



اسم المادة : دوائر الكترونية الفرقة الثانية ECE223  
زمن الامتحان : 10:00 صباحا - 1:00 ظهرا  
(دكتور عادل شاكر الفيشاوي)

كلية الهندسة الالكترونية بمنوف  
قسم : هندسة الالكترونيات و الاتصالات الكهربائية  
تاريخ الأختبار الأثنين 24 يونية 2019

الامتحان النهائي للفصل الدراسي الثاني- الجزء الثاني

**Answer the following four questions**

**Question No. 1**

**15 Marks**

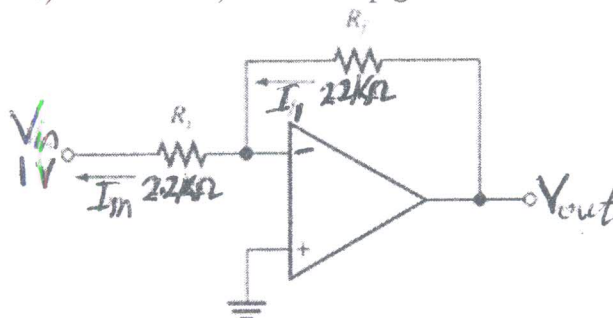
- 1) If the input to an Op-Amp log amplifier is  $z$ , the output equation will be .....
- 2) Astable timer 555 has  $V_{cc}$  equals to 9 volts, Therefore, the maximum voltage across the external capacitor used will be equals to .....while the minimum value equals to .....
- 3) The output voltage of a twin T filter (notch filter) at resonance frequency  $f_r$  is equals to .....
- 4) For an oscillator to have sustained oscillation, the gain around the feedback loop must be  
(a) less than 1            (b) greater than 1            (c) 1            (d) equal to B.
- 5) The 555 timer can be used as a voltage-controlled oscillator (VCO) by .....
- 6) If 10 mV is applied to the input to an inverting the op-amp and  $R_f$  is decreased, the output voltage will  
(a) increase            (b) decrease            (c) not change.
- 7) The reason behind that the phase shift oscillator uses three RC sections that gives  $180^\circ$  total phase shift is.....
- 8) An oscillator converts:  
a) AC input energy to AC output energy.  
b) DC input energy to DC output energy.            c) DC input energy to AC output energy.
- 9) If the output frequency of a certain voltage control oscillator VCO changes from 150 kHz to 165 kHz when the control voltage increases from 0.25V to 1V, the conversion gain K of the VCO be equal to.....
- 10) The main internal components of a 555 Timer are .....
- 11) The basic conditions for phase locked loop PLL to acquire lock are .....
- 12) The main reasons behind using voltage follower are .....
- 13) In a switched-capacitor circuit, the 1000 pF capacitor is switched at a frequency of 100 kHz, the value of emulated resistor will be equal to .....
- 14) The reason behind that Field Programmable Array FPAA uses emulated resistors that depends on using switched capacitor instead of using real resistors is that.....
- 15) During reprogramming of an FPAA running in a system, the first memory into which reconfiguration data are stored is the .....

**Question No. 2**

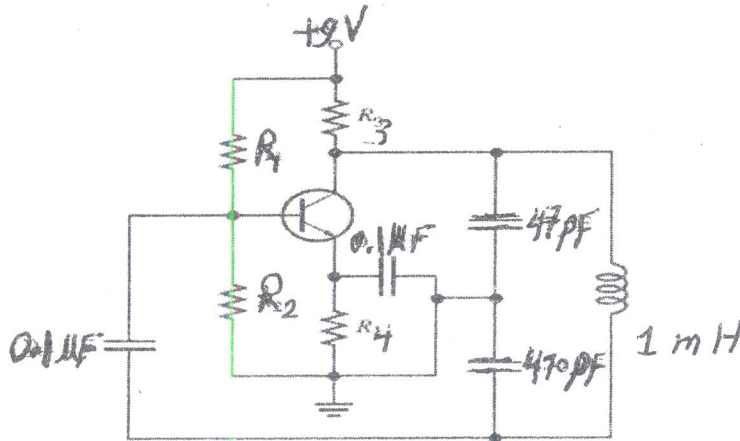
**10 Mark**

2-A) Determine the approximate values for each of the following quantities in the Figure below

- a)  $I_{in}$             b)  $I_f$             c)  $V_{out}$             d) closed-loop gain ACL            e)  $Z_{in}$



2-B) Determine the voltage gain  $A_v$  of the amplifier stage in Figure below in order to have sustained oscillation?. What is the frequency of the output signal if the Q of the coil is equal to 15, respectively?.



**Question No. 3**

10 Marks

- 3-A) Draw and discuss in detail the block diagram of a function generator showing the signal at the input and output of each block.
- 3-B) Derive the output voltage equation in terms of input voltages for Op-Amp summing amplifier.
- 3-C) Wien bridge oscillator use a lead-lag circuit with the following values:  $C_1 = C_2 = C = 0.01 \mu F$  and  $R_1 = R_2 = R = 10.0 K\Omega$ . Find the output oscillator frequency  $f_r$ . Draw the oscillator output showing its frequency. Then, plot the frequency and phase responses of the given lead- lag circuit. Then, show how to find the quality factor Q and the band width B.W. What is the rms output voltage of the given lead- lag circuit if an input signal with a frequency equal to  $f_r$  and with an rms value of 3.0 V is applied to the input?.

**Question No. 4**

10 Marks

- 4-A) Derive the relation between the output voltage  $V_{out}$  and input voltage  $V_{in}$  for an Op-Amp differentiator. Then, draw and compare between the output of an ideal differentiator and of Op-Amp differentiator due to a periodic square wave input signal.
- 4-B) Compare between linear and logarithmic compression of signals.
- 4-C) Draw a simplified CAB block diagram of Field Programmable Analog Arrays (FPAA).

توقيع أستاذ المادة :