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C16-AEI-106

6013

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DAEIE - 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. State Thevenin's theorem.
2. Define junction, branch and loop in a circuit.
3. Define the terms phase and phase difference.
4. Define Q-factor of an RLC series circuit.
5. A $4\ \Omega$ resistance connected in series with a 10 mH inductance across a 100 V, 50 Hz supply. Find the impedance of the circuit.
6. State how the heat is produced due to flow of electric current.
7. List any three applications in which heat is produced due to flow of electric current.

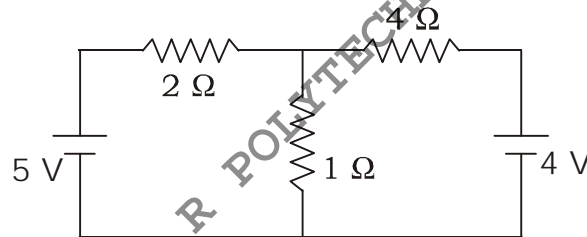
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8. State the need of cooling of a transformer.
9. List any three specifications of a transformer.
10. Write the torque equation of a DC motor.

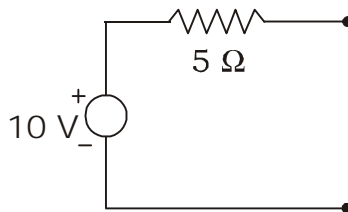
PART—B

Instructions : (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. (a) State Kirchhoff's Current Law and Voltage Law. 4
- (b) Find the current in $1\ \Omega$ resistor in the given circuit using nodal analysis. 6



12. (a) Three resistances $20\ \Omega$, $50\ \Omega$, $30\ \Omega$ are connected in delta. Find out their equivalent star-connected resistances. 6
- (b) Convert the following voltage source into an equivalent current source. 4



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13. (a) Find the resonant frequency of RLC series circuit having a resistance 10Ω , inductance 10 mH and capacitance $50\mu\text{F}$. 5
- (b) List any five differences between series and parallel resonance. 5
14. Derive the relationship between voltage and current when a pure inductance is connected across an AC supply. 10
15. (a) Explain the mechanical equivalent of heat. 4
- (b) An electric kettle is marked 500 W, 230 V and is found to take 15 minutes to raise 1 kg of water from 15°C to boiling point. Calculate thermal efficiency of kettle if specific heat capacity of water is $4181\text{ J/kg }^\circ\text{C}$. 6
16. Derive the e.m.f. equation of a transformer. 10
17. (a) Explain the working principle of a transformer. 6
- (b) A single-phase, 50 Hz transformer has 25 primary turns. The cross-sectional area of the core is 0.03 m^2 . When the primary winding is connected to a 250 V supply, determine the maximum flux density in the core. 4
18. (a) Classify DC generators on the basis of excitation. 5
- (b) List the different losses in DC machine. 5

A.A.N.M & V.V.R.S.R POLYTECHNIC, GUDLAPALLE, KRISHNA

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