

Geethanjali College of Engineering and Technology, Hyderabad (Autonomous)
II B.Tech. (ECE) I Semester I Mid-Term Examinations, November-2023

CIRCUIT THEORY

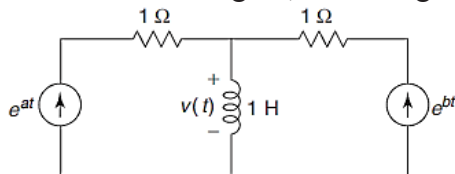
Time: 20 Min**Max. Marks: 10M**

Answer All Questions. All Questions Carry Equal Marks.

CO1	CO2
5 M	5 M

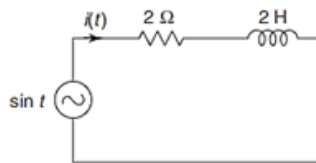
I. Choose the correct answer.

1. In the circuit of Figure, the voltage $v(t)$ across the inductor is _____volts []



- A $e^{at} + e^{bt}$ B $e^{at} - e^{bt}$
C $e^{at} X e^{bt}$ D e^{at}/e^{bt}

2. Loop equation of the circuit shown below is _____ [1]



- A $Sint = i(t) + \frac{di(t)}{dt}$ B $2Sint = i(t) + \frac{di(t)}{dt}$
C $\frac{1}{2}Sint = i(t) + \frac{di(t)}{dt}$ D $\frac{1}{2}Sint = i(t) - \frac{di(t)}{dt}$

3. A voltage of $v(t)$ volts is available across an inductance of L Haeners. The current through the inductor $i(t)$ is _____ amperes. []

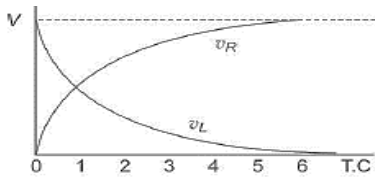
- A $L \frac{dv(t)}{dt}$ B $\frac{1}{L} \frac{dv(t)}{dt}$

C $L \int v(t) dt$ D $\frac{1}{L} \int v(t) dt$

4. A current of $i(t)$ amperes is flowing through a capacitor of C Farads. The voltage across this [] capacitor $v(t)$ is _____ volts

- A $C \frac{di(t)}{dt}$ B $\frac{1}{C} \frac{di(t)}{dt}$
 C $C \int i(t) dt$ D $\frac{1}{C} \int i(t) dt$

5. An RL network is excited by a DC signal of V volts. The response of this system is shown below. []
The system is a _____ circuit. V_R and V_L are voltage across resistor and inductor respectively.



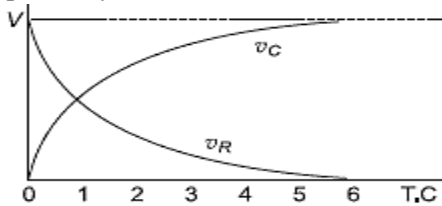
A Series RC

B Series RL

C Parallel RC

D Parallel RL

6. An RC network is excited by a DC signal of V volts. The response of this system is shown below. []
The system is a _____ circuit. V_R and V_C are voltage across resistor and capacitor respectively.



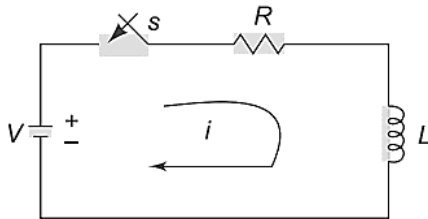
A Series RC

B Series RL

C Parallel RC

D Parallel RL

7. Time constant of the circuit shown below is _____ Seconds []



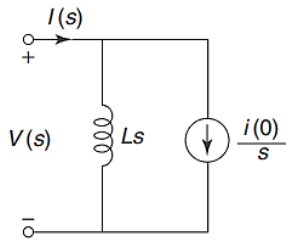
A $\frac{L}{R}$

B $\frac{R}{L}$

C LR

D $L + R$

8. _____ mathematical expression represents the network shown below. []



A $I(S) = \frac{1}{LS}V(S) + \frac{i(0)}{S}$

B $I(S) = \frac{1}{LS}V(S) - \frac{i(0)}{S}$

C $I(S) = \frac{1}{LS}V(S) + \frac{i(0)}{2S}$

D $I(S) = \frac{1}{LS}V(S) - \frac{i(0)}{2S}$

9. A capacitor having a capacitance 2 mF is charged to a voltage of 1000 V. The stored energy in joules is _____ []

A 1

B 2

C 3

D 4

10. In a series RL circuit, the voltage across the resistor is _____ for DC input of V volts []

A 0 volts always

B V volts always

C Rises exponentially

D Decays exponentially

Fill in the Blanks.

11. When a D.C signal is applied to an inductor, it behaves as _____
12. The immediate behavior of the voltage or current when it is changed from one state to another is called _____ state.
13. The response of a RL network is given by a linear differential equation. The particular integral of the solution refers to _____ response.
14. Units of $\frac{dv}{dt}$ are _____. Where v is the voltage and t is the time.
15. The differential equation of circuit is $12i + 1.5\frac{di}{dt} + \frac{1}{0.01}\int i dt = 10$. Its s domain equivalence is _____
16. The passive element inductor does not allow sudden changes in _____
17. The current response of a series RL circuit at one time constant reaches to _____ percent of its initial value.
18. The impedance offered by a capacitor of C Farads when a DC input signal is applied is _____ Ω
19. A series *RL circuit* is excited by an impulse of $\delta(t)$ volts at $t = 0$. The loop current is _____ Amps
20. Laplace transform of a unit impulse function is _____ .