

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

BASIC ELECTRICAL ENGINEERING

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define temperature coefficient of resistance.
2. Define electric flux density.
3. State Lenz's Law.
4. Define impedance of an ac circuit.
5. Write the minimum and maximum value of power factor in an ac circuit. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Explain effect of temperature on resistance.
2. State and explain Kirchhoff's current and voltage law.
3. State and explain laws of electrostatics.
4. Compare magnetic and electric circuit.
5. Differentiate statically and dynamically induced e.m.f.
6. Define Apparent power, Reactive power and True power.
7. Explain RL series circuit with phasor diagram. (5×6 = 30)

PART — C

(Maximum marks : 60)

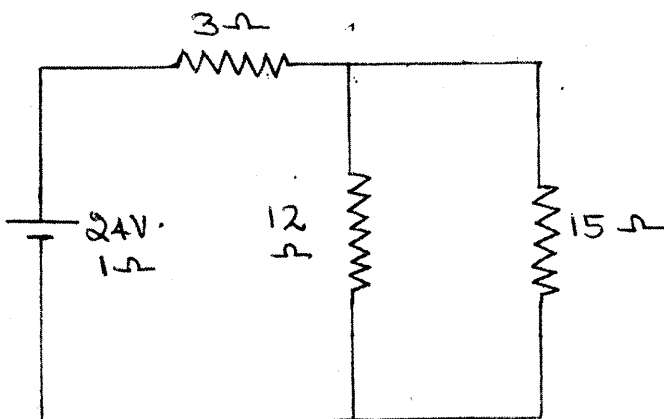
(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

- III (a) A coil has a resistance of 40Ω at 15°C and 50Ω at 60°C . Find the resistance at 0°C and the temperature coefficient of resistance at 40°C . 8
- (b) Derive an equation for equivalent resistance of three resistors which are connected in series and parallel. 7

OR

- IV (a) Find the current through 15Ω resistor in the circuit using Thevenin's Theorem.



- (b) State and explain superposition theorem.

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UNIT — II

- V (a) Three capacitors have capacitances of 10, 25 and $50\mu\text{F}$. Source voltage is 250V. Calculate charge on each Capacitor and total capacitance when they are connected in parallel and series.
- (b) Derive the expression for potential at a point in the air.

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OR

- VI (a) Derive the formula for energy stored in a capacitor.
- (b) Draw B-H curve and identify different regions.

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UNIT — III

- VII (a) An alternating current is given by $i=141.4 \sin 314t$. Find (i) Maximum value (ii) frequency (iii) time period (iv) the instantaneous value when t is 3ms.
- (b) Derive the expression for energy stored in a magnetic field.

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OR

- VIII (a) Define (i) Amplitude (ii) Average value (iii) RMS Value (iv) Form factor.
- (b) Derive the equation for alternating voltage and current with relevant figures.

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UNIT — IV

- IX (a) A resistance of 2.5Ω , an inductance of 0.06 H and a capacitance of $6.8\mu\text{F}$ are connected in series and 230V, 50 Hz supply is given the circuit. Find : (i) Impedance (ii) Current (iii) power factor (iv) Power.
- (b) Explain RLC series circuit with phasor diagram.

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OR

- X (a) Analyse the phasor method used to solve parallel circuits with an example.
- (b) The current in a circuit is given by $(4.5 + j12)$ A when the voltage is $(100 + j150)$. Determine : (i) Impedance (ii) Phase angle.

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