

- 9) In case of sinusoidal voltage if V_{rms} is the rms voltage and V_m is the maximum voltage, then $V_{rms} =$ _____
- A) V_m B) $\frac{V_m}{2}$ C) $\frac{3V_m}{2}$ D) $\frac{V_m}{\sqrt{2}}$
- 10) For a purely inductive AC circuit, inductor current leads the supply voltage by 90 degree angle.
- A) True B) False
- 11) At higher frequencies, the value of inductive reactance_____
- A) Decreases B) Remains same C) Increases D) Depends on applied voltage
- 12) In a series R-L-C circuit, at resonance current is maximum.
- A) True B) False
- 13) A transformer operates_____
- A) On DC supply only B) On AC supply only C) Both AC and DC supply
- 14) A transformer transforms_____
- A) Voltage and Current B) Voltage C) Current D) Frequency

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

- (a) Explain the effect of temperature on resistance for the given materials. **07**
- i) Pure Metals ii) Alloys iii) Insulators and Semiconductors
- (b) Derive an expression for 'n' number of resistances connected in parallel. Give the advantages of parallel connection. **07**

Q-3 Attempt all questions (14)

- (a) State Faraday's first law and second law electromagnetic induction. Derive the equation of induced emf $e = N \frac{d\phi}{dt}$. Where N= Number of turns in a coil, ϕ = flux in the coil. **07**
- (b) Derive the equation of flux $\phi = \frac{NI}{S}$ for a magnetic circuit. Where, **07**
- I = Current through the magnetic circuit.
 N = Number of turns in a magnetic circuit.
 S = Reluctance of the magnetic circuit.

Q-4 Attempt all questions (14)

- (a) Explain the action of a capacitor and derive the equation for the capacitance $C = \frac{Q}{V}$. **07**



- (b) Derive an expression for the equivalent capacitance for a number of capacitors connected in
Series ii) Parallel **07**

Q-5 Attempt all questions (14)

- (a) Obtain an expression for the equivalent delta network resistance for a given star network. **07**
- (b) Derive the relationship between the voltage and current for purely resistive AC circuit. Draw the waveforms and phasor for voltage and current. **07**

Q-6 Attempt all questions (14)

- (a) Draw the power triangle. From the power triangle define
i) Active power ii) Reactive power iii) Apparent power iv) Power factor **07**
- (b) Explain the following sinusoidal function terminology. **07**
i) Amplitude ii) Angular Frequency iii) Time period

Q-7 Attempt all questions (14)

- (a) For a three phase star connected balance system, Derive the relation between
i) Phase Voltage and Line Voltage
ii) Phase Current and Line Current **07**
- (b) Give various wattmeter methods for measuring power in three phase circuits and explain any one of them. **07**

Q-8 Attempt all questions (14)

- (a) Explain the theory of an ideal transformer. Explain the construction of core type transformer. **07**
- (b) Derive the emf equation $e = 4.44 f N \phi_m$ for a single phase transformer Where f= frequency of supply, N= number of turns either primary or secondary side, ϕ_m = maximum flux in the core. **07**

