Ministry of Higher Education

Kafrelsheikh University **Faculty of Engineering**

Electrical Engineering Department / 2nd year / Academic year (2020-2021)

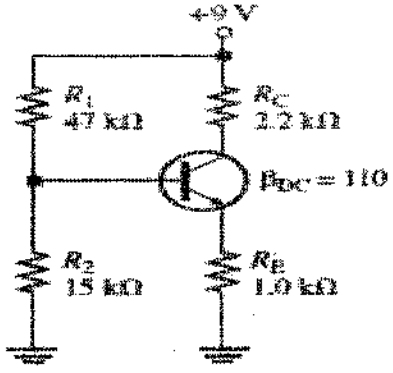
Subject : Electronic Engineering **Time** : 3 hours

Examiner : Dr. Amira El Attar **Full mark :** 70 Marks

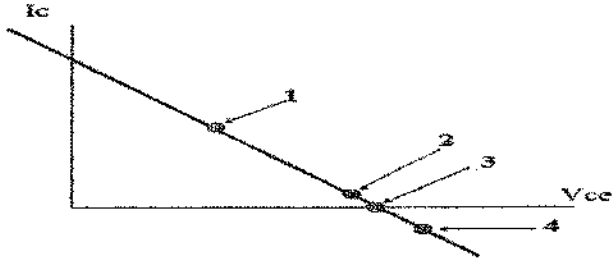
Question (1): **(40 marks)**

Put (√) or (×) and explain the reason for both cases then correct the false one:

1- For the voltage divider biasing circuit shown, the value of the base voltage with respect to ground equal 2.04 V.

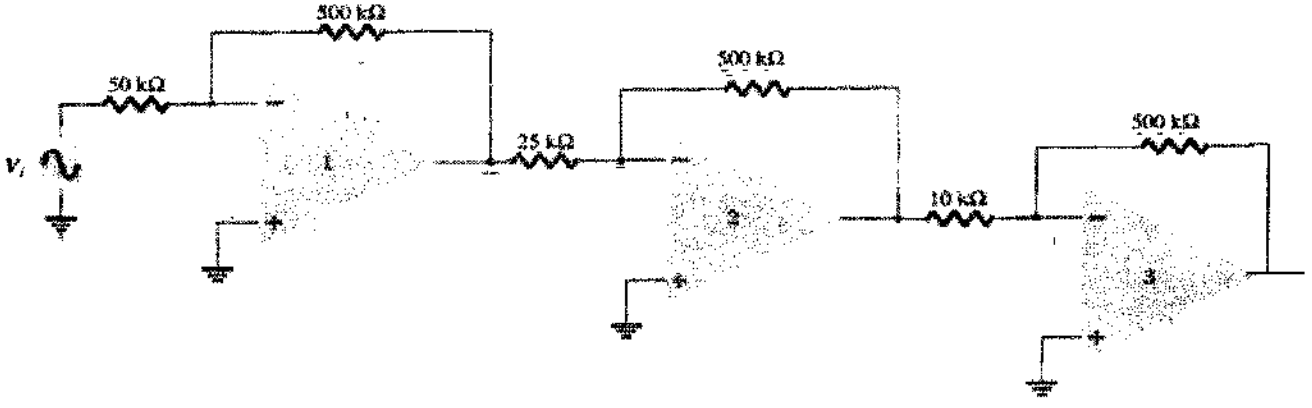


2- The load line shown below explains many points of amplifier's operation, the type of power amplifier in point (4) is Class A.

