(Time: 3 Hours) **[Total Marks:80]**

N.B. **(1)** Question no.1 is compulsory.
(2) Attempt any three questions from Question No. 2 to 6
(3) Make any suitable assumption wherever required.

Q.1		Answer the following	
	(a)	Draw and explain re Model.	**5M**
	(b)	Explain Barkhausen criterion for sustained Oscillation.	**5M**
	(c)	Explain the construction and working of LED.	**5M**
	(d)	Explain why JFET is voltage controller device.	**5M**
Q.2	**(a)**	Explain the operation of full wave center tap rectifier with LC filter with the help of circuit diagram and waveform.	**10M**
	(b)	Explain single stage CE amplifier & Draw its Frequency Response.	**10M**
Q.3	**(a)**	What are the types of MOSFET. Explain their consrtruction & working.	**10M**
	(b)	Draw h parameter model for CE Amplifier and derive equations for Av,Ri.Ro,Ai	**10M**
		What are the types of MOSFET. Explain their construction & working.	
Q.4	**(a)**	Explain dual input unbalanced output BJT differential amplifier.	**10M**
	(b)	Explain in brief effect of negative feedback on input impedance, output impedance, band- width, voltage gain.	**10M**
Q.5	**(a)**	Explain the operation of Wien Bridge Oscillator with the help of suitable diagram.	**10M**
	(b)	Explain UJT as relaxation Oscillators. Find the frequency of Oscillator.	**10M**
Q.6		Write short note on following.	**20M**
	(a)	Thermal run away in transistors	
	(b)	Expression for Darlington pair	
	(c)	UJT Relaxation Oscillator	

****

Duration:- Three Hours **Total Marks : 80**

NOTE
1. Question No 1 is Compulsory.
2. Solve any three out of the remaining.
3. Figure to the right side indicates marks.
4. Assume the suitable data and mention the same if required

Q.1 a) Explain conventional and non-conventional energy sources [5]

b) Explain load curve and load duration curve. [5]

c) Draw layout of Gas power plant. [5]

d) Explain in brief, principle of solar PV system [5]

Q.2 a) Explain the operation of fluidized bed combustion process. [10]

b) Explain site selection of thermal power plant. [10]

Q.3 a) Describe operation of hydro power plant with layout. [10]

b) The run off data of a river at a particular site is given as below: [10]

Month	Mean Discharge in m^2/s	Month	Mean Discharge in m^2/s
Jan	200	July	1600
Feb	400	August	1200
March	600	Sept	2000
April	2400	Oct	1200
May	1200	Nov	800
June	1800	Dec	400

Draw Hydrograph, flow duration curve and power that can be developed.

Q.4 a) Explain PWR nuclear reactor. [10]

b) Explain operation of Diesel power plant with layout. [10]

Q.5 a) Explain operation of pumped storage plant. [10]

b) Explain operation of Vertical axis and Horizontal axis wind turbine [10]

Q.6 a) Explain principle of fuel cell. State classification of fuel cells. [10]

b) Describe operation of Solar pond with layout. [10]

Duration – 3 Hours **Total Marks: 80**

N.B.:- (1) Question No.**1** is compulsory.
(2) **Attempt** any **three** questions out of remaining **five** questions.
(3) Assume suitable data if necessary and justify the same.

Q 1. Answer the following questions. **20**
a) Explain voltage multiplier.
b) Explain measurement of speed by photovoltaic tachometer.
c) Write the difference between attraction and repulsion type moving iron instrument.
d) Write about piezoelectric transducer.

