



C16-EE-106

6040

BOARD DIPLOMA EXAMINATION, (C-16)

OCT/NOV—2017

DEE—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. List the merits of electrical energy over other types of energy. 3
2. State and explain Ohm's law. 3
3. Define electric power and electrical energy, and give their SI units. $1\frac{1}{2}+1\frac{1}{2}$
4. State the function of a space heater. 3
5. State Biot-Savart law. 3
6. State Fleming's left-hand rule. 3
7. State Faraday's law of electromagnetic induction. 3
8. A coil having 200 turns links with a flux of 2 mWb. If the direction of this flux is reversed in every 0.01 sec, find the e.m.f. induced in the coil. 3

* 9. State Gauss theorem. 3

10. The capacitance of a capacitor is formed by two parallel metal sheets, each of 100 cm^2 in area separated by 2 mm thickness is $2 \times 10^{-10} \text{ F}$. Determine relative permittivity of dielectric. 3

PART—B

10×5=50

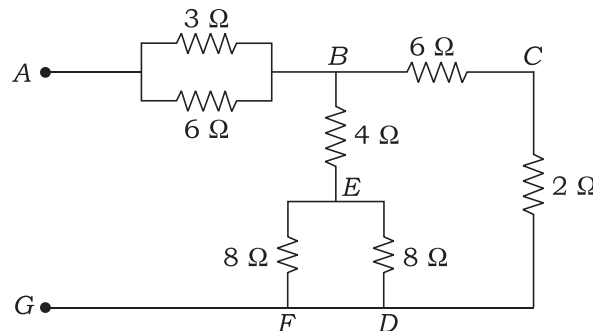
Instructions : (1) Answer any **five** questions.

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

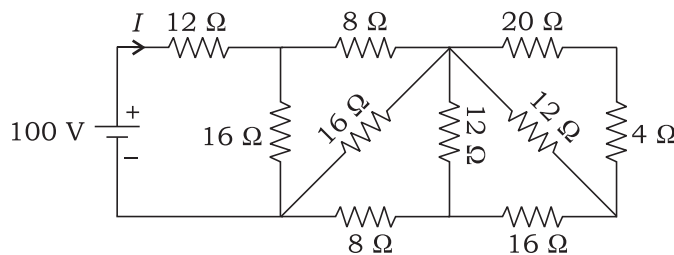
(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Derive an expression for equivalent resistance when three resistances are connected in series. 5

(b) Find the equivalent resistance between the terminal A and G in the given network : 5



12. Find the current I in the given circuit : 10



- * **13.** A house has following loads :
- (i) 5 lamps of 60 W each working for 8 hours a day
 - (ii) 4 lamps of 100 W each working for 1 hour a day
 - (iii) 5 fans of 80 W each working for 12 hours a day
 - (iv) 2 heaters of 1000 W each working for 3 hours a day
 - (v) 1 refrigerator of 250 W working for 12 hours a day
- Calculate the monthly electricity bill for the month of April, if the rate of charge per unit is ₹ 0.50 and add ₹ 15 as meter rent per month. 10
- 14.** (a) List out the advantages of CFL lamps over incandescent lamps. 5
- (b) An electric kettle contains 1.5 kg of water at 15 °C. It takes 15 minutes to raise the temperature of 95 °C. Assuming the heat losses due to radiation and heating the kettle is 14 kcal, find the current taken when it is connected to 250 volts supply. 5
- 15.** A circular iron ring having a mean diameter of 30 cm and cross-sectional area of 4 cm² is uniformly wound with 1000 turns of wire. A radial saw cut of 1 mm is made in the ring. Determine the current which will be produced a flux of 0.4 mWb in the air gap. Assume relative permeability under these conditions to be 941. Neglect leakage and fringing. 10
- 16.** (a) Derive an expression for the total inductance when two inductances are connected in series-opposing. 6
- (b) A coil of 500 turns wound on an iron core has an inductance of 10 mH. Calculate—
- (i) the flux produced by a current of 5 A;
 - (ii) the average value of e.m.f. induced when a current of 5 A is reversed in every 8 milliseconds. 4

- * 17. (a) Derive an expression for energy stored in a magnetic field. 6
- (b) An inductor with $10\ \Omega$ resistance and 200 mH inductance is connected to 100 V d.c. supply. Calculate the energy stored in the inductance. 4
18. (a) Derive an expression for energy stored in a capacitor. 4
- (b) Three capacitors of $10\ \mu\text{F}$, $50\ \mu\text{F}$ and $25\ \mu\text{F}$ are connected in parallel across a voltage of 250 volts. Calculate—
- (i) equivalent capacitance;
- (ii) potential difference across each capacitor;
- (iii) charge on each capacitor. 6

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