

SECOND SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND
ELECTRONICS ENGINEERING — MARCH, 2015

BASIC ELECTRICAL ENGINEERING

[Time : 3 hours

(Maximum marks : 100)

PART—A

(Maximum marks : 10)

Marks

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. Define temperature co-efficient of resistance.
2. State maximum power transfer theorem.
3. Write the term magneto motive force.
4. What do you understand by dynamically induced emf ?
5. Define power factor.

(5×2=10)

PART—B

(Maximum marks : 30)

II Answer *any five* of the following questions. Each question carries 6 marks.

1. Distinguish the sign conventions for voltage drop and emf in a branch of a network using Kirchhoff law.
2. State and prove superposition theorem.
3. Derive an expressions for capacitances of series and parallel connected capacitors.
4. Compare magnetic and electrical circuit.
5. With help of a figure explain mutually induced emf.
6. Express the following in trigonometrical and rectangular form. $V = 50 \angle 36.87^\circ$.
7. Derive an expression for impedances in R-L-C circuit.

(5×6=30)

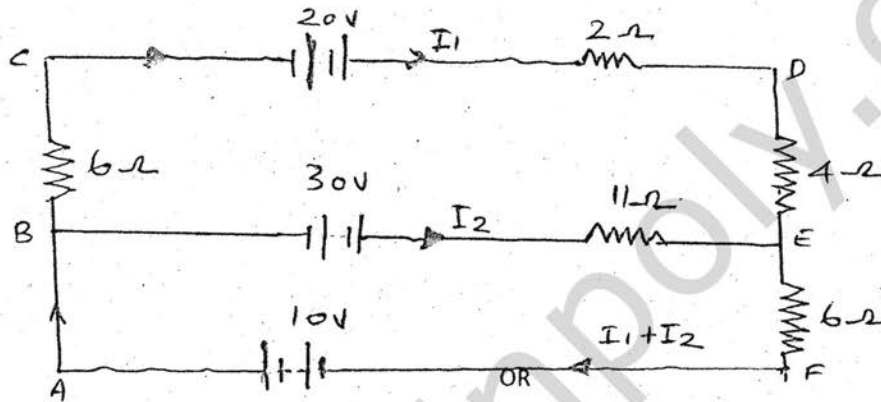
PART—C

(Maximum marks : 60)

(Answer one full question from each unit. Each full question carries 15 marks.)

UNIT—I

- III (a) State and explain Kirchhoff voltage and current law. 7
- (b) From the circuit shown below determine the directions and values of current in each of the battery. 8



OR

- IV (a) Calculate the resistance of 1km long cable composed of 19 strands of similar copper conductors, each strand being 1.32mm in diameter. Allow 5% increase in length for the lay (twist) of each strand in completed cable. Resistivity of copper is taken as $1.72 \times 10^{-8} \Omega\text{-m}$. 7
- (b) State and explain Thevenin's theorem. 8

UNIT—II

- V (a) Describe the term absolute and relative permeability. Give the relation between flux density and magnetising force. 7
- (b) Derive an expressions for the force produced by current carrying conductor placed in a magnetic field. 8

OR

- VI (a) Draw B-H curve and identify different regions. 7
- (b) Write short notes on the following :
- | | |
|--------------------|--------------------|
| (i) Ampere - turns | (iii) Permeance |
| (ii) Reluctance | (iv) Flux density. |
- 8

UNIT—III

- VII (a) Deduce an expression for co-efficient of coupling. 7
- (b) An electromagnet has stored 648J of magnetic energy when a current of 9A exits in its coils. What average emf is induced if the current is reduced to zero in 0.45 seconds ? 8

OR

- VIII (a) State Faraday's law of electromagnetic induction. 7
- (b) Define the following :
- | | | |
|--------------------|--------------------|---|
| (i) RMS Value | (iii) Form factor | |
| (ii) Average Value | (iv) Crest factor. | 8 |

UNIT—IV

- IX (a) Give an idea of rectangular form of mathematical representation of phasor. 7
- (b) A coil of resistance 5.94Ω and inductance 0.35H is connected in series with a capacitance of $35\mu\text{F}$ across a 200V , 50Hz supply. Find :
- | | | |
|--------------------------|---|---|
| (i) Impedance | (iv) Voltage across the coil | |
| (ii) The current flowing | (v) Voltage across the capacitor | |
| (iii) The power factor. | (vi) Total power taken from the supply. | 8 |

OR

- X (a) What do you understand by resonance in R-L-C series circuit ? 7
- (b) Deduce an expressions for addition and subtraction of phasors $V_1 = a_1 + jb_1$;
 $V_2 = a_2 + jb_2$. 8