3037

BOARD DIPLOMA EXAMINATION, (C–09)
MARCH/APRIL—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. Define conductor, semiconductor and insulator based on valance electrons.   1+1+1

2. Define work, power and energy.   1+1+1

3. State any three requirements of conducting materials.   1+1+1

4. Define *(a)* flux density, *(b)* permeability and *(c)* m.m.f.   1+1+1

5. Classify and define induced e.m.f.'s.   3

6. Define *(a)* self-inductance and *(b)* mutual inductance.   1½+1½

7. Define capacitance and state its unit.   2+1

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8. State factors affecting insulation resistance.   1+1+1

9. State three materials used for fuse.   1+1+1

10. Distinguish between intrinsic and extrinsic semiconductors.

                                                                       1+1+1

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. Calculate monthly electricity bill at 70 paisa per unit for a
residential building with the following load :   10

(a) 10 nos. 60 W lamps used for 10 hours/day

(b) 2 nos. 75 W fans used for 12 hours/day

(c) 1 no. 1500 W heater working for 2 hours/day

12. *(a)* Compare copper and aluminium.   5

(b) Explain thermocouple with a neat sketch.   5

13. *(a)* Explain Joule's law.   4

(b) An electric kettle marked 500 W, 230 V was found to take
15 min to raise the temperature of 1 kg of water from 15 °C
to 100 °C. Determine thermal efficiency.   6

14. *(a)* State the properties of magnetic lines of force.   5

(b) A cast steel ring has an air gap of 2 m and iron path of
50 cm. Find the number of *T* required to produce a flux
density of 1 Wb/m^2 in the air gap. Assume permeability of
steel as 800 and neglect leakage and fringing.   5

15. *(a)* State and explain Faraday's laws of electromagnetic
induction.   6

(b) A coil of 200 turns is linked by a flux of 0·65 m Wb. If the
flux is reversed in 0·012 sec, find e.m.f. induced in the coil. 4

16. *(a)* Derive the equation for equivalent capacitance when two capacitors are connected in series. 6

(b) Two capacitors having capacitance 4 F and 6 F are connected in series across a 120 V d.c. supply. Calculate *(i)* total capacitance and *(ii)* the charge on each capacitance.

2+2

17. What is PVC? Briefly explain the materials added to PVC to improve its properties. 3+7

18. Discuss the behaviour of a *P-N* junction under forward and reverse biasing. 5+5

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