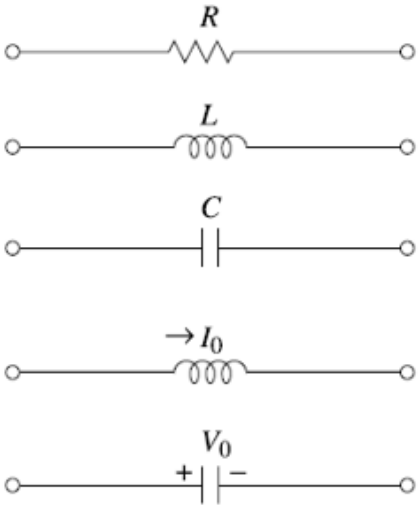
Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

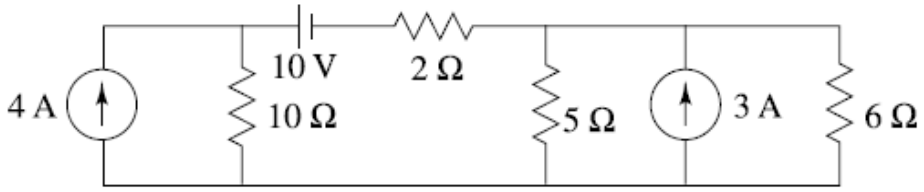
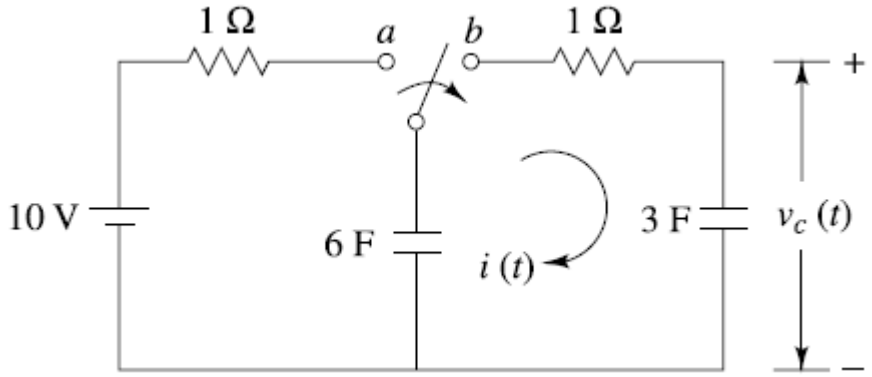
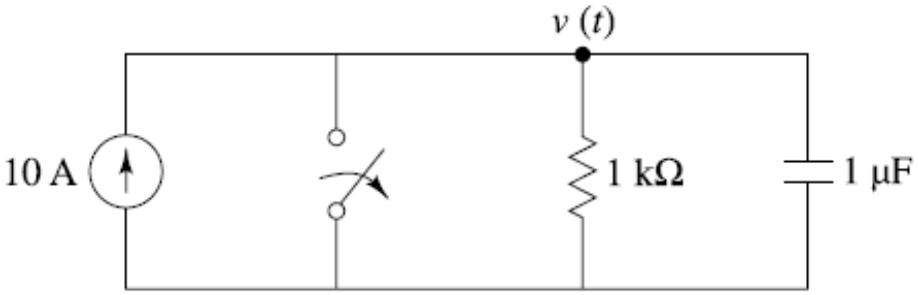
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

