**Elmansoura University**
**Faculty Of Engineering**
**Electronics and Comm. Engineering Dept.**

**Linear systems & Networks.**
**2$^{nd}$ year**    June 2012
**Time 3 Hours**

**Attempt the following.**

1-For the circuit in Fig.1, the switch was closed for a long time and is opened at t=0, Find $v_{(t)}$.   (12)

2- For the circuit in Fig 2 , (i) derive an expression for the transfer function $V_o/V_{in}$ ,
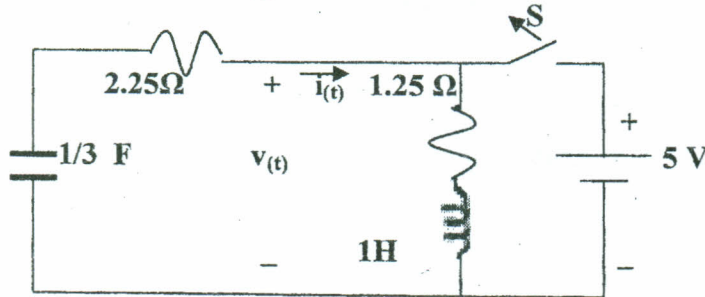(ii) Specify the type of filter and find the cutoff frequency (iii) plot the bode diagram    (15)
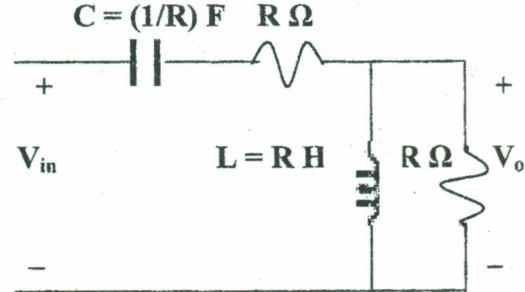


Fig 1          Fig 2

3- Write the matrix state equation for the circuit shown in Fig. 1, and hence find $i_{(t)}$    (10)

4- Determine the hybrid Parameters of the two-port shown in Fig.3. Find the two image impedances of the circuit    (15)

5- Find the impedance parameters for the two-port shown in Fig.4    (10)

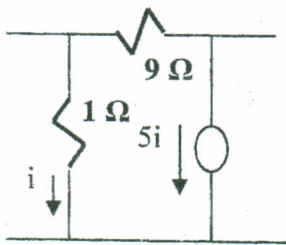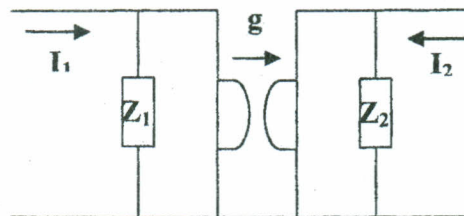6- Find the input impedance between A and B for the circuit shown in Fig.5    (10)
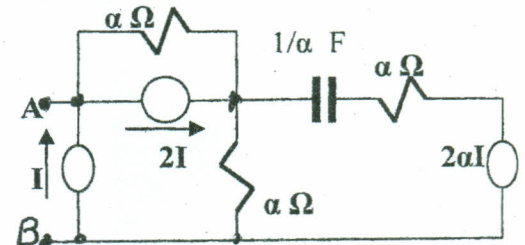


Fig.3.          Fig.4          Fig.5

7- Write the current and voltage relations of a (INIC) which makes $Z_{in} = -4Z_L$. Determine it's scatterting parameters whem terminated by two equal resistances of 1 Ω each.    (10)

8- Each transistor in fig.6 has a common emitter Y parameters given by $Y_{ie}$, $Y_{re}$, $Y_{fe}$ and $Y_{oe}$. Find an expression for $\dfrac{V_o}{V_{in}}$   (15)

