R13

Code No: 115EB

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]

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]

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]

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]

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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