5037

BOARD DIPLOMA EXAMINATION, (C–16)

MARCH/APRIL—2018

DEEE—FIRST YEAR EXAMINATION

BASIC ELECTRICAL ENGINEERING

Time : 3 hours]   [*Total Marks* : 80

PART—A   2×15=30

Instructions : (1) Answer *any* **fifteen** questions.

(2) Each question carries **two** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define resistivity.

2. Define conductance.

3. State Ohm's law.

4. Define temperature coefficient of resistance.

5. Define energy.

6. Define power.

7. Define thermal efficiency.

8. Write Joule's law of electric heating.

9. Define magnetic flux density.

www.manaresults.co.in

10. State magnetic field intensity.

11. Explain Fleming's left hand rule.

12. Define magneto motive force (m.m.f.)

13. State Lenz's law.

14. Define self-inductance.

15. State Faraday's laws of electromagnetic induction.

16. State coefficient of coupling.

17. Explain Gauss theorem.

18. Define permittivity.

19. State Coulomb's law of electrostatics.

20. Define electric flux.

<center>**PART—B**   10×5=50</center>
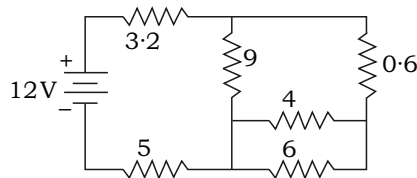
Instructions : (1) Answer *any* **five** questions.

                (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.

21. *(a)* Show that the resistance at any temperature t of a conductor is R_t $R_o (1$ $_o t)$.   6

      (b) The resistance of the field winding of a d.c. machine at 0 °C is 120 ohms. 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.   4

22. Calculate the total resistance of below circuit and current in 5 ohms resistance :

23. The following are the details of load on a circuit connected through a supply meter :

(a) Five lights of 60 W each working for 6 hours per day

(b) Two fluorescent tubes of 125 W, each working for 3 hrs/day

(c) One 1000 W heater working for 3 hours per day

If each unit of electrical energy costs 60 paise, what will be electricity bill for the month of September? The metre rent is ₹ 5 per month.

24. Explain metal filament lamp with neat sketch and label the parts.

25. *(a)* Derive an expression for the force between two parallel current-carrying conductor.   6

(b) Two parallel bus bars are separated by a distance of 23 cm between centers. Find the force in newton/meter runs between the bus bars when carrying a short-circuit current of 70000 A.   4

26. *(a)* Derive an expression for the energy stored in a magnetic field.   5

(b) An air-cored solenoid having a diameter of 4 cm and a length of 0·6 m is wound with 4000 turns. If a current of 5 A flows in the solenoid, calculate *(i)* the inductance and *(ii)* the energy stored in Joules.   5

27. *(a)* Derive an expression for lifting power of a magnet.   5

(b) The combined inductance of the coils connected in series is 0·6 H and 0·1 H, depending on the relative directions of the currents in the coils. If one of the coils when isolated has a self-inductance of 0·2 H, calculate *(i)* the mutual inductance and *(ii)* the coupling coefficient.   5

28. *(a)* Derive an expression for energy stored in a capacitor.   5

(b) Calculate the capacitance and energy stored in a parallel-plate capacitor which consists of two metal plates each 60 cm^2 separated by a dielectric of 1·5 mm thickness and $_r$ 3 5 if p.d. of 1000 V is applied across it.   5

★ ★ ★