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**A23-01659**

Reg. No……
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**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2023**

# BASIC ELECTRICAL ENGINEERING

[Maximum Marks: **100**] [Time: **3** Hours]

## PART-A

[Maximum Marks: **10**]

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

1. Define temperature coefficient of resistance.
2. State Maximum power transfer theorem.
3. Define potential gradient.
4. List the applications of capacitors.
5. Define reluctance. (5 x 2 = 10)

## PART-B

[Maximum Marks: **30**]

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

1. State and explain laws of resistance.
2. List the main characteristics of series circuit.
3. State and explain Reciprocity theorem.
4. Explain permittivity, absolute permittivity and relative permittivity.
5. Derive the expression for three capacitors connected in a) Series b) Parallel.
6. Define (i) flux density, (ii) MMF (iii) field intensity related to magnetic circuits.
7. Distinguish between dynamically induced emf and statically induced emf. (5 x 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's voltage and current laws. (7)

b. A transmission line is made of copper has a resistance of 100Ω at $0^0$C. Calculate the change in resistance between summer and winter, knowing that temperature varies from +35°C to – 30 °C. Assume temperature coefficient of copper to be 0.00427/°C at $0^0$C . (8)

**OR**

IV. a. Explain the effect of temperature on resistance. (7)

b. A house is fitted with 5 lamps of 100 watts each, one electric press of 220 V drawing 2 A of current, 4 fans of 110 watts each and a heater of 1120 watts. If all the appliances work for 2 hours a day, find the electricity bill for the month of September. Electrical energy is supplied at Rs.2 per kWh. (8)

**UNIT – II**

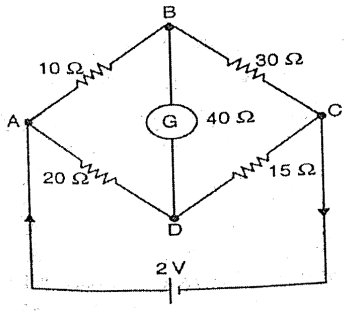
V. a. State and explain Superposition theorem. (7)

b. A circuit consisting of three resistances of 12Ω, 18Ω, 36Ω respectively joined in parallel is connected in series with a fourth resistance R. The whole circuit is supplied at 60 V and it is found that power dissipated in 12Ω resistance is 36 W. Determine the value of R and power absorbed in the parallel group. (8)

**OR**

VI. a. State Norton's theorem and explain the procedure for finding Norton's equivalent circuit. (7)

b. Apply Thevenin's theorem to calculate the current flowing through the galvanometer. (8)




**UNIT- III**

VII. a. Derive the expression for capacitance of parallel plate capacitor in a uniform dielectric medium. (7)

b. Derive the expression for energy stored in a capacitor. (8)

**OR**

VIII. a. State and explain laws of electrostatics. (7)

b. Three capacitors of capacitance 800 μF, 60μF and 1200 μF are connected in parallel to a 48 V d.c supply. Find (1) The total capacitance (2) The charge on each capacitor (3) The total charge. (8)

## UNIT - IV

IX. a. State and explain Fleming's left hand rule and Fleming right hand rule. (7)

b. An iron ring has a cross-sectional area of 400 $mm^2$ and a mean diameter of 25 cm. It is wound with 500 turns. If the value of relative permeability is 250, find the total flux set up in the ring. The coil resistance is 474 Ω and the supply voltage is 240 V. (8)

**OR**

X. a. Comparison between electric circuit and magnetic circuit. (7)

b. Derive the expression for energy stored in an inductor. (8)

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