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C16-EE-303

6239

BOARD DIPLOMA EXAMINATION, (C-16)

JUNE—2019

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. State the applications of potentiometer.
2. State the limitations of Ohm's law.
3. Differentiate between active and passive circuits.
4. Explain ideal voltage source.
5. Convert the following polar to rectangular or rectangular to polar :
 - (a) $100\angle 30^\circ$
 - (b) $8 + j6$
6. Derive the relationship between voltage and current in a pure inductive circuit.
7. Derive the expression for current in pure capacitive circuit when $v(t) = V_m \sin \omega t$ is applied.

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8. Why a parallel resonant circuit is called as rejector circuit?
9. What is meant by phase sequence in polyphase system?
10. Show that the line current in 3-phase delta-connected system is equal to $\sqrt{3}$ times phase current.

PART—B

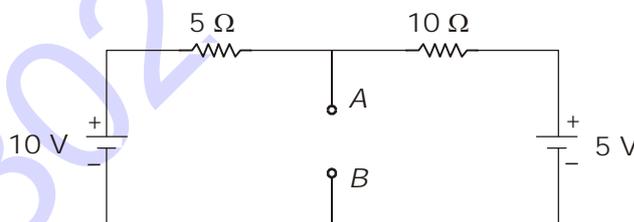
10×5=50

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. Explain the working of series-type ohmmeter with a neat sketch.
12. Derive the equations for delta to star transformation.
13. (a) Obtain Thevenin's equivalent circuit with respect to the terminals *AB* of the network shown in the figure given below.



- (b) Derive the expression for line voltage and phase voltage in case of star-connected system.
14. An alternating current of frequency 60 Hz has a maximum value of 100 A. Write the equation for its instantaneous value. Find (a) the instantaneous value after 0.005 second and (b) the time taken to reach 75 A for the first time.
15. A series circuit having a resistance of 10 Ω, an inductance of 0.25 H and capacitance is connected across a 100 V, 50 Hz supply. If the circuit takes a current of 8 A, calculate (a) impedance, (b) capacitance, (c) power factor and (d) power consumed.

16. (a) Derive a formula for resonant frequency of an R - L - C series circuit. 4
- (b) A R - L - C series circuit consists of $R = 20 \Omega$, $L = 0.1 \text{ H}$ and $C = 10 \mu\text{F}$. Determine the impedance at resonant frequency, 10 Hz above resonant frequency and 10 Hz below resonant frequency. 6
17. An R - L series circuit has $R = 25 \Omega$ and $X_L = 32 \Omega$. It is connected in parallel to a capacitor of $100 \mu\text{F}$ and the combination is connected across a 200 V, 50 Hz supply. Find the current in each branch and total current.
18. A star-connected alternator supplies a delta-connected load of $(10 + j8) \Omega$. If the voltage is 230 V, find (a) current in each phase of the load and alternator, (b) phase voltage of alternator, (c) power factor of the load and (d) power drawn by the load.

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