Kafrelsheikh University
Faculty of Engineering
Electronics and Com. Branch
Subject: **Electronic Engineering**
Instructor: Dr. **Bedir B. Yousif**
Second year, First semester

Date: 14-1- 2019
Time allowed: **3 hours**
Full mark: **70 Mark**
Final term Exam: Two pages
Academic No.: ECE2102

- Books & notes are not allowed. * Any missing data could be reasonably assumed.
- **Course ILOS(مخرجات التعلم المستهدفة من مقرر الهندسة الالكترونية)**

Field	National Academic Reference Standards (NARS)			
	Knowledge & Understanding	**Intellectual Skills**	**Professional Skills**	**General Skills**
Academic standards that the course contribute in achieving it	**a3, a4,a5,a8 ,a14**	**b2, b6, b8, b16**	**c2,c3**	**d1,d7**

Solve all the following questions:-

Question One: (30 Mark) (a3,a4,b2,c2,d1)

a- Calculate V_o in the circuit of **Fig. 1.** (7 Mark)

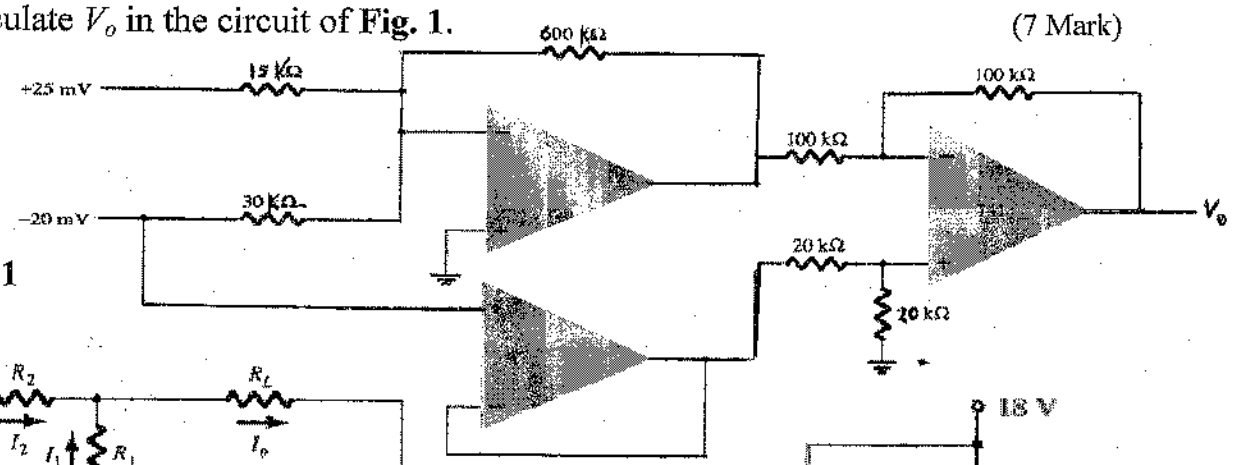

Fig. 1

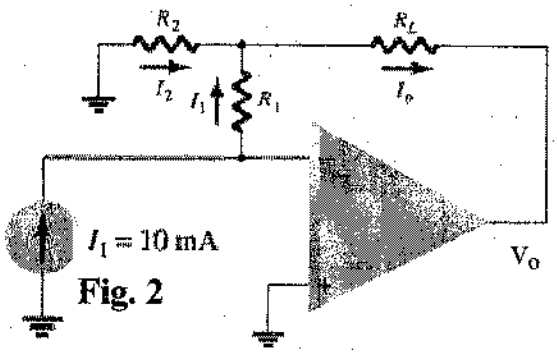

Fig. 2

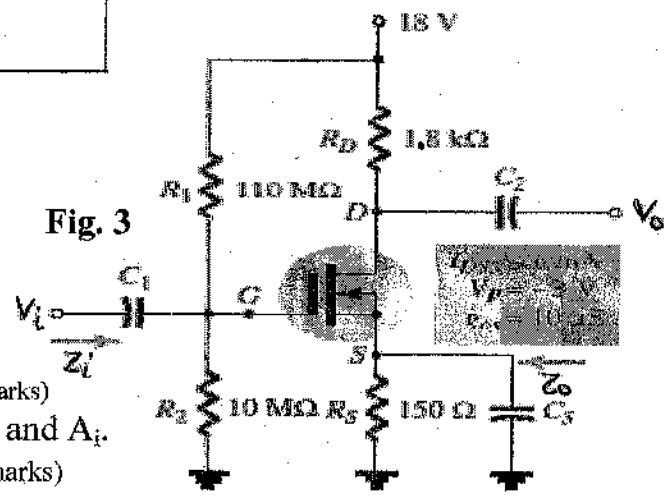

Fig. 3

b- Find V_o and I_o in the circuit of **Fig. 2.**
If $R_1 = 20$ kΩ, $R_2 = 2$ kΩ and $R_L = 4$ kΩ (7 Marks)

c. For the network of **Fig. 3**: Evaluate Z_i, Z_o, A_v and A_i. (8 marks)

d. For the voltage-divider bias configuration of **Fig. 4**, if $V_D = 12$ V , $V_{GSoff} = -3.78$ V and $I_{DSS} = 10$ mA, calculate the value of R_S. (8 marks)