Q 2 a) Explain the construction and working of Weston type synchroscope. **10**
Q 2 b) Draw and explain working of successive approximation type digital voltmeter. **10**

Q 3 a) Explain the construction and working of Thermocouple. **10**
Q 3 b) Explain the construction and working of single phase electrodynamometer type power factor meter. **10**

Q 4 a) Explain the different types of torques required for operation of any indicating instruments. **10**
Q 4 b) Discuss the construction and working of moving coil instrument and derive the equation of torque. **10**

Q 5 a) Explain how D.C. potentiometer is used to calibrate the ammeter, voltmeter and wattmeter. **10**
Q 5 b) Explain the construction and working of Schering's bridge **10**

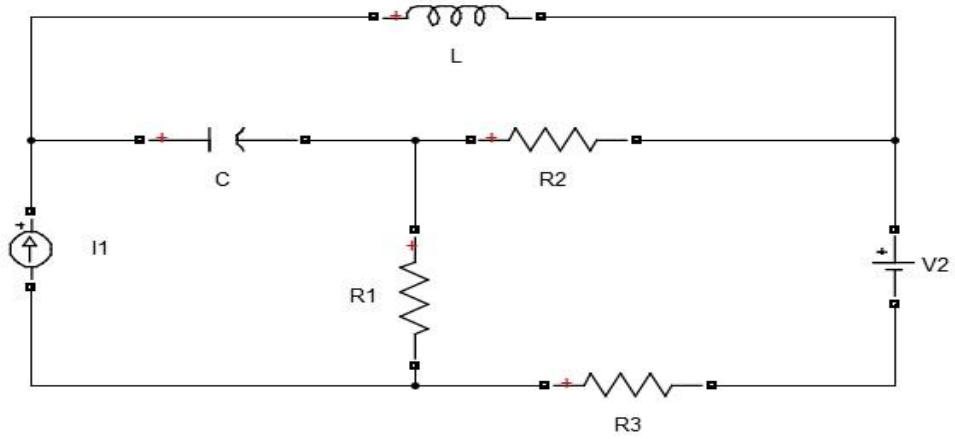
Q 6 a) Explain the construction and working principle of thermistor. **10**
Q 6 b) Explain how Hay's bridge can be used to measure value of unknown inductor. **10**

****

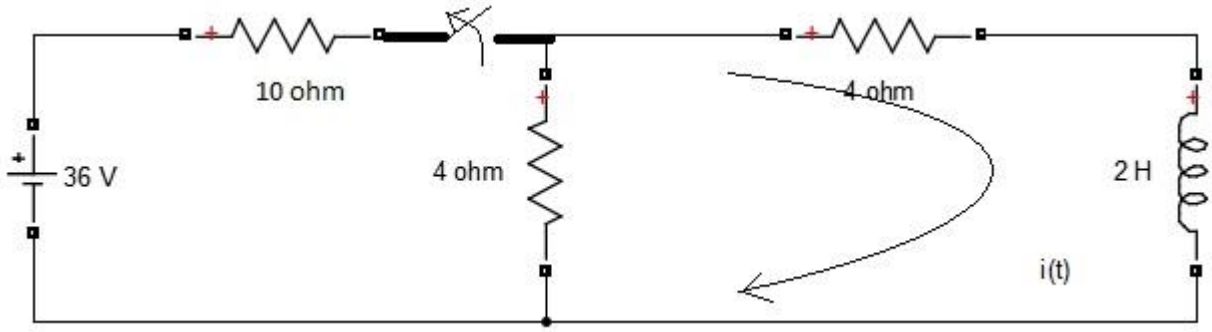
(3 HOURS) **TOTAL MARKS: 80**

N.B.: 1. Question 1 is compulsory
2. Solve any three questions from remaining five questions.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.

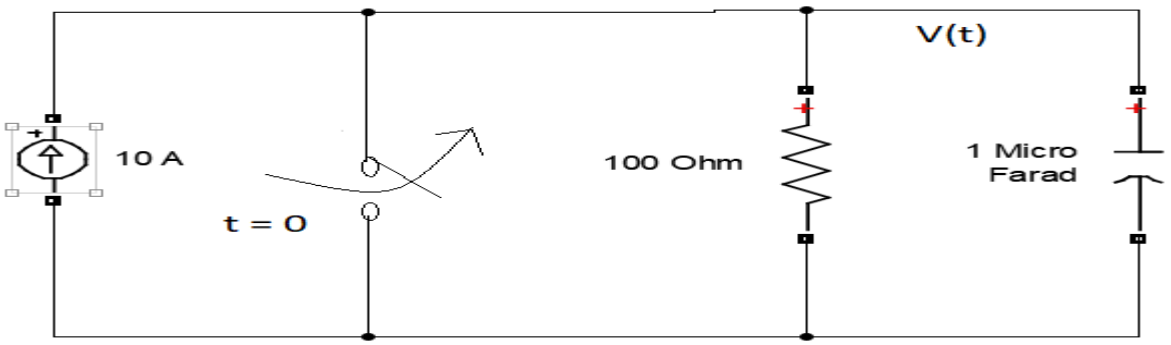
1. Attempt the following: 20
   1. Find condition of symmetry for z parameters.
   2. Define and differentiate with suitable examples: a) tree and cotree b) graph and oriented graph
   3. What are restrictions on pole and zero location for driving point function.
   4. State and explain reciprocity theorem.
2. A) For the given network draw an oriented graph and write f-cut set and f-tie set matrix. 10



