

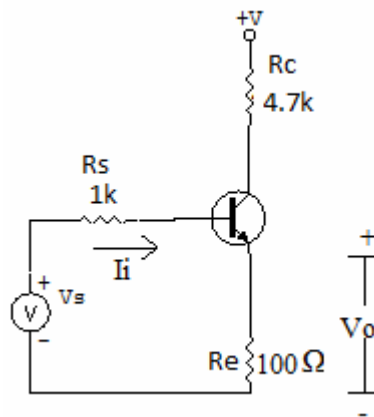
GUJARAT TECHNOLOGICAL UNIVERSITY

P.D.D.C. Sem- III Examination December 2010

Subject code: X31101**Subject Name: Advance Electronics****Date: 11 /12 /2010****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain single stage CE transistor amplifier response and also derive the equation for gain bandwidth product for voltage and current. **07**
- (b) Explain the working of voltage series feedback amplifier. Derive its D , A_V , A_{VF} for given fig. Take $h_{ie} = 1.1 \text{ K}\Omega$, $h_{fe} = 50$. Neglect h_{re} and h_{oe} . **07**



- Q.2** (a) Write short notes on (i) Classification of amplifiers (ii) Distortion in amplifiers. **07**
- (b) (i) Find the capacitor C and h_{fe} for the transistor to provide a resonating frequency of 10 KHz of a transistorised phase shift oscillator. Assume $R_1 = 25 \text{ K}\Omega$, $R_2 = 57 \text{ K}\Omega$, $R_c = 20 \text{ K}\Omega$, $R = 7.1 \text{ K}\Omega$ and $h_{ie} = 1.8 \text{ K}\Omega$. R_1 and R_2 are the resistors used in voltage divider bias of amplifier and R_c is collector resistor. R is resistor which is used in feedback path of RC phase shift oscillator. **04**
- (ii) Determine the output voltage of a differential amplifier for the input voltages of $300 \mu\text{V}$ and $240 \mu\text{V}$. The differential gain of amplifier is 5000 and the value of the CMRR is 100. **03**

OR

- (b) At $I_c = 1 \text{ mA}$ and $V_{CE} = 10 \text{ V}$, a certain transistor datasheet shows $C_{b'c} = 3 \text{ pF}$, $h_{fe} = 200$ and $\omega_T = 500 \text{ M rad/s}$. Calculate g_m , $V_{b'e}$, $C_{b'e}$ and ω_β . **07**

- Q.3** (a) Derive equation of transfer gain with feedback. Define desensitivity D . For large value of D what is A_f ? what is significance of this result? **07**
- (b) Derive the formula for frequency of RC phase shift oscillator. **07**

OR

- Q.3** (a) What is oscillator? Explain concept of oscillation with Barkhausen criteria. **07**
- (b) The bandwidth of amplifier is from 30 Hz to 15 KHz. Find frequency range over which A_v is down by 0.5 dB from its midband value. **07**

- Q.4 (a)** What is need of constant current bias circuit? Explain different constant current bias circuits. **07**
- (b)** Explain transistorised Wien Bridge Oscillator. **07**
- OR**
- Q.4 (a)** Draw the equivalent circuit of an ideal OP-Amp and explain the ideal OP-Amp characteristics. **07**
- (b)** Obtain the expression for the input resistance of an amplifier with current series and voltage shunt feedback. **07**
- Q.5 (a)** What is Analog to Digital converter? List the type of Analog to Digital converters. Explain Counter type ADC. **07**
- (b)** Give the classification of Logic families. Also list the characteristics of digital IC and explain any two of them. **07**
- OR**
- Q.5 (a)** Explain Resistor Transistor Logic (RTL) and Direct coupled Transistor Logic (DCTL).Mention the advantages and disadvantages of DCTL. **07**
- (b) (i)** What is Digital to Analog converter? Give the applications of D/A converters. **03**
- (ii)** How many bits are required to build R-2R DAC if reference voltage is 5V and DAC has resolution of 1 mV, 100 mV? How is full scale output voltage dependent on resolution? **04**
