C16-**EE-303**

6239

BOARD DIPLOMA EXAMINATIONS

OCT/NOV-2019

DEEE– THIRD SEMESTER

ELECTRICAL CIRCUITS

Time: 3 hours Max. Marks: 80

PART – A **3 X 10 = 30**

Instructions: *1. Answer **all** questions.*
*2. Each question carries **Three** Marks.*
3. Answer should be brief and straight to the point and should not exceed five simple sentences.

1. Differentiate between series ohmmeter and shunt ohmmeter in three aspects.
2. Define the terms: (a) active circuit (b) passive circuit.
3. Three resistances of 6 Ω, 10 Ω and 15 Ω are connected in star, find the equivalent delta connected resistances
4. State Thevenin's theorem.
5. Define average value of sinusoidal voltage and give the formula.
6. Define and give the relation for resonance frequency in RLC series circuit.
7. Show that the average power consumed in a pure capacitor is zero.
8. Define Q- factor of an RLC parallel circuit.
9. List any three advantages of poly-phase system over single phase system.
10. Show that the line voltage in 3-phase star connected system is equal to $\sqrt{3}$ times phase voltage.

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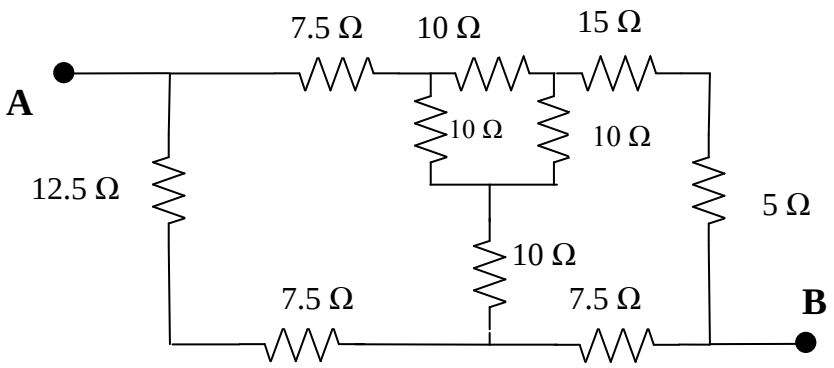
PART – B 5 X 10 = 50

Instructions: *1. Answer any **Five** questions*
*2. Each question carries **TEN** Marks.*
3. Answer should be comprehensive and a criterion for valuation is the content but not the length of the answer.

11. Explain the construction and working of basic potentiometer with a neat sketch.

12. Find the equivalent resistance between the terminals A and B of the network shown in Fig. by using star/delta transformation.



13. a) State and explain Maximum Power Transfer theorem.

b) A balanced 3-phase delta connected load of 150 KW takes a lagging current of 100 A with line voltage of 1100 V, 50 Hz. Find the circuit constants of the load per phase.

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14. a) An alternating current is represented by i = 50 sin 314 t. Determine

(i) Average value (ii) RMS value

(iii) Peak factor (iv) Form factor.

b) Perform the following, where $I_1 = 80\angle -30^0$, $I_2 = 60\angle 45^0$ and $V_S = 200\angle 0^0$

i) $I_1 + I_2$ ii) $\frac{V_S}{I_{1+I_2}}$

15. A capacitor of 20 μF is connected in series with a resistor of 120 Ω across a 200 V, 50 Hz supply.

Calculate i) Impedance

ii) Current

iii) Voltage across resistor and capacitor

iv) Power factor and phase angle

v) Power absorbed in the circuit.

16. A coil of resistance 2 Ω and inductance of 0.01 H is connected in series with a capacitor across 200 V supply. Determine the value of capacitance that would produce resonance at a frequency of 50 Hz.

Also find i) Current at resonance

ii) Voltage across the coil and

iii) Voltage across capacitor.

[Cont..,

17. A coil having a resistance of 20Ω and an inductance of 0.07 H is connected in parallel with a capacitor of 60μF, which is in series with a resistor of 50Ω. Calculate the total current and phase angle when this combination is connected across 200 V, 50 Hz supply.

18. a) A three phase delta connected load has (6 + J8) Ω impedance per phase. The load is connected to a 400 V, 3-phase, 50 Hz supply. If two watt meters are used for the measurement of power, find their readings.

b) Three coils, each having a resistance of 20 Ω and an inductive reactance of 15Ω are connected in star to 400 V, 3- phase, 50 Hz supply.

Calculate a) Line current,

b) Power factor and

c) Power supplied.