SE/Sem III CBSGS / ... Analysis & Synthesis

QP Code : 30748

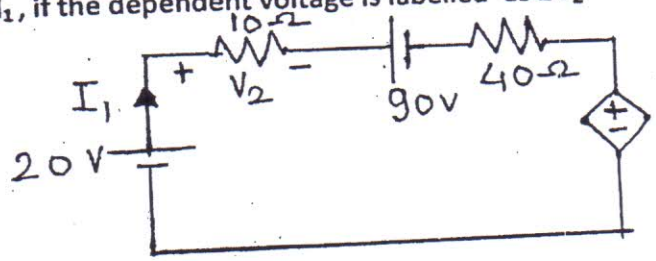
(3 Hours) [Total Marks : 80

Note: 1.Question no.1 is compulsory.

2. Solve any three from the remaining questions.

Q1. (20)

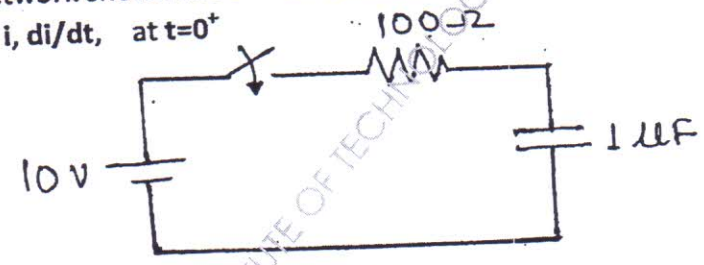
a) Find I_1, if the dependent voltage is labelled as $2V_2$



b) Draw oriented graph for the given incidence matrix

$$A = \begin{bmatrix} -1 & 1 & 0 & -1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$

c) In the network shown the switch is closed at t=0. With the capacitor uncharged, find value for i, di/dt, at $t=0^+$



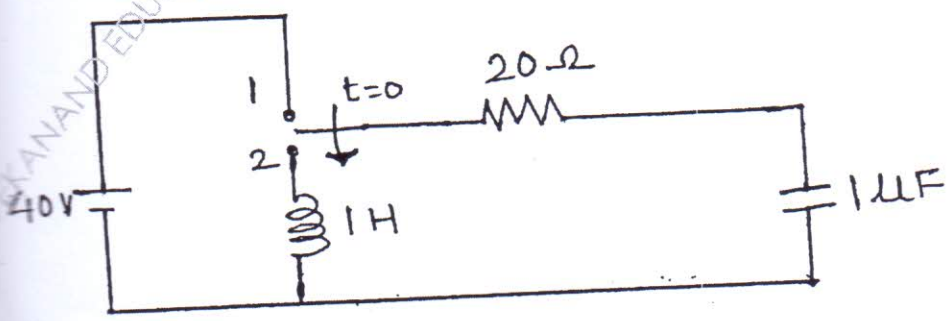
d) Test whether the polynomial is Hurwitz

1) $P(s)= s^6+ 3s^5+8s^4+15s^3+17s^2+12s+4$

2) $P(s)= s^8+ 5s^6+ 2s^4+ 3s^2+1$

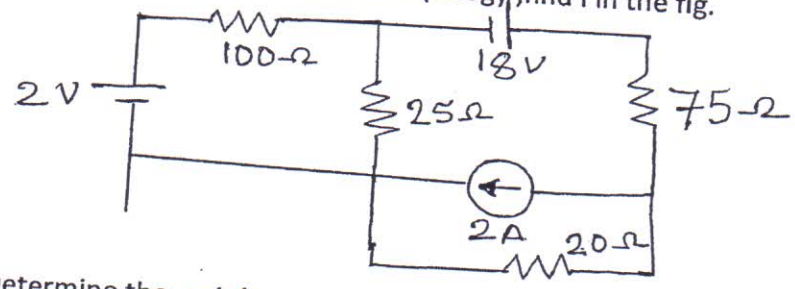
Q2.

a) In the network shown the switch is changed from position 1 to 2 at t=0. Steady state condition having reached before switching, find value for i, di/dt, & d^2i/dt^2 at $t=0^+$ (10)



