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C14-AEI-106

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BOARD DIPLOMA EXAMINATION, (C-14)

MARCH/APRIL—2016

DAEIE—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) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define specific resistance and state its units.
2. Classify conductors, insulators and semiconductors with reference to valance electrons.
3. Define electrical power and energy.
4. Define thermal efficiency.
5. Draw lines of force around a magnet.
6. Define (a) permeability, (b) flux and (c) reluctance.
7. State Faraday's laws of electromagnetic induction.

- * 8. State the coefficient of coupling.
9. State Gauss theorem.
10. Define trickle charging.

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) The resistance temperature coefficient of phosphor bronze is $39.4 \times 10^{-4} / ^\circ\text{C}$ at 0°C . Find the coefficient for temperature at (i) 20°C and (ii) 100°C . 6

(b) Derive the formula for equivalent resistance when three resistances are connected in series. 4

12. Calculate the monthly bill of electricity charges for the following loads fitted in an electrical installation : 10

(a) 20 lamps 100 W each working 6 hr/day

(b) 10 ceiling fans 120 W each working 12 hr/day

(c) 2 kW heater working 3 hr/day

(d) 2 HP motor (85%) working 4 hr/day

The rate of charges for light and fan is 50 paise/unit and heater and motor is 65 paise/unit.

13. Explain with neat diagram, the construction and working of electric geyser. 10

- * 14. Derive the expression for the force between two parallel current carrying conductors. 10
15. (a) Derive an expression for energy stored in a magnetic field. 5
 (b) Explain statically induced EMF. 5
16. (a) State Coulomb's law of electrostatics. 4
 (b) Determine the equivalent capacitance of 3 capacitors having capacitances of 2 F, 4 F and 8 F (i) when connected in series and (ii) when connected in parallel. 6
17. (a) Write the chemical reactions during charging and discharging of lead-acid battery. 5
 (b) Compare lead-acid and nickel-iron cell. 5
18. (a) Compare electrostatic and magnetic circuits. 5
 (b) Explain work law and its applications. 5
