

INSTRUCTIONS:

- ❖ Answer any **FOUR** questions.
- ❖ These values of physical quantities may be useful to you:
 - Acceleration due to gravity = 10ms^{-2}
 - Speed of sound in air = 320ms^{-1}
 - Velocity of electromagnetic waves = $3.0 \times 10^8\text{ms}^{-1}$.

1.
 - a) State the conditions for a body to be in,
 - i) Stable equilibrium. (01 mark)
 - ii) Neutral equilibrium (01 mark)
 - b) Explain why bus passengers luggage is loaded in the boots rather than the rack on top of the bus. (02 marks)
 - c)
 - i) State Hooke's law. (01 mark)
 - ii) Describe an experiment to verify Hooke's law using a spring. (05 marks)
 - d)
 - i) State Newton's laws of motion. (03 marks)
 - ii) Explain why passengers in a vehicle need to fasten their seat-belts (03 marks)
2.
 - a) State the Kinetic theory of matter. (01 mark)
 - b) Briefly explain the mechanism of heat transfer through a non-metal solid. (03 marks)
 - c) Describe an experiment to determine the fixed points of a thermometer. (06 marks)
 - d)
 - i) Mention any three reasons for not using water as a thermometric liquid. (03 marks)
 - ii) When a Celsius thermometer is inserted in a boiling liquid, the mercury thread rises above the lower fixed point by 19.5cm. Find the temperature of the boiling liquid if the fundamental interval is 25cm. (03 marks)

3. a) Distinguish between primary and secondary cells and give one example of each. (04 marks)
- b) State two precautions one has to undertake to prolong the life of a lead-acid accumulator. (02 marks)
- c) Define energy and state its SI units. (02 marks)
- d) Describe the energy changes that occur when a filament bulb is connected to a battery. (04 marks)
- e) Resistors of 4Ω , 3Ω and 2Ω are connected as shown in fig1 across a battery of e.m.f 2V and of negligible internal resistance.

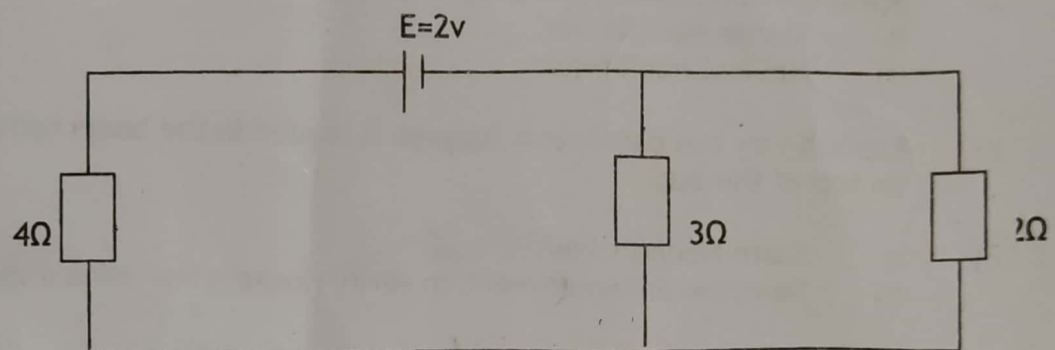


Fig 1

Calculate the current through the 4Ω resistor. (04 marks)

4. a) List two differences between Cathode rays and x-rays. (02 marks)
- b) With the aid of a labeled diagram describe how x-rays are produced. (07 marks)
- c) What are the differences between hard and soft x-rays? (02 marks)