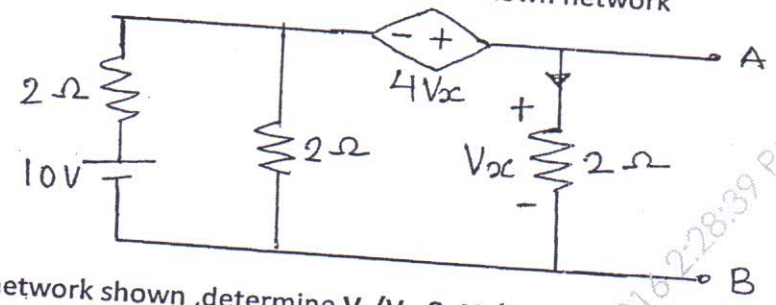
[TURN OVER

b) Using the principle of network topology, find I in the fig. (10)

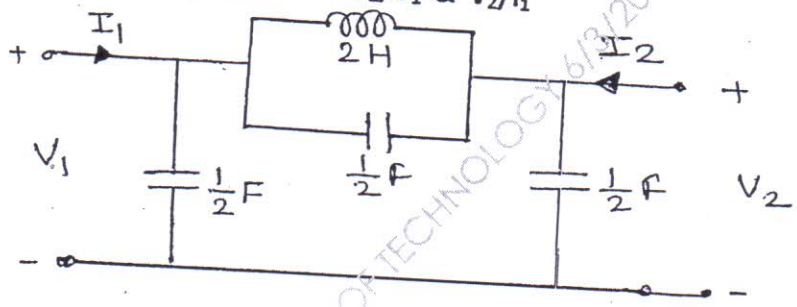


Q3.

a) Determine thevenin's equivalent ckt for the shown network (10)

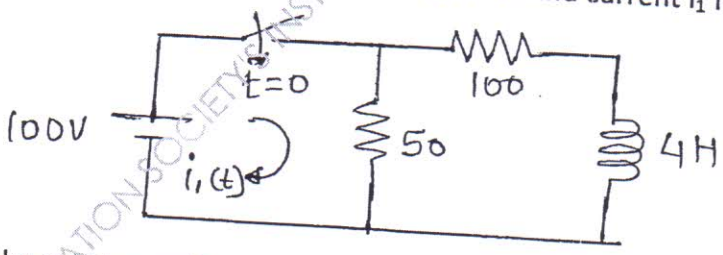


b) For the network shown, determine V_2/V_1 & V_2/I_1 (10)



Q4.

a) For the shown network, switch is closed at t=0. Find current i_1 for t>0 (10)

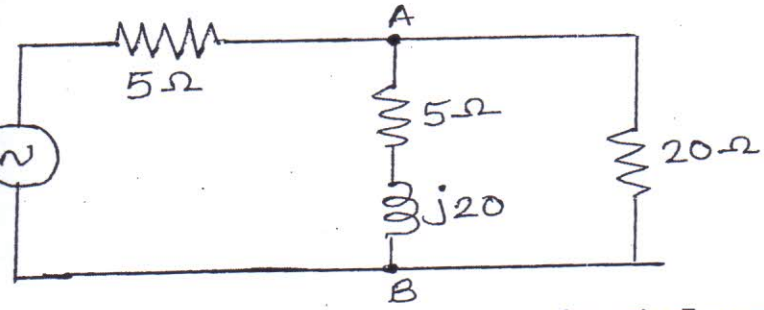


b) Check the positive realness of the given functions (10)

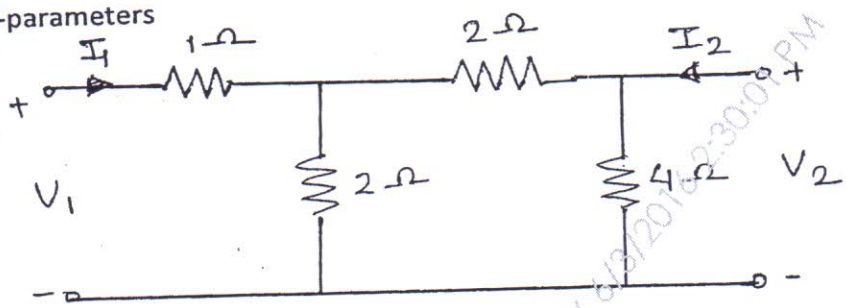
1) $F(s) = \dfrac{S^2+6s+5}{S2+9s+14}$

2) $F(s) = \dfrac{2s^3+2s^2+3s+2}{S^2+1}$

a) For the shown network, find voltage Vab (10)



