Code No: 115AH **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November/December - 2016
IC APPLICATIONS
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) Explain "Latch up" and the circumstances it needed. [2]
b) Discuss how a logic buffer amplifier is different from an audio amplifier. [3]
c) List the features of 741 OP-AMP. [2]
d) List the non-ideal DC characteristics of an OP-AMP. [3]
e) What is frequency stability? Explain it's significance. [2]
f) What is an Active filter? What are the advantages offered by it over a passive filter? [3]
g) What are the modes of operation of a Timer? [2]
h) What is the major difference between digital and analog PLLs? And list the applications of PLL. [3]
i) How many resistors are required in a 12-bit weighted resistor DAC? Why? [2]
j) Explain how Dual-slope ADC provides noise rejection? [3]

PART - B

(50 Marks)

2.a) Compare the TTL and CMOS logic families.
b) Design a TTL 2-state NAND gate and explain its operation. [4+6]

OR

3.a) What is interfacing? Explain the operation of TTL driving CMOS.
b) Explain the operation of the TTL open collector outputs. [5+5]

4.a) What is instrumentation amplifier? What are the features of it? Explain any three applications of instrumentation amplifier.
b) Derive input resistance for inverting amplifier with feedback arrangement. [4+6]

OR

5.a) Discuss how a voltage follower is built using an op-amp.
b) In an AC inverting amplifier circuit R_{in}=50Ω, C_i= 0.1μF, R_1=100KΩ, R_f=1KΩ, R_2=10KΩ and V_{cc}=±15V. Determine the Bandwidth of the amplifier. [4+6]

6.a) Derive the expression for the transfer function of first order high pass filter.
b) Draw the schematic diagram of Wein bridge oscillator and explain its working. [6+4]

OR

7.a) Design a first order active high pass filter with cutoff frequency of 2KHz with op-amp. Why this is called Active filter?
b) Design a Triangular wave generator with f_0= 1.5 KHz andV_0 (PP) = 5V. [5+5]

8.a) Describe the 555 timer monostable multivibrator applications in pulse stretching.
b) Design a 555 timer circuit whose output frequency is 2KHz when the trigger input signal frequency is 4KHz. [5+5]

OR

9.a) Explain the operation of frequency multiplier using PLL.
b) Define Lock-in range, Capture range and Pull-in time in PLL system. [6+4]

10.a) Compare the dual slope ADC with successive approximation ADC.
b) Explain the operation of R-2R ladder DAC with the help of neat diagrams. [4+6]

OR

11.a) Explain the operation of flash ADC using relevant diagrams.
b) What are the merits and demerits of counter type ADC? Explain. [6+4]

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