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C20-EC–106

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BOARD DIPLOMA EXAMINATION, (C-20)

SEPTEMBER/OCTOBER—2021

DECE - FIRST YEAR EXAMINATION

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 capacitance and state its units.

2. Define electric potential and its units.

3. Classify various types of induced e.m.f.

4. State Kirchhoff's laws.

5. Define Q factor of a coil.

6. Give the expression for impedance (Z) and phase angle in series RLC circuit.

7. Define voltage transformation ratio.

8. Discuss the reason for using lamination in transformer core.

9. List the specifications of DC motor.

10. Compare DC series motor and DC shunt 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)* State and explain Faraday's laws of electromagnetism.

OR

(b) Derive an expression for equivalent capacitance when three capacitors are connected in series.

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

OR

(b) Derive an expression for equivalent resistance when three resistances are connected in parallel.

13. *(a)* Explain AC through resistance and capacitance connected in series.

OR

(b) Explain the admittance method for solving AC parallel circuits.

14. *(a)* Explain the working principle of autotransformer.

OR

(b) Explain the applications of transformer as the following :

(i) Potential transformer

(ii) Current transformer

(iii) Impedance matching transformer

(iv) Isolation transformer

15. *(a)* Explain the working principle of DC motor.

OR

(b) Explain the principle of operation of single phase induction motor.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) It carries **ten** marks.

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

16. Analyse a circuit which has a coil of resistance 10 ohms is connected in series with a coil of inductance 0·02 H and is connected to AC mains of 100 V and 50 Hz. Calculate current, power factor and voltage drop across resistance and inductance.

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