



*Zagdu Singh Charitable Trust's (Regd.)*  
**THAKUR INTERNATIONAL SCHOOL**

**FIRST PRELIMINARY EXAMINATION 2021 – 2022**

Paper: Physics

Grade - 10

Date -09/02/2022

Marks - 40

Time -1 hr 30 mins

*Answer 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.*

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*The intended marks for questions or parts of a question are given in the brackets [ ]*

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**SECTION – A**

*(All the questions from this Section are compulsory)*

**Question 1**

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

- a) Resonance is a special case of \_\_\_\_\_ vibrations, when frequency of the driving force is \_\_\_\_\_ natural frequency of the driven body. [1]
- i) forced, less to the
  - ii) forced, equal to the
  - iii) forced, greater to the
  - iv) forced, zero
- b) An electric kettle is rated at 230 V, 1000 W. The resistance of its element when in use is [1]
- i) 52.7 ohm
  - ii) 52.9 ohm
  - iii) 55.9 ohm
  - iv) 55.7 ohm
- c) Arrange  $\alpha$ ,  $\beta$  and  $\gamma$  radiations in ascending order of their (i) ionising power and (ii) penetrating power. [1]
- i) (i)  $\gamma > \beta < \alpha$  (ii)  $\alpha < \beta < \gamma$
  - ii) (i)  $\gamma < \beta < \alpha$  (ii)  $\alpha < \beta < \gamma$
  - iii) (i)  $\gamma < \beta < \alpha$  (ii)  $\alpha < \beta > \gamma$
  - iv) (i)  $\gamma > \beta > \alpha$  (ii)  $\alpha < \beta < \gamma$

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*This paper consists of 5 printed pages.*

d) A wire stretched between two fixed supports, is plucked exactly in the middle and then released. It executes (neglect the resistance of the medium) [1]

- i) resonant vibrations
- ii) natural vibrations
- iii) damped vibrations
- iv) forced vibrations

e) A certain nucleus A (mass number 238 and atomic number 92) is radioactive and becomes a nucleus B (mass number 234 and atomic number 90) by the emission of particle. Name the particle emitted. [1]

- i)  $\gamma$
- ii)  $\beta$
- iii)  $\alpha$
- iv)  $\alpha$  and  $\beta$

f) Which of the following is an ohmic resistance? [1]

- i) LED
- ii) filament of a bulb
- iii) junction diode
- iv) nichrome wire

g) How much heat energy is required to melt 5 kg of ice?  
Specific latent heat of ice =  $336 \text{ J g}^{-1}$ . [1]

- i) 1680000 J
- ii) 168000 J
- iii) 16800000 J
- iv) 1600 J

h) The approximate range of temperature at which water boils in a pressure cooker is [1]

- i)  $110^\circ\text{C}$  to  $115^\circ\text{C}$
- ii)  $120^\circ\text{C}$  to  $125^\circ\text{C}$
- iii)  $100^\circ\text{C}$  to  $110^\circ\text{C}$
- iv)  $130^\circ\text{C}$  to  $135^\circ\text{C}$

i) The extra energy is released in the form of electromagnetic radiation known as [1]

- i)  $\beta$  - radiation
- ii)  $\gamma$  - radiation
- iii)  $\alpha$  - radiation
- iv)  $\alpha$  and  $\beta$  - radiation

j) Which of the following statements is not true? [1]

- i) Polarity of an electromagnet can be reversed.
- ii) Magnetic field of an electromagnet can be very strong.
- iii) Electromagnets can not be easily demagnetised.
- iv) Electromagnet is made up of soft iron.

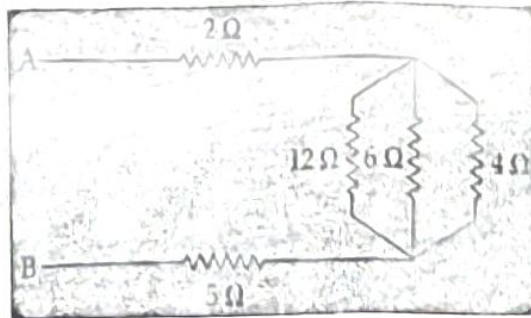
[2]

### SECTION - B

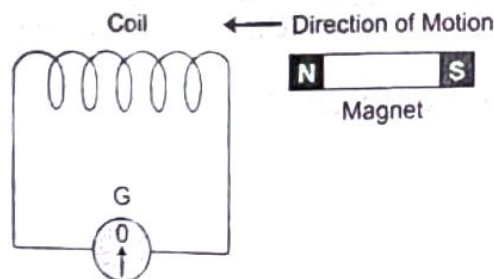
(Attempt any three questions from this Section.)

