Alternating Current (AC)

1. **Assertion (A):** In a series LCR circuit at resonance, the voltage across the capacitor or inductor may be more than the applied voltage.
Reason (R): At resonance in a series LCR circuit, the voltages across inductor and capacitor are out of phase.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

2. **Assertion (A):** Average power consumed in an ac circuit is equal to average power consumed by resistors in the circuit.
Reason (R): Average power consumed by capacitor and inductor is zero
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

3. **Assertion (A):** Peak voltage across the resistance can be greater than the peak voltage of the source in an series LCR circuit.
Reason (R): Peak voltage across the inductor can be greater than the peak voltage of the source in an series LCR circuit.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

4. **Assertion (A):** The power rating of an element in AC circuit refers to average power rating.
Reason (R): A given value for AC voltage or current is usually its average value.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

5. **Assertion (A):** Average power consumed in a circuit is never negative.
Reason (R): Instantaneous power is always positive.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

6. **Assertion (A):** At an airport, a person is made to walk through the doorway of a metal detector.
Reason (R): Metal detector works on the principle of resonance in AC circuits.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

7. **Assertion (A):** Smaller the band width, sharper the resonance and easier it is to tune an LCR circuit.
Reason (R): Resonant frequency is arithmetic mean of half power frequencies.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

8. **Assertion (A):** At resonance in AC circuits current and emf are in phase.

Reason (R): At resonance in AC circuits, current is maximum.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

9. **Assertion (A):** At frequency greater than resonant frequency, circuit is inductive in nature.

Reason (R): Reciprocal of reactance is called susceptance.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

10. **Assertion (A):** If the resistance of a series resonant LCR circuit is decreased, then the peak current versus frequency graph will be taller and narrower.

Reason (R): If the resistance of a series resonant LCR circuit decreased, then its resonance will be unaffected.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

11. **Assertion (A):** The impedance of series L-C-R circuit can be greater, equal or less than the resistance.

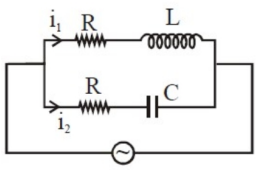
Reason (R): The minimum impedance of series LCR circuit depends over angular frequency of applied emf.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

12. 

Assertion (A): Current i_1 & i_2 can not be in same phase.

Reason (R): If $X_L = X_C$, i_1 & i_2 may be in same phase.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

13. **Assertion (A):** A capacitor of suitable capacitance can be used in an A.C. circuit in place of the choke coil.

Reason (R): A capacitor blocks D.C. and allows A.C. only.

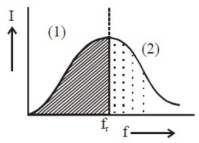
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

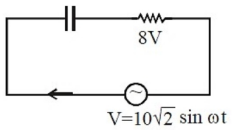
(4) Both (A) and (R) are false

14. **Assertion (A):** For series RLC network, power factor of circuit in region (1) is positive and in region (2) is negative.
Reason (R): Overall nature of circuit in region (1) is inductive while in region (2) is capacitive.



(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

15. **Assertion (A):** KVL rule is also being applied in AC circuit shown below.



Reason (R): V_C in the circuit = 2V.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

16. **Assertion (A):** When frequency is greater than resonance frequency in a series LCR circuit, it will be an inductive circuit.
Reason (R): Resultant voltage will lead the current.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

17. **Assertion (A):** The moving coil ammeters or voltmeters can't be employed to measure alternating current or voltage respectively.
Reason (R): If an alternating current is passed through a moving coil ammeter or voltmeter, then the average value of torque experienced by the coil is zero.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

18. **Assertion (A):** In ac supply we cannot feel any fluctuations of current in bulbs.
Reason (R): House hold ac supply has very low frequency.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

19. **Assertion (A):** 220V, 50 Hz appliance implies that potential difference in bulb is always 220V.
Reason (R): Every appliance is specified with its peak tolerable voltage.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

20. **Assertion (A):** Transformer does not work on dc

Reason (R): dc neither changes in magnitude nor in direction.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

21. **Assertion (A):** Choke coil is preferred over a resistor to adjust current in an ac circuit.

Reason (R): Power factor for inductance is zero.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

22. **Assertion (A):** The divisions are equally marked on the scale of ac ammeter.

Reason (R): Heat produced is directly proportional to the current.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

23. **Assertion (A):** An electric lamp is connected in series with a long solenoid of copper with air core and then connected to ac source. If an iron rod is inserted in solenoid, the lamp will become dim.

Reason (R): If an iron rod is inserted in solenoid, the inductance of solenoid increases.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

24. **Assertion (A):** For an electric lamp connected in series with a variable capacitor and ac source, its brightness increases with increase of capacitance.

Reason (R): Capacitive reactance decreases with increase in capacitance of capacitor.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

25. **Assertion (A):** In series RL ac circuit voltage leads the current.

Reason (R): In series LCR circuit current may lead the voltage.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

ANSWER KEY																			
Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	2	1	4	3	3	2	3	3	2	2	4	3	2	4	3	1	1	3	4	3
Que.	**21**	**22**	**23**	**24**	**25**															
Ans.	1	4	1	1	2															