- 1. The difference between alternating current (ac) and direct current (dc) is:
 - a) Ac changes value and dc does not
 - b) Ac changes direction and dc does not
 - c) Both answers (a) and (b)
 - d) None of the above

Answer: (b)

- 2. A sine wave with a frequency of 12kHz is changing at a faster rate than a sine wave with a frequency of:
 - a) 20 kHz
 - **b**) 15,000 Hz
 - **c)** 10,000 Hz
 - **d)** 1.25 MHz

Answer: (c)

- 3. If the peak value of a sine wave is 10V, the peak-to-peak value is:
 - a) 20 V
 - **b**) 5 V
 - **c)** 100 V
 - d) None of these

Answer: (a)

- 4. The average value of a 10 V peak sine wave over one complete cycle is:
 - a) 0 V
 - b) 6.37 V
 - **c)** 7.07 V
 - **d**) 5 V

Answer: (a)

- 5. The average half-cycle value of a sine wave with a 20 V peak is:
 - a) 0 V
 - **b**) 6.37 V
 - **c)** 12.74 V
 - **d)** 14.14 V

Answer: (c)

- **6.** A Phasor represents:
 - a) The magnitude of a quantity
 - **b)** The magnitude and direction of a quantity.
 - c) The phase angle.
 - d) The length of a quantity.

- 7. If the rms current through a 10 k Ω resistor is 5 mA, the rms voltage drop across the resistor is:
 - **a)** 70.7 V
 - **b)** 7.07 V
 - c) 5V
 - **d**) 50 V

Answer: (d)

- 8. The duty cycle of a square wave:
 - a) Varies with the frequency.
 - **b)** Varies with the pulse width.
 - c) Both answers (a) and (b).
 - d) Is 50% .

Answer: (d)

- 9. Which of the following statements are true?
 - a) There is current through the dielectric of a charging capacitor.
 - **b)** When a capacitor is connected to a dc voltage source, it will charge to the value of the source.
 - c) An ideal capacitor can be discharged by disconnecting it from the voltage source.
 - d) None of the above.

Answer: (b)

- **10.** A capacitance of 1000 pF is smaller than:
 - a) 0.01 µF
 - **b**) 0.001 μF
 - **c)** 0.00000001 F
 - d) Both (a) and (c).

Answer: (d)

Answer: (d)

11. When the voltage across a capacitor is increased, the stored charge:

- a) Increases
- **b**) Decreases
- c) Remains constant
- d) Fluctuates

12. The capacitance value is increased by:

- a) Decreasing the plate area.
- **b)** Decreasing the plate separation.
- c) Increasing the plate area.
- e) Both (c) and (d).

13. A sinusoidal voltage is applied across a capacitor. When the frequency of the voltage is increased, the current:

- a) Increases.
- b) Decreases.
- c) Remains constant.
- d) Ceases.

Answer: (a)

14. Switched capacitor circuits are used to

- a) Increase capacitance.
- **b)** Emulate inductance.
- c) Emulate resistance.
- d) Generate sine wave voltages.

Answer: (c)

15. An inductance of 0.33 mH is smaller than:

- **a**) 33 μH
- **b**) 330 μ*H*
- c) 0.05 *mH*
- **d**) 0.0005 *H*

Answer: (d)

16. When the current through an inductor doubles, the stored energy:

- a) Doubles.
- b) Quadruples.
- c) Is halved.
- d) Does not change.

Answer: (b)

- 17. The inductance of an iron-core coil increases if:
 - a) The number of turns is increased.
 - **b)** The iron core is removed.
 - c) The length of the core is increased.
 - d) Larger wire is used.

Answer: (a)

- **18.** A sinusoidal voltage is applied across an inductor. When the frequency of the voltage is increased, the current:
 - a) Decreases.
 - **b)** Increase.
 - c) Does not change.
 - d) Momentarily goes to zero.

19. The complex number 5 + j5 is equivalent to:

- a) 5∠45°
- **b**) 25∠0°
- c) 7.07∠45°.
- d) 7.07∠135°.

Answer: (c)

20. The complex number $35 \angle 60^\circ$ is equivalent to:

- a) 35 + *j*35
- **b**) 35 + *j*60
- c) 17.5 + j30.3
- d) 30.3 + j17.5.

Answer: (c)

21. The complex number (16 - j8) - (12 + j5) is equivalent to:

- a) 28 j13
- **b**) 4 j13
- c) 4 j3.
- **d**) -4 + j13.

Answer: (b)

22. In a series RC circuit, the voltage across the resistance is:

- a) In phase with the source voltage
- **b)** Lagging the source voltage by 90° .
- c) In phase with the current.
- d) Lagging the current by 90°.

Answer: (c)

23. In a series RC circuit when the frequency and the resistance are doubled, the impedance:

- a) Doubles.
- **b**) Is halved.
- c) Is quadrupled.
- d) Cannot be determined without values.

Answer: (d)

- **24.** When $R=X_C$ the phase angle is:
 - a) 0°
 - **b**) +90°.
 - c) -90°.
 - **d**) 45°.

25. In a parallel RC circuit, there is 1 A rms through the resistive branch and 1 A rms through the capacitive branch. The total rms current is:

- a) 1 A
- **b**) 2 A
- c) 2.28 A
- **d)** 1.414 A
- **26.** Energy sources are normally rated in:
 - a) Watts.
 - b) Volt-amperes.
 - c) Volt-amperes reactive.
 - d) None of the above.

