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C14–EE–106

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2018

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. Distinguish among conductor, insulator and semiconductor with respect to valence electrons.

2. State Ohm's law.

3. Define electrical work.

4. Write Joule's law of electric heating.

5. State work law. Mention its applications.

6. Define *(a)* MMF and *(b)* reluctance.

7. State and explain Fleming's right-hand rule.

8. Calculate the inductance of a coil that induces 40 V when a current changes at the rate of 8 amp/sec.

9. Define electric flux.

10. State Gauss's theorem.

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. Find the resistance of an aluminium wire having a length of 5000 m and a diameter of 2 mm. The resistivity of aluminium is 28 3 10 ^{9} -m. What will be the resistance, if the diameter is doubled?

12. *(a)* Derive R_{eq} R_1 R_2 R_3 ⋯ R_n. 5

(b) A lamp has a rated voltage 100 V and hot resistance 25 . Find the value of the series resistance to be connected so that it can operate 220 V mains. 5

13. Two lamps of rating 150 W, 230 V and 250 W, 250 V are connected in parallel across 200 V supply. Calculate—

(a) the resistance of each lamp;

(b) total current;

(c) the power drawn from the supply;

(d) the electrical energy taken from the supply in 8 hours.

14. An electric kettle contains 40 litre of water initially at a mean temperature of 15 °C. The heater supplies an energy of 2·5 kWh to water. Assuming no heat losses, find the final mean temperature of the water.

15. An ring made of iron has a cross-sectional area of 4 91 cm^2. It has an air gap of 1 mm wide and a net iron path of 94 15 cm. It is uniformly wound with 500 turns of wire. Calculate the current required by the exciting coil to produce a total flux of 4 mWb. Assume a relative permeability of iron at this flux density as 800. Neglect leakage and fringing.

16. Compare an electric circuit with a magnetic circuit in any eight aspects.

17. *(a)* Derive $E \quad 1/2LI^2$.

(b) An air cored solenoid having a diameter of 4 cm and a length of 0 6 m is wound with 4000 turns. Calculate the energy stored if a current of 5 A is flowing through it.

18. State and explain Coulomb's laws of electrostatics.

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