6040

BOARD DIPLOMA EXAMINATION, (C–16)
OCTOBER—2020
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 between conductor, insulator and semiconductor based on valance electrons.

2. State the limitations of Ohm's law.

3. Define work, power and energy.

4. State any three merits of CF lamps over incandescent lamps.

5. Draw the field patterns due to *(i)* solenoid, *(ii)* toroid.

6. State Flemming's left-hand rule.

7. Define :

(a) Self-inductance

(b) Mutual inductance

(c) Coefficient of coupling

8. State Lenz's law.

9. Define :

    (a) Electric flux

    (b) Electric flux density

    (c) Electric field intensity

10. State the uses of capacitors.

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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 criteria for valuation are the content but not the length of the answer.

11. Derive the formula for temperature coefficient of resistance at any temperature.   10

12. *(a)* Derive an expression for equivalent resistance when two resistors are connected in series.   5

    (b) Two resistors of 4Ω and 6Ω in parallel are in series with another resistor of 12Ω. If the current flowing in 12Ω is 2A, determine

     (i) the current flowing through 4Ω and 6Ω resistors;

    (ii) voltage across whole circuit.   5

13. A house has the following loads :

    (a) 10 lamps of 60 W each working for 8 hours a day

    (b) 4 lamps of 100 W each working for 5 hours a day

    (c) 2 heaters of 1000 W each working for 3 hours a day

    (d) 5 fans of 100 W each working for 12 hours a day

Calculate the monthly electricity bill if the cost per unit of consumption is 50 paise   10

14. An electric kettle is rated 1·5 kW, 230 V takes 5 minutes to bring 1 kg of water to boiling point from 15 °C. Find the efficiency of the kettle.　　　　　　　　　10

15. Explain the mechanical force on a current carrying conductor and also derive the expression for that force.　　　　10

16. Explain dynamically and statically induced emf with suitable diagrams.　　　　　　　　　10

17. *(a)* Derive an expression for equivalent inductance when two inductances are connected in series aiding.　　　5

　　(b) Two coils of self-inductance 0·5 H and 0·3 H respectively with a mutual inductance of 0·1 H are connected in series. Calculate the equivalent inductance when they are connected in *(i)* aiding, *(ii)* opposing.　　5

18. *(a)* Compare electrostatic and magnetic circuits in any five aspects.　　　　　　　　　5

　　(b) Derive an expression for energy stored in a capacitor.　　5

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