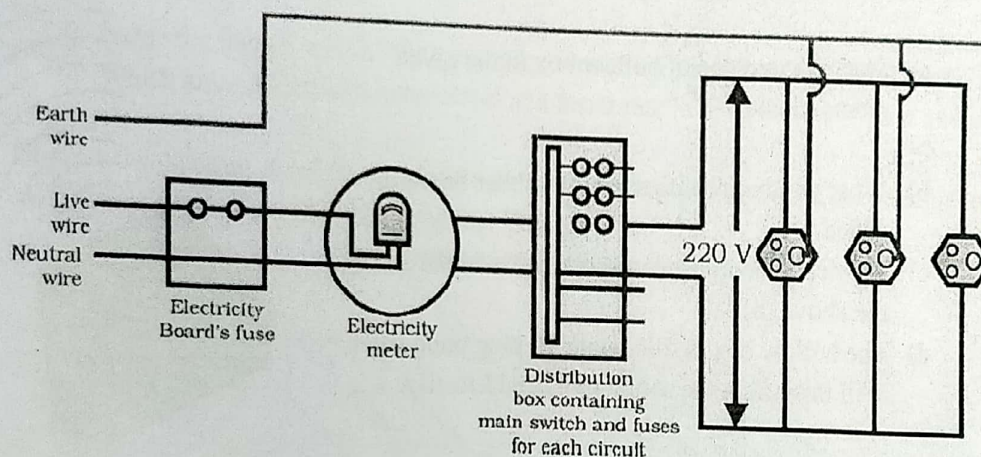
- iii The arrangement below shows the movement of a bar magnet toward a coil. Answer the following questions. [3]



- What will happen if the magnet stops moving?
- If the position of bar magnet is reversed and set into motion, what will happen?
- Name the phenomenon seen above.

**Question 5**

- i The diagram below show the electrical distribution of a living room. [3]



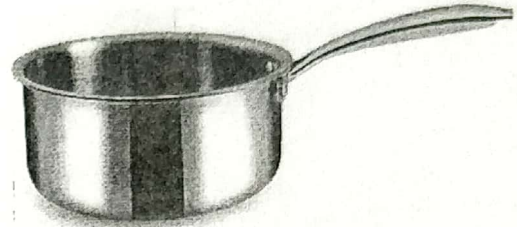
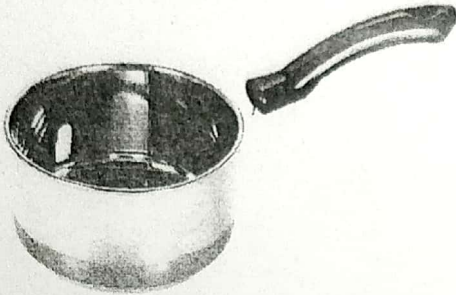
- One of the appliances in the room is damaged. What will happen to the other appliance? Why?
  - Name the arrangement used in the above diagram.
  - Name two advantages of the above arrangement.
- ii Define the terms: [3]
- Free vibrations
  - Forced vibrations
  - Damped vibrations



[3]  
iii

- a) State two types of background radiations with examples.  
b) Observe the sauce pans given below. One is coated with copper at its base and other is not. Which sauce pan is a better cookware and why?

[4]



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