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MANIPAL INSTITUTE OF TECHNOLOGY Manipal University

FOURTH SEMESTER B.Tech. (I & C E) DEGREE END SEMESTER EXAMINATION May/June 2016 SUBJECT: ANALOG SYSTEM DESIGN (ICE - 2204)

TIME: 3 HOURSMAX. MARKS: 50

Instructions to candidatesAnswer all the questions.

- Missing data may be suitably assumed.
- 1A. With a circuit diagram explain the voltage amplifier and emphasize the effects of loading due to source and load. How are they overcome?
- 1B. Design a circuit for the following using a single opamp $V_0 = 1.25V_1 0.5V_2 0.9V_3$
- 1C. Explain the working of current mirror using BJT.

(5+3+2)

- 2A. With a circuit diagram explain the working of an instrumentation amplifier using a transducer bridge. Derive the relationship between input and output voltages.
- 2B. Draw the circuit of basic differentiator and explain its working. What are its drawbacks?
- 2C. If slew rate of an opamp is $0.5V/\mu$ sec, plot the output for both (a) 10Hz (b) 1MHz if input is a square wave of $\pm 2V$

(5+3+2)

- 3A. With a circuit diagram explain the working of a first order high pass filter. Derive its transfer function and draw it's frequency response.
- 3B. Explain the working of an astable multivibrator using 555 timer and derive the expression for time period of its output waveform.
- 3C. What is frequency scaling? Using the frequency scaling technique, convert the 1KHz frequency of low pass filter to a cut off frequency of 1.6KHz.

(5+3+2)

- 4A. Design an inverting type Schmitt trigger circuit with UTP = 3V and hysteresis of 4V. OPAMP saturation voltage is $\pm 12V$.
- 4B. For a Wein bridge Oscillator, derive the expression for frequency and also the relation between ' R_F ' and ' R_1 '.
- 4C. Design RC phase shift oscillator so that frequency is 200 Hz. Choose C= 0.1μ F.

(3+5+2)

- 5A. With a block diagram explain the dual slope type ADC. List its advantages, disadvantages and major applications.
- 5B. For an R-2R DAC what is the output for digital input of 0010?
- 5C. Define Settling voltage and Monotonicity of a DAC.

(5+3+2)