R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November - 2015
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) Give the characteristics of TTL family. [2]
  b) Draw a CMOS tri state buffer and explain. [3]
  c) What do you mean by voltage regulator? Discuss the types in it. [2]
  d) Discuss the following: input bias current, input off set current and thermal drift. [3]
  e) Design a notch filter to eliminate 120Hz signal. [2]
  f) What are the advantages of active filter over passive filter? [3]
  g) What are the features of 555 timers? [2]
  h) Explain the importance of control voltage pin 5 of the timer 555. [3]
  i) An 8 bit successive approximation type ADC is driven by a 1MHz clock. Find the conversion time. [2]
  j) What are the different sources of errors in DAC? [3]

PART - B (50 Marks)

2.a) Explain the operation and use a TTL gate with an open-collector output.
  b) Discuss the logic levels and noise margin with reference to TTL family. [5+5]

OR

3.a) Explain the operation of the CMOS gate with open drain output.
  b) Draw a standard two input TTL NAND gate and explain the operation. [5+5]

4.a) The input signal V_i to an op amp id 0.04 sin $1.13 \times 10^5 t$ is to be amplified to the maximum extent. How much maximum gain can be had by using op amp with a slew rate of 0.4V/sec.
  b) Explain how the op amp is use as I-V converter. [5+5]

OR

5.a) Explain and draw the output waveforms of the ideal integrator circuit when the input is
i) sine wave   ii) square wave and   iii) step input.
  b) Design a op amp circuit which can give the output as $V_0 = 2V_1 - 3V_2 + 4V_3 - 5V_4$. [5+5]

6.a) Design a phase shift oscillator to have output frequency of 500Hz. Use ±12V supply.
  b) Draw and analyze the second order low pass Butterworth filter. [5+5]

OR

7.a) Explain with the help of the neat diagram and waveforms working of triangular wave generator.
  b) Discuss the applications of VCO. [5+5]

8.a) Design a 555 based square wave generator to produce a symmetrical square wave of 1KHz. If $V_{CC}=12V$ draw the voltage across timing capacitor and the output.

  b) Give the applications of Astable multivibrator. [5+5]

OR

9.a) Derive the Lock range and capture range in PLL.

  b) Explain the PLL as a FM detector. [5+5]

10.a) Explain the working of weighted resistor D/A converter and state its features.

  b) Find the resolution of a 12 bit D/A converter. [5+5]

OR

11.a) Explain the working of dual slope A/D converter.

  b) Draw the IC 1408 DAC pin diagram and explain. [5+5]

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