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C14–EE–303

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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 $A \quad 3 \quad j4$ and $B \quad 5 \quad j6$, find $A \quad B$ and express in polar form.

5. An e.m.f. is given by $v \quad 200\sin(157t)$ and the current is given by $i \quad 25\sin(157t \quad 30)$. 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 $v \quad 150\sin(157t)$. 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

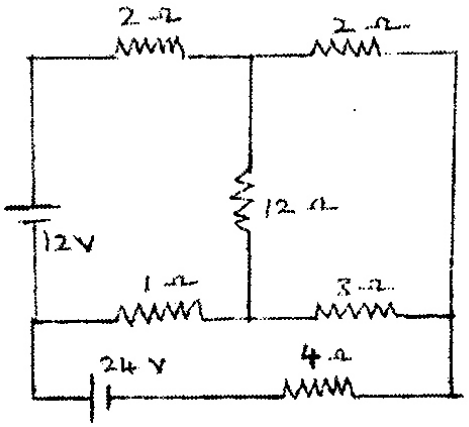
10×5=50

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

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

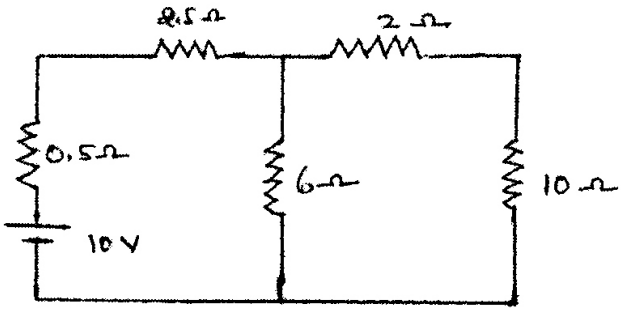
(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Find the current in 12 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 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

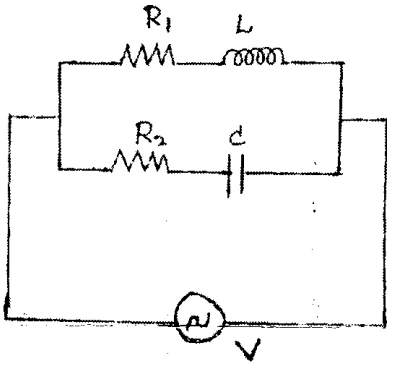
15. A non-inductive resistance of 25 is connected in series with a capacitor of 100 F across a 230 V, 50 Hz single-phase supply. Calculate *(a)* impedance of the circuit, *(b)* current, *(c)* power factor, *(d)* phase angle and *(e)* the power consumed in the circuit. 2+2+2+2+2

16. A series *R-L-C* circuit has the following parameters :

R 100 , L 0 01 H, C 50 F, V = 230 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 , R_2 18 , L = 0·07 H, C 50 F and V = 115 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 ohm per phase is connected to a 3-phase, 415 V supply. Find the line current and the power factor. 6+4

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