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C14-EE-106

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BOARD DIPLOMA EXAMINATION, (C-14)

MARCH/APRIL—2018

DEEE—FIRST YEAR EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time : 3 hours]

[Total Marks : 80

PART—A

10×3=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) conductance and (b) conductivity.
2. Determine the resistance of 100 m length of a wire having a uniform cross-sectional area of 0.1 mm^2 , if the wire is made of manganin having a resistivity of $50 \times 10^{-8} \Omega\text{m}$.
3. Derive the relation between KWH and KCAL.
4. State Joule's law of electric heating.
5. Define the terms (a) magnetic flux and (b) magnetic flux density.
6. An iron ring with a mean length of 100 cm is wound with a magnetising winding of 100 turns. A current of 10 A is flowing in the magnetizing coil. Calculate the magnetic field strength.
7. State and explain Lenz's law.
8. Define the terms (a) self inductance (b) mutual inductance.

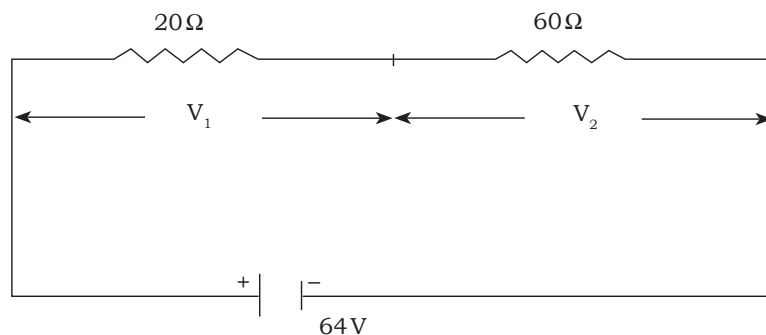
9. Define capacitance and state its units.
10. Compare between electric potential and potential difference.

PART—B

10×5=50

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

11. (a) Derive an expression for the equivalent resistance when three resistances are connected in series. 5
- (b) Determine the voltage across each resistance for the following circuit by using voltage divider rule: 5



12. (a) Derive an expression for resistance at any temperature $t^{\circ}\text{C}$ in terms of resistance at 0°C . 5
- (b) The resistance of 360 m of wire is 90Ω . How much length of the same volume of wire will have a resistance of 100Ω ? 5
13. (a) Find the current taken by a 480V DC motor driving a pump to raise 14000 litres of water per minute to a height of 27 m. Motor efficiency is 0.9 and pump efficiency is 0.75. 6
- (b) Define (a) electric work and (b) electric power and state units. 4

- 14.** (a) Define thermal efficiency. 4
 (b) An electric kettle is required to raise the temperature of 2 kg of water from 20°C to 100°C in 15 minutes. Calculate the resistance of heating element if the kettle is to be used on 240V supply. Assume the efficiency of the kettle to be 80%. 6
- 15.** (a) Explain work law and its applications. 4
 (b) Derive an expression for the force between two parallel current carrying conductors. 6
- 16.** (a) Derive an expression for lifting power of a magnet. 4
 (b) Determine the force required to separate two magnetic surfaces with contact area of 100 cm² if the magnetic flux density across the surface is 0.1 Wb/m². 6
- 17.** Two coils with a coefficient of coupling 0.6 between them are connected in series so as to magnetise (a) in the same direction and (b) in the opposite direction. 10
 The corresponding values of total inductances are 2.02H and 0.53H respectively.
 Determine the self inductance of the two coils and the mutual inductance between them.
- 18.** (a) Derive an expression for energy stored in a capacitor. 5
 (b) Three capacitors 10µF; 20µF and 50µF are connected in series parallel across a 400 V supply. Find the energy stored in each case. 5

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