N24 - 7117

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2024

ELECTRICAL TECHNOLOGY

[Maximum marks: 100]   [Time: 3 Hours]

PART – A
Maximum marks: 10

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

1. Define the term frequency of an AC waveform.

2. Write the expression for form factor.

3. State Ohm's law.

4. Name the law used to find direction of rotation of DC motor.

5. List one application of single phase induction motor.   (5 x 2 = 10)

PART – B
Maximum marks: 30

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

1. Derive the current expression in a series RL circuit when an AC voltage of $V_m sin\omega t$ is applied.

2. Draw the figure of insulation Megger.

3. Explain Kirchhoff's Current Law and Kirchhoff's Voltage Law.

4. Derive the EMF equation of transformer.

5. Explain the No load characteristics of a DC generator with figure.

6. List the different types of DC motor.

7. Draw and explain the Open circuit characteristics of an alternator.   (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) For the AC voltage $340 sin 314t$, find the

         (i) Maximum value   (ii) Frequency in Hz   (iii) RMS value   (iv) Time period   (8)

       (b) Draw and explain pipe earthing.   (7)
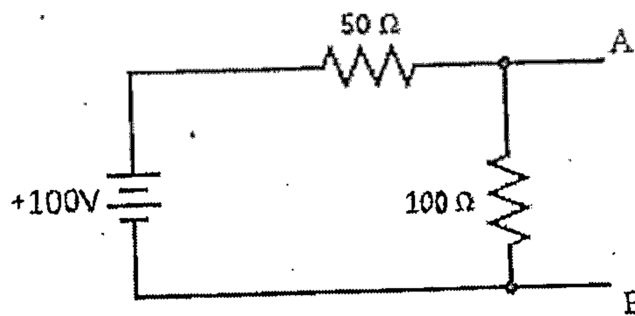
IV. (a) An inductance of 0.1H and a 100Ω resistance is connected in series. Find the power consumed and power factor when an AC voltage of $100 sin 314t$ is applied. (8)

(b) Draw and explain plate earthing. (7)

UNIT - II

V. (a) State and explain superposition theorem and maximum power transfer theorem. (8)

(b) Describe the various losses in a transformer. (7)

OR

VI. (a) For the circuit shown below find the Thevenin equivalent voltage and Thevenin equivalent resistance across AB. (8)

(b) Explain the working principle of a transformer. (7)

UNIT - III

VII. (a) Derive the EMF equation of DC generator. (8)

(b) Explain the need of starter in a DC motor and draw the diagram of three point starter. (7)

OR

VIII. (a) Explain the classification of DC generators with neat figures. (8)

(b) Explain the working of a DC motor with figure. (7)

UNIT – IV

IX. (a) Explain the working principle of three phase induction motor. (8)

(b) Derive the EMF equation of an alternator. (7)

OR

X. (a) Derive the relationship between synchronous speed and frequency of an alternator. Find the synchronous speed for a 3 phase induction motor wound for 4 poles and supplied from 50 Hz. (8)

(b) Explain the working principle of stepper motor with diagram. (7)