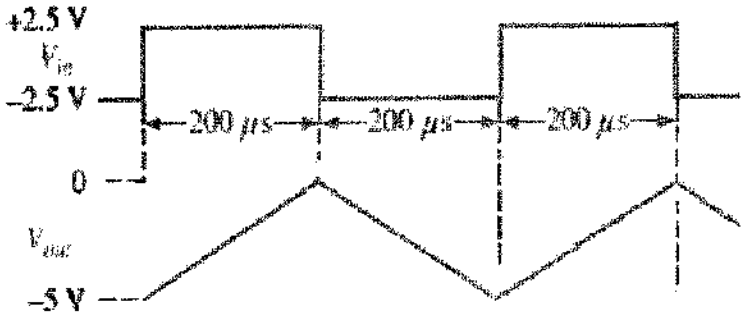


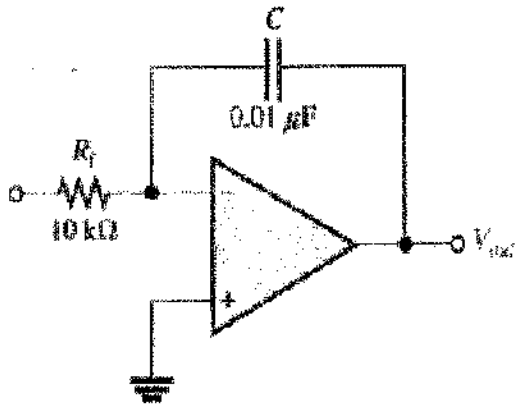
3- The voltage follower is a special case of a noninverting amplifier configuration as it has the same impedance formula but with B=1.

4- The connection of three op-amp stages shown below used to provide outputs that are 10, 20, and 50 times larger than the input, as a feedback resistor $R_f = 500$ kΩ.



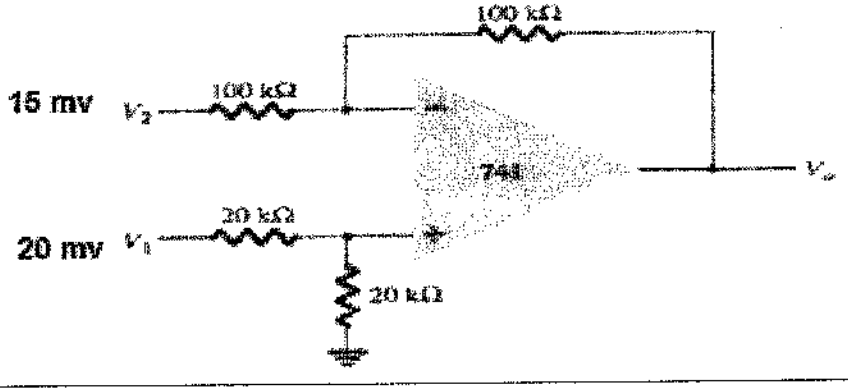
5- The following waveform describes the output voltage of the ideal op-amp shown below.





6- For a given value of open-loop differential gain, a higher common-mode gain result in a lower CMRR.

7- The output voltage for the circuit shown below equal 35 mV.



8- The waveforms given in Figure (1) are observed at the indicated points in Figure (2). Assume the maximum output levels of the comparator are ± 10 .

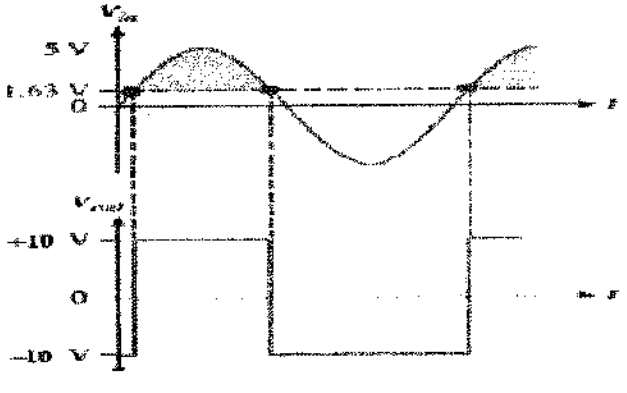


Fig. (1)

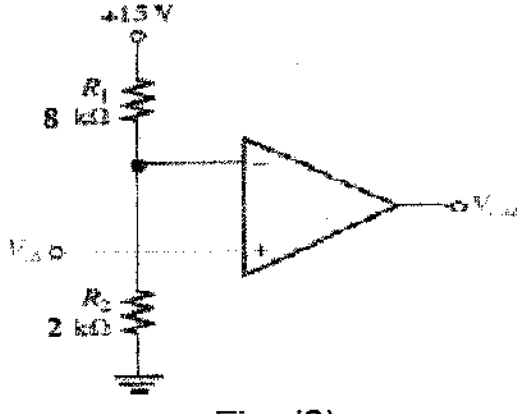


Fig. (2)

