

Scheme – I

Sample Question Paper

Program Name : **Electronics Engineering, Digital Electronics and Instrumentation Engineering Program Group**
Program Code : **DE/EJ/ET/EN/EX/IE/IS/IC**
Semester : **Third**
Course Title : **Electric Circuits and Networks**
Marks : **70**

22330

Time: 3 Hrs.

Instructions:

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following.

10 Marks

- a) Define: i) Active Power ii) Reactive Power.
- b) Write the equation of resultant Impedance of Series R-L-C circuit.
- c) Define Quality factor of Series resonance circuit. Give equation of it.
- d) Explain the term source transformation.
- e) Write the formula for star to delta and delta to star conversion.
- f) State Superposition Theorem.
- g) Write the equations of Open circuit Z parameters.

Q.2) Attempt any THREE of the following.

12 Marks

- a) Draw circuit of series R- L circuit and sketch phasor diagram, waveform of voltage and current in the circuit.
- b) Explain Q-factor of Series R-L-C circuit.
- c) State the need for source transformation. Write three steps to convert voltage source into current source.
- d) State Superposition theorem and write the steps to find the current through an element by Superposition theorem

Q.3) Attempt any THREE of the following.

12 Marks

- a) Draw phasor diagram, voltage and current waveform of parallel R-C circuit.
- b) Derive an expression for resonant frequency of a series RLC circuit.
- c) Explain the procedure to convert a practical Voltage source into an equivalent Current source with suitable example.

- d) State Maximum Power transfer theorem. Write the steps to find the current in the load by Maximum Power Transfer theorem.

Q.4) Attempt any THREE of the following.

12 Marks

- a) An alternating voltage of 250 V, 50 Hz is applied to a coil which takes 5 A of current. The power absorbed by the circuit is 1 KW. Calculate the resistance and inductance of the coil.
- b) Draw the vector diagram for the circuit shown in Figure1 indicating the voltage drop V_1 and V_2 across the resistance and inductance and the current I flowing in the circuit.

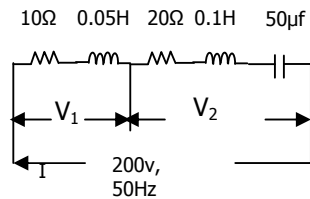


Figure 1

- c) An a.c series circuit has a resistance of 10 W, an inductance of 0.2 H and a capacitance of 60 μ F , voltage applied to the circuit is 200 V. Calculate : (a) resonant frequency (b) current (c) power at resonance..
- d) Use Mesh analysis to calculate current in the 6 Ω resistor. (As shown in the Figure-2)

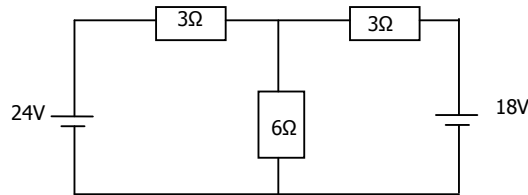


Figure 2

- e) Apply Norton's theorem to calculate current flowing through 10 Ω resistor of Figure3

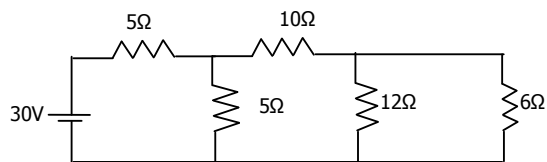


Figure 3

Q.5) Attempt any TWO of the following.

12 Marks

- a) A coil of resistance 20 ohm and inductance of 200 mH is connected in parallel with a variable capacitor. This combination is connected in series with a resistance of 8000 ohm. Supply voltage is 200 V, 50Hz. Calculate the following
- The value of C at resonance
 - The Q of the coil
 - Dynamic resistance of the circuit.

b) Find Current through Impedance $3+j5$ as shown in the Figure 4 using superposition theorem.

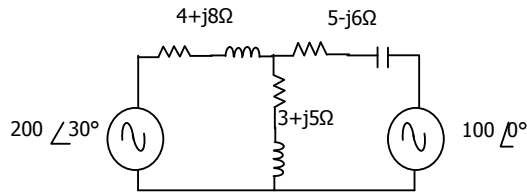


Figure 4

c) Draw the two port network and determine the indicated parameters for the following configurations.

- i) Cascade configurations (ABCD parameter)
- ii) Series configurations
- iii) Parallel configurations.

Q.6) Attempt any TWO of the following.

