Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2720312 **Date: 24/05/2016**

Subject Name: Intelligent sensor and Instrumentation

Time:10:30 am to 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	a)	How 2.5 V common reference is generated from a single 5 V dc supply system to power op – amp.	07
	b)	Briefly explain types of standards used for smart sensors.	07
Q.2		Design a circuit to convert a 4 mA to 20 mA input current to a 0 v to 10 v output voltage. The reference direction of the input source is from ground to your circuit. Circuit is powered by +/- 15 V regulated supply.	14
		OR	
Q.2	a)	Find v_N ,v_P and v_O in the circuit shown in fig.1 if i_S = 1mA. Calculate resistance R when connected in parallel with a 1 mA source will cause v_O to drop to half of the value without resistance.	07
	b)	For the ckt. shown in fig.2 show that Ri is infinite and $A = -(1 + R_3/R_4)\, R_1/R_2$	07
Q.3		Design 4th order high pass butter worth filter for unity gain and 3 dB cutoff frequency Fc= 668 Hz.	14
		OR	
Q.3		Design seventh order filter for fc= 1KHz and Ho= 0. Assume value of capacitors and resistors in circuit are equal.	14
Q.4	a)	Explain wireless sensor network in detail.	07
	b)	How performance of integrator may improved by selecting the high quality of capacitor?	07
		OR	
Q.4	a)	Explain Chebyshev approximation in detail.	07
	b)	Briefly explain Wireless Sensor Based on Microcontroller and Communicating Device.	07
Q.5		Explain circuit diagram of Low pass KRC filter with diagram	14
		OR	
Q.5		Explain standard second-order responses of a filters in detail .	14

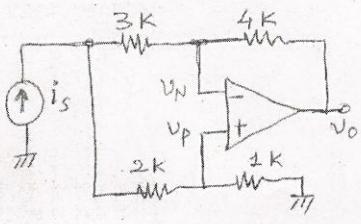

Fig-1

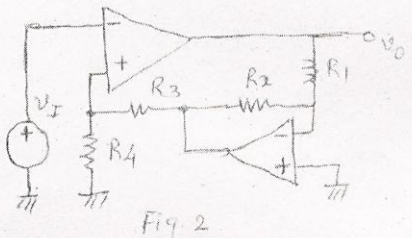

Fig-2