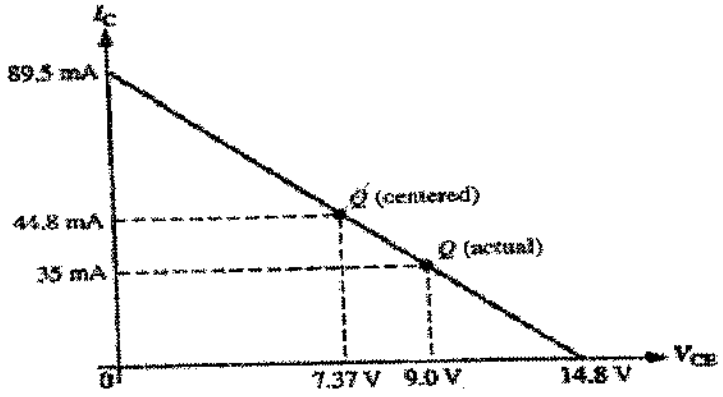
Question (2): **(30 marks)**

Choose the correct answer:

1- For the Emitter Feedback Bias circuit, if the collector current tries to increase, the base voltage .....

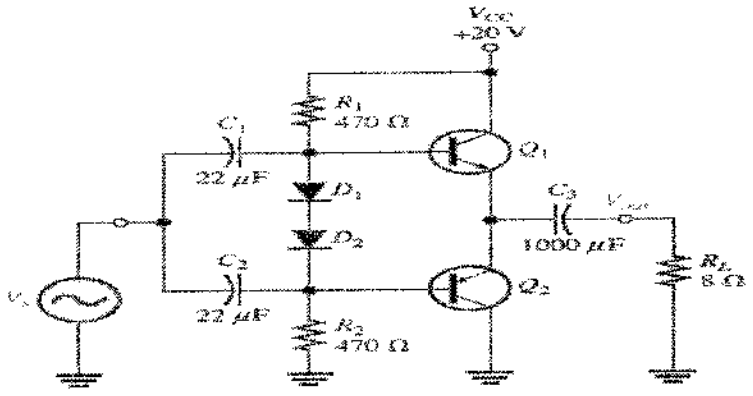
(a) Increase **(b) Decrease** **(c) Not affected**

2- The ac load line for a specific circuit is shown below, the actual Q point for this amplifier is closer to..... , therefor the maximum output current swing equal .....



(a) Saturation, 35mA **(b) Cutoff , 35mA** **(c) Cutoff , 9.8 mA**

3- The maximum ac output power of the amplifier shown below equal .....



(a) 12.5 W **(b) 7.96 W** **(c) 6.25 W**

4- The output voltage of an op-amp is 45.8 mV for input voltages of V_{i1} = 150 μV and V_{i2} = 140 μV. The amplifier has a differential gain of A_d = 4000, the value of CMRR is.....

a) 1000 **b) 100** **c) 105**

5- There are three types of power amplifiers, the greatest efficiency is in .....

a) Class A b) Class B c) Class C

6- The closed-loop critical frequency $fc_{(cl)}$ of an op-amp is ..... its open loop critical frequency $fc_{(ol)}$.

a) higher than b) smaller than c) equal

7- The maximum rate of change of the output voltage in response to a ..... input voltage is defined as the slew rate of an op-amp.

a) Step b) Square c) Ramp

8- When the open-loop gain of an op-amp is reduced by negative feedback, the bandwidth is .....

a) Increased b) Decreased c) not affected

9- A certain op-amp has three internal amplifier stages with midrange gains of 40 dB, 32 dB, and 20 dB. Each stage also has a critical frequency associated with it as follows: $fc_1 = 2$ kHz, $fc_2 = 40$ kHz, and $fc_3 = 150$ kHz. The total phase shift through the amplifier is ..... , when the signal frequency is 2 kHz.

a) -40.8 ° b) -48.6 ° c) -43 °

10- ..... is a circuit that produces aperiodic waveform on its output with only the dc supply voltage as an input.

a) Oscillator b) Voltage amplifier c) Power amplifier

Best wishes

Dr. Amira El Attar