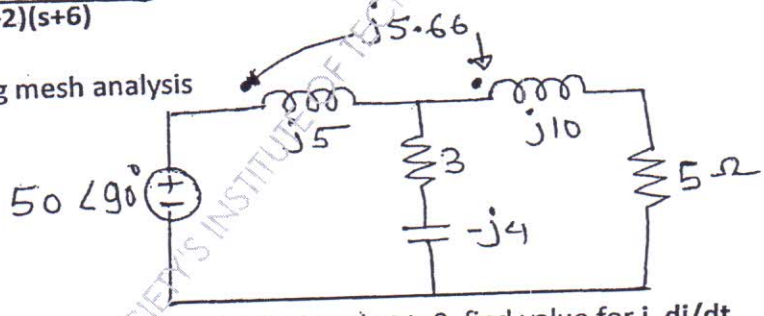
b) Determine Y parameters for the shown network. Also write Z-parameters from Y-parameters (10)



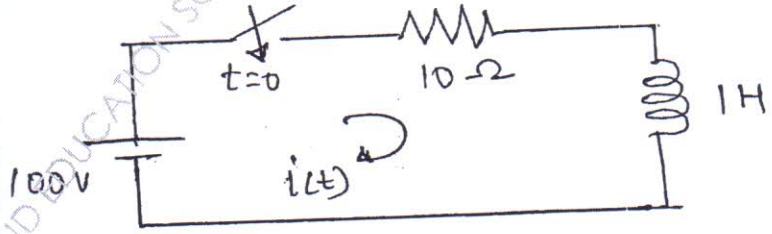
a) Synthesize the following RL function in Foster-I & Foster-II form (10)

$$Z(s) = \frac{2(s+1)(s+3)}{(s+2)(s+6)}$$

b) Find I1 using mesh analysis (5)



c) For the shown network ,switch is closed at t=0. find value for i, di/dt (5)



INST / SEM-III (CBSGS) / Analog Electronics / MAY-16

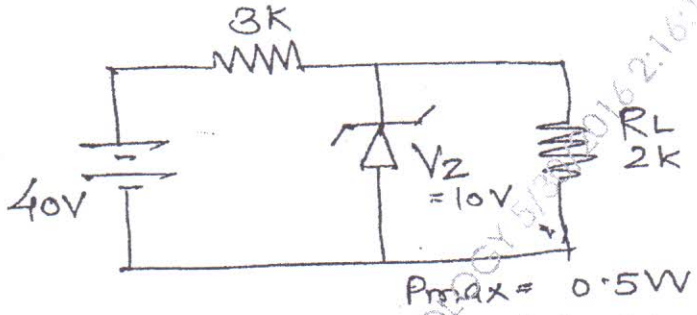
QP Code : 30705

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

(1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions from remaining **five** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume **suitable** data if **necessary**.

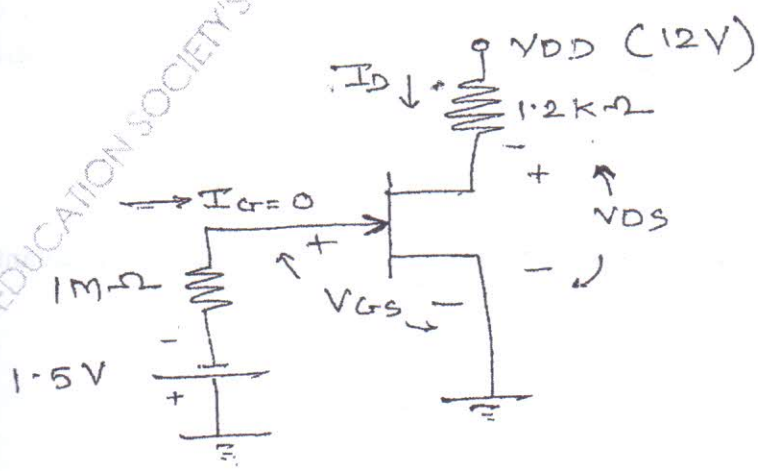
Attempt any **four** questions from the following :- **20**

(a) Derive the stability factor S(Ico) for fixed bias circuit.
(b) Calculate battery current I, I_Z and I_L in circuit



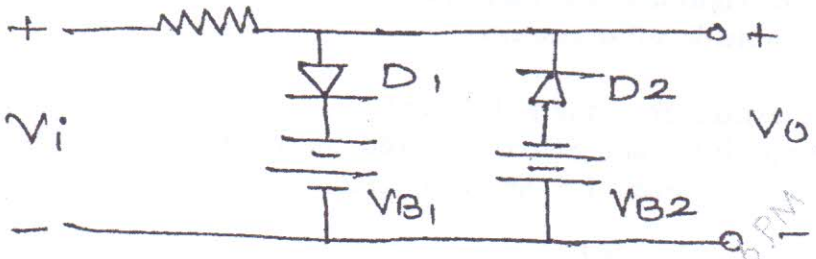
(c) How FET be employed as a voltage controlled resistor ?
(d) Explain OP-AMP as summing amplifier averaging amplifier.
(e) What are the ideal op-Amp characteristics?
(f) Define and explain harmonic distortion'.

