976

Register No.:

April 2018

Time – Three hours
(Maximum Marks: 75)

(N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART - A and PART - B

(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 electric flux. State its unit.

2. Define electric current. State its unit.

3. Write the condition to transfer maximum power from source to load in a circuit.

4. Convert the vector $10\angle 30^{\circ}$ into rectangular form.

5. Define impedance in AC circuit.

6. Write the equation for resonant frequency in RLC series circuit.

7. What is the relationship between line voltage and phase voltage, line current and phase current in a balanced 3ϕ star connected system?

8. Write the equation to find total power and power factor of a balanced 3ϕ load by using two wattmeter method.

PART – B

9. Three capacitors 2μF, 4μF and 6μF are connected in parallel across a 24V DC supply. Find the total charge in the circuit.

10. State Thevenin's theorem.

11. The equation for an AC sinusoidal current is $100 \sin 314t$. Find the maximum value, rms value of current and supply frequency.

12. Define the terms conductance, susceptance and admittance in AC parallel circuit.

13. What is the necessity of 3ϕ system?

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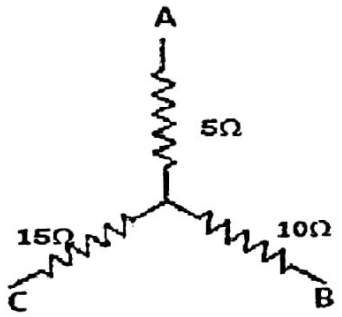
14. Compare series and parallel resonance.

15. State and explain Ohm's law.

16. Convert the following star connected resistors into delta equivalent.



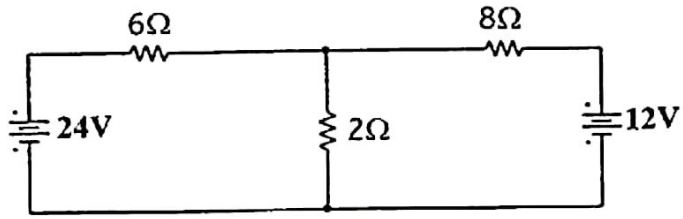
PART – C

17. (a) (i) Derive an expression to find the energy stored in a capacitor.

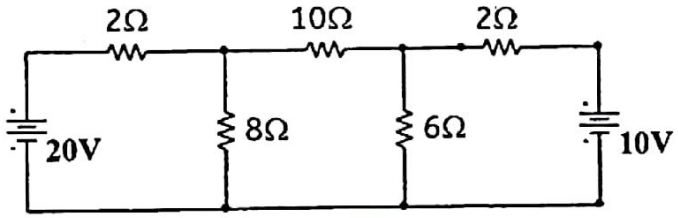
(ii) A resistor of 4Ω resistance is connected in series with a parallel circuit comprising of 3Ω, 3Ω and 6Ω resistance respectively. A battery of emf 12V is connected across the circuit. Draw the circuit diagram and find the total resistance and total current in the circuit.

(Or)

(b) By using Kirchhoff's law, find the current supplied by the batteries and the current through 2Ω resistor, for the circuit given below.

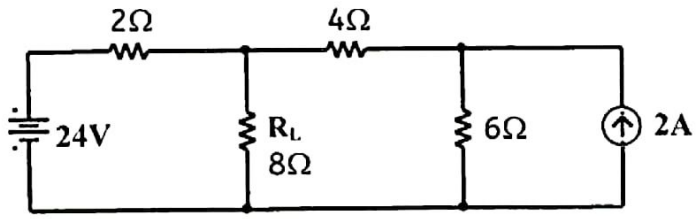


18. (a) By using nodal voltage analysis find the current through 10Ω resistor.



(Or)

(b) State superposition theorem. By using this theorem, find the current through R_L for the circuit given below.



19. (a) A series RLC circuit consisting of 20Ω resistance, 0.2H inductance and 100μF capacitance is connected to 230V, 50Hz AC supply. Calculate impedance, current, power factor and power consumed in the circuit.

(Or)

(b) Two impedances $Z_1=(6+j8)\Omega$ and $Z_2=(3-j4)\Omega$ are connected in parallel. This combination is connected across 230V, 50Hz AC supply. Calculate the current in each branch, total current and total power consumed by the circuit.

20. (a) A series RLC circuit contains a resistance of 4Ω, an inductance of 0.5H and a variable capacitor across 100V, 50Hz supply. Find (i)the value of capacitance for getting resonance at 50Hz (ii)Q- factor of the circuit and (iii)Current at resonance.

(Or)

(b) A coil of 10Ω resistance and 0.2H inductance is connected in parallel with a capacitor of 100μF. Calculate the frequency at which the circuit will act as non-inductive resistance of 'R'Ω. Find also the value of dynamic resistance and Q-factor.

21. (a) Three identical coils with a resistance of 15Ω and reactance of 15Ω are connected in delta across 400V, 50Hz, 3ϕ supply. Find the line current, phase current and the 3ϕ power consumed by the load.

(Or)

(b) (i) Explain the method of measuring 3ϕ power by using single wattmeter method.

(ii) The power input to a 400V, 50Hz, 3ϕ motor is measured by two wattmeters, which indicate 2500W and 500W respectively. Find the total power and power factor of the circuit.
