SUB: Electric Circuits and Electron Devices

Course Code: UBEE309

UNIT 1

PART A

1 State Transient and Transient Time?

2 What is Tansient State?

3 What is Steady State?

4 Define Source Free Response

5 Define Forced Response?

6 When do we get Transient Response

7 What is total or complete Response?

8 What are the Causes of Tranient Behaviour Occuring in the Circuit.

9 What is the Causes of Free Response in Electrical Circuit

10 State Initial Value Theorem

11 State Final Value theorem

12 Write the Expression for transient current and voltages of RL circuit.

13 Write the Expression for transient current and voltages of RC circuit.

14 Define time constant or RL circuit and RC Ciruit.

15 Define Damping Ratio.

16 Define Laplace Transform Function

17 What are the advantages of Laplace Transform Function.

18 When the System is said to be under damped, over damped, critically damped?

19 Write Down the few applications of RL, RC, and RLC Circuits.

PART B

1 Distinguish between Natural Response and Forced Response.

2 What is Laplace Transform? Write some Laplace Transformation of Some Necessary function.

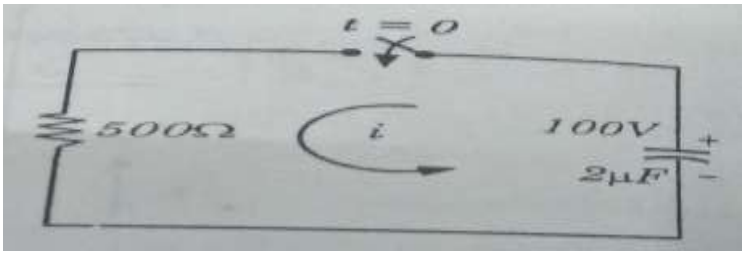
3 Distinguish between Transient Response and Steady State Response

4 Explain critically damped, over damped and under damped condition in RLC circuit.

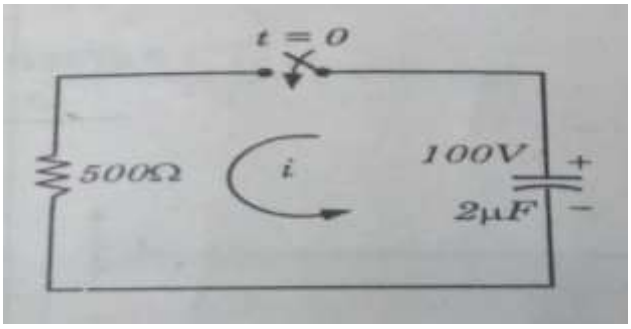
5 Distinguish Transfer Impedence and Driving Point Impedence?

6 Explain Initial or Boundary conditions for an inductor and Capacitor.

7 "The RC transient circuit has 100 Ω resistance, 20 µF capacitor connected to 50 V has an initial charge Q0=0.001 coulombs. The Switch is closed at t=0, Find the transient current."



8 "A Capacitor of 2 μF with an initial charge Q0 =200X10^-6 is connected across the terminals of a 500 ohm resistor at t=0.Calculate the time in which the transient voltage across the resistor drops from 60 to 20 volts."



9 "A Series RL circuit with R=100 ohms and L=20 h has a DC voltage of 200 volts applied through a switch at t=0.

Find a) The Equation for the Current and Voltages across the different Elements b) The Current at t=0.5 seconds.

C) The Current at 1 Sec d) The Time at Which eR=eL."

10 "In a Circuit the Switch is closed on Position 1 at t=0 and after 1 time constant is moved to position 2.

Find the current before and after moving to position 2. Assume no initial Charge ."

PART C

1 Derive the Transient current for RL Circuit with DC excited source.

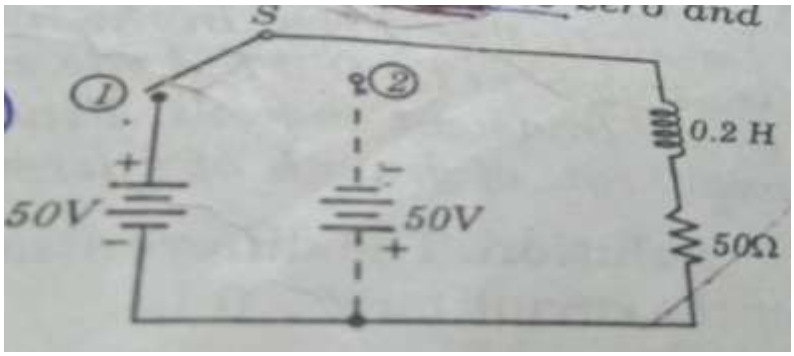
2 Derive the Transient current for RC circuit with DC Excited Source.

