NRT/KS/19/2123

Bachelor of Science (B.Sc.) Semester–IV Examination

ELECTRONICS (Analogue & Digital Techniques)

Optional Paper–I

Time : Three Hours]   [Maximum Marks : 50

N.B. :— (1)   All questions are compulsory and carry equal marks.

(2)   Draw diagram wherever necessary.

EITHER

1. (A) What is feedback ? Explain positive and negative feedback. Draw the block diagram of feedback amplifier and derive an expression for gain of amplifier with feedback.   1+3+6

OR

(B) Explain the construction and working of Colpitts oscillator. A Colpitts oscillator uses the following components in the tank circuit L = 100 mH, and $C_1 = C_2 = 20$ pF. Calculate the frequency of its output.   6+4

EITHER

2. (A) Draw the circuit diagram of monostable multivibrator using OP-AMP and explain its working. Calculate the time delay generated by a monostable multivibrator with R = 47 kΩ, C = 10 μf. (Assume that $R_1 = R_2$)   7+3

OR

(B) Explain Symmetrical Astable multivibrator. How is it converted into Asymmetrical Astable multivibrator ? Define duty cycle and state its significance.   6+2+2

EITHER

3. (A) Explain the working of weighted resistor type 4-bit DAC with neat circuit diagram. State advantages and disadvantages of it.   7+3

OR

(B) Logic levels for 4-bit R-2R ladder are 1 = 5V and 0 = 0V. Calculate output voltage :

(i)   (1101)

(ii)   Only LSB is 1

(iii) Full scale output.

State the advantages and disadvantages of R-2R ladder type D/A converter.   6+4

EITHER

4. (A) What is the need of ADC ? State different types of ADC. Explain construction and working of counter type ADC. State its advantages.   2+6+2

OR

(B) Explain the working of flash type ADC with suitable diagram. State its advantages and disadvantages (any three).   7+3

5. Attempt any **ten** :

(A) What is an oscillator ?

(B) State any two factors affecting the stability of output frequency of an oscillator.

(C) Give the formula for frequency of oscillation in Wein-Bridge oscillator.

(D) State the applications of astable multivibrator.

(E) How many states monostable multivibrator have ?

(F) State the use of instrumentation amplifier.

(G) Define settling time.

(H) State the principle of Dual bias DAC.

(I)   Why is it useful to connect an OP-AMP at the output of a DAC ?

(J)   State the sampling theorem.

(K) State two advantages of successive approximation type ADC.

(L) What is the role of a comparator in ADC ?   1×10