

**PRELIMINARY EXAMINATION – 2021-22**

<b>STD: X</b>	<b>SUBJECT: <u>PHYSICS</u></b>	<b>M.MARKS:40</b>
<b>05 JANUARY 2022</b>		<b>DURATION: 1.5 HOUR</b>

Roll No.: \_\_\_\_ NAME: \_\_\_\_\_

**Instructions:**

- 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 I
- Attempt any three questions from section II.
- This paper contains 6 printed pages

Section I

Attempt all questions.

**Question 1**

Choose the correct answers to the questions from the given options. (10  
(Do not copy the question, Write the correct answer only. )

- i. If 1 A current flows through a conductor, it implies that \_\_\_\_\_ $\times 10^{18}$  electrons pass in one second.  
(a) 625  
(b) 6.25  
(c) 62.5  
(d) 0.625
- ii. The generating voltage at generating station generated is stepped up from 11 KV to \_\_\_\_\_ KV.  
(a) 1100 KV  
(b) 110 KV

- (c) 132 K V
- (d) 150 KV
- iii. A geyser is rated '1500 W, 250 V'. This geyser is connected to 250 V mains. Calculate the current drawn?
  - (a) 5 A
  - (b) 6 A
  - (c) 8 A
  - (d) 10 A
- iv. Two sounds of same loudness and same pitch produced by two different instruments differ in their :
  - (a) Amplitudes
  - (b) frequencies
  - (c) Wave forms
  - (d) all the above
- v. Pitch of high frequency sound is:
  - (a) high
  - (b) low
  - (c) zero
  - (d) infinite
- vi. The base of cooking pans is made thicker and heavy because:
  - (a) it lowers the heat capacity of pan
  - (b) it increases the heat capacity of pan
  - (c) the food does not get charred and keeps hot for long time
  - (d) both (a) and (c)
- vii. The specific heat capacity of a body is a characteristic property of a substance. Is it true or false?
  - (a) True.
  - (b) False.
- viii. A radioactive material undergoes decay by ejecting electrons. The

electron ejected in this process is

- (a) the electron from the decay of a neutron
- (b) the electron present in the nucleus
- (c) an orbital electron
- (d) None of these

ix. What is the number of neutrons in this isotope of uranium  ${}_{92}^{238}\text{U}$ ?

- (a) 92
- (b) 119
- (c) 146
- (d) 238

x. The least penetrating radiation is:

- (a)  $\alpha$  - particles
- (b)  $\beta$  - particles
- (c) X - rays
- (d)  $\gamma$  - radiations

## Section II

### Question 2

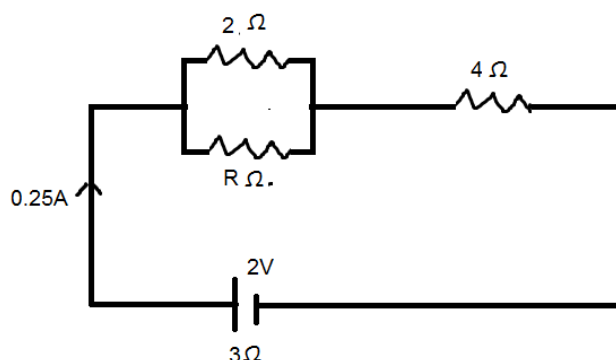
- a. Sometimes when a vehicle is driven at a particular speed, a rattling sound is heard. Explain briefly, why this happens and give the name of the phenomenon taking place. [3]
- b. A straight current carrying conductor is kept in a magnetic field. It experiences a force. State two factors on which the magnitude of force experienced by the conductor depends. Under what condition will the conductor experience no force? [3]
- c. An atomic nucleus X is composed of 84 protons and 128 neutrons emits an alpha particle. Write the reaction. The element X is then heated. What will be the in change in the reaction? [4]

### Question 3

- a. i. Which particles are responsible for flow of current in conductors? [3]  
 ii. To which wire of a cable in a power circuit should the metal case of a geyser be connected?  
 iii. Name the unit in which electrical bills are calculated.
- b. The relationship between the potential difference and the current in a conductor is stated in the form of a law. [3]  
 (i) Name the law.  
 (ii) What does the slope of V-I graph for a conductor represent?  
 (iii) Name the material used for making the connecting wire.
- c. 0.08 kg of a substance is heated from  $30^{\circ}\text{C}$  to  $130^{\circ}\text{C}$  when 2000 calories of energy is supplied to it. Calculate the specific heat capacity of the substance in (a) calories, (b) joule [4]

#### Question 4

- a. Four resistances of  $2.0\Omega$  each are joined end to end to form a square ABCD. Calculate the equivalent resistance of the combination between any two adjacent corners. [3]
- b. (i) Water in lakes and ponds do not freeze at once in cold countries. Give a reason in support of your answer. [3]  
 (ii) What is the principle of Calorimetry?
- c. The circuit diagram shows three resistors  $2\Omega$ ,  $4\Omega$  &  $R\Omega$  connected to a battery of e.m.f. 2V & internal resistance  $3\Omega$ . If the main current of 0.25A flows through the circuit. [4]

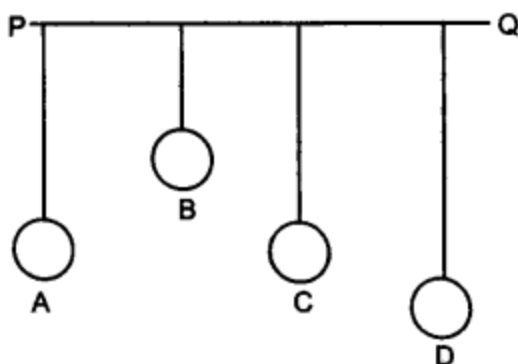


➤ Find :

- i. P.d. across  $4\ \Omega$  resistor
- ii. P.d. across internal resistance of the cell
- iii. P.d. across  $R\ \Omega$  or  $2\Omega$  resistor
- iv. Value of  $R$

### Question 5

- a. What are background radiations? When does the nucleus of an atom become radioactive? [3]
- b. In the diagram below, A, B, C, D are four pendulums suspended from the same elastic string PQ. The length of A and C are equal to each other while the length of pendulum B is smaller than that of D. Pendulum A is set into a mode of vibrations. [3]



- (i) Name the type of vibrations taking place in pendulums B and D?
  - (ii) What is the state of pendulum C?
  - (iii) State the reason for the type of vibrations in pendulums B and C.
- c. A solid of mass  $0.15\text{ kg}$  and at  $100^\circ\text{C}$  is placed in  $0.25\text{ kg}$  of water, contained in a copper calorimeter of mass  $0.12\text{ kg}$  at  $10^\circ\text{C}$ . If the final temperature of the mixture is  $20^\circ\text{C}$ , calculate the specific heat capacity of the solid. [4]
- (given, specific heat capacity of copper =  $400\text{ J Kg}^{-1}\text{ K}^{-1}$ )

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