9-In the circuit of Fig. 7 show that the impedance between the input terminals is equivalent to that of a capacitor of Capacitance $= \left(1 + \dfrac{R_2}{R_1}C\right) F$   (15)
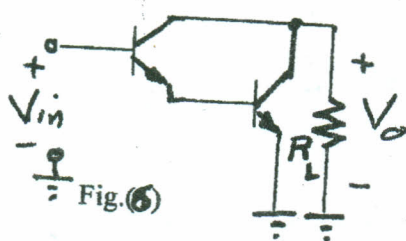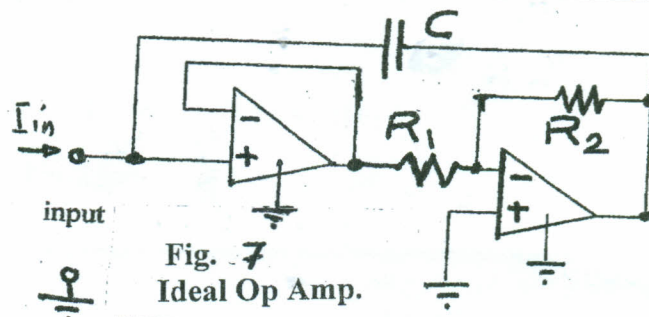


Fig.(6)          Fig. 7
Ideal Op Amp.

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2$^{nd}$ Year Communications
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من فضلك أجب عن جميع الأسئلة مع إعادة رسم الدائرة في كراسة الإجابة.

Q.1 For the circuit shown in **Fig.1**: find the input impedance and give your comments?

Q.2 For the circuit shown in **Fig.2**: find the Y-parameters and then find the 2×2 Z-parameters.

Q.3 Write the state equation for the circuit shown in **Fig.3**?

Q.4 For the circuit shown in **Fig.4**, find $v_2(t)$ assume zero initial conditions.

Q.5 Compute the input impedance and transfer function of the circuit shown in **Fig.5**; network N has transmission parameters: $A=-y_4/y_3$, $B=C=0$ and $D=1$.

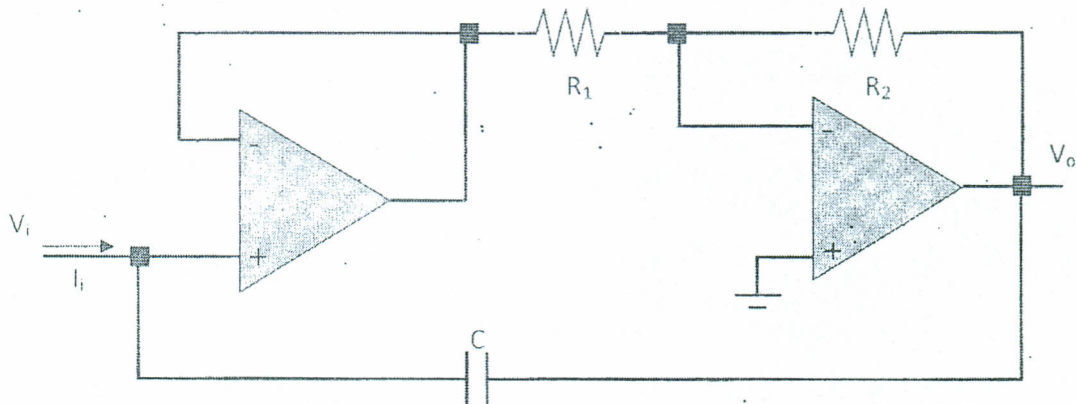Q.6 Find the Thevenin's equivalent of the circuit shown in **Fig.6**? Assume that the capacitor is uncharged.
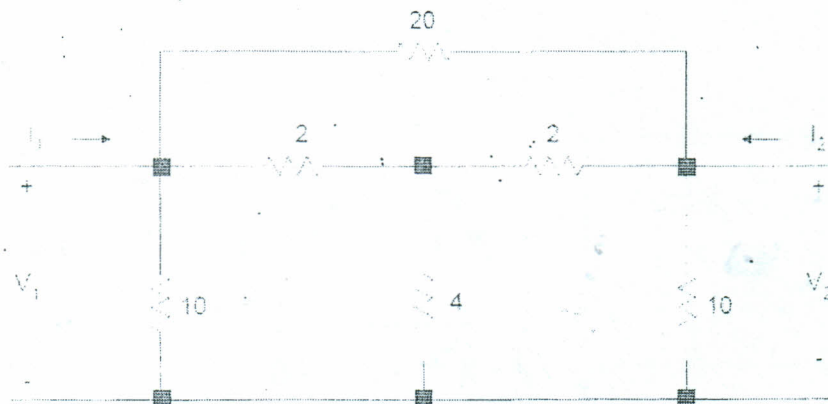


