Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FOURTH SEMESTER B.TECH. (INSTRUMENTATION & CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATION, JUNE- 2018

SUBJECT: ANALOG SYSTEM DESIGN [ICE – 2204]

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. Define CMRR. What is the importance of CMRR? What are all the ways in which CMRR can be improved?

1B. For an OPAMP define and explain (i) input bias current. (ii) input offset voltage (iii) Output offset voltage (iv) Slew rate

1C. Design an OPAMP circuit whose output is $V_1 - V_2 + V_3 - V_4$

(3+4+3)

2A. Draw the circuit diagram of 3 OPAMP instrumentation amplifier and derive the expression for output voltage.

2B. Design a 3rd order Butterworth low pass filter with cut off frequency 1KHz. Butterworth polynomial for third order filter is $(s+1)(s^2+s+1)$.

2C. A square wave of ±1V and frequency 10Hz is applied to ideal differentiator. Assuming RC= 1µsec plot output voltage of differentiator.

(4+4+2)

3A. Design an inverting type Schmitt trigger circuit with UTP= 3V and hysteresis of 6V. OPAMP saturation voltage is ±12V. Draw the circuit diagram.

3B. Write the circuit of OPAMP based pulse generator and derive expression for pulse duration

3C. Design a circuit to generate a square wave of frequency 1 KHz and amplitude ±12V. Draw the circuit diagram.

(4+4+2)

4A. Design a monostable multivibrator with trigger pulse shaping, which will drive LED *ON* for 0.5 second each time it is pulsed.

4B With help of block diagram explain PLL as frequency multiplier.

4C Design RC phase shift oscillator using OPAMP to generate 2 kHz signal. Draw the circuit diagram.

(4+3+3)

5A. State the conditions for oscillations. Also classify the oscillators.

5B. With the help of block diagram explain successive approximation Analog to Digital conversion principle.

5C. With help of circuit diagram explain working of R- 2R DAC.

(2+4+4)

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