**SINDHI HIGH SCHOOL, HEBBAL**

**UNIT TEST II-2024-25**

**PHYSICS (042)**

**Grade: XII Max. Marks: 25**

**Date:06/08/2024 Reading time: 8.25am-8.35am**

**No of sides: 3 Writing time: 8.35am-9.35am**

**General Instructions:**  
(1) There are 14 questions in all. All questions are compulsory.  
(2) This question paper has five sections: Section A, Section B, Section C, Section D and  
 Section E.  
(3) All the sections are compulsory.  
(4) Section A contains nine questions, seven MCQ and two Assertion Reasoning based of 1

mark each, Section B contains two questions of two marks each, Section C contains one

question of three marks, Section D contains one case study based question of four marks

and Section E contains one long answer questions of five marks.

(5) Use of calculators is not allowed.

**SECTION A**

1. When a current of 0.2A is drawn from a battery, then the potential difference between its

terminals is 20V and when a current of 2A is drawn, then the potential difference drops to

16 V. The EMF of the battery is **(1)**

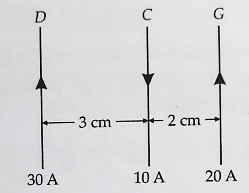
a) 15.1V b) 20.4V c) 18.9V d) 23.3V

2. Two wires A and B of same material and mass have the lengths in the ratio 1:2. On

connecting them to the same source, the rate of heat dissipation in B is found be 5W. The

rate of heat dissipation in A is **(1)**

a) 10 watt b) 5 watt c) 20 watt d) 15 watt



3. Three long straight parallel wires carrying currents are arranged as

shown in the figure. The force experienced by a 25cm length of wire

C is **(1)**

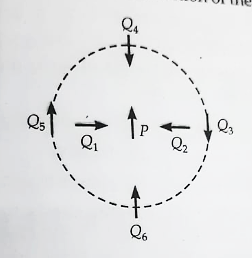
a) 10-3 N b) 2.5X 10-3 N c) zero d) 1.5 X 10-3 N

4. Two similar coils of radius R align concentrically with their planes at right angles to each

other. The current flowing through them are I and 2I respectively. The resultant magnetic field

induction at centre will be **(1)**

a) b) c) d)

5. The figure beside shows the variation of various positions (labelled by

subscripts) of small magnetic magnetized needles P and Q. The arrows

show the direction of their magnetic moments. Which configuration

corresponds to the lowest potential energy among all the configuration

shown? **(1)**

a) PQ3 b) PQ4 c) PQ5 d) PQ6

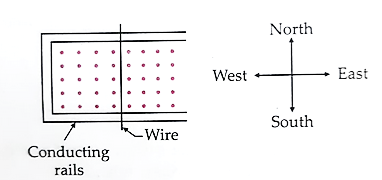
6. A conducting wire sits on smooth metal rails as shown in the

figure. A variable magnetic field points out of the page .The

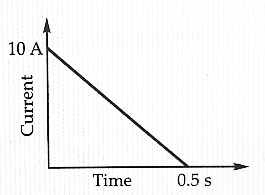
strength of this magnetic field is increased linearly from zero.

Immediately after the field starts to increase, what will be the

direction of the current in the wire and the direction of the

wire’s motion? **(1)**

|  |  |  |
| --- | --- | --- |
|  | **CURRENT IN THE WIRE** | **MOTION OF THE WIRE** |
| a) | North | No motion |
| b) | North | East |
| c) | South | West |
| d) | South | East |

7. In a coil of resistance 100 ohm, a current is induced by changing the

magnetic flux through it as shown in the figure. The magnitude of change in

flux through the coil is **(1)**

a) 200 Wb b) 225 Wb c) 250Wb d) 275Wb

**For Questions 8 and 9, two statements are given –one labelled Assertion (A) and other labelled Reason (R). Select the correct answer to these questions from the options as given below.**

**a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.**

**b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.**

**c) If Assertion is true but Reason is false.**

**d) If both Assertion and Reason are false**

**e) If Assertion is false but Reason is true**

8. **Assertion (A):** The current density at any point in ohmic resistor is in the direction of

electric field at the point.

**Reason (R):** A point charge when released from rest in a region having only electrostatic field

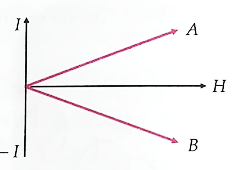
always moves along electric lines of force **(1)**

9. **Assertion (A):** A paramagnetic sample display greater magnetisation (for the same magnetic

field) when cooled.