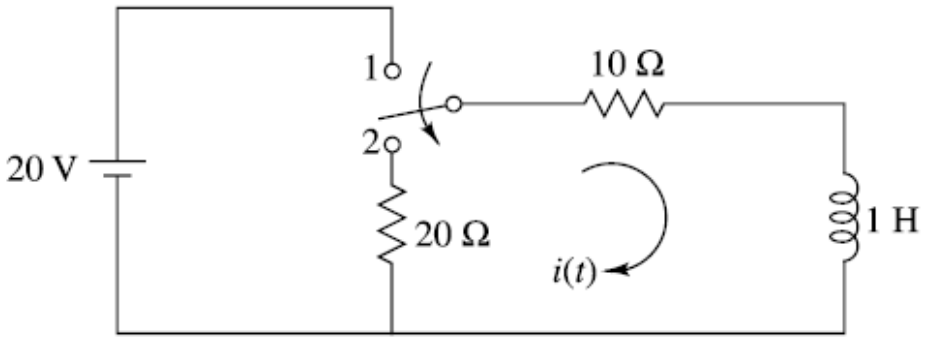
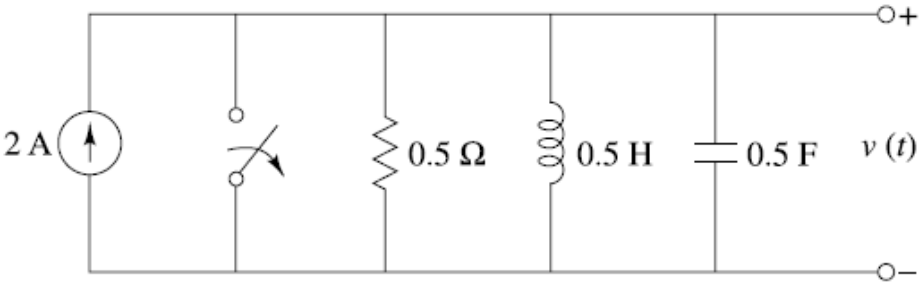
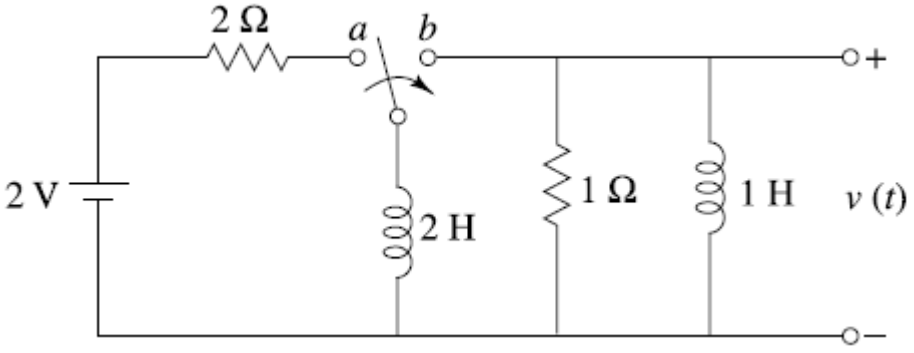
Course: Electrical Circuit Analysis **Semester: III**
Program: B.Tech (EE) **Time: 03 hrs.**
Course Code: EPEG2009 **Max. Marks: 100**

Instructions: Read the instructions provided for every question properly before attempting the answer. Use of calculator is permitted.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain with suitable diagram the two Kirchhoff's Law.	**4**	**CO1**
Q 2	Evaluate the Laplace transform of: (a) u(t) = 1 t > 0 u(t) = 0 t < 0 (b) r(t) = t t > 0 r(t) = 0 t < 0	**4**	**CO4**
Q 3	Test results for a two-port network are (a) $I_1 = 0.1\angle 0°$ A, $V_1 = 5.2\angle 50°$ V, $V_2 = 4.1\angle -25°$ V with Port 2 open circuited (b) $I_2 = 0.1\angle 0°$A, $V_1 = 3.1\angle -80°$ V, $V_2 = 4.2\angle 60°$ V, with Port 1 open circuited. Find Z parameters.	**4**	**CO5**
Q 4	Draw the equivalent circuit at $t = 0^+$ of the elements with initial conditions as given below: 	**4**	**CO2**

Q 5	Explain the advantages of a three-phase system.	**4**	**CO3**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Find the current through the 6Ω resistor using superposition theorem. 	**10**	**CO1**
Q 7	Explain two-wattmeter method along with the phasor diagram and how it can be used to measure three-phase power.	**10**	**CO3**
Q 8	In the network of figure below, the switch is moved from a to b at t = 0. Determine i(t) and $v_c(t)$. 	**10**	**CO4**
Q 9	In the network shown in figure below, the switch is opened at t = 0. Solve for v, $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t=0^+$.  OR In the network shown in Figure below, the switch is changed from the position 1 to the position 2 at t = 0, steady condition having reached before switching. Find the values of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t=0^+$.	**10**	**CO2**

			
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Derive the expression of real, reactive and apparent power along with the phasor diagram (lagging power factor) of a three-phase balanced star connected load.	**20**	**CO3**
Q 11	The switch in figure below is opened at time t = 0. Determine the voltage v(t) for t > 0.  OR The network shown in figure below was initially in the steady state with the switch in the position a. At t = 0, the switch goes from a to b. Find an expression for voltage v (t) for t > 0. 	**20**	**CO4**