Reg. No. ....

Signature ....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 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 specific resistance and write its unit.

2. Write the equation for parallel connection of two resistors.

3. State Kirchhoff's current law.

4. Mention electric flux density.

5. Write the equation for energy stored in inductor.   (5×2 = 10)

PART — B
(Maximum marks : 30)

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

1. The resistance of a wire increases from 40Ω at 20°C to 50Ω at 70°C. Find the temperature coefficient of resistance at 0°C.

2. Write short note about electrical power and electrical energy.

3. Derive the equation for effective resistance when the resistance Rl, R2, R3 are connected in Series.

4. Explain voltage division rule in series circuit of resistance with neat figure.

5. State the laws of electrostatics.

6. Explain dynamically induced emf and statically induced emf.

7. Compare magnetic circuit and electric circuit.   (5×6 = 30)
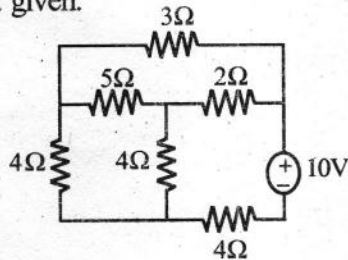
[13]

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Using Kirchhoff's laws calculate the current delivered by the battery of the circuit given.

8

(b) State Ohms law and write its limitations.

7

OR

IV (a) Calculate the resistance of a 100m length of wire having a uniform cross sectional area .02 mm² and having resistivity of 40μΩ-cm. If the wire is drawn out to 4 times its original length, calculate its new resistance.

8

(b) Calculate the cost of electrical energy for a month of April for a residential building with the following loads

60W bulb — 3 nos. working 6 hours per day.
40W — 4 nos. fluorescent lamp working 8 hours per day.
15W CFL — 5 nos. working 5 hours per day.
Cost of energy is 2.50 per unit.

7

UNIT — II

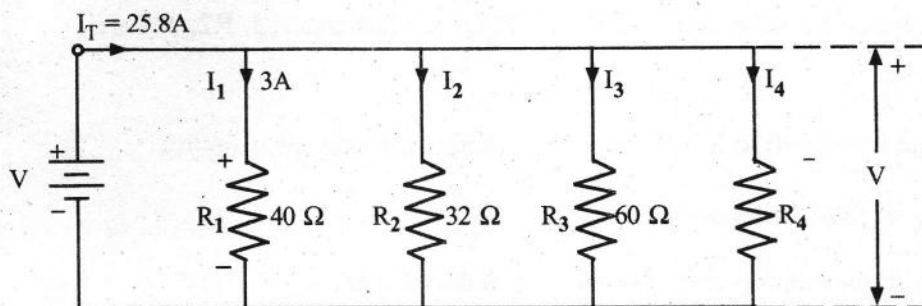V (a) List the care and maintenance of lead acid battery.

10

(b) State Super Position Theorem.

5

OR

VI (a) Four resistors are connected as shown in fig. Current in 40Ω is 3A while the total current from the supply is 25.8A. Find (i) supply voltage (ii) value of R4 (iii) equivalent resistance across supply.

8

(b) State Maximum power transfer theorem and prove.

7

Unit — III

VII (a) Derive the equation for equivalent capacitance when capacitors C1, C2, C3 are connected in series 7

(b) A capacitor consist of two parallel rectangular plates each 120mm² separated by 1mm in air. When a voltage 100 V is applied between the plate, calculate (i) the charge on the capacitor (ii) the electric flux density (iii) the electric field strength in the dielectric. 8

Or

VIII (a) Define relative permittivity, absolute permittivity. 8

(b) Three capacitors are connected in series across a 120V supply, the voltage across them are 30V, 40V, 50V respectively and the charge on each is 4500µC. What is the value of each capacitor and equivalent capacitance of the series combination ? 7

Unit — IV

IX (a) State Faraday's laws of electromagnetic induction. 6

(b) Define :
(i) magnetic flux (ii) magnetic flux density (iii) magnetic field strength 9

Or

X (a) State and explain Fleming's left hand rule. 6

(b) An iron cored toroid of relative permeability 980 has a mean length of 120cm and core area of 10mm². A current of 0.3A establishes a flux of 40µWb Calculate :

(i) the number of turns of the coil
(ii) self inductance
(iii) energy stored in magnetic field. 9