3.20 ELECTRICITY (448)

3.20.1 Electricity Paper 1 (448/1)

SECTION A (48 marks)

*Answer **all** the questions in this section in the spaces provided.*

1.	(a)	Name **four** conducting materials used in electrical circuits.	(2 marks)
	(b)	State **three** advantages of circuit breakers over rewirable fuses.	(3 marks)
2.	(a)	State **two** reasons that may cause an entrepreneur to fail in business.	(2 marks)
	(b)	State **two** causes of accidents in a workshop.	(2 marks)
		(ii) State **two** functions of the try square.	(2 marks)
	(b)	Make a free hand isometric drawing of a one gang one way switch.	(3 marks)
5.	(a)	State **two** functions of the controlling torque in analogue instruments.	(2 marks)
	(b)	Name **two** types of moving coil instruments.	(1 mark)
6.	(a)	Outline **three** methods used in demagnetising a magnet.	(3 marks)
	(b)	Name **two** non-magnetic materials.	(1 mark)
7.	(a)	Name **three** types of diodes and for each case sketch their symbols.	(3 marks)
	(b)	Explain the difference between an ordinary switch and a P.N. junction diode.	(2 marks)
	(c)	State **two** ways of disposing electrical waste materials.	(1 mark)

8. **Figure 1** shows an electric circuit. Calculate the:

(i) Supply voltage;

(ii) Reading on ammeter A;

(iii) Value of resistor R_3. (6 marks)

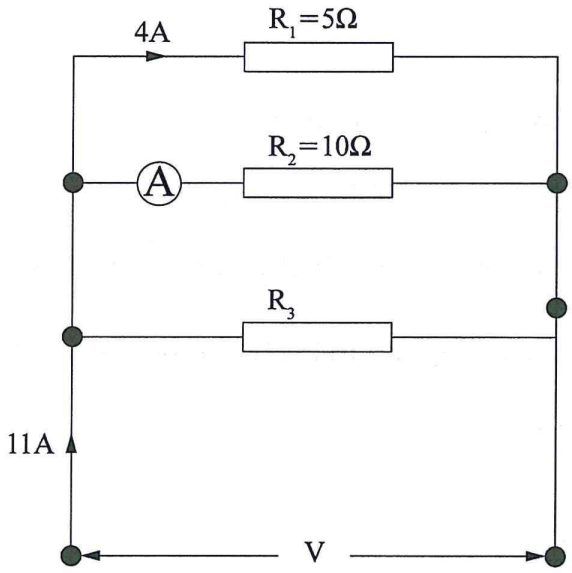

Figure 1

9. (a) Draw a labelled diagram of a carbon resistor. (3 marks)

(b) Define the term 'inductance'. (2 marks)

10. (a) Name **three** tests carried out in a completed electrical installation and in each case, state the instrument used. (3 marks)

(b) State **two** options that one can pursue in electrical engineering field after the completion of secondary education. (1 mark)

SECTION B (52 marks)

*Answer any **four** questions from this section in the spaces provided.*

11. (a) Draw a labelled diagram of a single phase double wound core type transformer. (5 marks)

(b) A 240v/12v ideal transformer is connected to a lamp of 120 watts.

Calculate:

(i) Current taken from the supply

(ii) Transformer turns ratio

(5 marks)

(c) Explain the purpose of a centrifugal switch in an A.C. single phase motor. (3 marks)

12. With the aid of a labelled diagram of a P.N.P. transistor, explain the following:

(i) Emitter

(ii) Base

(iii) Collector

(9 marks)

(b) Draw the truth table for an OR logic gate. (4 marks)

13. **Figure 2** shows three views of a simple shaped block drawn in orthographic first angle projection. Draw the block in isometric projection making corner P the lowest point. (13 marks)