Fig.1



Fig.2

خاص بالطلاب من الخارج فقط

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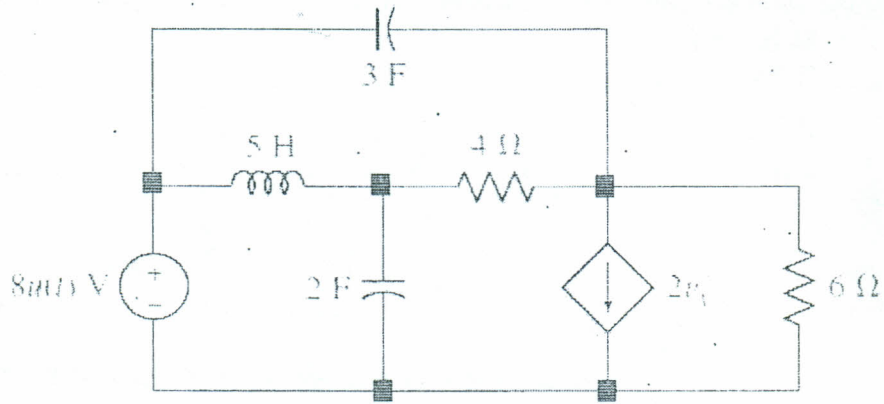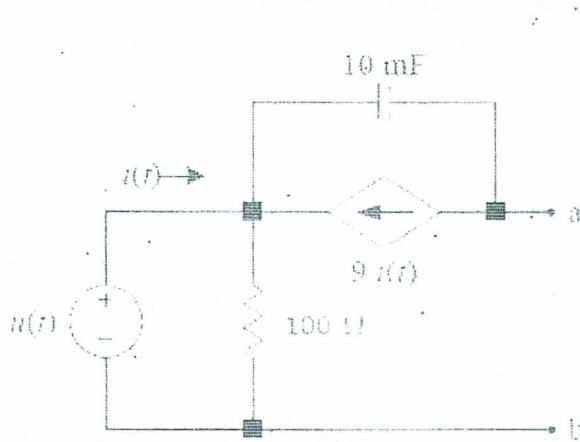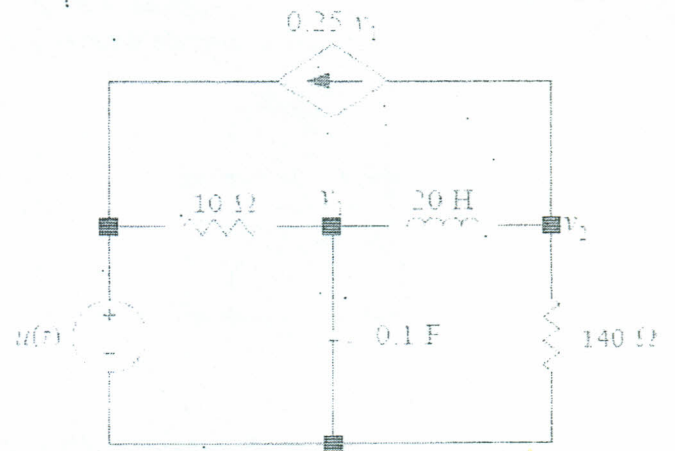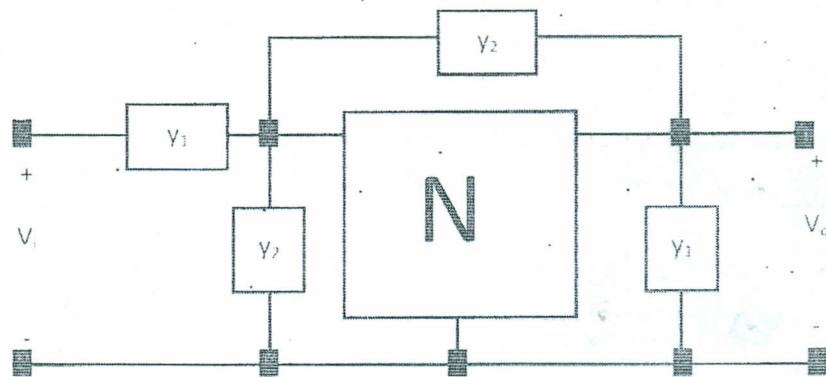2nd Year Communications
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Fig.3



Fig.6



Fig.4



Fig.5

Good Luck
Mohamed Abdel-Azim