Kaferelsheikh University
Faculty of Engineering
Department of Electrical Engineering
Year: 3rd comm. Academic Number:
Name: ECE 3209

Date: 2/ 6 /2019
Time allowed: 3h
Full Mark: 100 degree
Final Exam: 2 page
Subject: Electronic circuits 2

This exam measures ILOs no: a.3, a.8,a.15,a.14,a.15, b.2, b.5,b.16, c.13,c.17, d7

[1] Question One[25 degrees]:

1- **In figure 1.** The regulator has load current varies from 0-1A and the unregulated d.c. input varies from 12-18v. the 8.5v zener diode requires at least 1 mA of current to stay in its regulation region ($I_{Z(min)}$=1mA). [15 degrees]

a- **what is** the type of this regulator, explain its principle of operation.
b- **determine** the value of Rs to ensure proper circuit operation.
c- **determine** maximum power dissipation in Rs.
d- **determine** maximum power dissipation in zener diode.

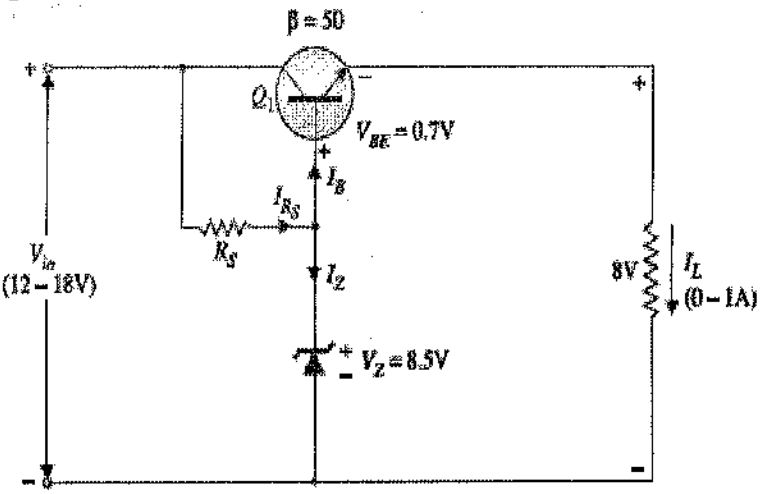

Fig.1

2- **Design** regulator circuit suitable for high current application with explanation. [10degrees]

[2] Question Two[30 degrees]:

1. **write short** note about the following with a neat diagram : [18 degrees]

a- R_C phase shift oscillators and get an expression of its resonance frequency when R =R_L.

b- crystal oscillators and get an expression of its resonance frequency.

2. A Wien Bridge Oscillator circuit is required to generate a sinusoidal waveform of 5200 Hertz (5.2kHz). Calculate the values of the frequency determining resistors R_1 and R_2 and the two capacitors C_1 and C_2 to produce the required frequency. If the oscillator circuit is based around a non-inverting operational amplifier configuration, determine the minimum values for the gain resistors to produce the required oscillations. Finally draw the resulting oscillator circuit [12 degrees]

[3] Question Three[20 degrees]:

1. **Sketch the block** diagram of transistor Astable Multivibrator and explain its operation. Sketch the output signal varying with time. [10 degrees]:
2. **Design** Hartley oscillator circuit has operating frequency of f = 2.989 kHz. [10 degrees]:

[4] Question Four[25 degrees]:

1. **Find the equivalent circuit** of Fig. 2, then calculate the voltage gain with and without feedback. With values of g_m = 5 mS, R_D = 5.1 k, R_S =1 k, and R_F= 20 k. [12 degrees].

2. **Figure 3.** Presents an OP-AMP followed by a BJT common collector amplifier, the resistance R_E provides the negative feedback. Given $R_i = 50k\Omega$, $A_v = 1000$, $R_o = 100\Omega$, $I_C = 2$ mA, $h_{FE} = 100$. Further, $R_E = 100\Omega$, $R_L = 1k\Omega$. Find the ac equivalent circuit of the connected system. Then calculate the gain i_o/v_i, R_{if}, and R_{of}. [13 degrees]:

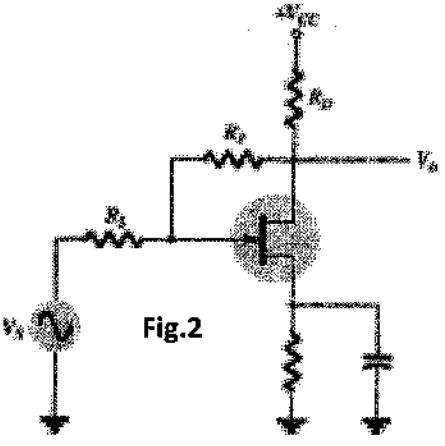
Fig.2

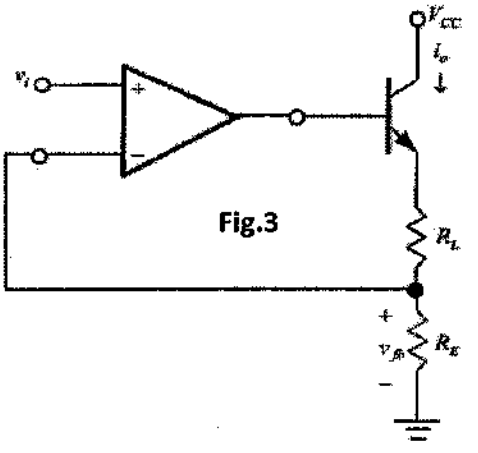
Fig.3

[*] Question [7degrees]:

Write about one of the following:

1. **Dielectric resonator oscillator.**
2. **Nano technology.**
3. **Automatic gain control.**
4. **Power amplifier classifications.**