

R15

Code No: 125EB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January/February - 2023

LINEAR AND DIGITAL IC APPLICATIONS

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) List out Ideal characteristics of OP-amp. [2]
- b) Draw the Op-amp block diagram. [3]
- c) Draw the block diagram of PLL. [2]
- d) Mention the applications of 555 timer. [3]
- e) Define the terms Linearity and accuracy of A/D converters. [2]
- f) List the different types of ADCs? [3]
- g) Give the logic levels of CMOS and TTL families. [2]
- h) What are the advantages of ECLs? [3]
- i) Write the applications of Shift registers? [2]
- j) Distinguish between synchronous counters and asynchronous counters. [3]

PART – B

(50 Marks)

- 2.a) Draw the IC 741 Op-amp pin diagram and Explain the function of each pin in detail.
- b) What is an Integrator circuit? Discuss the relative advantages and disadvantages if IC's over discrete assembly. How will you make a monolithic IC? Explain in detail. [5+5]

OR

- 3.a) Draw the equivalent circuit of dual input balanced output differential amplifier and derive the expressions for small signal voltage gain, input resistance and output resistance.
- b) How Op-amp is used for comparator? Explain its working. [5+5]

- 4.a) Design a first order low pass active filter for a high cutoff frequency of 2 KHz and pass band gain of 2.

- b) How to generate a sawtooth wave form? Explain the working of such a circuit with neat circuit diagram. [5+5]

OR

- 5.a) Design a Monostable multivibrator using 555 timer to produce a pulse width of 100 m sec.
- b) Describe the 555 timer monostable multivibrator applications in i) Frequency divider ii) Pulse width modulation. [5+5]

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6.a) How many resistors are required for an 8-bit weighted resistors D/A converter? What are those resistor values, assuming the smallest resistance is R?

b) With a neat diagram explain about the counter type A/D converter in detail. [4+6]

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OR

7.a) Explain in detail with a neat circuit diagram the operation of 3-bit parallel ADC.

b) Consider a 10 bit D/A converter having a reference voltage of 10 V. What is the Binary digital input needed to get 4.5 V output? What outputs are obtained from the converter for the inputs of (i) binary 0010110101 (ii) decimal 520? [6+4]

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8. Explain about Parity generator and checker using IC's. [10]

OR

9.a) Design a 4 to 16 decoder using two 74x138 IC's.

b) Implement the 32 input to 5 output priority encoder using four 74LS148 and gates. [5+5]

10.a) Draw the circuit of MOD 16 Down ripple counter with D-flip-flops and explain its operation.

b) Explain ROM and it's types and RAM and it's types. [5+5]

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OR

11.a) Explain how a JK- flip-flop can be constructed using a T- flip-flop.

b) Design a 8-bit parallel-in and serial-out shift registers. Explain the operation of the shift register with the help of timing waveforms. [4+6]

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