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SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar - 388120

B.Sc. (2ND Sem) Examination - March/April 2018 [CBCS]

Wednesday, 4th April, 2018

02:00 PM to 04:00 PM

US02CINV01 (Instrumentation - Vocational)

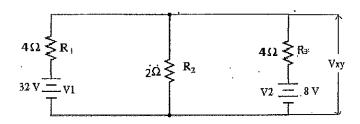Basic Electronic Instruments

Maximum Marks: 70

Que 1 Each question below gives a multiple choice of answers. Choose the most **[10]** appropriate one.

1 A Train of Sine Waves which Contains 50 Positive Peaks and 50 Negative Peaks per Second has Frequency of ____ Hz.

   a) 50×10^6 b) 50×10^3

   c) 50   d) 50×10^{-6}

2 If the Phase Difference of Sinusoidal Wave is ____ Degree, the Wave is Considered as Out of Phase Signal.

   a) 60   b) 90

   c) 180   d) 270

3 According to Kirchoff's Current Law (KCL), the Algebraic Sum of Currents Meeting at a Junction is ____.

   a) Zero   b) Very High and Positive

   c) Very Low and Negative   d) Always One

4 An Ideal Constant Current Source has ____ Ohm Resistance.

   a) Zero   b) One

   c) Medium   d) Infinite

5 In Ideal Capacitive Circuit, Phase Difference Between Voltage and Current is ____ Degree.

   a) 0   b) 90

   c) 180   d) 270

6 Sharpness of Resonance is Ratio of ____ of the Circuit to Its Resonance Frequency.

   a) Current   b) Voltage

   c) Quality Factor   d) Bandwidth

7 Power Factor of Series Resonant Circuit is ____.

   a) Zero   b) +1

   c) -1   d) Infinite

8 Thevenin's Equivalent of a Circuit Consists of a Constant ____ Source and Equivalent Resistance in Series With It.

   a) Current   b) Power

   c) Voltage   d) Current and Voltage

(1)

(P.T.O.)

9 Inductive Reactance is ____.

    a) Proportional to Frequency

    b) Inverseley Proportional to Frequency

    c) Proportional to Square of Frequency

    d) Inverseley Proportional to Square Root of Frequency

10 Capacitive Reactance is ____.

    a) Inverseley Proportional to Square Root of Frequency

    b) Proportional to Square of Frequency

    c) Inverseley Proportional to Frequency

    d) Proportional to Frequency

Que 2 Short Questions (Attempt any TEN)   [20]

1 Explain What Network Circuit is.

2 Draw Only Waveform For Inductor Response to Sinusoidal Signals.

3 What Do You Mean By Peak to Peak Value In Terms of Sinusoidal Signal?

4 What is "Phase (Angle) Difference"?

5 Enlist Factors Which Determine the Energy Stored by Capacitor.

6 Briefly Explain KCL.

7 What Do You Mean By Phase Lagging and Phase Leading?

8 Write Briefly on Norton's Theorem.

9 Explain "Tuning RLC Circuit".

10 What is Resonance Circuit?

11 Explain What Quality Factor is.

12 Enlist Applications of Resonance Circuit.

Que 3 **[A]** Derive an Expression for the Average and Effective Values of the Sinusoidal Signals. Write on Form Factor. **[05]**

    [B] Convert Following Polar Coordinates to Cartesian Coordinates, Vice Versa. **[05]**

        1) $Z_T = 6+j6$

        2) $Z_T = 9-j2$

        3) $Z_T = 100 < 45°$

        4) $Z_T = 3- j4$

        5) $Z_T = 5 < 37°$

OR

    [C] Do As Directed: **[05]**

        1) $j5 +(3-j2)$

        2) $(7-j) – (6+j2)$

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

        4) $(8-j8) + (1+j)$

        5) $(5-j2) + (j+1)$

    [D] Explain Following Terms With Respect to AC Signals With Necessary Figures: **[05]**

        1) Phase

        2) Frequency

        3) Periodic Time

Find Periodic Time of the Signal Produced By the Inverter With 10 KHz Frequency.

Que 4 **[A]** State Millman's Theorem. Determine The Value of "Vxy" In Circuit Given Below Using Millman's Theorem. **[05]**

[B] Give an Account of Thevenin's Theorem. **[05]**

OR

[C] Discuss Maximum Power Transfer Theorem With Necessary Circuit Diagram. **[10]**

Que 5 **[A]** Discuss Parallel RL Circuit For AC Signals. Derive an Expression For the Total Impedance and Phase Angle of the Circuit. **[05]**

[B] Explain The Capacitor Response to Sinusoidal Signals. **[05]**

OR

[C] Discuss Series RL Circuit For AC Signals. Derive an Expression For the Total Impedance and Phase Angle of the Circuit. **[05]**

[D] The Current of 1.2 Amp Flows in a Coil With Inductance of 0.4 Henry, Determine the Energy Stored in Inductor. **[05]**

Que 6 **[A]** Draw and Explain the Circuit of the Parallel Resonance. Derive an Expression For the Resonance Frequency. **[05]**

[B] A Circuit Consist of Capacitor of 100pF Connected in Parallel With Coil of Resistance 5Ω and Inductance 100 µH. Calculate **[05]**
   1) Resonance frequency
   2) Q-factor
   3) Bandwidth

OR

[C] Give an Account of Series Resonance Circuit. With Necessary Diagrams, Explain Inductor Response to AC Sinusoidal Signals. **[10]**

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