3 Derive the Transient current for RLC circuit with DC Excited Source.

4 State and Prove Initial Value and Final Value Theorem

5 "In the Series circuit , the switch is closed on position 1 at t=0. At t=1 milli second, the switch is

moved to position 2 .Obtain the Equation for the current in both the intravals and draw transient current curve."



UNIT II

PART A

1 What is Resonance Frequency

2 Define Series Resonance

3 What are the Applications of Series Resonance

4 Define Quality Factor

5 Define Bandwidth of Resonant circuit.

6 Define Half Power Frequencies?

7 State Self Inductance

8 Define Mutual Inductance

9 Define Co-efficient of Coupling

10 State Dot Convention

11 What are the Applicatons of Resonance?

12 Which is Referred as Acceptor and Rejector Circuit.

13 "Two coils are connected in series have an equivalent inductance of 0.6 H when connected in aiding, and an

equivalent inductance of 0.3 H when the connection in opposing. Calculate t mutual inductance of the coil."

14 State the Expression for Equivalent Inductance of Two coils in Series with Series Aiding and Series Opposing.

15 State the Expression for Equivalent inductance of Two coils in parallel with Parallel Aiding and parallel opposing.

PART B

1 Plot the Variation of reactance with frequency.

2 What are the Properties of Co-efficient of Coupling.

3 "A series RLC circuit with R=100Ω, L=0.5H and C=40μF has an applied Voltage of 50 V with Variable Frequency.

Calculate i) Resonance Frequency ii) Current at Resonance iii) Voltage across R, L, and C.

iv) upper and Lower Frequencies v) Bandwidth vi) Quality Factor of the Circuit."

4 "Two Coupled Coils with L1= 0.02 H, L2=0.01 H and K=0.5 are connected in four different ways,

series aiding,Series opposing and Parallel with both arrangements of the winding Sense. What are the four equivalent Inductance .

"

5 Comparison Between Series resonance and Parallel resonance.

6 "A series RLC circuit consists of 50 ohm resistance, 0.2 H inductance and 10 μF capacitance with

applied voltage of 20V. Determine resonant Frequency. Find the Q factor of the circuit.

Compare lower and Upper Frequency limits and the bandwidth of th circuits."

PART C

1 Explain in brief the concept of Mutual Inductance with Co-efficient of Coupling.

2 Explain with Neat Circuit Diagram of dot Convention analysis of coupled circuits.

3 Derive th Expression of Parallel RLC Resonance circuit for both Ideal and Practical Circuit.

4 "Derive the Expression of Lower cutoff Frequency, Higher Cutoff Frequency, Resonant Frequency,

Bandwidth , Quality Factor in series RLC Circuit."

5 Explain the series resonance in RLC circuit with necessary condition.

UNIT III

PART A

1 Write Short Notes on Transistor as an amplifier?

2 Define Quisent point And Load Line?

3 State Current Gain

4 State Voltage Gain?

5 Define Input impedence?

6 Define Output Admittance?

7 Define Cascode Amplifier?

8 State the Function of Differential amplifier?

9 Define Common mode Rejection Ratio?

10 State Various Features of Differential Amplifier?

11 Define Current Mirror?

12 What are the advantages of Current mirror circuit?

13 What are the Four Configuration of Differential Amplifier?

14 Define multistage amplifier.

15 What are the characteristics of tuned amplifier?

16 What is Darlington transistor?

17 State single tuned amplifier.

18 State Double Tuned amplifier

19 What is the need for cascading?

PART B 1 Explain the Working Principle of Common Emitter Amplifier.