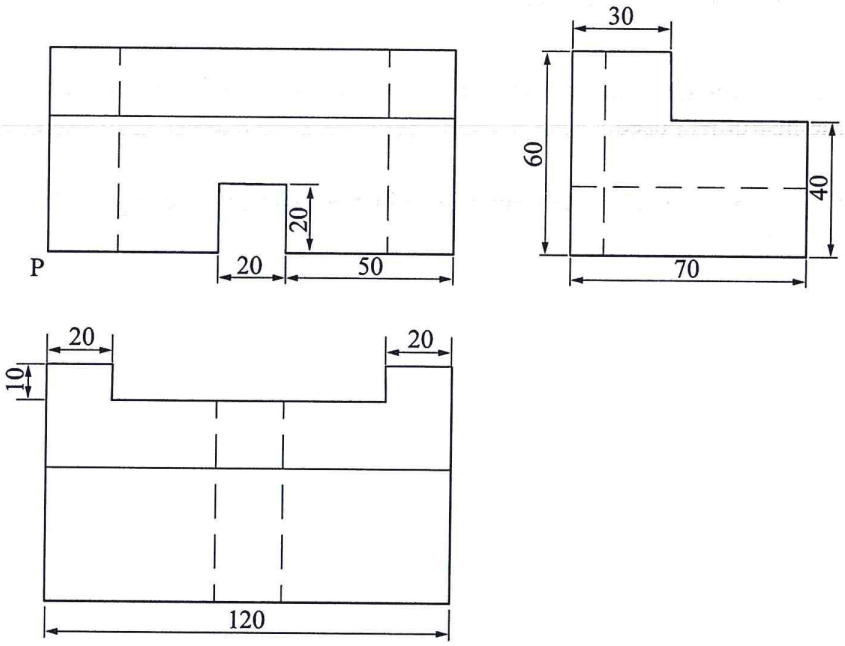

Figure 2

14. (a) (i) **Figure 3** shows a voltage sine wave produced by an alternator.

Name the parts labelled A – F. (3 marks)

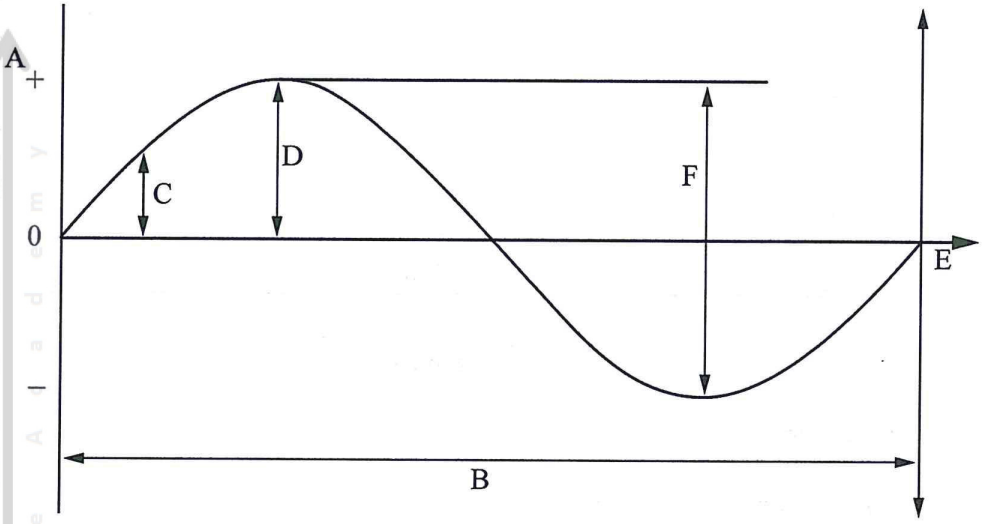

Figure 3

(ii) A supply voltage has a mean value of 120v.

Determine its:

I. Maximum value

II. rms value

(3 marks)

(b) **Figure 4** shows an R–C circuit.

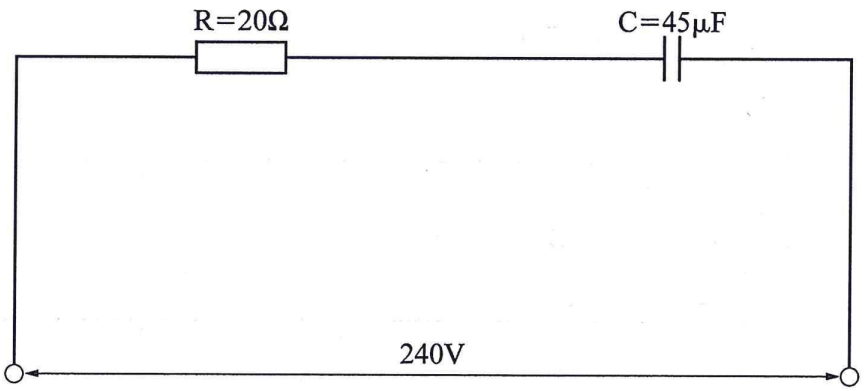

Figure 4

Calculate the:

(i) Capacitive reactance;
(ii) Impedance;
(iii) Supply current. (5 marks)

(c) Name **four** applications of electromagnets. (2 marks)

15. (a) Outline the action to be taken on a victim found in contact with live conductors and is very unconscious. (5 marks)

(b) State **two** I.E.E. regulation requirements regarding 13A socket outlets. (2 marks)

(c) (i) Draw a circuit diagram of a switch start fluorescent fitting. (4 marks)

(ii) A fluorescent lamp fails to start and there is no end glow.
State **two** possible causes for this action. (2 marks)