EC-404 (Pulse Shaping & Wave Generation)

B.Tech-4th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note: Attempt Five questions in all, selecting one question from each Section A, B, C and D. Section E is compulsory.

SECTION-A

1. What is meant by linear waveshaping? What is the unique property enjoyed by a sinusoidal input waveform? (10)

2. Obtain the expression for the output voltage of an RC high-pass filter for ramp input. Sketch the output response for $RC/t_p >> 1$ and $RC/t_p << 1$. (10)

SECTION-B

3. Sketch and describe the working of the following clipping circuits:

   (a) Series-diode positive limiting circuit (5)

   (b) Parallel-diode negative limiting circuit (5)

4. What is the effect of diode characteristics on clamping voltage? Explain comparators. (10)

SECTION C

5. Sketch the circuit of a simple diode unidirectional sampling gate and describe its functioning with neat waveforms. Explain the effect of the higher voltage level $-V_2$ of the control input on the output of the circuit. (10)

6. Explain the basic operating principle of sampling gates. (10)

SECTION D

7. Describe the effect of loop gain on the behaviour of the Schmitt trigger circuit with neat sketches of the transfer characteristic. (10)

8. Write a short note on Digital to Analog Converter. (10)

SECTION E

9. Answer the following: (10×2=20)

   a. What is the condition for RC high-pass filter to act as good differentiator?

   b. Give some general features of a time base signal.

   c. What is the purpose of linear waveshaping?

   d. What are the applications of 555 timer IC?

   e. When does a transistor Schmitt trigger circuit fail to convert a periodic waveform into a square waveform?

   f. Which components are primary responsible for the occurrence of the quasistable state in a collector coupled monostable multivibrator?

   g. How does flash ADC work?

   h. A 5-bit ladder has a digital input of 11010. Assuming that 0 corresponds to 0V and 1 corresponds to +10 V. What will be its output?

   i. List different types of clippers.

   j. Write the application of Digital to Analog converters.