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C14–EE–106

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BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2017

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 terms *(a)* potential difference and *(b)* EMF.

2. State the laws of resistance.

3. Calculate the input of the motor when the output of the motor is 10 HP and efficiency is 90%.

4. State Joule's law of electric heating.

5. Define the terms *(a)* reluctance, *(b)* permeability and *(c)* magnetic field.

6. A straight long conductor of 1 m length carrying a current of 60 A is placed at right angles to uniform magnetic field of strength 2·5 Wb/m^2. Determine mechanical force acting on a conductor.

7. State Faraday's laws of electromagnetic induction.

8. List the e.m.f.s induced and briefly explain.

9. Define Gauss theorem.

10. Calculate the energy stored in a circuit of capacitances 125 pF, 100 pF connected in parallel across a potential difference of 1000 V.

PART—B

10×5=50

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

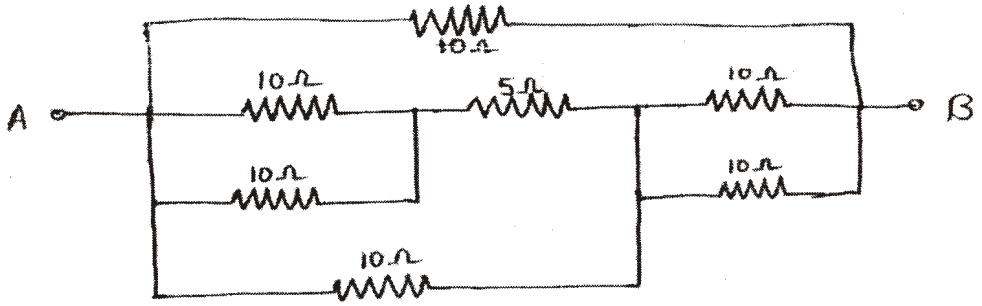
(2) Each question carries **ten** marks.

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

11. *(a)* Derive the expression for resistance at any temperature as $R_t \quad R_0\{1 \quad {}_0 t\}$. 5

(b) A coil wound of copper wire has a resistance of 16 at 20 °C. Calculate its resistance at 60 °C. The resistance temperature coefficient of copper is 0·0043/°C at 0 °C. 5

12. Calculate the equivalent resistance for the following circuit and find the current drawn by the circuit if a p.d. of 50 V connected across it. 10



13. A house has the following loads :

(a) 10 lamps of 60 W each working for 10 hrs/day

(b) 1 electric iron of 450 W working for 1 hr/day

(c) 8 fans of 80 W each working for 12 hrs/day

(d) 1 heater of 1000 W working for 1 hr/day

(e) 1 refrigerator 250 W working for 12 hrs/day

Calculate the monthly bill if rate of charge per unit is ₹ 1·20 plus ₹ 20 as meter rent for the month of June. 10

14. *(a)* Define thermal efficiency. 4

(b) An electric kettle was marked 500 W, 230 V and was found to take 15 minutes to bring one kg of water at 15 °C to boiling point. Determine heat efficiency of the kettle. 6

15. An iron ring of mean length 50 cm has an air gap of 1 mm and a winding of 200 turns. If the permeability of the iron is 300 when a current of 1 ampere flows through the coil, find the flux density. 10

16. *(a)* Derive the expression for energy stored in an inductor. 4

(b) An air cored solenoid having a diameter of 4 cm and a length of 0·6 m is wound with 4000 turns. If a current of 5 A flows in the solenoid, calculate *(i)* inductance and *(ii)* energy stored in joules. 6

17. *(a)* Explain Fleming's right-hand rule. 4

(b) Two magnetically coupled coils have a coefficient of 0·5, when they are connected in series, the total inductance is 80 mH. When one of the coils is reversed, the total inductance becomes 40 mH. Calculate their self-inductance and mutual inductance. 6

18. *(a)* Mention the uses of capacitors. 4

(b) Two capacitors having capacitances of 4 F and 6 F are connected in series across 120 V DC supply. Calculate *(i)* total capacitance, *(ii)* charge on each capacitor and *(iii)* potential difference across each capacitor. 6

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