7033

BOARD DIPLOMA EXAMINATION, (C-20)
JUNE/JULY—2022

DECE - FIRST YEAR EXAMINATION

BASIC ELEMENTS OF ELECTRICAL ENGINEERING

Time : 3 hours]   [*Total Marks* : 80

PART—A   3×10=30

Instructions :   (1) Answer **all** questions.

                (2) Each question carries **three** marks.

                (3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define magnetic flux and magnetic flux density.

2. Define electrostatic field.

3. Determine the voltage across a 2·5 μF capacitor, when charged to 10 mC.

4. State Ohm's law and give the limitations of Ohm's law.

5. Define Q-factor of a coil.

6. State the methods used to solve the AC parallel circuits.

7. Define the regulation of a transformer.

8. State any three applications of isolation transformer.

9. List any three specifications of DC motors.

10. Give the expression for back EMF of a DC motor.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Define self-inductance, mutual inductance and co-efficient of coupling.

(OR)

(b) Derive the expression for capacitors connected in parallel and find the equivalent capacitance of 1 µF, 2 µF and 3 µF connected in parallel.

12. *(a)* Derive the expression for equivalent resistance of resistors connected in series and find the equivalent resistance of 3 Ω, 6 Ω and 9 Ω resistors connected in series.

(OR)

(b) Explain the ideal voltage source and draw its VI characteristics.

13. *(a)* Explain the representation of a vector by *(i)* symbolic notation and *(ii)* trigonometric form.

(OR)

(b) Explain the AC response of a series RC circuit.

14. *(a)* Explain the construction and working of isolation transformer.

(OR)

(b) State and explain the losses in transformers.

15. *(a)* Explain the construction and working principal of a DC motor.

(OR)

(b) Explain briefly the significance of back EMF.

PART—C

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

16. A Resistance of 12 Ω, inductance of 0·15 H and a capacitance of 1 μF are connected in a series across a 100 V, 50 Hz AC supply. Calculate—

   (a) Power factor

   (b) Power dissipated in the circuit

   (c) Current

   (d) Impedance

   (e) Voltage across resistor   2+2+2+2+2

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