3037

BOARD DIPLOMA EXAMINATION, (C–09)
APRIL/MAY—2015
DEEE—FIRST YEAR EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time : 3 hours]   [*Total Marks* : 80

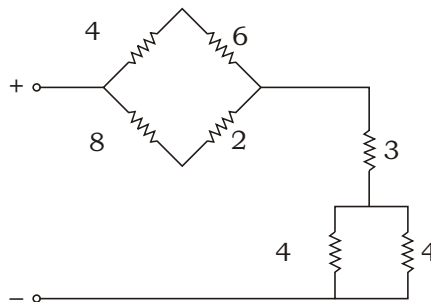**PART—A**   3×10=30

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. Derive the relation $R \quad \dfrac{l}{a}$.

2. Find the equivalent resistance of the circuit given below :

3. Distinguish between copper and aluminium in any three aspects.

4. Define the following :

(a) Magnetic flux

(b) Reluctance

(c) Permeability of a magnetic field

5. Explain dynamically induced e.m.f. and give its expression.

6. Two inductances of 16 H and 9 H are connected in series. The coefficient of coupling is 0·8. Find the mutual inductance between them. Find also the total inductance of the combination when the fluxes are *(a)* aiding and *(b)* opposing.

7. *(a)* State Gauss theorem. 2

   (b) Define capacitance and give its unit. 1

8. State any three factors which effect insulation resistance.

9. List three properties of fuse material.

10. Give any three differences between *P*-type semiconductors and *N*-type semiconductors.

<center>**PART—B**   10×5=50</center>

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)* An aluminium resistor has a resistance of 45·6 ohms at 25 °C and 49·2 ohms at 50 °C. Calculate the temperature coefficient of resistance at 0 °C. 4

   (b) A house has the following loads :

   (i) 10 lamps of 60 W each working for 10 hr a day

   (ii) 6 fans of 80 W each working for 15 hr a day

   (iii) 1 electric iron of 750 W working for 1 hr a day

   (iv) 1 heater of 1000 W working for ½ hr a day

   (v) 1 refrigerator of 250 W working for 12 hr a day

   Calculate monthly bill, if the rate of charge per unit is ₹ 1·25 plus ₹ 20 as meter rent. 6

12. *(a)* State Joule's law and explain mechanical equivalent of heat. 4

   (b) An electric kettle is required to heat 0·6 litre of water from 10 °C to the boiling point in 5 min. The supply voltage is 240 V. The efficiency of the kettle is 78%. Calculate the *(i)* resistance of the heating element, *(ii)* kW power consumed and *(iii)* energy consumed in kWH. 6

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13. *(a)* State work law. 2

(b) Give the expression for the field strength on the axis of a solenoid. 2

(c) A circular ring of iron is wound uniformly with 1000 turns of wire. Its mean diameter is 20 cm and its cross-section is 4 sq cm. Determine the current which will produce a flux of 20 -Wb. Assume the permeability to be 800. 6

14. *(a)* Explain the statically induced e.m.f. 4

(b) Two coils of 100 and 150 turns respectively are wound side by side on a closed iron circuit of section 125 cm^2 and mean length 200 cm. If the permeability of iron is 2000, calculate *(i)* self-inductance of each coil, *(ii)* mutual inductance between them and *(iii)* the e.m.f. induced in the second coil if current in the first coil changes from zero to 5 A in 0·02 sec. 6

15. *(a)* Explain *(i)* dielectric strength and *(ii)* dielectric constant. 4

(b) Two capacitors having capacitances 6 F and 4 F respectively are connected in series across 100 V DC supply. Calculate *(i)* potential difference across each capacitor, *(ii)* equivalent capacitance and *(iii)* energy stored in each capacitor. 6

16. Mention the properties and applications of *(a)* mica and *(b)* asbestos. 5+5

17. Draw CB configuration and CE configuration of *(a) P-N-P* transistor and *(b) N-P-N* transistor. 5+5

18. *(a)* Mention the properties, applications and advantages of ACSR conductors. 5

(b) Explain galvanizing and its applications. 5

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