**Reason (R):** The magnetisation does not depend on temperature. **(1)**

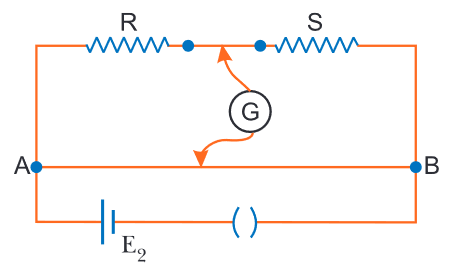
**SECTION B**

10. The given figure shows the variation of intensity of magnetization

versus the applied magnetic field H for two magnetic materials A and B.

(a) Identify the materials A and B

(b) Draw the variation of susceptibility with temperature for B **(2)**

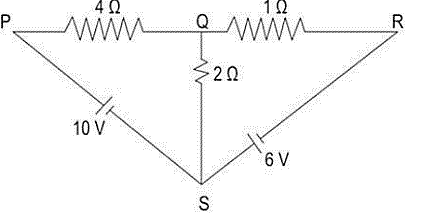


11. In a Metre Bridge shown in the figure, the balance point is found to

be 40 cm from end A. If a resistance of 10 ohm is connected in

series with R balance point is obtained 60 cm from A. Calculate the

value of R and S. **(2)**

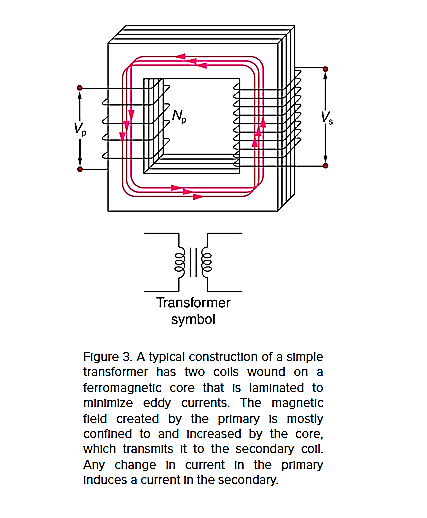
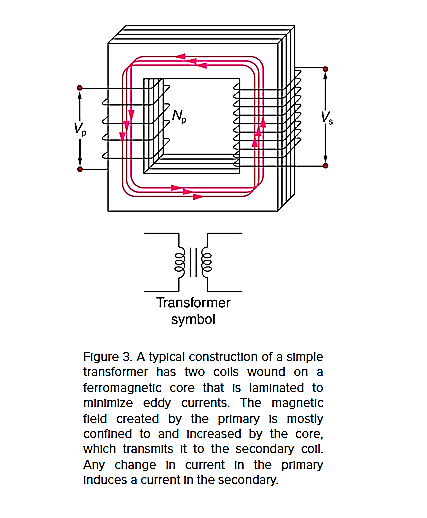
**SECTION C**

12. Using Kirchhoff's laws, calculate the current flowing through 4 Ω,

1 Ω, and 2 Ω resistors in the circuit shown. **(3)**

**SECTION D**

13. Case Study: **Transformers (1X4=4)**

*Transformers* do what their name implies—they transform voltages from one value to another (The term voltage is used rather than emf, because transformers have internal resistance). For example, many cell phones, laptops, video games, and power tools and small appliances have a transformer built into their plug-in unit that changes 120 V or 240 V AC into whatever voltage the device uses. Transformers are also used at several points in the power distribution systems. Power is sent long distances at high voltages, because less current is required for a given amount of power, and this means less line loss. But high voltages pose greater hazards, so that transformers are employed to produce lower voltage at the user’s location.

i) A transformer has 500 primary turns and 10 secondary turns. If the secondary has resistive load

of 15 ohm, the currents in the primary and secondary respectively are

a) 0.16A, 3.2X 10 -3 A b) 3.2X 10 -3 A ,0.16 A

c) 0.16A, 0.16A d) 3.2X 10 -3 A ,3.2X 10 -3 A

ii) The primary of a step down transformer used for ringing door bells has 2000 turns of fine

wire and the secondary has 100 turns .This transformer when connected to 110 volt AC

source will deliver at its secondary a potential difference of

a)220V b) 11V c) 55 V d) 5.5 V

iii) The core of any transformer is laminated so as to

a) reduce the energy loss due to Eddy Currents b) make it light weight

c) make it robust and strong d) increase the secondary voltage

iv) In the method using the transformers, assume that the ratio of the number of turns in the

primary to that in the secondary in the step up transformer is 1:10 . If the power to the

consumers has been supplied at 200V, the ratio of the number of turns in the primary to that

in the secondary in the step down transformer is

a) 200:1 b) 150:1 c) 100:1 d) 50:1

**SECTION E**

14. (a) Draw a labelled diagram of a moving coil galvanometer. Describe briefly its principle and

working.

(b) Answer the following:

(i) Why is it necessary to introduce a cylindrical soft iron core inside the coil of a

galvanometer?

(ii) Increasing the current sensitivity of a galvanometer may not necessarily increase its

voltage sensitivity. Explain, giving reason. **(5)**