Mansoura University - Faculty of Engineering
MTE Program - Level 200
Electronics 2 (ECE264)
Time : 120 minutes - Full Mark : 50 Marks

Final Exam (24-8-2019) – Summer Semester - **Model 3**

Notes:

1- يجب التأكد من وجود اسمك علي ورقة الاجابة (Answer Sheet) و كتابة الاسم والرقم القومي في المكان المحدد

2- يجب التأكد من مطابقة رقم النموذج (Model) الموجود علي ورقة الأسئلة للرقم الموجود علي ورقة الاجابة (Answer Sheet)

3- يجب التاكد من اختيار الرقم الصحيح للاجابة و تظليل دائرة الرقم للاجابة الصحيحة بالقلم الازرق او الاسود هكذا :

4- لا يمكن اختيار اكثر من اجابة او الكشط او الشطب وفي حالة الخطأ يمكن استخدام Corrector لمسح التظليل

5- يمكن للطالب طلب كراسة اجابة لاستخدامها كمسودة لحل المسائل و المساعدة في اختيار الناتج الصحيح و لكن يجب تسليمها للكنترول للتخلص منها بعد الامتحان و لن يتم تسليمها لأستاذ المادة. وفقط يتم ارسال ال(Answer Sheet) للتصحيح.

Answer the following questions, you can assume any missing parameter within its acceptable range:

Question Number 1

For the circuit shown in figure(1);

R_1= 220 KΩ

R_2= 470 KΩ

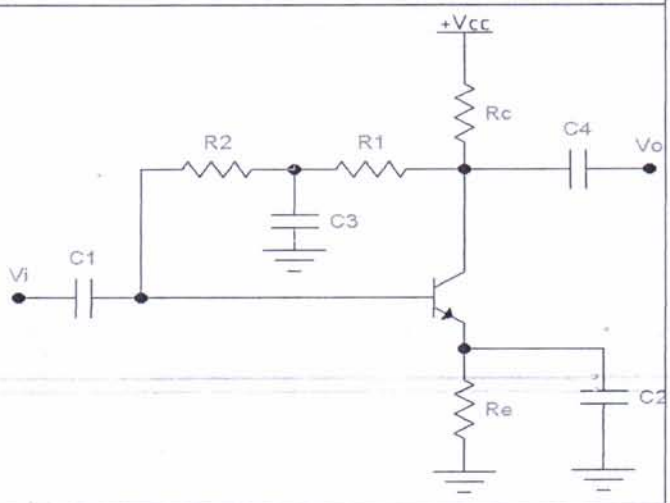
R_c= 3.1 KΩ

R_e= 1.5 KΩ

$C_1 = C_2 = C_3 = C_4$ = 10 µF

V_{cc} = 30 volts

B = 100



. Choose the correct answer from the following

1	Dc emitter current (Ie) will be ….						
(a)	1.99 mA	(b)	2.016 mA	(c)	19.96 µA	(d)	Other value
2	r_e value for the re-model will be ….						
(a)	12.9 mΩ	(b)	12.9 Ω	(c)	12.9 kΩ	(d)	Other value
3	Ac Voltage gain will be …. Using re model						
(a)	$\frac{R_1 \times R_c}{(R_1 + R_c) \times r_e}$	(b)	$\frac{R_1 \times R_c}{(R_1 + R_c) \times R_2 \times r_e}$	(c)	$\frac{-R_1 \times R_c}{(R_1 + R_c) \times r_e}$	(d)	$\frac{-R_1 \times R_c}{(R_1 + R_c) \times R_2 \times r_e}$
4	Ac voltage gain will be ….						
(a)	0.2337	(b)	233.7	(c)	-233.7	(d)	Other value
5	The output / input phase shift will be ….						
(a)	Zero	(b)	90 degrees	(c)	180 degrees	(d)	270 degrees
6	The input impedance using thevinin's will be ….						
(a)	$\frac{R_2 \times B \times r_e}{R_2 + (B \times r_e)}$	(b)	$B \times r_e$	(c)	$\frac{R_2 + (B \times r_e)}{R_2 \times B \times r_e}$	(d)	Other value
7	The input impedance value will be ….						
(a)	1.286 KΩ	(b)	150 KΩ	(c)	0.7 KΩ	(d)	Other value
8	The output impedance using thevinin's will be ….						
(a)	$\frac{R_c \times R_2}{R_c + R_2}$	(b)	$\frac{R_c \times R_1}{R_c + R_1}$	(c)	R_c	(d)	Other value
9	The output impedance value will be ….						
(a)	3.12 kΩ	(b)	3.056 kΩ	(c)	6.02 kΩ	(d)	Other value
10	Ac current gain magnitude will be ….						
(a)	9.834	(b)	89.34	(c)	98.34	(d)	Other value

