B.Tech 3rd Semester End-Term Examination, 2022

SUBJECT: NETWORK ANALYSIS

CODE: UEE03B12

Full Marks: 50

Time: 2 Hrs

Answer all questions

(5x2=10)
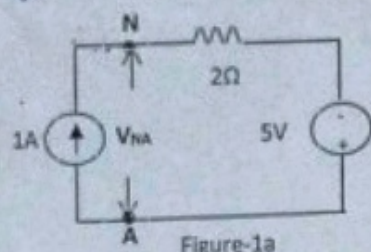
1.

a) Find V_{NA} in Fig-1a

Figure-1a

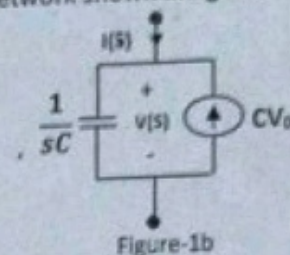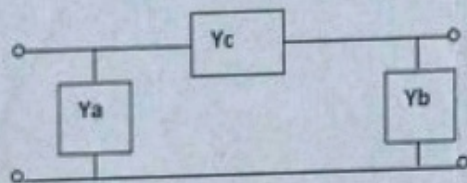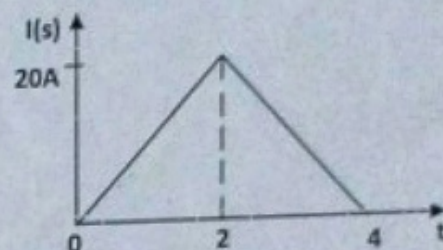b. Draw dual circuit of network shown in fig-1b

Figure-1b

Figure-1c

Figure-1d

c. If $Y_{11}=8\mho$, $Y_{12}=Y_{21}=-6\mho$ and $Y_{22}=10\mho$ of Fig-1c, then $Y_a=? \; Y_b=? \; \& \; Y_c=?$

d. The applied current in a 1H inductor is shown in, Fig-1d, sketch the waveform for voltage across inductor.

e. Network-A (N_a) is 3 terminal and network-B (N_b) is 4 terminal, connect them parallel by maintaining their own character.
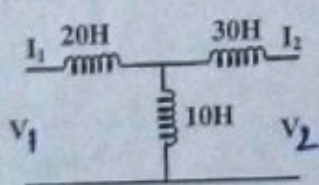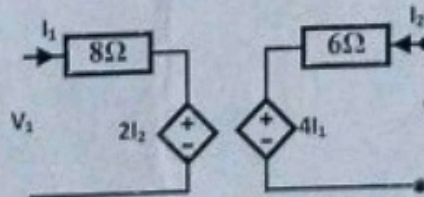

Figure-2a

Figure-2b
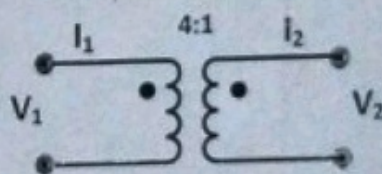

Figure-2c

(5X4=20)

2.

a. Obtain physical and mathematical π- network of the circuit shown in Fig-2a?

b. Draw inverse hybrid parameter equivalent circuit of network shown in Fig-2b.

c. Considering transmission parameter for the network of Fig. 2c, does it satisfied the reciprocity and symmetry condition? justify.
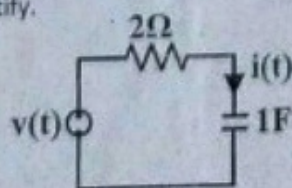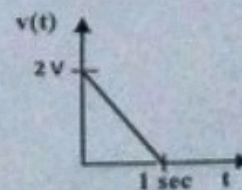

Fig. 2d

Fig. 2e

d. A series RC circuit of Fig. 2d is excited by a waveform shown in Fig. 2e, find current i(t).

3.

(10X2=20)

a.

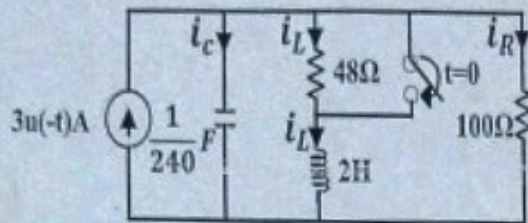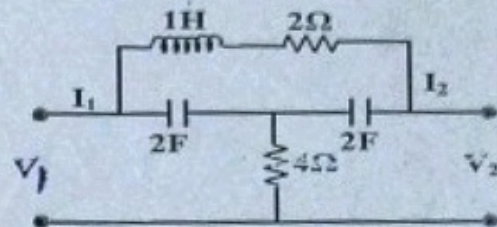i. Determine current $i_L(t)$ for the network shown in Fig. 3.

Fig. 3

Fig. 4

ii. Determine [Y] parameter for the network shown in Fig. 4.

(5+5)

b.

i. Define co-efficient of coupling (k) and indicates its value. Write the properties of 'incidence matrix'.

ii. For the coupled network shown in Fig. 5, find voltage V₃(t), if mutual inductance M is 1H.
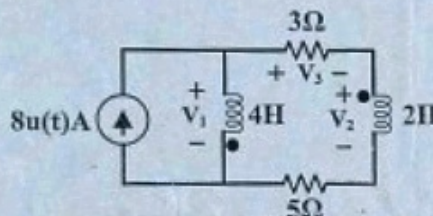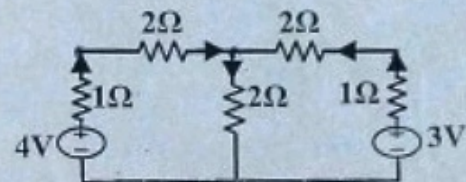
Fig. 5

Fig. 6

iii. For the network shown in Fig. 6, write down the tie-set matrix and obtain the equilibrium equation in matrix form using KVL. Calculate loop currents and branch voltages.

iv. Determine the cut-off frequency and the nominal impedance of each of the low-pass filter section shown in Fig. 7a and 7b.
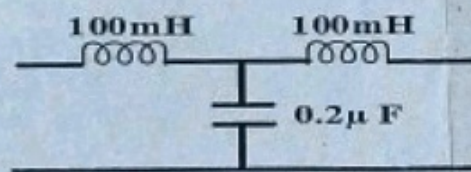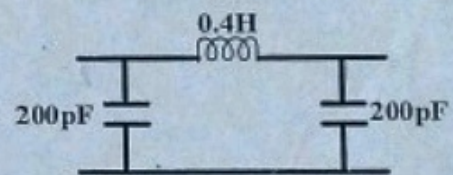
$(2+3+2^1/_2+2^1/_2)$

Fig. 7a

Fig. 7b

2