



- Notes :
1. Same Answer book must be used for each section.
 2. All questions carry as indicate marks.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) For dual input balanced output differential amplifier with swamping emitter resistor following specification are given below $R_C = 2.2K\Omega$, $R_E = 4.7K\Omega$, $R_B = 100K\Omega$, $V_{CC} = 10V$, $V_{EE} = -10V$, the transistor used have $V_{BE} = 0.7V$ and $\beta_{ac} = \beta_{dc} = 100$ Determine:
- 1) Operating point of transistor
 - 2) Voltage gain
 - 3) i/p & o/p resistance
 - 4) i/p & o/p impedance

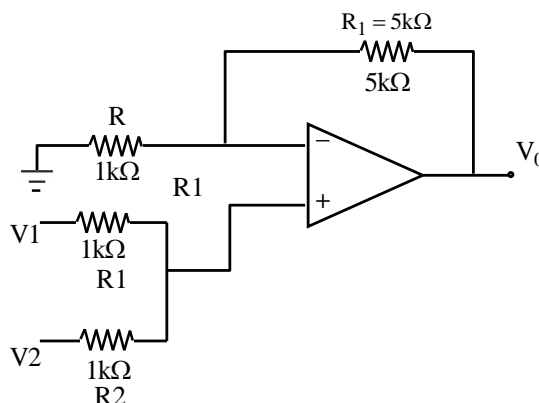
- b) Explain the block diagram of op-amp? 8

OR

2. a) Draw and discuss current mirror circuit and derive the output current expression. 8
- b) Discuss the necessity of dc level shifter in op-amp. Draw and explain any one dc level shifter circuit? 8
3. a) Draw the circuit diagram of basic integrator and derive the expression for its output voltage. What are the various problem associated with basic integrator circuit? Draw the practical integrator circuit. 8
- b) Explain briefly instrumentation amplifier? 8

OR

4. a) Draw the circuit diagram of basic differentiator and derive the expression for its output voltage. What are the various problem associated with basic differentiator circuit? Draw the practical differentiator circuit. 8
- b) Determine the output voltage for the circuit shown in the figure, for $v_1 = 1V$ & $v_2 = 3V$. 8



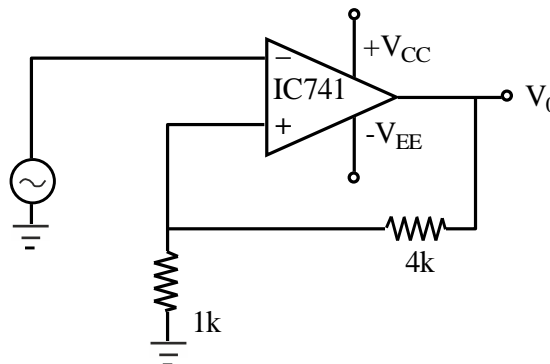
5. a) Design a first order high pass filter at a cut off frequency of 2kHz with a pass band gain of 2. Also plot its frequency response? 8
- b) With neat circuit diagram, explain the RC phase shift oscillator? Design a phase shift oscillator so that $f_0 = 1\text{kHz}$. 8

OR

6. a) Draw a first order high pass Butterworth filter. Derive the expression for frequency? 8
- b) Design a high pass filter with a cut off frequency of 10kHz with a pass band gain of 1.5. Also plot the frequency response for the designed filter. 8
7. a) Explain sample and hold circuit with diagram? 8
- b) Explain full wave precision rectifier using op-amp with the help of waveform and derivation? 8

OR

8. a) Explain the working of a D/A convertor using op-amp with R-2R ladder network? 8
- b) The op-amp comparator circuit is shown in figure. 8



If a sine wave of 10V is applied calculate threshold level and plot input output waveform assume $+V_{CC} = +12\text{V}$.

9. a) Write short note on: 8
- i) PLL AM detector.
- ii) PWM using IC-555.
- b) Design a square wave generator of frequency 100Hz and duty cycle of 75%. 8

OR

10. a) Discuss the application of phase locked loop (PLL), also write down the advantages of PLL? 8
- b) Draw the block diagram of ic 723 voltage regulator and explain working each block? 8
