23061

C23-EE–106

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BOARD DIPLOMA EXAMINATION, (C-23)

OCTOBER/NOVEMBER—2025

DEEE – FIRST YEAR EXAMINATION

BASIC ELECTRICAL TECHNOLOGY

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. State Ohm's law. 3

2. A charge equal to 5.6 Coulombs is crossing over a point in a circuit in 2.8 sec. Find the current flowing in the circuit. 3

3. Define temperature coefficient of resistance and state its SI units. 2+1

4. Write any three differences between active and passive circuits. 3

5. Define electrical power and mention its SI units. 2+1

6. State Joule's law of electrical heating. 3

7. An electric heater draws a current of 12 A from a supply of 230 V. If the load is connected for 10 hours, find the energy consumed in kWH. 3

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8. Define ideal current source and draw its characteristics. 2+1

9. State superposition theorem. 3

10. What is the need of network theorems? 3

PART—B

10×5=50

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

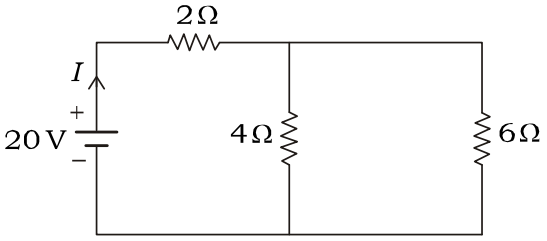
(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

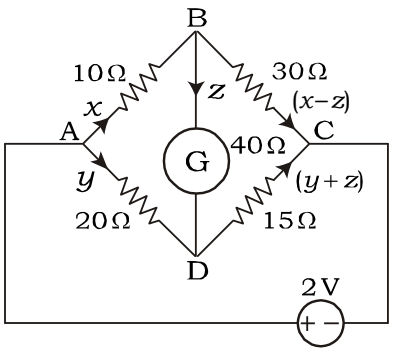
11. *(a)* Derive the expression for resistance at any temperature, i.e. $R_t = R_0 (1 + \alpha_0 t)$.

(b) A rectangular carbon block has dimensions 1 cm × 1 cm × 50 cm. If the resistivity of carbon is 3.5×10^{-5} Ω-m, find the resistance between *(i)* opposite ends *(ii)* opposite rectangular faces. 4+6

12. Find the currents flowing through 4 Ω and 6 Ω resistances by using current division rule in the circuit shown below : 10



13. Calculate the current flowing through the galvanometer in the following Wheatstone bridge network : 10



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14. Calculate the monthly bill of a household consumer for the following loads in a month of 30 days if the cost of energy per unit is ₹3.50 10

(a) 4 lamps of 100 W each working for 6 hours a day

(b) 3 fans of 60 W each working for 10 hours a day

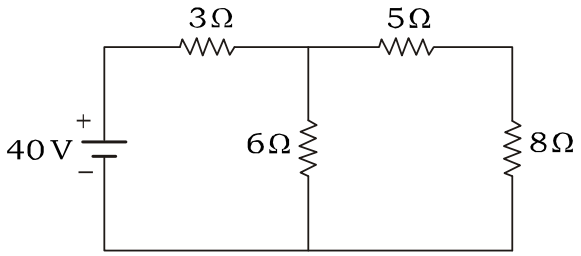
(c) An immersion heater of 2000 W is working for 1 hour a day

(d) An electric iron of 1000 W working for 1 hour a day

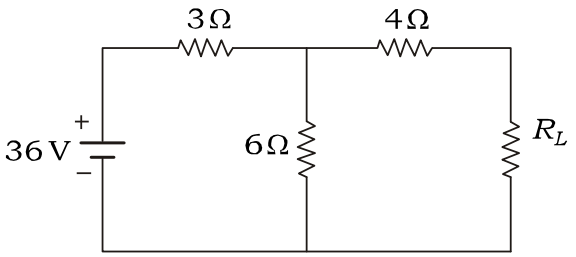
15. An electric kettle rated at 1 kW, takes 7.5 minutes to bring 1 kg of water at 15 °C to boiling point. Find *(a)* efficiency of the kettle *(b)* current taken if the supply voltage is 230 V. 10

16. Develop the transformation formulae for converting Delta configuration into Star configuration. 10

17. Using Thevenin's theorem, find the current through 8 Ω resistance in the circuit shown below : 10



18. Find the value of R_L for which maximum power will be absorbed in it and determine the maximum power in the circuit shown below : 10



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