

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions from Q. Nos. 2 to 7.
 (3) Assume **suitable** data wherever **necessary**.
 (4) Draw **neat** sketches/circuits to support your answer.
 (5) **Figures** to the **right** indicate **full** marks.

1. Attempt any **four** :- 20
- (a) Draw the functional diagram of IC 723 voltage regulator and explain it.
 - (b) Compare function generator ICs 566, IC 8038 and XR - 2206.
 - (c) Explain the terms with reference to DAC :-
 - (i) Settling time
 - (ii) Long term drift
 - (iii) Resolution
 - (iv) Accuracy
 - (v) Supply rejection.
 - (d) Draw and explain functional block description of IC 8038.
 - (e) Draw precision half wave non-inverting rectifier. Explain it with the help of waveforms. In case of full wave rectifier why amplitudes of rectified output waveforms peak are different ?
2. (a) What are the different methods of generating a time base waveform ? Draw and explain UJT relaxation oscillator. Also derive the expression for the output frequency of oscillations. What is the effect on o/p frequency when R is minimum and R is maximum ? 12
- (b) What is millers time base generator ? Explain. State general considerations for the same. Compare it with bootstrap time base generator. 8
3. (a) Draw a staircase generator using op-amp miller integrator with suitable waveforms so as to terminate the staircase after seventh pulse. 10
- (b) Explain the operation of SAR. 10
4. (a) State features of IC 723 voltage regulator. Explain constant current limiting in detail. 10
- (b) Design a regulator using IC 723 to give 5V output upto 500 mA, with input of 12V dc. Use fold back current limiting. 10
5. (a) Draw and explain with neat circuit diagram, how will you generate the triangular waveform using op-amp. Derive formula for frequency of oscillation. 10
- (b) Draw circuit diagram of High pass filter using op-amp. Derive the expression for output voltage. Discuss the drawbacks associated with it. How will you overcome it ? Also plot frequency response. Draw the nature of output voltage waveform if input is a square wave of amplitude 6V p-p, 250 Hz frequency. 10
6. (a) Draw functional diagram of monostable multivibrator. Explain its operation with the help of waveforms. Discuss the application of IC 555 as a missing pulse detector. 12
- (b) Design an astable multivibrator with $f_o = 12$ KHz, duty cycle = 70%. How will you modify the circuit for 50% duty cycle. 8
7. Write short notes on (any **four**) :- 20
- (a) PPM generator using IC 555
 - (b) IC 566 VCO
 - (c) Schmitt Trigger using op-amp
 - (d) Switching mode regulators
 - (e) Free running ramp generator using IC 555.