4046

BOARD DIPLOMA EXAMINATION, (C–14)
SEPTEMBER/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. Define the following terms :

(a) Potential difference

(b) EMF

2. State Ohm's law and give the equation with units.

3. Define thermal efficiency.

4. State Joule's law of electric heating.

5. Define the following terms :

(a) Magnetic flux

(b) Magnetic flux density

6. State Biot-Savart law.

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7. State Fleming's right-hand rule.

8. Find the area required for such an electromagnet to have a lifting power of 400 kg with a flux density of 0·1 weber/sq. meter.

9. Define the following :

(a) Electric flux

(b) Electric flux density

(c) Electric field intensity

10. Define capacitance and state its units.

PART—B   10×5=50

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) The resistance of a conductor at 10 °C is 5 ohm and at 100 °C is 12 ohm. Find the resistance at 0 °C and also find temperature coefficient at 40 °C.   5

12. Find the total current *I* in the given circuit :   10
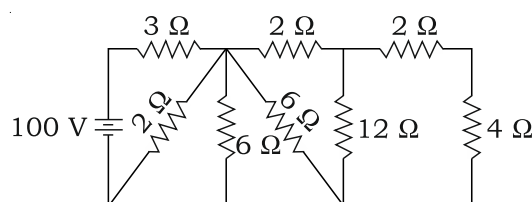
13. A household has the following load :

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

(b) 1 electric iron of 450 W, working for 1 hour a day

(c) 8 fans of 80 W each, working for 12 hours a day

(d) 1 heater of 1000 W, working for 1 hour a day

(e) 1 refrigerator 250 W, working for 12 hours a day

Calculate the monthly bill, if the rate of charge per unit is ₹ 1·20 plus ₹ 20 as meter rent.　　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 150 °C. Find the efficiency of the kettle.　　10

15. *(a)* Explain work law and its applications.　　5

(b) Derive an expression for force between two parallel current-carrying conductors.　　5

16. *(a)* State Faraday's laws of electromagnetic induction.　　5

(b) Compare an electric circuit with a magnetic circuit in any five aspects.　　5

17. *(a)* Derive an expression for lifting power of a magnet.　　5

(b) An inductor with $10\,\Omega$ resistance and 200 mH inductance is connected to 24 V d.c. supply. Calculate the energy stored in the inductance and power absorbed.　　5

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

(b) Three capacitors 20 mF; 40 mF and 100 mF are connected in *(i)* series, *(ii)* parallel across a 400 V supply. Find the energy stored in each case.　　5

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