



C14-EE-303

4245

BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL—2017
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. Define (a) active element and (b) passive element.
2. List any three limitations of Ohm's law.
3. Define RMS value and average value of an alternating current.
4. If $A = 3 - j4$ and $B = 5 - j6$, find $A + B$ and express in polar form.
5. An e.m.f. is given by $v = 200 \sin(157t)$ and the current is given by $i = 25 \sin(157t - 30)$. Find (a) frequency and (b) phase angle between current and voltage.
6. Write the equations for instantaneous values of current and voltage in a pure resistive circuit.
7. The voltage across a capacitor is given by $v = 150 \sin(157t)$. The value of capacitance is 50 farads. Write the equation for instantaneous current.

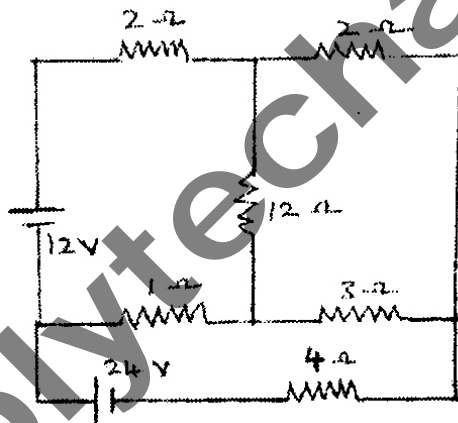
8. If $Z = 3 + j4$, find the admittance and express in rectangular form.
9. List the advantages of polyphase system.
10. In a delta connection, the line voltage is 415 V and the line current is 15 A. Find the phase current and phase voltage.

PART—B

10×5=50

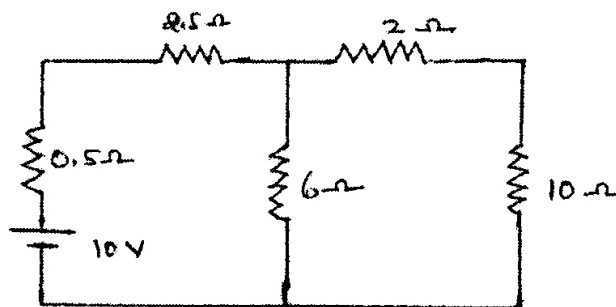
- Instructions :** (1) Answer any **five** questions.
 (2) Each question carries **ten** marks.
 (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Find the current in 12 Ω resistor using Kirchhoff's laws : 10

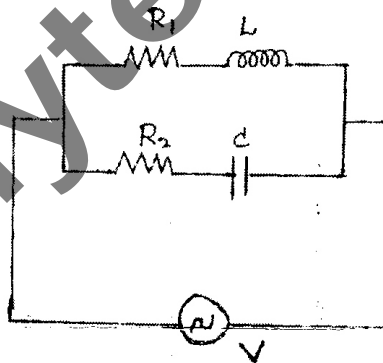


12. Derive the expression for the conversion of delta connected resistors into equivalent star values. 10

13. Find the current in 10 Ω resistor using Norton's theorem : 10



14. The expression for an alternating current is given by $i = 100 \sin(157t)$. Find (a) average current, (b) RMS current and (c) time taken by the instantaneous value of current to reach 75 amp for the first time after passing through zero in positive direction. 2+2+6
15. A non-inductive resistance of 25 Ω is connected in series with a capacitor of 100 μF across a 230 V, 50 Hz single-phase supply. Calculate (a) impedance of the circuit, (b) current, (c) power factor, (d) phase angle and (e) the power consumed in the circuit. 2+2+2+2+2
16. A series R-L-C circuit has the following parameters :
 $R = 100 \Omega$, $L = 0.01 \text{ H}$, $C = 50 \mu\text{F}$, $V = 230 \text{ V}$, 50 Hz.
 Find (a) impedance, (b) current, (c) power factor, (d) power drawn and (e) voltage drop across the capacitor. 2+2+2+2+2
17. Find the total current and the total power drawn from the source, if $R_1 = 25 \Omega$, $R_2 = 18 \Omega$, $L = 0.07 \text{ H}$, $C = 50 \mu\text{F}$ and $V = 115 \text{ V}$, 50 Hz : 6+4



18. (a) Derive the relation between V_{ph} and V_L in a star connection.
- (b) A balanced delta connected load of $5 - j8 \Omega$ per phase is connected to a 3-phase, 415 V supply. Find the line current and the power factor. 6+4
