MULTIPLE CHOICE QUESTIONS

1. What is the frequency of the AC Mains in India?
   a. 60 Hz **b. 50 Hz** c. 40 Hz d. 30 Hz

2. An alternating current can be produced by
   a. Choke Coil **b. Dynamo** c. Electric Motor d. Transformer

3. Which of the following can measure an alternating current?
   a. Voltmeter **b. Ammeter**
   c. Suspended coil galvanometer d. Moving coil galvanometer

5. What happens to the inductive reactance when the frequency of the AC supply is increased?
   a. **Increases** b. Decreases
   c. Remains the same d. Decreases inversely

6. What happens to the quality factor of an LCR circuit if the resistance is increased?
   a. Increases **b. Decreases** c. Remains the same d. None of the above

7. Which of the following statements is true about the LCR circuit connected to an AC source at resonance?
   a. Voltage across R equals the applied voltage.
   b. Voltage across R is zero.
   c. Voltage across C is zero.
   d. Voltage across L equals the applied voltage.

8. When is the current in a circuit wattless?
   a. When the inductance of the circuit is zero.
   b. When the resistance of the circuit is zero.
   c. When the current is alternating.
   d. When both resistance and inductance are zero.

9. For which of the following the power factor is one?
   a. Pure capacitor b. Pure inductor **c. Pure resistor** d. All of the above

10. For which of the following the average power dissipation is maximum?
   a. only to Pure capacitor
   b. only to Pure inductor
   c. only to Pure resistor
   d. to a series capacitor and inductor.

11. The main reason for preferring use of ac voltage over dc voltage is
   (a) ac voltages can be easily and efficiently converted from one voltage to the other by means of transformers.
   (b) electrical energy can also be transmitted economically over long distances
   (c) both (a) and (b) are correct

(d) both (a) and (b) are wrong.

12. If ac applied to pure resister then voltage and current are
(a) In phase (b) out of phase
(c) voltage leads current by 90^0 (d) voltage lagss current by 90^0

13. If ac applied to pure capacitor then voltage and current are
(a) In phase (b) out of phase
(c) voltage leads current by 90^0 (d) voltage lagss current by 90^0

14. If ac applied to pure inductor then voltage and current are
(a) In phase (b) out of phase
(c) voltage leads current by 90^0 (d) voltage lagss current by 90^0

15. If ac applied to pure resister which of the following is correct
(a) The average current is zero and average power is not zero
(b) The average current is not zero and average power is zero
(c) The average current is zero and average power is also zero
(d) The average current is not zero and average power is not zero

16. Tthe household line voltage of 220 V is an rms value then a peak voltage of voltage is
(a) 200V **(b) 311V** (c) 220V (d) 20V

17. If ac applied to pure inductor the average power supplied to an inductor over one complete cycle is
(a) zero (b) i^2R (c) maximum (d) not zero

18. A lamp is connected in series with a capacitor with dc connections then
(a) the lamp will glow more brightly (b) the lamp will glow less brightly
(c) the lamp will not glow (d) the lamp will shine

19. A lamp is connected in series with a capacitor with ac connections. What happens if the capacitance of the capacitor is reduced?
(a) lamp will shine more brightly (b) lamp will not shine
(c) depends on which lamp is used **(d) lamp will shine less brightly**

20. Resonance phenomenon is exhibited by a circuit only if both
(a) L and C are present in the circuit (b) L and R are present in the circuit
(c) C and R are present in the circuit (d) R and R are present in a circuit.

21. A light bulb and an open coil inductor are connected to an ac source. The switch is closed and after sometime, an iron rod is inserted into the interior of the inductor. The glow of the light bulb
(a) increases (b) decreases (c) is unchanged (d) stop glowing

22. The value of induced emf produced in transformer depends on
(a) the number of turns in the secondary coil
(b) the number of turns in the primary coil
(c) the number of turns in both primary and secondary coil
(d) none of the above.

23. the assumption made wile obtaining the relation between turns ratios and primary and secondary voltage are

(a) the primary resistance and current are small;
(b) the same flux links both the primary and the secondary as very little flux escapes from the core, and
(c) the secondary current is small.
(d) all the above

24. which of the following is true in case of step up transformer

(a) $N_s < N_p$ **(b)** $\boldsymbol{N_s > N_p}$ (c) $N_s = N_p$ (d) it is independent of turns

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26. The large scale transmission and distribution of electrical energy over long distances is done with the use of transformers. The voltage output of the generator is stepped-up because

(a) minimising power loss by reducing current
(b) minimising current loss by reducing current
(c) minimising current loss by reducing power
(d) all the above

27. The power consumed in an ac circuit is

(a) never negative. (b) never positive (c) may be negative or positive (d) always zero

29. In a pure capacitive circuit if the frequency of ac source is doubled, then its capacitive reactance will be

(a) remains same (b) doubled **(c) halved** (d) zero

30. **A.C. power is transmitted from a power house at a high voltage as**

(a) the rate of transmission is faster at high voltages
(b) it is more economical due to less power loss
(c) power cannot be transmitted at low voltages
(d) a precaution against theft of transmission lines

31. In an alternating current circuit consisting of elements in series, the current increases on increasing the frequency of supply. Which of the following elements are likely to constitute the circuit?

(a) Only resistor (b) Resistor and inductor
(c) Resistor and capacitor (d) Only inductor

32. **A transformer works on the principle of**

(a) self induction (b) electrical inertia
(c) mutual induction (d) magnetic effect of the electrical current

33. **For an ideal-step-down transformer, the quantity which is constant for both the coils is**

(a) current in the coils (b) voltage across the coils
(c) resistance of coils **(d) power in the coils**

34. The core of any transformer is laminated so as to

(a) reduce the energy loss due to eddy currents.
(b) make it light weight.

(c) make it robust and strong.
(d) increase the secondary voltage.

35. The transformation ratio in the step-up transformer is
(a) one **(b) greater than one**
(c) less than one (d) the ratio greater or less than one depends on the other factor

2 MARKS QUESTIONS

1. What is transformer? Name the its working principle of transformer.
2. Briefly explain the construction of transformer.
3. What is resonant frequency? Write the expression for it.
4. Mention any two sources of energy loss in transformer.
5. Show that current and voltages are in same phase when an AC source applied across resistor.
6. Write any to applications of resonant circuits.
7. Write the assumption made wile obtaining the relation between turns ratios and primary and secondary voltage.

5 MARKS

1. A 15.0 mF capacitor is connected to a 220 V, 50 Hz source. Find the capacitive reactance and the current (rms and peak) in the circuit. If the frequency is doubled, what happens to the capacitive reactance and the current?
2. A resistor of 200 W and a capacitor of 15.0 mF are connected in series to a 220 V, 50 Hz ac source. (a) Calculate the current in the circuit; (b) Calculate the voltage (rms) across the resistor and the capacitor.
3. A sinusoidal voltage of peak value 283 V and frequency 50 Hz is applied to a series LCR circuit in which R = 3 W, L = 25.48 mH, and C = 796 mF. Find (a) the impedance of the circuit; (b) the phase difference between the voltage across the source and the current; (c) the power dissipated in the circuit; and (d) the power factor
4. a series LCR circuit connected to a variable frequency 230 V source. L = 5.0 H, C = 80μF, R = 40Ω.
   (a) Determine the source frequency which drives the circuit in resonance.
   (b) Obtain the impedance of the circuit and the amplitude of current at the resonating frequency.
   (c) Determine the rms potential drops across the three elements of the circuit. Show that the potential drop across the LC combination is zero at the resonating frequency.