

MID TERM Exam

- (1-a) Describe how can we test a semiconductor diode with an ohmmeter.
(1-b) If the DC output of center tap full wave rectifier is about 2 Volt , what is the rms value of input potential.
(1-c) If a zener diode used as a shunt regulator in a circuit with a battery of 300mV, If V_{out} is 200m V and the total current in the circuit was 0.5mA, what is the desired value of the series resistance in the regulator circuit.
(2-a) Design a circuit contains some operational amplifiers which provide a gain of + 0.5.
(2-b) compare between BJT and FET in terms of (Linearity, input impedance , output current dependence , carrier dependence)

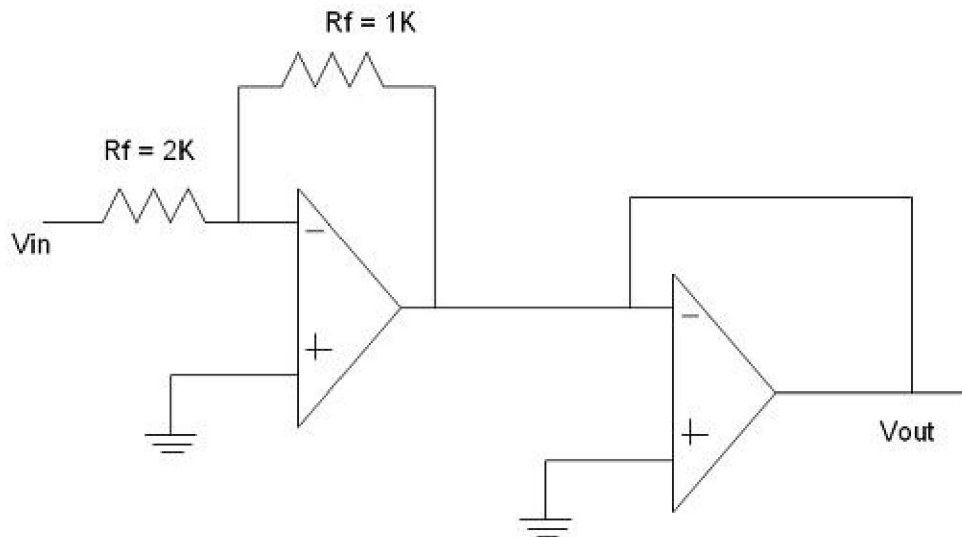
Answers

(1-a) we connect diode across ohmmeter if it is connected forward , it is expected to measure low resistance , and if it is connected reverse , it is expected to measure large resistance. Otherwise , we can say that diode fails.

(1-b) $V_{oDC} = \frac{2V_m}{\pi} = 2 \text{ Volt}$, so $V_m = \pi$ and $V_{rms} = \frac{V_m}{\sqrt{2}}$, so $V_m = \pi/\sqrt{2} = 2.22$ Volt.

(1-c) $I = \frac{V_{in} - V_{out}}{R_s} = \frac{300m - 200m}{0.5m} = 200\Omega$

(2-a) there are many configurations , I'll select one of them, which consists of two inverting amplifiers , one with gain -0.5 , the other with gain -1 (voltage follower or buffer)



(2-b)

comparison	BJT	FET
1- linearity	Linear (I_C & I_B)	Non linear (I_D , V_{GS})
2- input impedance	low	Very high
3- o/p current dependence	Current controlled current source	Voltage controlled current source
4- carrier dependence	Bipolar (holes and electrons)	Unipolar (holes or electrons)