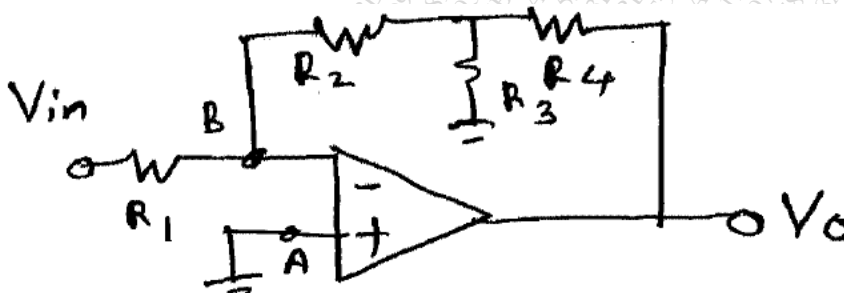


**Instructions:**

- (1) Question 1 is compulsory, solve any three from remaining questions
- (2) Assume suitable data if necessary.
- (3) Diagrams to be drawn neatly.

Q1(A) Determine  $V_o / V_{in}$  for the circuit shown below – 05



Q1(B) Draw the circuit diagram and explain the operation of zero crossing detector. 05

Q1(C) Explain specifications of ADC. 05

Q1(D) What are active filters? State its advantages over passive filters

Q2(A) Draw the circuit diagram and explain the operation of differentiator. What are limitations of ideal differentiator? How they are overcome in practical circuit, state its application areas. 10

Q2(B) Design first order low pass filter using opamp at a cut off frequency of 1Khz, having pass band gain of 2. 10

Q3(A) Draw the circuit diagram and explain the operation of precision full wave rectifier. Derive the expression of output voltage. 10

Q3(B) Design triangular wave generator using opamp to have output voltage = 7VPP volts, frequency 2 kHz, with supply voltage +/- 14 V. 10

Q4(A) Draw neat circuit diagram and explain the operation of successive approximation type analog to digital converter. What are its advantages and disadvantages. 10

Q4(B) Draw neat circuit diagram and explain the operation of monostable multivibrator using IC 555. 10

Q5(A) Design a IC 555 based symmetrical square wave generator for 1 KHz frequency of  $V_{cc} = 5\text{ V}$ . Draw waveforms for voltage across timing capacitor and output. 10

Q5(B) Design voltage regulator using IC 723 to have  $I_o = 50\text{ mA}$ ,  $I_{sc} = 75\text{ milli amp}$ ,  $V_{in} = 15\text{ V}$ . Assume  $V_{sense} = 0.6\text{ V}$  and  $V_o = 5\text{ V}$ . 10

Solve any **TWO** of the following.

Q6(A) Functional block diagram and working of IC 723. 10

Q6(B) PLL (Phase lock loop) and its applications. 10

Q6(C) Wein bridge oscillator using opamp. 10