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**

22330

Course Title : **Electric Circuits and Networks**

Marks : **70** **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.

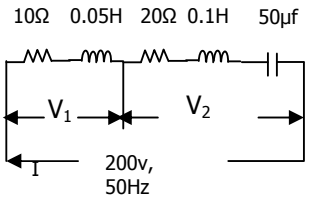


Figure 1

c) An a.c series circuit has a resistance of 10 W, an inductance of 0.2 H and a capacitance of 60 μF , 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)

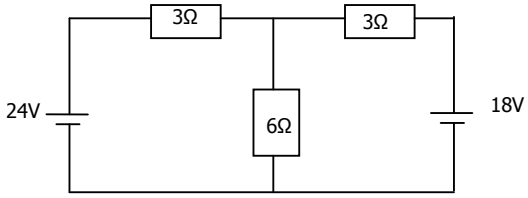


Figure 2

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

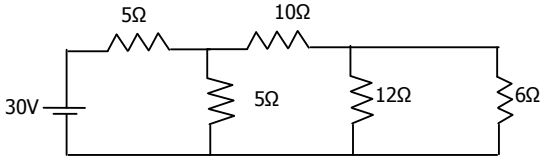


Figure 3

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

i) The value of C at resonance

ii) The Q of the coil

iii) Dynamic resistance of the circuit.

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

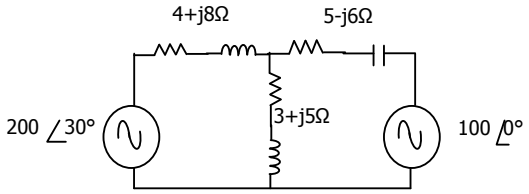


Figure 4

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

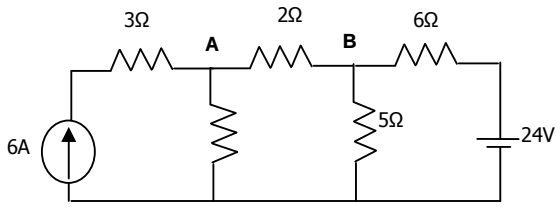


Figure 5

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

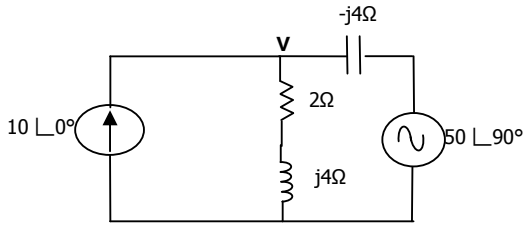


Figure 6

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

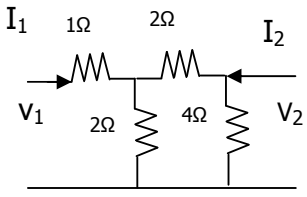


Figure 7

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**

22330

Course Title : **Electric Circuits and Networks**

Marks : **20** **Time: 1 Hour**

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 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.

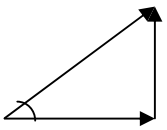
i) Pure L ii) Pure C

d) State the meaning of t = o – and t = o +.
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 2 sin (wt20°) V. The current in the circuit then is found to be i = 10 2 cos (314 t – 25°) 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 12 Ω and inductance 0.15 H is connected in series with a capacitor of 12 μF , 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

Program Name : **Electronics Engineering, Digital Electronics and Instrumentation Engineering Program Group**

Program Code : **DE/EJ/ET/EN/EX/IE/IS/IC**

Semester : **Third**

22330

Course Title : **Electric Circuits and Networks**

Marks : **20** **Time: 1 Hour**

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 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 R2.

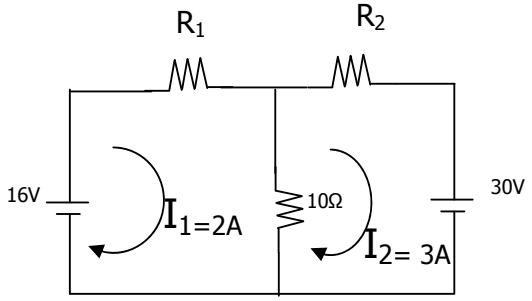


Figure 1

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

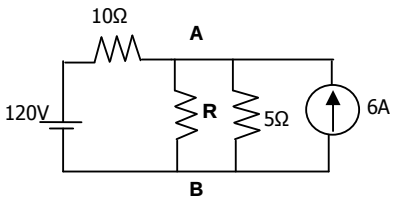


Figure 2

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

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

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

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

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

Calculate impedance values of the network.