(a) Determine I_{DQ} and V_{DSQ} for following fixed bias configuration. It is given that I_{DSS} = 12mA and V_P = -4V) **10**



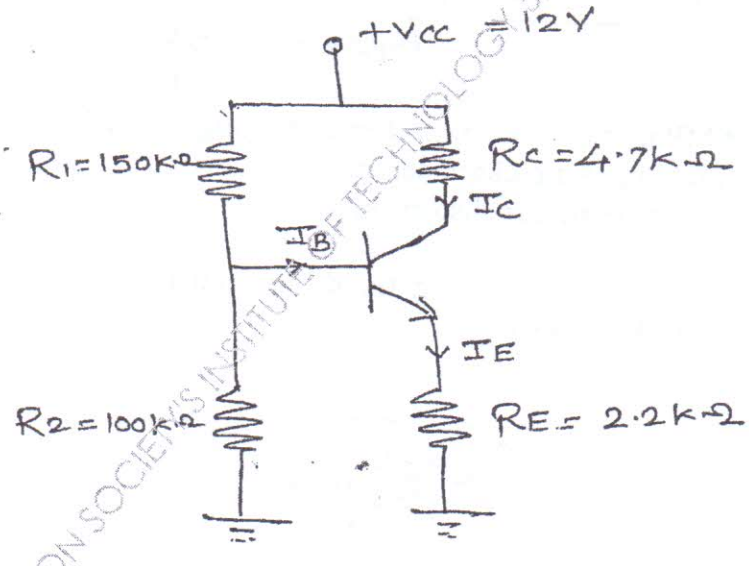
[TURN OVER

(b) Determine Output voltage. Assume, $V_{B1} = 8$ V, $V_{B2} = 6$V and input to be sine wave of 20V peak.



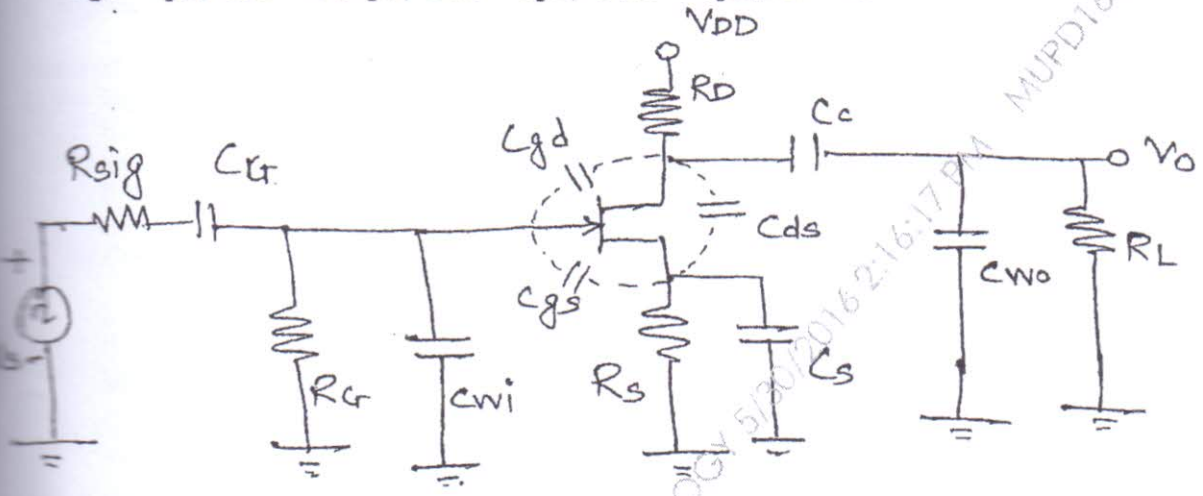
(c) Explain Low pass filter.

