

6239

BOARD DIPLOMA EXAMINATION, (C-16)

MAY/JUNE—2023

DEEE - THIRD SEMESTER EXAMINATION

ELECTRICAL CIRCUITS

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. Write any three differences between series and shunt ohm meters.
2. The resistances of 1.67Ω , 5Ω . and 2.5Ω are connected in star. Find the equivalent delta arrangement.
3. State Kirchhoff's voltage law and Kirchhoff's current law.
4. State Norton's theorem.
5. Perform the following where $A = 6 + j8$, $B = 8 - j10$
 - (a) $A + B$
 - (b) $A - B$
6. Draw the phasor diagrams for the following AC circuits :
 - (a) R - L series circuit
 - (b) R - C series circuit
7. Define Q-factor of RLC series circuit.

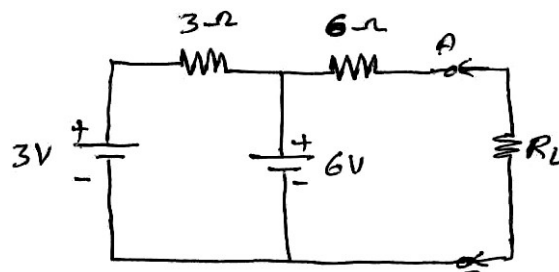
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8. List the three methods for solving AC parallel circuits.
 9. List any three advantages of 3-phase system over single-phase system.
 10. Write the expressions for poly phase e.m.f.s and represent them by phasor diagram.

PART—B

10×5=50

- 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. Explain the method of measuring earth resistance using earth megger.
12. A Wheatstone bridge ABCD consists of $AB = 20\Omega$, $BC = 5\Omega$, $CD = 4\Omega$ and $DA = 10\Omega$. A galvanometer of resistance 6Ω is connected between B and D. If a battery of e.m.f. 100 V is connected between A and C, with A positive. Find the magnitude and direction of current through galvanometer.
13. (a) Calculate the value of R_L which will draw maximum power from the circuit of Fig. Also find the value of this maximum power.



- (b) Derive the expression for line voltage and phase voltage in case of star connected system.

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14. A sinusoidal current wave is given by $i = 50 \sin(100 \pi t)$ determine (a) maximum value, (b) RMS value and (c) time interval between a maximum value and next zero value.
15. Derive the relationship between voltage and current in a pure capacitive circuit with waveforms.
16. An inductive circuit has a resistance of 5Ω in series with an inductance of 0.03 H. Calculate the current and power factor when connected across 230 V, 50 HZ supply.
17. A coil having a resistance of 20Ω and an inductance of 0.14 H is connected in parallel with a capacitor of 60 uF, which is in series with a resistor of 25Ω . Calculate the total current and phase angle when this combination is connected across 200 V, 50 HZ supply.
18. A balanced delta connected load of $(3 + j4)\Omega$ per phase is connected to a balanced three phase 440 V supply the phase current is 10 A. Find (a) total active power, (b) reactive power and (c) apparent power in the circuit.

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