Question Number 2

For the circuit shown in figure(2);

V_{cc}= 2 volts

V_{dd}= 20 volts

R_1= 2 MΩ , R_2= 2 MΩ

R_d= 2 KΩ

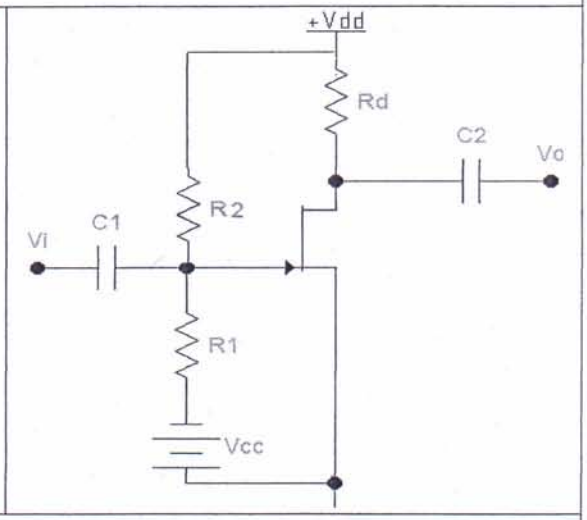
C_1=C_2= 10 μF

I_{Dss}= 10 mA

r_d= 25 KΩ

V_p= - 8 v

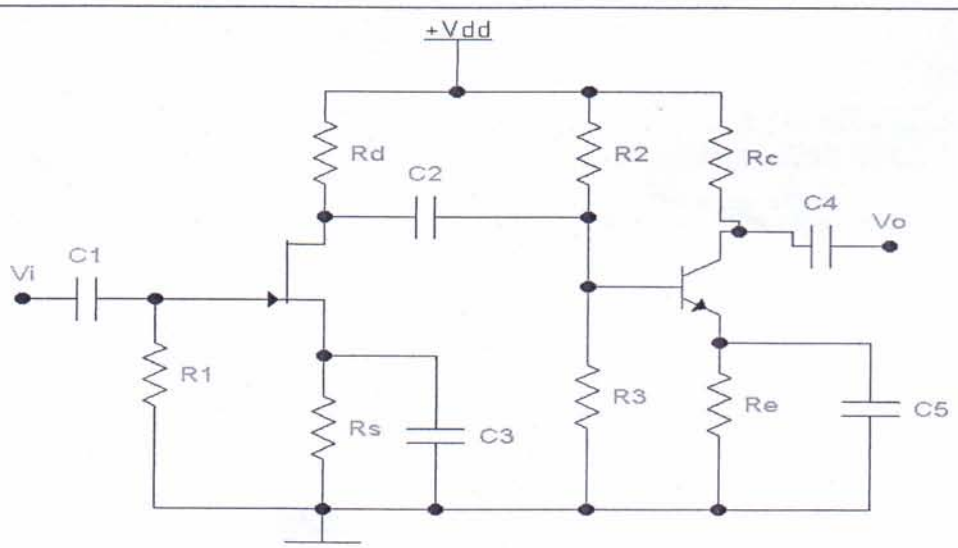
g_m = 1.88 ms



1	The type of this transistor						
(a)	BJT	(b)	JFET	(c)	MOSFET	(d)	NPN
2	Ac Voltage gain will be ….						
(a)	$-g_m\left(\frac{R_D \times r_d}{R_D + r_d}\right)$	(b)	$g_m\left(\frac{R_D \times r_d}{R_D + r_d}\right)$	(c)	$-g_m\left(\frac{R_D + r_d}{R_D \times r_d}\right)$	(d)	Other value
3	Ac voltage gain value will be ….						
(a)	-3.48	(b)	3.48	(c)	-2.46	(d)	Other value
4	The output / input phase shift will be ….						
(a)	Zero	(b)	90 degrees	(c)	180 degrees	(d)	270 degrees
5	The input impedance using thevinin's will be ….						
(a)	R_1	(b)	R_D	(c)	R_1//R_D	(d)	Other value
6	The input impedance value will be ….						
(a)	1 MΩ	(b)	2 KΩ	(c)	0.76 KΩ	(d)	Other value
7	The output impedance using thevinin's will be ….						
(a)	r_d	(b)	R_D	(c)	r_d//R_D	(d)	Other value
8	The output impedance value will be ….						
(a)	25 KΩ	(b)	2 KΩ	(c)	1.85 KΩ	(d)	Other value
9	Ac current gain magnitude will be ….						
(a)	1881	(b)	1890	(c)	18.81	(d)	Other value
10	The maximum current pass from drain to source when JFET has V_{Gs} = ...						
(a)	0 volts	(b)	-Vp	(c)	Vp	(d)	Other value

