

SARDAR PATEL UNIVERSITY V.V.NAGAR**B.Sc.INSTRUMENTATION (v)****SEM-II, OCTOBER-2016(NC) EXAMINATION****SUB. CODE:-US02CINV01****SUB: BASIC ELECTRONIC INSTRUMENTS****DATE:-20/10/2016****TIME:-2:00 pm to 4:00 pm****MARKS-70****Q-1 Choose correct answer****[10]**

1. The polarity of an AC waveform reverses every _____ cycle.
(A) $1/4$ (C) $1/2$
(B) 1 (D) All of above
2. The frequency of A.C. signal depends on _____.
(A) Amplitude of signal (C) Phase angle of signal
(B) Periodic time of signal (D) All of above
3. Algebraic sum of the current entering and leaving the junction is always _____.
(A) Positive (C) Negative
(B) Zero (D) None of above
4. Series resonant circuit has _____ power factor.
(A) one (C) infinite
(B) zero (D) none of above
5. The phase difference between the voltage and current in an ideal capacitive circuit is _____.
(A) $+90^\circ$ (C) -90°
(B) 0° (D) none of above
6. The quality factor of the series resonance circuit is lowered due to _____.
(A) Leakage through capacitor (C) Loading on resonance circuit
(B) Coil resistance (D) All of above
7. The average value of the sinusoidal signal is _____.
(A) $0.5 V_m$. (C) $0.707 V_m$.
(B) $1.1 V_m$. (D) $0.636 V_m$.
8. For maximum power transfer the resistance of load circuit should be _____.
(A) More than source resistance (C) Less than source resistance
(B) Equal to source resistance (D) All of above
9. An inductor-capacitor (LC) circuit is said to be in resonance when $X_c =$ _____.
(A) X_L (C) $1/2\pi fc$
(B) X_c (D) none of above
10. If the two signals are in phase opposition then what is the phase difference between them?
(A) 360° (C) 180°
(B) 90° (D) 0°

Q-2 Short answer type question. (any ten)**[20]**

1. What is network?
2. State Norton theorem and draw Norton equivalent circuit.
3. Differentiate between Resistance and Reactance.
4. Define form factor.
5. Which factors determines the energy stored by the capacitors?
6. State Kirchhoff's Voltage and Current laws.
7. Explain the meaning of phase lagging and phase leading in AC circuits.
8. Define Resonance.
9. What is Quality factor?
10. List application of the resonance circuit.
11. Define admittance.

12. Define peak to peak value of an AC sinusoidal signal.

Q.3 (A) Do as directed..

[06]

(1) $(9+j5)+(3+j2)$

(4) $(5-j4) - (4+j6)$

(2) $(7+j3) - (3)$

(5) $(9-j8) - (1+j3)$

(3) $(9+j2) + (3-j2)$

(6) $(9-j9) + (j5+1)$

(B) Convert following polar coordinates to Cartesian coordinates and vice versa.

[04]

(1) $Z_T = 5+j6$

(3) $Z_T = 100 \angle -30^\circ$

(2) $Z_T = 3-j4$

(4) $Z_T = 5 \angle 37^\circ$

OR

Q.3 (A) Derive an expression for the average and effective values of the ac sinusoidal signals with an expression of the form factor.

[5]

(B) Define the terms Phase, Frequency and Periodic time of an ac sinusoidal signal.

[5]

Find the periodic time of the signal produced by the inverter with 50 Hz frequency.

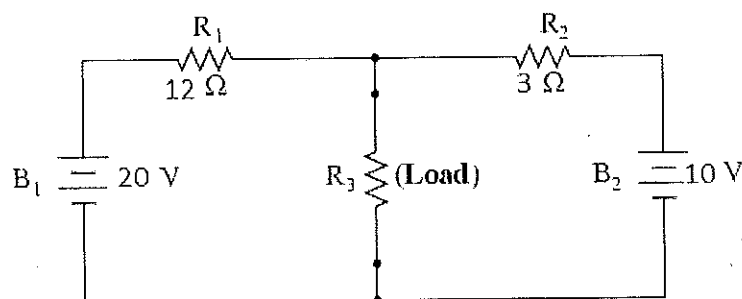
Q.4 Write a note on maximum power transfer theorem.

[10]

OR

Q.4 State Thevenin's theorem. Reduce below given circuit in to Thevenin's equivalent circuit and find the value of V_{TH} and R_{TH} .

[10]



Q.5 (A) Discuss the resonance of parallel RL circuit for sinusoidal signals. Derive expression for the total impedance and phase angle of the circuit.

[06]

(B) Discuss the inductor response to sinusoidal signal.

[04]

OR

Q.5 (A) Discuss the resonance of series RL circuit for sinusoidal signals. Derive expression for the total impedance and phase angle of the circuit.

[06]

(B) Calculate the impedance and phase angle offered by the series RL circuit made up of 100 Ω resistors and 100 Ω inductive reactance.

[04]

Q.6 (A) Draw the circuit of the Series resonance and explain it with necessary diagrams. Also derive an expression for the resonance frequency.

[06]

(B) A circuit consist of capacitor of 100pF connected in series with coil of resistance 5Ω and inductance 100 μH. Calculate resonance frequency and Q-factor.

[04]

OR

Q.6 (A) Draw the circuit of the parallel resonance and explain it with necessary diagrams. Also derive an expression for the resonance frequency.

[06]

(B) Discuss bandwidth of a tuned circuit.

[04]

$X = X = X$

(2)