2 Explain the Working Principle of Common Base Amplifier.

3 Explain the Working Principle of Common Collector Amplifier.

4 Draw the AC equivalent circuit of CB, CE,CC amplifier using Hybrid model

5 Comparison of Push pull and Complementary symmetry circuits.

5 Explain the differential mode operation of transistorised differential amplifier.

6 Explain the common mode operation of transistorised differential amplifier.

7 Draw the Various configuration of Differential amplifier .

8 Derive the Expression of Differential Gain Ad.

9 Derive the Expression of Common mode gain Ac.

10 Explain the Concept of large signal amplifier.

PART C 1 "Derive the Expression for Ai, Av, Zi, and R0 of a transistor amplifier interms of h-

Parameters

"

2 Discuss the operation of Emitter Coupled Differential amplifier with Neat Diagram.

3 Draw and Explain the Various Configuration of Differential amplifier

4 Draw the Circuit of push pull class B power amplifier coupled using transformer and explain the operation.

5 Explain the operation of Cascode Amplier

6 Explain the single and double tuned amplifier

Explain Harmonic Distortion and obtain its waveform.

UNIT IV

PART A 1 Define Feedback.

2 Draw the Block diagram of an amplifier with feedback.

3 Define the term negative feedback in amplifier.

4 What are the Types of Negative Feedback?

5 Define the Term Positive feedback in amplifier.

6 Define Voltage series feedback.

7 Define Voltage shunt feedback.

8 What are the disadvantages of negative feedback?

9 Define Current series feedback

10 Define Current shunt feedback

11 Illustrate Harmonic Oscillator.

12 Draw the Block diagram of oscillator.

13 What are the advantages of introducing Negative Feedback?

14 Draw the Equivalent Circuit of crystal Oscillators?

15 State Nyquiest Stability criteria.

16 List out the Properties of Negative Feedback amplifier?

17 Give the Effect of negative feedback on amplifier characteristics.

18 Write the expression of input and output resistance of current shunt feedback amplifier

19 Write the Expression of Input and output resistance of voltage shunt feedback amplifier.

PART B

1 Compare the Various types of RC Oscillators.

2 Explain The Concept of feedback

3 Explain the Main Difference between an amplifier and oscillators.

4 Draw the block Diagram of Voltage Series and Voltage Shunt Feedback.

5 Draw the Block Diagram of Current Series and current shunt feedback.

6 Compare negative feedback and Positive feedback.

PART C

1. Draw the Circuit of Hartley oscillator and explain its working.

2. Draw the circuit of Cristal oscillator and explain its working.

3. Explain the Operation of Colpitt's Oscillator and Obtain the Expression for the Frequency of Oscillation.

4. With a Circuit diagram, Explain the operation of Opam based Wein bridge oscillator.

5. Explain the types of negative feedback connections.

6. Explain the working principle of weinbridge oscillator

UNIT V

PART A

1. Define clipper?

2. Define clamper?

3. State multivibrator?

4. What are the types of multivibrator?

5. Define Schmitt triggers?

6. How a Schmitt Trigger different from the multivibrator.

7. What are applications of Astable multivibrators.

8. What are applications of Schimitt triggers.

9. List the applications of Monostablemultivibrators.

10. State “Lower” and “upper” Threshold voltages in the Schmitt trigger.

11. List the application of bistable multivibrators.

12. Define Rise time, Fall time and Delay Time.

13. What is saw tooth oscillators.

14. Illustrate Inductor Filter

15. Illustrate Capacitor Filter.

16. Draw the block diagram of Series voltage Regulator.

17. Write the basic concept of SMPS?

18. How Shunt Regulator is differentiated from series regulator.

19. Mention the advantages of Switched mode Power Supply.

20. Define Voltage Regulator

PART B

1 Differentiate Positive clipper and Negative clipper.

2 Differentiate positive clamper and Negative clamper.

3 Obtain the waveform, Explain Rise time, fall time, Delay time, and Storage time.

4 Why is triggering needed for multivibrator.

5 Comparison of Shunt and series Regulator.

6 Mention the advantages of Switched mode Power supply?

7 Comparison of Rectifier and Regulator

8 Explain the needs of switched Mode power supply.

9 sketch and explain the block schemetic of regulated power supply.

10 Compare Capacitor input filter with choke input filter

11 Compare the Types of Multivibrators.

12 Explain the Characteristics of UJT sawtooth relaxation oscillator,

13 Explain the need of filters in Power supply.

PART C

1 Draw the Schmitt trigger circuits and explain with waveform.

2 "Draw the block diagram of Switched mode power supply and explain its operation

"

3 Explain the Working principle of series voltage regulator.

4 "What is clipper? With the help of circuit diagram and waveform describe the operation of positive

and negative clipper.

"

5 With Circuit Diagram and Waveforms explain the operation of a transistor based bistable Multivibrator.

6 With a Capacitor Filter , Explain the working of a Half wave rectifier and obtain its Ripple Factor.