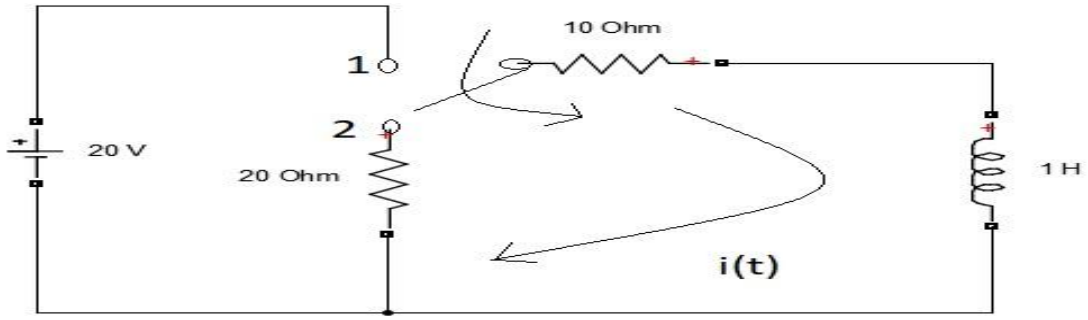
B) the network shown has acquired steady state with the switch closed for t > 0. At t=0, the switch is opened. Obtain i(t) for t>0. 10



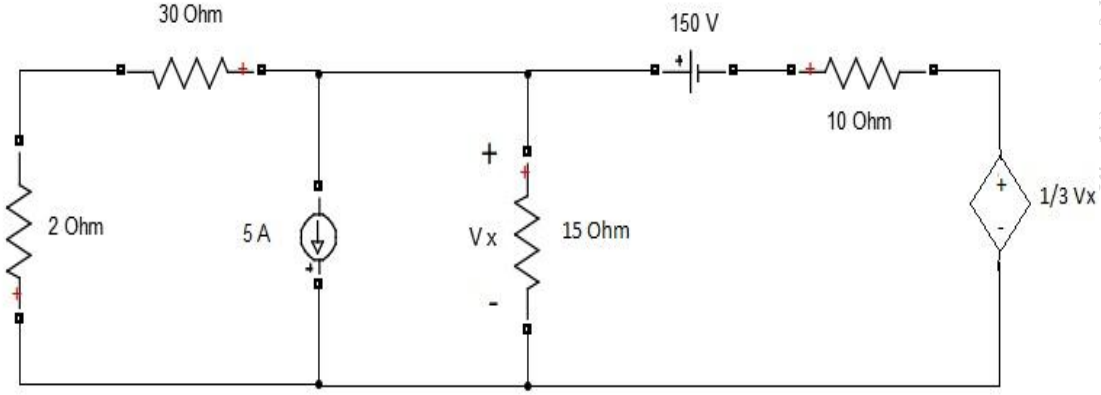
3. A) In the given circuit switch is opened at t = 0. Find the value of v, dv/dt, d^2v/dt^2 at $t = 0^+$. 10