12 Marks

a) Find the voltages at Node A and B in the network shown in Figure 5

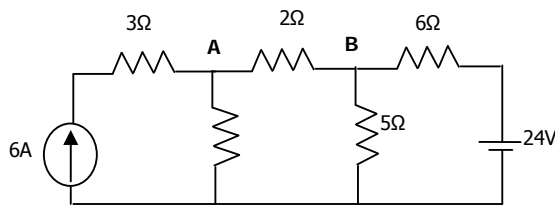


Figure 5

b) Use super-position theorem to find the voltage V in the network shown in Figure 6

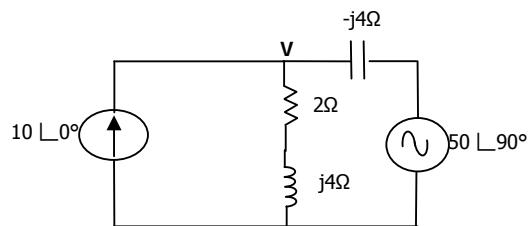


Figure 6

c) Find the z parameters for the network shown in Figure 7

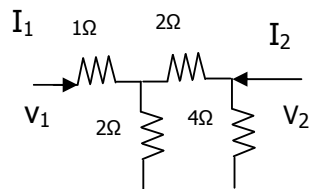


Figure 7

Scheme – I

Sample Test Paper - I

Program Name : **Electronics Engineering, Digital Electronics and Instrumentation Engineering Program Group**
Program Code : **DE/EJ/ET/EN/EX/IE/IS/IC**
Semester : **Third**
Course Title : **Electric Circuits and Networks**
Marks : **20**

22330

Time: 1 Hour

Instructions:

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Q.1 Attempt any FOUR.

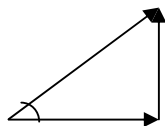
08 Marks

- a) Define i) Apparent Power ii) Power factor.
- b) Write the formula of active and reactive power.
- c) State the behavior of following elements at the time of switching.
 - i) Pure L ii) Pure C
- d) State the meaning of $t = 0^-$ and $t = 0^+$.
- e) Define Quality Factor of Parallel resonance circuit. Give equation of it
- f) Write Current magnification formula in Parallel Circuit.

Q.2 Attempt any THREE.

12 Marks

- a) For the given Impedance triangle
 - i) Identify the circuit
 - ii) Mark Parameters of all sides of triangle
 - iii) State the Nature of power factor
 - iv) Draw sinusoidal waveform for voltage and current



- b) Draw circuit diagram, phasor diagram and waveform of voltage and current of series R- C circuit

- c) A two element series circuit is connected across an a.c source $e = 200 \sqrt{2} \sin (\omega t + 20^\circ)$ V. The current in the circuit then is found to be $i = 10 \sqrt{2} \cos (314 t - 25^\circ)$ A. Determine the elements and its value of the circuit.
- d) Define the power factor of resonant circuit .State the value of power factor at resonance.
- e) Compare series and parallel resonance on the basis of following:
- (i) Resonant frequency
 - (ii) Impedance
 - (iii) Current
 - (iv) Bandwidth
- f) A circuit consisting of a coil of resistance 12Ω and inductance 0.15 H is connected in series with a capacitor of $12 \mu\text{F}$, variable frequency supply of 240 V is applied across the circuit . Calculate: (a) resonant frequency (b) current in the circuit at resonance

Scheme – I

Sample Test Paper - II

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Course Title : **Electric Circuits and Networks**
Marks : **20**

22330

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Q.1 Attempt any FOUR.

08 Marks

- a) Draw symbol for current controlled voltage source.
- b) Define dependent Current source and draw its symbol.
- c) State Thevenin's Theorem.
- d) State Reciprocity Theorem.
- e) Write the condition to transfer Maximum Power to the load in a.c circuits.
- f) Write the condition for network to be reciprocal in terms of Y and Z parameters.

Q.2 Attempt any THREE.

12 Marks

- a) Write the steps to convert given current source into equivalent voltage source.
- b) Use Mesh Analysis for Figure1 find the values of R_1 and R_2 .

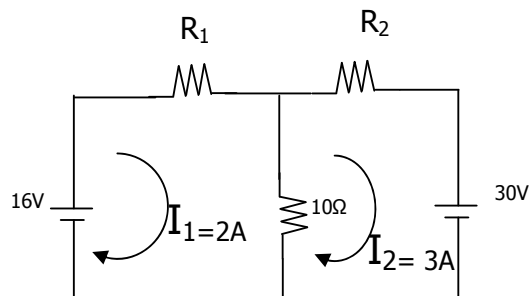


Figure 1

- c) State the Norton's theorem. Write stepwise procedure for applying Norton's theorem to simplify the circuit.
- d) Calculate the value of load R to transfer the maximum power, for the circuit shown in the

Figure 2

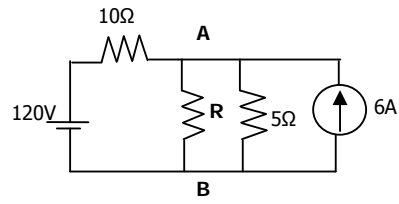


Figure 2

- e) For the given two-port network equations, draw an equivalent network.

$$I_1 = 5V_1 - V_2 \quad ; \quad I_2 = -V_2 + V_1$$

- f) A symmetrical T-network has the following open-circuit and short-circuit impedances:

$$Z_{oc} = 800\Omega \text{ (open circuit impedance)}$$

$$Z_{sc} = 600\Omega \text{ (short circuit impedance)}$$

Calculate impedance values of the network.