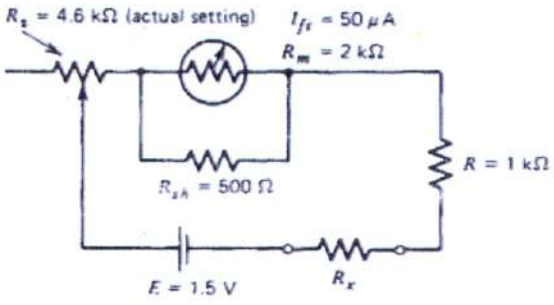
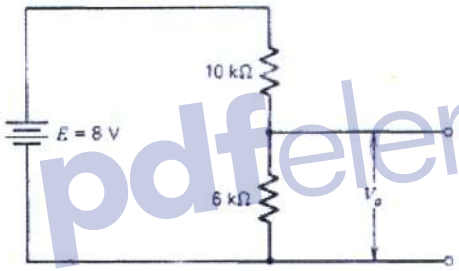
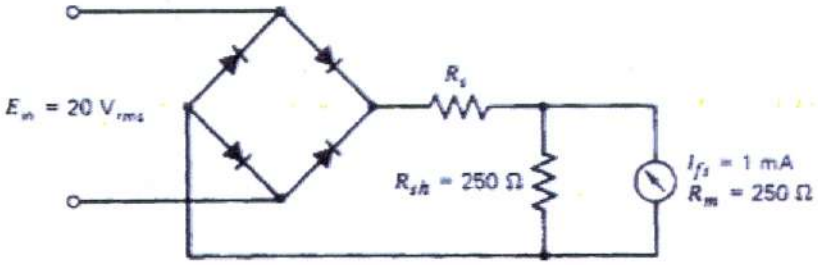
B. What is the value of R_x if the meter reads half scale? **(3 Marks)**



C. A voltage reading is to be taken across the 6 kΩ resistor in the circuit A voltmeter with a sensitivity of 10 kΩ/V is to be used. If the instrument has ranges of 1 V. 5 V, 10 V, and 100 V, what is the most sensitive range that may be used to obtain a reading having less than 3% error owing to voltmeter loading? **(4 Marks)**



D. Calculate the AC and DC sensitivity and the value of the multiplier resistor required to limit current to the full-scale deflection current in the circuit shown. All diodes have a forward resistance of 300Ω and an infinite reverse resistance. **(4 Marks)**



E. Pressure is measured by strain gauges. One strain gauge is active and the other is dummy. The strain gauge form the opposite arms of a Wheatstone bridge. The other two arms formed by equal resistances of 120Ω each at 27C. The frequency bandwidth is 100KHz. The output of the bridge is a voltage signal. **(5 Marks)**

1.when the pressure of $7000KN/m^2$ is applied the output voltage is 0.12mV. Find the ratio of output signal voltage to the noise voltage generated by the resistor.

2.Find the ratio of output signal voltage to the noise if applied pressure is $7KN/m^2$

Q1. Choose the correct answer **(3 Marks)**

1. A Wheatstone bridge is balanced with all the four resistances equal to 1kW each. The bridge supply voltageis 100 V . The value of one of the resistance is changed to 101 W. The output voltage is measured with a voltage measuring device of infinite resistance. The bridge sensitivity is

(a) 2.5mV/W
(b)10 V/W
(c) 25mV/W
(d)none of the above

2. The shunt resistance in an ammeter is usually

(a) less than meter resistance
(b)equal to meter resistance
(c) more than meter resistance
(d)of any value

3. A galvanometer is

(a) an absolute instrument
(b) an indicating instrument
(c) a controlling instrument
(d)a recording instrument

Q2. Draw the generalised measurement system and its different components/elements. **(3 Marks)**

Q3. Complete the following (10 Marks)

1. The moving-coil mechanism is generally set in a jewel and pivot suspension system to …….. Another method of suspension is the …….. suspension system which provides ……

2. the voltage across the component is less whenever the voltmeter is connected. The decrease in voltage may be negligible or it may be appreciable depending on the …….. of the voltmeter being used. This effect is called ……

3. ……..……..are those which measure the total amount of either quantity of electricity (ampere-hours) or electrical energy supplied over a period of time

4. ……..instruments are those in which no outside power is required for operation.

5. Hysteresis is ……

6. To prevent the ohm meter from being zeroed if the battery has aged considerably……..

7. PMMC stand for ……

Q4 Answer the following:

A. Calculate the value of resistors R_1 **through** R_4 in the circuit **(8 Marks)**