

October 2016

Time – Three hours
(Maximum Marks: 75)

**[N.B: (1) Answer any FIVE questions in each PART – A and PART – B.
Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory.**

(2) Answer division (a) or division (b) of each question in PART – C.

**(3) Each question carries 2 marks in PART – A, 3 marks in Part – B
and 10 marks in PART – C.]**

PART – A

1. Define the term electric flux density. Mention its unit.
2. Define electric power. Mention its unit.
3. What do you mean by an active network in electrical circuit?
4. State superposition theorem.
5. Define the power triangle of an electric circuit.
6. What will be the dynamic resistance at resonance in RLC series circuit?
7. What are the different methods used for measuring power using wattmeters in three phase circuits.
8. What is form factor in terms of average and RMS values of an alternating quantity? Also give its numerical value.

PART – B

9. Define the temperature coefficient of resistance of a material.
10. State (a)Kirchhoff's current law (b)Kirchhoff's voltage law.
11. State the Thevenin's theorem.
12. Convert $60\angle 90$ into rectangular form.
13. Define the following:
(a)Apparent power (b)Active power (c)Reactive power.
14. Derive the expression for the resonance frequency in RLC series circuit.
15. Write down the necessity of three phase system.
16. Write the condition for series resonance.

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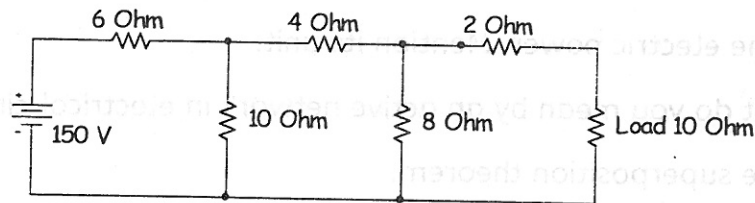
PART - C

17. (a) Calculate the total capacitances when three capacitors $50\mu\text{F}$, $30\mu\text{F}$ and $10\mu\text{F}$ are (i) Connected in series and (ii) Connected in parallel.

(Or)

- (b) A copper coil has a resistance of 15Ω at 20°C . Find its resistance at 70°C . The temperature co-efficient of copper at 20°C is 0.00394.

18. (a) In the given circuit, obtain the current in the load and power to the load.



(Or)

- (b) Derive the expressions to convert the star connected resistors into an equivalent delta connected resistors.
19. (a) For an alternating current, derive (i) RMS value (ii) Form factor (iii) Peak factor.

(Or)

- (b) Two impedances $Z_1=12+j16$ and $Z_2=10-j20$ are connected in parallel. A 230V, 50Hz is applied across this combination. Calculate (i) Total current taken from supply (ii) Total power in the circuit (iii) The circuit p.f.

20. (a) Derive the expression for the Q-factor of RLC series resonant circuit.

(Or)

- (b) Compare the series and parallel resonant circuits.

21. (a) Derive the expression to determine the power in a 3-phase, balanced star connected load by two wattmeter method.

(Or)

- (b) A balanced star connected load of $8+j6$ per phase is connected to a balanced 3-phase, 400V supply. Find the line current, power and power factor of the circuit.