Question Number 3

V_{dd}= 20 volts
B= 200
C_1=C_2=C_3=C_4=C_5=10 μF
r_e=6.5 KΩ
R_d= 2.4 KΩ
Rs= 680 KΩ
R_c= 2.2 KΩ
R_e= 1KΩ
R_1= 3.3 MΩ
R_2= 15 KΩ
R_3= 4.7 KΩ
I_{Dss}= 10 mA
r_d is very large
V_p= - 4 v
g_m = 2.6 ms



1	Ac Voltage gain for the BJT using re model excluding (R2, and R3) will be ….						
(a)	$-R_c/R_e$	(b)	R_c/R_e	(c)	$-R_c/r_e$	(d)	Other value
2	Ac voltage gain for the FET phase including (R2, and R3) will be ….						
(a)	$g_m(R_D//r_d//R_2//R_3)$	(b)	$-g_m(R_D//r_d//R_2//R_3)$	(c)	$-g_m(R_D//r_d)$	(d)	$g_m(R_D//r_d)$
3	The total ac Voltage gain is …….. voltage gain						
(a)	More than FET	(b)	Less than FET	(c)	Equal FET	(d)	Equal BJT
4	The total output / input phase shift will be ….						
(a)	zero	(b)	90 degrees	(c)	180 degrees	(d)	270 degrees
5	The input impedance using thevinin's will be ….						
(a)	R_c	(b)	R1//Rc	(c)	R_1	(d)	Other value
6	The input impedance value will be ….						
(a)	2.2 KΩ	(b)	2 MΩ	(c)	1 MΩ	(d)	3.3 MΩ
7	The output impedance using thevinin's will be ….						
(a)	R_c	(b)	R1//Rc	(c)	R_1	(d)	Other value
8	The output impedance value will be ….						
(a)	2 MΩ	(b)	2.2 KΩ	(c)	1 MΩ	(d)	3.3 MΩ
9	Ac total current gain will be ….						
(a)	$(A_{VBJT}).(R_1/R_e)$	(b)	$(A_{VBJT}).(R_1/R_c)$	(c)	$(A_{VFET}).(R_1/R_e)$	(d)	$(A_{VBJT}).(R_1/r_e)$
10	This multi-stage transistor circuit is connected using ….. connection						
(a)	Cascade	(b)	Cascode	(c)	Darlington	(d)	Feedback pair

Question Number 4

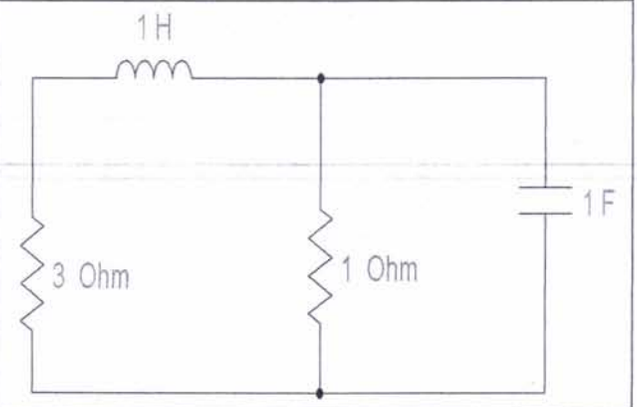
For the circuit shown in figure(4);

Initial value for the current is 1 amp

Initial value of the voltage is 1 volt

The voltage required is the voltage across the capacitor terminals

. Choose the correct answer from the following



1	The value of the voltage source which will be added in series with the inductor using L.T. is …						
(a)	1 volt	(b)	1/S volt	(c)	2 volt	(d)	Other value
2	The value of the voltage source which will be added in series with the capacitor using L.T. is …						
(a)	1 volt	(b)	1/S volt	(c)	2 volt	(d)	Other value
3	The equation of the current in the left side loop will be …. In S domain						
(a)	$\frac{S^2}{S^2+2S+2}$	(b)	$\frac{S}{S^2+2S+2}$	(c)	$\frac{S}{S^2+4S+4}$	(d)	Other value
4	The equation of the current in the left side loop will be …. In time domain						
(a)	3	(b)	Exp(-2t)	(c)	Exp(-2t).u(t)	(d)	Other value
5	The value of of the current in the left side loop when t=0 will be …..						
(a)	0	(b)	1	(c)	2	(d)	Other value
6	The value of V(s) will be ….						
(a)	1/S	(b)	$[1/S].[1+I_1(s)]$	(c)	$[1/S].[1+I_2(s)]$	(d)	Other value
7	The Inverse laplace transform of V(s) will be ….						
(a)	1	(b)	Exp(-2t).u(t)	(c)	Exp(-2t)	(d)	Other value

