JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year I Semester Examinations, June/July - 2014
IC APPLICATIONS
(Common to EEE, ECE, ETM)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1.a) List out and explain the characteristics of ideal an operational amplifier. Also mention the significance of each of the characteristic parameter.
  b) Draw and explain the inverting mode and non-inverting mode of operation of IC 741 op-amp. Obtain the expression for gain in each case.

2.a) "Op-amp can be used as summing amplifier." Prove this statement by taking four sinusoidal input voltages V1, V2, V3 and V4 (Each signal has peak-peak amplitude of 2.5 V and frequency 500 Hz.
  b) Derive the expression for output voltage of 3-op-amp instrumentation amplifier used to amplify the current being sensed by a transducer.

3.a) Explain the principal of operation and construction of wein bridge oscillator.
  b) Design a phase shift oscillator to have output frequency of 1 KHz. (Make the necessary assumptions)

4.a) Explain how the 555 timer can be used as a monostable multibrator.
  b) Design a monostable multibrator which will drive an LED, 'ON' for 0.5 seconds each time it is pulsed.

5.a) Explain the operation of a successive Approximation ADC with neat block diagram.
  b) Obtain the digital output of 8-bit SAR type A/D converter for the input analog voltage of 3.75V. (V_{max} = 4.5V and V_{min}= - 0.5V).

6.a) Explain the following terms with reference to TTL gate.
  i) Logic levels   ii) DC Noise margin   iii) fan out
  b) Design a transistor circuit of 2-input TTL NOR gate. Explain the operation with the help of function table.

7.a) Design a 12-bit comparator circuit using 74×85 ICs and discuss the functionality of the circuit.
  b) Draw the gate-level circuit and explain the operation of IC 74×151. Also realize the Boolean expression $F(w, x, y, z) = \sum(3, 5, 6, 7, 13)$

8.a) Design an 8-bit shift register to perform
  i) Serial-In Parallel Out   ii) Parallel-In Parallel Out
  b) Design a conversion circuit to convert a T flip-flop to J-K flip-flop.

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