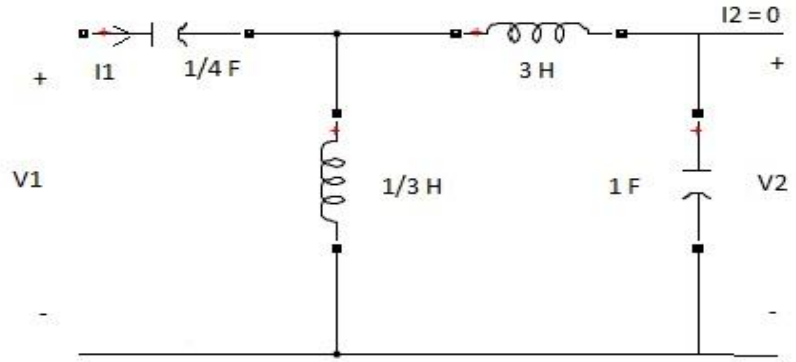
B) In the network shown in figure the switch is changed from position 1 to 2 at t = 0, steady state condition having reached before switching. Find the values of ***i, di/dt, d^2i/dt^2*** at $t = 0^+$. 10



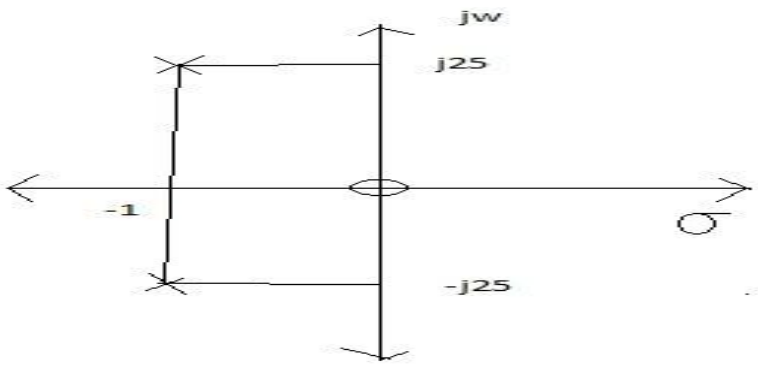
4. A) Find the current in 2 Ω resistance using Thevenin's theorem. 10



B) Find Z_{11} and G_{12} for the following circuit. 10



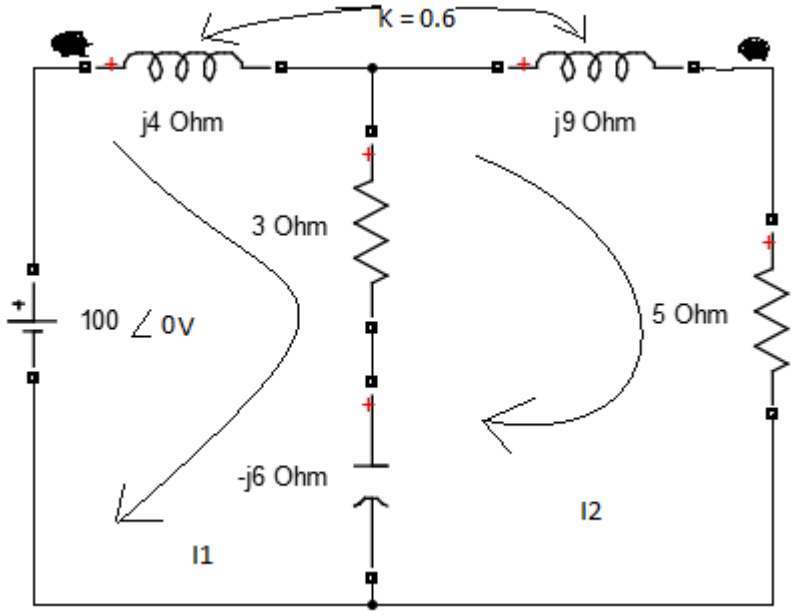
5. A) A series RLC circuit has a scale factor 5 for its driving point admittance and the p-z plot of the same as shown below. Find the values of R, L, C. 10



B) Realize Cauer I and Cauer II forms of following impedance function. 10

$$Z(s) = \frac{10s^4 + 12s^2 + 1}{2s^3 + 2s}$$

6. A) Calculate the mesh currents in given circuit. 10



B) 1. Write properties of positive real function. 05

2. Explain duality in network. 05