3. (a) For the circuit shown find the operating point co-ordinates. Given that $\beta = 50$, $V_{BE} = 0.7$V 1



(b) Derive equation for three op Amp Instrumentation amplifier. Give advantages and application of Instrumentation amplifier. 1

5 (a) Determine the higher cut off frequencies for the given circuit diagram. 10
Given $C_G = 0.01\mu F$, $C_C = 0.5\mu F$, $C_S = 2\mu F$, R_{SIG} 10K, $R_G = 1M$, $R_D = 4.7K$, $R_S = 1K$, $R_L = 2.2K$, $I_{DSS} = 8mA$. Vp = -4V, rd = ∞, $V_{DD} = 20V$, Cgd = 2pF, Cgs= 4pF, Cds = 0.5 pF, Cwi = 5pF, CWo = 6pF, Av = -3



(b) Write note on 'Transistor as Switch'. 10

(a) Explain with a neat diagram a transformer coupled audio power amplifier. 10
(b) Draw and explain wien bridge oscillator. 5
(c) What do you understand by thermal runaway? 5

(a) Draw and explain a series voltage regulator. 10
(b) Draw the circuits for integrator and differentiator. Derive the necessary equation. Draw the frequency response of these circuits. 10

Sem-III-(CBSGS) / INST / Digital Electronics / May-2016

QP Code : 30560

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

(1) Question No. **1** is compulsory.
(2) Attempt any **THREE** questions from remaining.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.

1. Answer the following:- [20]

(a) State and prove De Morgan's theorems.
(b) Implement 4:1 MUX using logic gates.
(c) Explain the difference between combinational and sequential circuits.
(d) Simplify the following expression using K Map.
$F = \sum (0,2,5,7,8,10,13,15)$

2. (a) Convert :- [10]

i. $(1010.101)_2$ to Decimal.
ii. $(1085)_{10}$ to Octal.
iii. $(1011)_2$ to Gray.
iv. $(34FB)_{16}$ to Binary.
v. $(177.1)_8$ to Binary.

(b) Perform: - [05]
i. Add $(9BDE)_{16}$ and $(ABCD)_{16}$
ii Divide 110110 by 101

(c) Compare demultiplexer and decoder. [05]

3. (a) Prove the following using Boolean algebra and draw the logic circuit. [10]
i. $(A+B)(A+\overline{B}) = A$
ii. $AB+\overline{A}C = AB+\overline{A}C+BC$

(b) Convert JK flip-flop to T flip-flop and D flip-flop. [10]

4. (a) Design 4 bit Binary to Gray code converter. [10]
(b) Implement full adder using logic gates. [10]

5. (a) Design a MOD 5 synchronous counter using JK flip flops. [10]
(b) What is Shift register? Explain the working of 4 bit bidirectional shift register. [10]

6. Write note on: - (any Four) [20]

(a) PAL and PLA, (b) ALU, (c) Priority Encoder, (d) ECL Family,

(e) Basic dynamic RAM Cell.

****

FW-Con. 9414-16.

TRANSDUCERS - I

MAY'11

QP Code : 30657

(3 Hours) [Total Marks : 80

N.B.: (1) Question No.1 is **compulsory.**
(2) Answer any **three** out of remaining **five** questions.
(3) Assume suitable data whenever required and state the assumptions.

1. Solve any **four** from the following 20
   (a) What do you mean by calibration? What is need of calibration?
   (b) Explain the principle of radiation type pyrometer.
   (c) Define transducer and state its classification.
   (d) Explain ultrasonic liquid level measurement.
   (e) Define metrology and write its significance.

2. (a) Explain static and dynamic characteristics of an instrument 10
   (b) Compare RTD, thermister and thermocouple. 10

3. (a) Explain use of potentiometer for displacement measurement 10
   (b) The output of a LVDT is connected to 5V voltmeter through an amplifier whose amplification factor is 250. An output of 2 mV appears across the terminals of L VDT when core moves through a distance of 0.5mm. Calculate sensitivity of the L VDT and that of the whole setup. The milivoltmeter scale has 100 divisions. The scale can read of 1/5 of division. Calculate the resolution of the instrument in mm. 10

4. (a) Draw and explain schematic block diagram of hair hygrometer 10
   (b) A platinum thermometer has a resistance of 100Ω at 25°C. 10
      (i) Find its resistance at 65°C, if the platinum has a resistance temperature coefficient of 0.00392/°C.
      (ii) If the thermometer has a resistance of 150Ω, calculate the temperature.

5. (a) Explain Air purge type level gauge with advantages and disadvantages. 10
   (b) Define error and explain types of error. 10

6. Write short notes on following topic. (Any **two**) 20
   (a) Optical pyrometer
   (b) Cold junction compensation
   (c) Limits and fits
