



C14-EE-106

4046

BOARD DIPLOMA EXAMINATION, (C-14)

OCT/NOV—2016

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. Explain laws of resistance.
2. The resistance of the field winding of a d.c. machine at 0 °C is 120 . What will be its resistance at a working temperature of 55 °C? Temperature coefficient of resistance of copper is 0.0043/ °C at 0 °C.
3. Define electrical power and energy and mention their units.
4. State Joule's law of electric heating.
5. Define (a) magnetomotive force, (b) reluctance and (c) magnetizing force.
6. Compare magnetic circuit with electric circuit in any three aspects.
7. State Faraday's law of electromagnetic induction.
8. Define self-inductance and mutual inductance.

- * 9. State Coulomb's laws of electrostatics.
10. Define (a) electric flux, (b) electric flux density and (c) electric field intensity.

PART—B

10×5=50

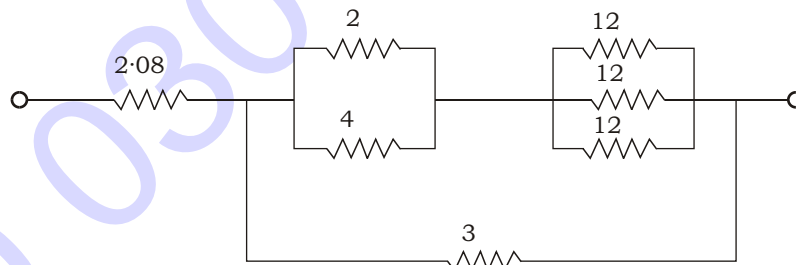
Instructions : (1) Answer any **five** questions.
 (2) Each question carries **ten** marks.
 (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) A silver wire has resistance of 5 Ω , what will be the resistance of manganin wire having a diameter half of the silver and its length being one-fourth of silver. The specific resistance of manganin is 30 times that of silver. 6

- (b) Develop the formula for resistance at any temperature

$$R_t = R_0 (1 + \alpha_0 t)$$
 4

12. (a) Find the equivalent resistance for the circuit shown below : 6



- (b) Derive an expression for total resistance when three resistances R_1 , R_2 and R_3 are connected in series. 4

13. A workshop is connected with—

- (a) 10 fans of 60 W, working for 10 hours a day;
 (b) two 1 kW heater working for 6 hours a day;
 (c) one oven of 1.5 kW working for $\frac{1}{2}$ hour a day;
 (d) 15 electric bulbs of 60 W working for 4 hours a day.

Calculate the bill for the month of 30 days at the rate of 55 paise per unit. 10

- * 14. (a) Explain the following applications of heat produced due to electric current : 6
- (i) Metal filament lamp
- (ii) Electric kettle
- (iii) Space heater
- (b) An immersion heater takes 1 hour to heat 50 kg of water from 20 °C to boiling point. Calculate the power rating of the heater. Assuming the heating equipment to have an efficiency of 90%. 4
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 iron is 300, when a current of 1 ampere flows through the coil, find the flux density. 10
16. (a) Explain statistically and dynamically induced e.m.f. 6
- (b) A conductor of length 2 m moves at an angle of 30° to the direction of uniform magnetic field of strength 0.75 Wb/m² with a velocity of 50 m/sec. Calculate the e.m.f. induced. 4
17. (a) Derive an expression for self-inductance. 4
- (b) If a coil of 800 H is magnetically coupled to another coil of 200 H, the coefficient of coupling between the coils is 0.05. Calculate the inductance if two coils are connected in (i) series aiding and (ii) series opposing. 3+3
18. (a) Mention the properties of electrostatic lines of force. 6
- (b) Three capacitors having capacitances of 10 F, 30 F and 90 F are connected in series across 220-V d.c. supply. Find the equivalent capacitance and the charge on each capacitor. 4
