Code No: 155SN **RA**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, July/August - 2023
LINEAR AND DIGITAL IC APPLICATIONS
(Electrical and Electronics 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) Define CMMR and give its ideal and practical values. [2]
b) Describe different configurations of differential amplifier. [3]
c) Draw the pin diagram of IC 555 and explain each pin. [2]
d) Why do we use higher order filters? Give the relationship between order of a filter and roll off rate? [3]
e) Define the following terms with reference to DAC and ADC (Specifications):
i) Linearity ii) Monotonicity. [2]
f) List out different A/D convertors and justify which A/D convertor is best in terms of speed. [3]
g) Write the concept of CMOS transmission gate. [2]
h) Write about magnitude comparator. [3]
i) How to convert JK flip-flop to D flip flop? [2]
j) Discuss how PROM, EPROM and EEPROM technologies differ from each other. [3]

PART-B

(50 Marks)

2.a) Draw the circuit of any one type of differential amplifier and explain the operation.
b) Describe the working of three terminal voltage regulator and mention its applications. [5+5]

OR

3.a) Explain the working of Inverting amplifier and derive the equation for its gain.
b) Derive the output voltage V_o of practical integrator circuit. [5+5]

4.a) Explain the operation of 2^{nd} order band reject filter along with circuit diagram.
b) Discuss about of the process of generating a square wave form with a neat circuit diagram. [5+5]

OR

5.a) Explain the operation of astablemultivibrator using 555 timer and also derive the expression for frequency of oscillation.
b) Draw the block diagram of 565 PLL and explain about each block. Make circuit connections to track the input signal and explain its operation. [5+5]

6.a) Explain the weighted resistor type DAC. Mention its applications.
b) With neat schematic, explain the operation of a counter type Analog to Digital converter. [5+5]

OR

7.a) Draw the circuit of weighted resistor DAC and derive expression for output analog voltage Vo.
b) Explain the counter type ADC in detail. Mention its applications. [5+5]

8.a) Explain sinking current and sourcing current of TTL output? Which of the above parameters decide the fan out and how?
b) Interpret Parallel binary adder with a circuit diagram. [5+5]

OR

9.a) Distinguish between static and dynamic power dissipation of a CMOS circuit. Derive the expression for dynamic power dissipation.
b) Design a driving circuit for LED and which 74XX series IC is used for it. [5+5]

10.a) Design a 4-bit bidirectional shift register with parallel load.
b) Design an 8×4 diode ROM using 74×138 for the following data starting from the first location. [5+5]

OR

11.a) Design a modulo 12 ripple counter using 74×74.
b) With the help of timing waveforms, explain read and write operations of SRAM. [5+5]

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