C16–EE–**106**

6040

BOARD DIPLOMA EXAMINATION, (C–16)
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. Define the terms *(a)* resistance, and *(b)* specific resistance.

1½+1½=3

2. State and explain Ohm's law.

3. Define electric power and electrical energy and give their SI units   1½+1½=3

4. State Joule's law of heating.

5. State Fleming's left-hand rule.

6. Plot the field patterns due to—

(a) straight current carrying conductor;

(b) solenoid;

(c) toroid.   1+1+1=3

7. State Lenz's law.

8. Classify various types of induced e.m.f.

9. Define capacitance and state its units. $\qquad$ 2+1=3

10. Determine the capacitance of parallel-plate capacitor having an area of 625 cm^2 separated by a glass dielectric of 0·5 cm thickness with relative permittivity as 6.

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PART—B $\qquad$ 10×5=50

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

$\qquad$ (2) Each question carries **ten** marks.

$\qquad$ (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. *(a)* Derive an expression for equivalent resistance, when three resistances are connected in parallel. $\qquad$ 5

$\qquad$ *(b)* Find the equivalent resistance between the terminals *A* and *B* in the given network : $\qquad$ 5
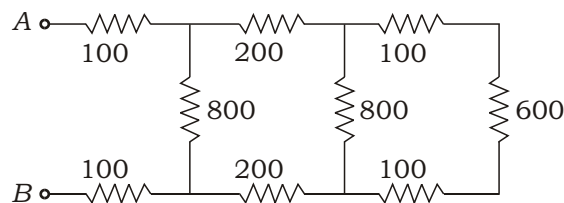
12. If the three resistances 2 , 4 , 6 respectively are connected in series across 60 V supply, find the—

(a) total resistance;

(b) current drawn from supply;

(c) potential drop across each resistance;

(d) power consumed by each resistance;

(e) total power delivered by the supply. $\qquad$ 10

13. A house has the following loads :

    (a) 5 lamps of 60 W each, working for 10 hours/day

    (b) 1 electric iron of 100 W each, working for 1 hour/day

    (c) 5 fans of 80 W each, working for 8 hours/day

    (d) 2 heaters of 1500 W each, working for 6 hours/day

    (e) 1 electric motor of 1·5 HP, working for 4 hours/day at an efficiency of 85%

Calculate the monthly electricity bill for the month of September, if rate of charge per unit is ₹ 2 and add ₹ 25 as meter rent per month.   10

14. *(a)* Explain the operation of an electric kettle with a neat sketch.   5

    (b) An electric kettle rated at 1·5 kW, 230 V takes 5 minutes to bring 1 kg of water to boiling point from 15 °C. Find the efficiency of a kettle.   5

15. Compare the magnetic circuit with electric circuit in all aspects.   10

16. *(a)* Derive an expression for magnitude of dynamically induced e.m.f.   5

    (b) A coil of 1000 turns is wound on a toroidal magnetic core having a reluctance of 10^4 A-t/Wb. When the coil current is increasing at the rate of 5 A/s, determine the e.m.f. induced in the coil.   5

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

    (b) Determine the force required in kg to separate two magnetic forces with contact area of 100 cm^2, if the flux density across the surface is 0·1 tesla.   5

18. *(a)* Derive an expression for equivalent capacitance, when three capacitors are connected in parallel.   5

    (b) A parallel-plate air capacitor of area 25 cm^2 and plates being separated by 1 mm apart is charged to a potential of 100 volts. Calculate the energy stored in it.   5

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