C09–EE–304

3241

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2015

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 junction and branch in electric circuits.

2. State Norton's theorem.

3. Define *(a)* cycle, *(b)* time period and *(c)* frequency.

4. Define phase and phase difference.

5. Derive the relation between poles, speed and frequency.

6. Draw an impedance triangle for an RC series circuit and give the formula for power factor in RC circuit.

7. Write the relation for resonant frequency in parallel circuit.

8. Write the relation between voltage and current in pure inductive circuit and draw its phasor diagram.

9. List the advantages of polyphase system.

10. A symmetrical 3- , 400 V system supplies a balanced star-connected load. The current in each branch is 30 A and phase angle is 30° lag. Find the line current and the total power.

PART—B

10×5=50

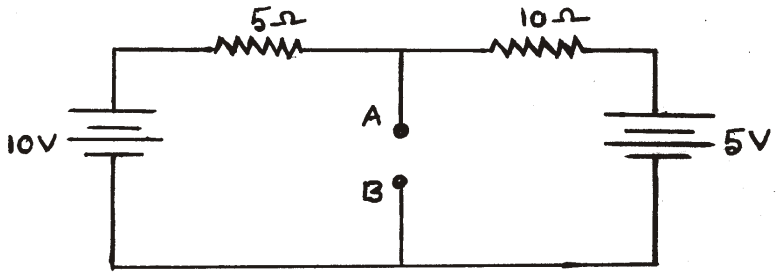
Instructions : (1) Answer *any* **five** questions.

(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. Derive the relation for delta to star transformation.

12. *(a)* Obtain Thevenin's equivalent circuit with respect to the terminals A and B of the network shown below :



(b) Explain the ideal voltage and ideal current source.

13. *(a)* State and explain Kirchhoff's laws.

(b) Derive the RMS value of a sinusoidal current.

14. An alternating current is represented by i 70 7 sin 520t. Determine *(a)* RMS value of current, *(b)* peak factor and *(c)* the current at 0·0015 sec. after passing through zero, increasing positively.

15. A resistance of 12 , an inductance of 0·15 H and capacitance of 100 F are connected in series across a 100 V, 50 Hz supply. Calculate *(a)* the current, *(b)* power factor and *(c)* power consumed.

16. A choking coil having a resistance of 22 and inductance of 0·07 H is connected in parallel with a capacitor of 50 F capacitance across 200 V, 50 Hz mains. Determine the total current taken and power factor and draw its vector diagram.

17. A coil of inductance 9H and a resistance 50 in series with a condenser is supplied at constant voltage from a variable frequency source. If the maximum current is 1 A at 75 Hz, find the frequency when the current is 0·5 A.

18. Three similar impedances when connected in delta across a 3 400 V, 50 Hz supply takes a current of 4 ampere at a lagging power factor of 0·8 from the mains. Calculate *(a)* the line constants per phase and *(b)* the change in power drawn if one of the phase open circuited.

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