C14–EE–**106**

4046

BOARD DIPLOMA EXAMINATION, (C–14)
MARCH/APRIL—2016
DEEE—FIRST YEAR EXAMINATION

BASIC 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. Distinguish among conductor, insulator and semiconductor with respect to valence electrons.

2. List the limitations of Ohm's law.

3. Define *(a)* electrical energy, and *(b)* electrical power.

4. Define thermal efficiency.

5. Compare between magnetic and electrical circuits in any three aspects.

6. State Fleming's left-hand rule.

7. State the coefficient of coupling.

8. A coil of 360 turns is linked by a flux of 100 microweber. If the flux is reversed in 0·01 second, find the e.m.f. induced in the coil.

9. Define absolute permittivity and relative permittivity.

10. State electric flux and electric flux density.

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PART—B 10×5=50

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Instructions : (1) Answer any **five** questions.

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

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

11. *(a)* State the laws of resistance and give the units. 4

(b) An aluminium resistor has resistivity of 45·6   at 25 °C and 49·2   at 55 °C. Calculate the temperature coefficient of resistance at 0 °C. 6

12. *(a)* Find current *I* in the following network : 6
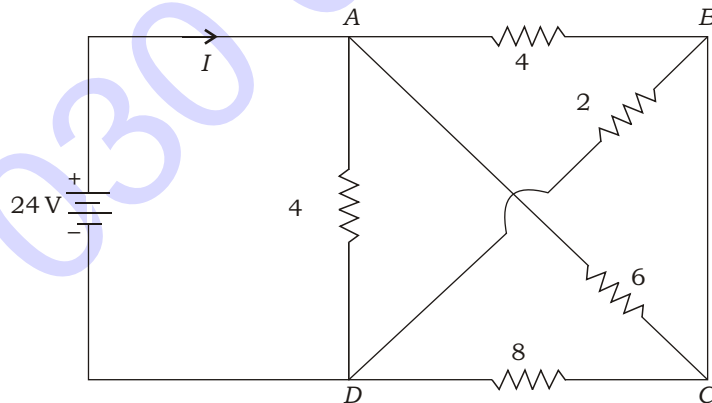
(b) Find the resistance of 100-m copper wire, 0·05 cm in diameter. [Take the specific resistance of copper as 1·7   -cm] 4

13. Two bulbs rated 60 W at 220 V and 100 W at 220 V are connected in series across a 220-V DC supply. Calculate the power absorbed by each lamp. If the above two bulbs are connected in parallel across the 220-V DC supply, what is the power absorbed by each lamp? 10

14. Calculate the time taken and the cost of energy used to raise the temperature of one litre water from 15 °C to 90 °C in a 250-V electric kettle. Resistance of the kettle is 100 ohm, efficiency of the kettle is 85%, and the cost of electrical energy is 75 paise per unit. 10

15. *(a)* Explain work law and its applications. 6

  (b) Derive an expression for force between two parallel current-carrying conductors. 4

16. *(a)* Derive the expression for energy stored in a magnetic field. 6

  (b) Develop an expression for lifting power of a magnet? 4

17. *(a)* Obtain an expression for total inductance when two coils connected in series fluxes are *(i)* aiding, and *(ii)* opposing. 6

  (b) State and explain Fleming's right-hand rule. 4

18. *(a)* Compare electrostatic circuit with magnetic circuit. 4

  (b) Three capacitors 10 F, 20 F and 50 F are connected in *(i)* series, and *(ii)* parallel across a 400-V supply. Find the energy stored in each case. 6

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