Answer: (b)

Answer: (d)

- **27.** When the frequency of the voltage applied to a series RL circuit is increased, the impedance:
 - a) Decreases.
 - **b)** Increases.
 - c) Does not change.
 - d) None of the above.

Answer: (b)

- **28.** If the frequency is doubled and the resistance is halved, the impedance of a series RL circuit:
 - a) Doubles.
 - b) Halves.
 - c) Remains constant.
 - d) Cannot be determined without values.

Answer: (d)

- **29.** When the resistor voltage in a series RL circuit becomes greater than the inductor voltage, the phase angle:
 - a) Increase.
 - b) Decreases.
 - c) Is not affected.
 - d) None of the above.
- **30.** In a parallel RL circuit, there are 2A rms in the resistive branch and 2 A rms in the inductive branch. The total rms current is:
 - a) 4 A
 - **b**) 5.656 A
 - **c**) 2 A
 - **d)** 2.828 A

Answer: (d)

31. The total reactance of a series RLC circuit at resonance is:

- a) Zero.
- **b)** Equal to the resistance.
- c) Infinity.
- d) Capacitive.

Answer: (a)

- **32.** The phase angle between the source voltage and current of a series RLC circuit at resonance is:
 - **a)** -90°
 - **b**) +90°
 - **c**) 0°
 - d) Dependent on the reactance.

Answer: (c)

33. In a series RLC circuit that is operating below the resonant frequency, the current:

- a) Is in phase with the applied voltage.
- **b)** Lags the applied voltage.
- c) Leads the applied voltage.
- d) None of the above.

Answer: (c)

34. The total current into the L and C branches of a parallel circuit at resonance is ideally:

- a) Maximum.
- b) Low.
- c) High.
- d) Zero.

Answer: (d)

35. In applying the superposition theorem:

- a) All sources are considered simultaneously.
- **b)** All voltage sources are considered simultaneously.
- c) The sources are considered one at a time with all others replaced by short.
- d) The sources are considered one at a time with all others replaced by their internal impedances.

Answer: (d)

- 36. A Thevenin ac equivalent circuit is always consists of an equivalent ac voltage source:
 - a) And an equivalent capacitance.
 - **b)** And an equivalent inductive reactance.
 - c) And an equivalent impedance.
 - d) In series with an equivalent capacitive reactance.

- **37.** The Thevenin equivalent voltage is:
 - a) The open circuit voltage.
 - **b)** The short circuit voltage.
 - c) The voltage across an equivalent load.
 - d) None of the above.

Answer: (a)

38. The Thevenin equivalent impedance is the impedance looking from:

- a) The source with the output shorted.
- **b)** The source with the output open.
- c) Any two specified open terminals with all sources replaced by their internal impedances.
- d) Any two specified open terminals with all sources replaced by a short.

Answer: (c)

- **39.** A Norton ac equivalent circuit always consists of:
 - a) An equivalent ac current source in series with equivalent impedance.
 - b) An equivalent ac current source in parallel with an equivalent reactance.
 - c) An equivalent ac current source in parallel with equivalent impedance.
 - d) An equivalent ac voltage source in series with equivalent impedance.

Answer: (c)

- **40.** The Norton equivalent current is:
 - a) The total current from the source.
 - **b)** The short circuit current.
 - c) The current to an equivalent load.
 - d) None of the above.

Answer: (b)

41. In case of inductive circuit, frequency is ______ Proportional to the inductance (L) or inductive reactance (X_L):

- a) Directly.
- **b**) Inversely.
- c) No effect.
- d) None of the above.

Answer: (a)

42. In case of capacitive circuit, frequency is ______ Proportional to the capacitance (C) or capacitive reactance (X_C):

- a) Directly.
- **b)** Inversely.
- c) No effect.
- d) None of the above.

43. The relationship between Impedance (Z) and Admittance (Y) is ? a) $Z = \frac{1}{Y}$ **b**) Z = 1 + Yc) Z = 1 - Y. d) $Z = Y^2$. Answer: (a) 44. In a highly capacitive circuit the: a) Apparent power is equal to the actual power. **b)** Reactive power is more than the apparent power. c) Reactive power is more than the actual power. d) Actual power is more than its reactive power. Answer: (c) 45. Which of the following statements pertains to resistors only? a) Can dissipate considerable amount of power. b) Can act as energy storage devices. c) Connecting them in parallel increases the total value. d) Oppose sudden changes in voltage. Answer: (a) **46.** The period of a wave is: a) The same as frequency. b) Time required to complete one cycle. c) Expressed in amperes d) None of the above. Answer: (b) 47. The peak value of a sine wave is 200 V. its average value is: a) 127.4 V. **b)** 141.4 V c) 282.8 V **d)** 200 V Answer: (a) **48.** In a highly capacitive circuit the: a) Apparent power is equal to the actual power. **b**) Reactive power is more than the apparent power. c) Reactive power is more than the actual power.

d) None of the above.

- **49.** Ohm is the unit of all of the following except:
 - a) Inductive reactance.
 - **b)** Capacitive reactance.
 - c) Resistance.
 - d) Capacitance.

Answer: (d)

50. The power factor of a D.C. circuit is always:

- a) Less than unity.
- **b)** Unity.
- c) Greater than unity.
- d) Zero.