8	The value of v(t) when t=0 will be ….						
(a)	0	(b)	1	(c)	2	(d)	Other value
9	The … converts the electrical current into visible or invisible light						
(a)	photodiode	(b)	LED	(c)	Varactor	(d)	Other device
10	The … converts the visible or invisible light into an electrical current						
(a)	photodiode	(b)	LED	(c)	Varactor	(d)	Other device

Question Number 5

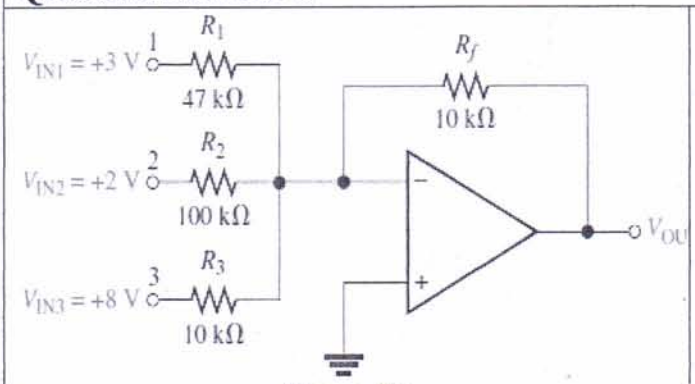


Figure (5)

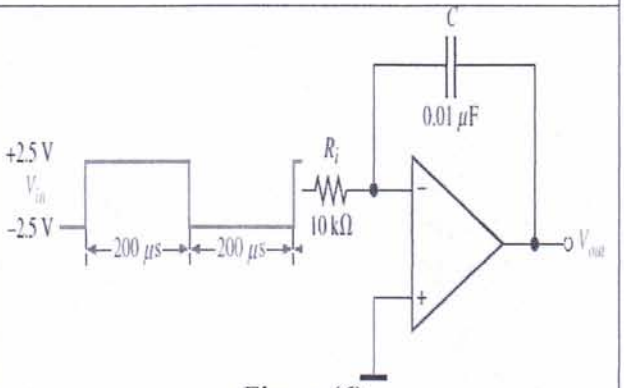


Figure (6)

1	The circuit in Figure (5); the weight of input 1 : R_f/R_1 will be ….						
(a)	0.312	(b)	0.213	(c)	0.123	(d)	Other Value
2	The circuit in Figure (5); the weight of input 2 : R_f/R_2 will be ….						
(a)	-0.2	(b)	0.2	(c)	0.3	(d)	Other Value
3	The circuit in Figure (5); the weight of input 3 : R_f/R_3 will be ….						
(a)	1	(b)	2	(c)	3	(d)	Other value
4	The circuit in Figure (5); the output voltage will be ….						
(a)	-8.48 volts	(b)	8.48 volts	(c)	-8.84 volts	(d)	Other value
5	From 1,2,3, and 4; we can get that this circuit in Figure (5) is able to calculate the ….						
(a)	Weighted sum	(b)	Inverter	(c)	A and b	(d)	Another function
6	The circuit in Figure (6) can be used as ….						
(a)	Adder	(b)	Subtractor	(c)	Integrator	(d)	Differentiator
7	The equation of the output voltage in Figure (6) will be ….						
(a)	$V_0 = -R_i \times C \times \frac{d}{dt}(vi)$	(b)	$V_0 = R_i \times C \times \frac{d}{dt}(vi)$	(c)	$V_0 = \frac{1}{R_i \times C}\int V_i . dt$	(d)	$V_0 = \frac{-1}{R_i \times C}\int V_i . dt$
8	The output wave form for figure (6) will be ….						
(a)	Rectangular	(b)	Saw tooth	(c)	Half- circles	(d)	Other waveform
9	The Peak values (+ve, and –ve) for the output figure (6) will be ….						
(a)	0 volt, and 5 volt	(b)	-5 volt, and 5 volt	(c)	-5 v, and 0 v	(d)	other value
10	The voltage of the –ve input terminal of the both op-amps in figures (5, and 6) will be ….						
(a)	0 volts	(b)	5 volts	(c)	-5 volts	(d)	other value

With all of my best wishes
Ehab H. Abdelhay