#### Question 2

- a) [3]
- Write an expression for the electrical power spent in flow of current through a conductor in terms of resistance and potential difference.
  - Find the equivalent resistance between points A and B.



- b) [3]
- What property of water makes it an effective coolant?
  - Two blocks P and Q of different metals having their mass in the ratio 2:1 are given same amount of heat. Their temperature rises by same amount. Compare their specific heat capacities.
  - State the effect of presence of impurity on the melting point of ice.
- c) [4]
- The diagram shows a fixed coil of several turns connected to a centre zero galvanometer G and magnet NS which can move in the direction shown in the diagram.



- Describe the observation in the galvanometer if (1) the magnet is moved rapidly, (2) the magnet is kept stationary after it has moved into the coil, (3) the magnet is then rapidly pulled out of the coil.
- How would the observation in (1) of a part (i) change if a more powerful magnet is used?

#### Question 3

- a) [3]
- Draw a labelled diagram of a three pin socket.

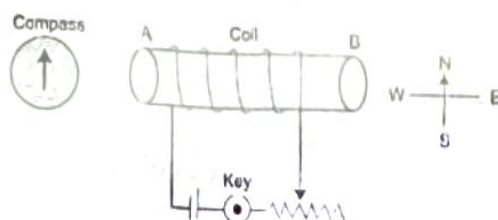


- b) What do you mean by background radiations? Name its two sources. Is it possible for us to keep ourselves away from it? [3]

- c) A vessel of mass 100 g contains 150 g of water at  $30^{\circ}\text{C}$ . How much ice is needed to cool it to  $5^{\circ}\text{C}$ ? Take specific heat capacity of material of vessel =  $0.4 \text{ J g}^{-1} \text{ K}^{-1}$ , specific latent heat of fusion of ice =  $336 \text{ J g}^{-1}$  and specific heat capacity of water =  $4.2 \text{ J g}^{-1} \text{ K}^{-1}$ . [4]

#### Question 4

- a) [3]
- State one way by which the magnetic field due to a current carrying solenoid can be made stronger.
  - The following diagram shows a spiral coil wound on a hollow cardboard tube AB. A magnetic compass is placed close to it. Current flows by closing the key.
    - What will be the polarity at the ends A and B?
    - How will the compass needle be affected? Give reason.

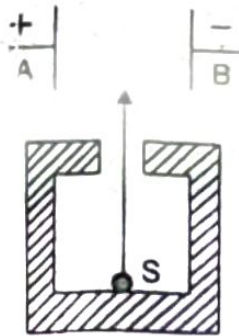


- b) [3]
- How do beta rays differ from cathode rays?
  - State one use and one harmful effect of the radioactivity.
- c) [4]
- Calculate the electrical energy in kWh consumed in a month, in a house using 2 bulbs of 100 W each and 2 fans of 60 W each, if the bulbs and fans are used for an average of 10 hours each day.
  - If the cost per unit is Rs 4.50, calculate in part (i) the amount of electric bill to be paid per month.

#### Question 5

- a) Sometimes when a vehicle is driven at a particular speed, a rattling sound is heard. Explain briefly, why does this happen and give the name of the phenomenon taking place. Suggest one way by which the rattling sound could be stopped. [3]

- b) Fig. shows a radioactive source S in a thick lead walled container having a narrow opening. The radiations pass through an electric field between the plates A and B. [3]



- Complete the diagram to show the paths of  $\alpha$ ,  $\beta$  and  $\gamma$  radiations.
  - Why is the source S kept in a thick lead walled container with a narrow opening?
  - Name the radiation which is unaffected by the electrostatic field.
- c) A power circuit uses a cable having three different wires. [4]
- Name the three wires of the cable.
  - Between which of the two wires should the heating element of an electric geyser be connected?
  - To which wire should the metallic case of the geyser be connected?
  - To which wire should the switch and fuse be connected?

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*[Faint, illegible handwritten text covering the majority of the page]*