

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019**

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 the resistance and write its unit.
2. Mention type of energy conversion occur in battery.
3. Notate the Thevenins equivalent of an electric circuit.
4. Define mmf.
5. Define capacitance.

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Draw the atomic structure of silicon atom neatly. Atomic number of silicon is 14.
2. State the ohms law. Write laws of resistance.
3. Derive the equation for effective resistance when the resistance R1, R2, R3 are connected in parallel.
4. State voltage divide rule in series circuit of resistance with neat fig.
5. State the Coulombs laws of electrostatics.
6. Explain electrical potential.
7. State Faradays laws of electromagnetic induction.

(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) What are the factors effecting resistance ? | 8 |
| | (b) A coil has a resistance 18Ω at 20°C and 22Ω at 50°C . Find the rise in the temperature when resistance becomes 24Ω . The room temperature is 18°C . | 7 |

OR

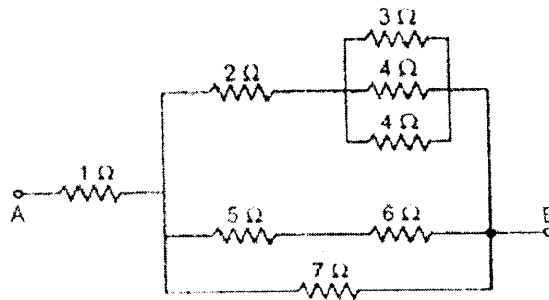
- IV (a) Write the short note on short circuit, open circuit with figure. 8
- (b) Calculate the cost of electrical energy for a month of April of a residential. 100W bulb-3 nos. working 12 hours per day, 25W- 4 nos. fluorescent lamp working 10 hours per day, 40W fluorescent lamp-5 nos. working 10 hours per day. Cost of energy is Rs. 4 per unit. 7

UNIT — II

- V (a) State and explain the charging and discharging of lead acid battery with neat diagram. 10
- (b) State and explain Norton's theorem. 5

OR

- VI (a) Find the equivalent resistance between A and B (show the each step of reduction).



- (b) State Super position theorem. 5

UNIT — III

- VII (a) Derive the equation for equivalent capacitance when capacitors C_1 , C_2 , C_3 are connected in series. 7
- (b) A parallel plate capacitor has an area of 10 cm^2 , distance between the plate is 2 mm , relative permittivity of dielectric medium of capacitor is 3. The potential gradient between the plates of a capacitor is 12 kV/cm . Determine the capacitance of the parallel plate capacitor, voltage across the plate, charge, electric flux density and electric flux between the plate. 8

OR

- VIII (a) Define relative permittivity, absolute permittivity. 8
- (b) Four capacitors are connected in parallel across 250 V supply. The charges are taken by them are 750 , 1000 , 1500 , $2000 \mu\text{C}$ each. What is the equivalent capacitance ? 7

UNIT — IV

- IX (a) Explain self induced emf, mutual induced emf with figure. 8
- (b) A solenoid of a 100 cm is wound on a brass tube. If the current flow through the coil is 0.5 A , calculate the number of turns necessary over the solenoid produce a field strength of 500 AT/m at the centre of the coil. 7

OR

- X (a) Derive the equation for energy stored in magnetic field. 6
- (b) A coil carries 200 turns of gives rise a flux of $500 \mu\text{Wb}$ when carrying a certain current. If this current is reversed in $1/10^{\text{th}}$ of a second, find the average emf induced in the coil. 6
- (c) List any three application of electromagnet. 3