C16–EE–106

6040

BOARD DIPLOMA EXAMINATION, (C–16)
MARCH/APRIL—2018
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. State Ohm's law and give the equation with units.

3. Define electrical work and electrical energy and mention its units.

4. Define thermal efficiency.

5. A current of 10 A is flowing through a straight wire. Determine the force on a unit north pole placed 0·2 m from the wire.

6. State Biot-Savart law.

7. Define self-inductance and mutual inductance.

8. Classify the types of induced e.m.f.

9. List the properties of electrostatic lines of force.

10. Define electric flux and electric flux density and mention its unit.

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)* Derive the formula for equivalent resistance of three resistances in parallel.   5

    (b) Derive an expression a_t $a_o(1$ $a_o t)$.   5

12. Calculate the equivalent resistance between the *AB* terminals and also find the current and power wasted if the voltage across *AB* is 15 V :   10
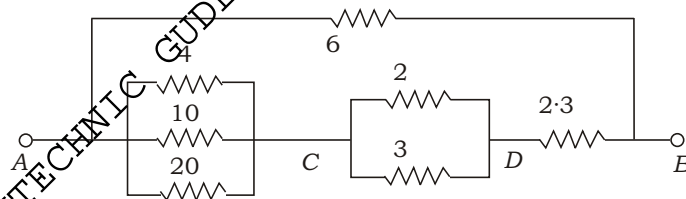
13. Two lamps of rating 220 V, 60 W and 220 V, 100 W are connected in series across 220 V supply. Calculate the voltage across each lamp and power consumption. What will be the power consumption if the two lamps are connected in parallel?   10

14. *(a)* Draw the parts of electric iron with a neat sketch.   4

    (b) A kettle having a heater element of 15   resistance has a water equivalent of 200 gm. Calculate the time taken to raise the temperature of 6 litres of water from 20 °C to boiling point. The supply voltage is 230 V. Assume heat loss of 20%.   6

15. A circular iron ring 20 cm in diameter has an air-gap of 1 mm wide cut in it. The area of cross-section of the ring is 3·6 cm^2. Calculate the number of ampere turns needed to set up a flux of ·5 milli weber in the air-gap. Neglect leakage and fringing.   10

16. *(a)* Explain Flemings' right-hand rule. 4

(b) State and explain Faraday's laws of electromagnetic induction. 6

17. *(a)* Derive an expression $e = B \, 1 \, v \sin \theta$. 4

(b) A coil having 100 turns links with a flux of 1 milli weber. If the direction of this flux is reversed in 0·01 second, find the e.m.f. induced in the coil. 6

18. Three identical point charges of +2 mC each are placed at the vertices of an equilateral triangle 10 cm apart. Calculate the force on each charge. 10

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