7033

BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH —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 the term magnetic field.

2. Define the term electrical potential.

3. Find the energy stored in a capacitor of 150 µF when connected across 230 V battery.

4. Classify the energy sources.

5. Give the mathematical representation of vectors in symbolic notation.

6. Define active power and reactive power of AC current.

7. Classify the losses in a transformer.

8. Define voltage transformation ratio of transformer.

9. Distinguish between DC shunt and DC series motor.

10. State the significance of back emf of a motor.

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) State the Faraday's laws of electromagnetic induction.

(OR)

(b) Derive the expression for equivalent inductance when inductors are connected in series and parallel.

12. (a) Explain the current division rule for two branch parallel resistive network.

(OR)

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

13. (a) Explain the effect of AC through *R-L-C* series circuit.

(OR)

(b) Find $Z1*Z2$ and $Z1/Z2$ if

$Z1 = 5 - j2, Z2 = -3 - j8$

14. (a) Explain the construction and working principle of an auto transformer.

(OR)

(b) Explain the need for lamination of core in the transformer.

15. (a) Explain the construction and working principle of a stepper motor.

(OR)

(b) Explain the need for starter in a DC motor.

PART—C

Instructions : (1) Answer the following question.

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

16. An Inductive coil having an internal resistance $5\,\Omega$ takes $10\,A$ when connected to a supply of $230\,V$, $60\,Hz$. Then find

(a) Inductance of coil

(b) Power factor

(c) Reactance

(d) Quality factor

(e) Angle of lag   2+2+2+2+2

★ ★ ★