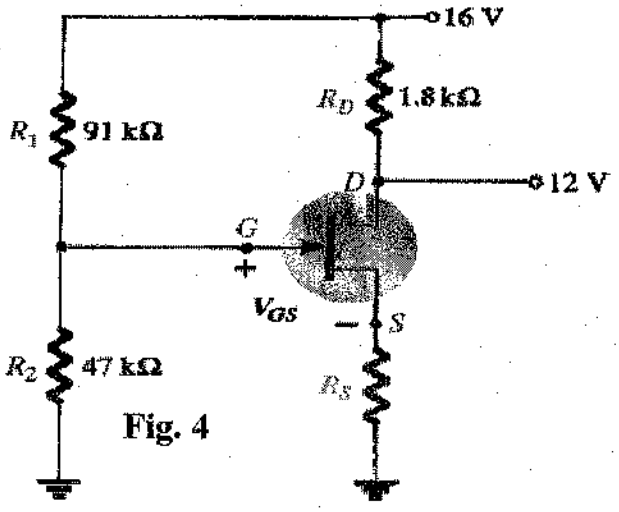

Fig. 4

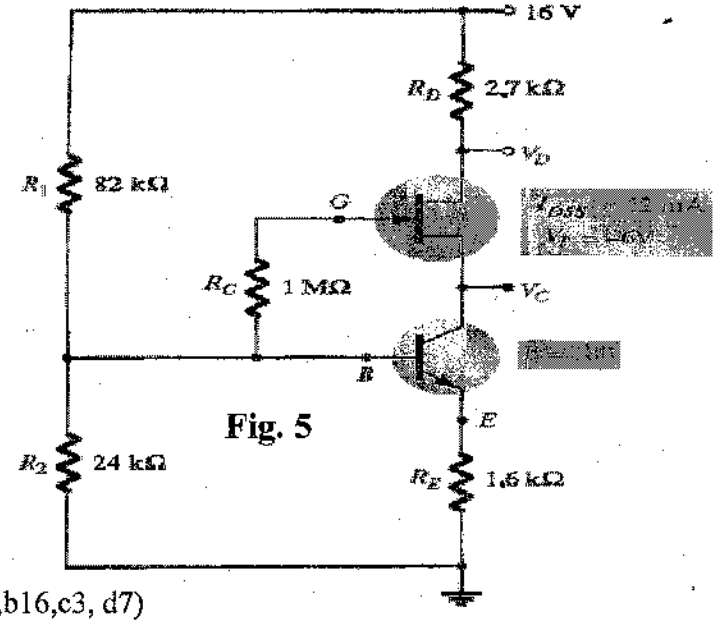

Fig. 5

Question Two: (40 Mark) (a5,a8,a14,b6,b8,b16,c3, d7)

a- Determine the levels of V_D and V_C for the network of Fig. 5 . (10 marks)

b- Choose the values of R_D and R_S for the network of Fig. 6 that will result in a gain of 8 using a relatively high level of g_m for this device defined at $V_{GSQ} = \frac{1}{4}V_P$. (10 marks)

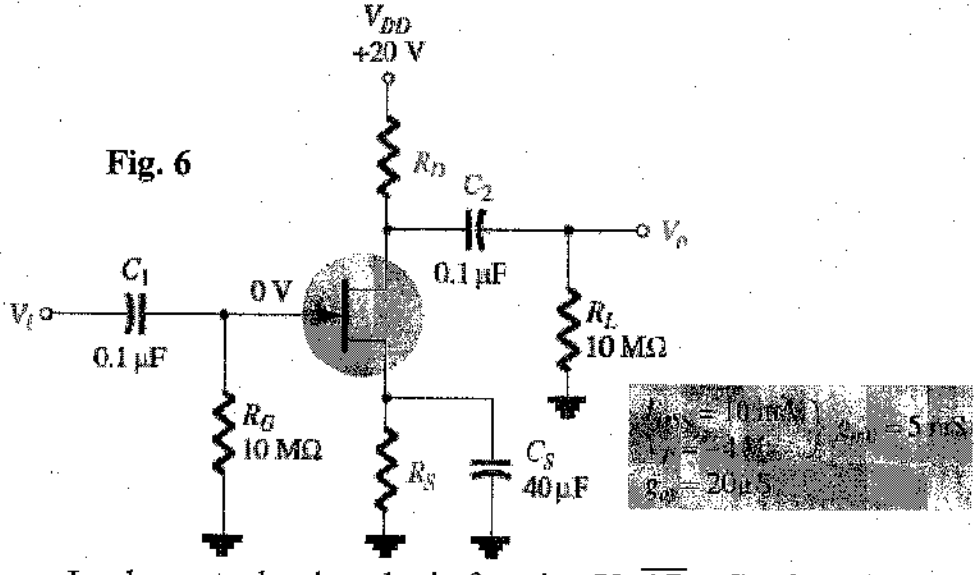

Fig. 6

c- Implement a boolean logic function $Y=\overline{AB}+C$ using CMOS transistors? (7 marks)

e- An analog switch is used to sample a signal $x(t)=10+5\cos 2000t+8\cos 8000t$. Determine the minimum frequency of the pulses applied to the MOSFET gate. (5 marks)

f. Design an analog time division multiplexer for a four input sinusoidal signals with frequencies of f_1=5 kHz, f_2=10 kHz, f_2=15 kHz and f_2=20 kHz, and peak amplitude 3 V to be transmitted on the line? Furthermore draw the input output waveforms and gating rectangular signal of 40KHz? Hint: MOSFET device has $V_{GS(th)}$=2 V and lossless (8 marks)

Best wishes of success

Dr. Bedir yousif