Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER II EXAMINATION – SUMMER 2017

Subject Code: 2720312 Date: 25/05/2017

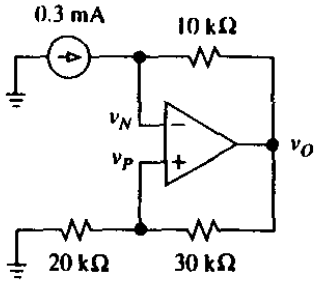
Subject Name: Intelligent Sensor and Instrumentation

Time:02:30 PM to 05:00 PM Total Marks: 70

Instructions:

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

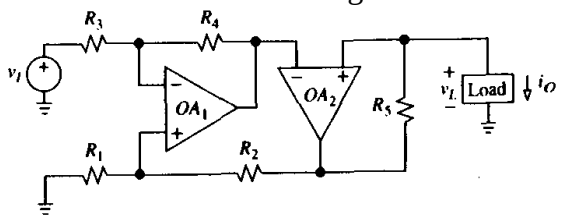
Q.1 **(a)** Find V_N, V_P and Vo in the circuit of Fig1. **07**



Repeat with a 40Kohm resistance in parallel with the 0.3mA source.

(b) Explain switched capacitor integrator in detail. **07**

Q.2 **(a)** Given that the circuit of fig.2 yields $io=A_{VI} – (1/Ro)v_L$, find expressions for A and Ro, as well as the condition among its resistances that yields $Ro=\infty$. Also discuss the effect of using 1% resistances. **07**



(b) Explain IEEE 1451.1 standard in detail. **07**

OR

(b) Explain wireless sensor network in detail. **07**

Q.3 **(a)** Explain Chebyshev approximation in detail. **04**

(b) Explain the error caused by Input bias and offset currents in detail **10**

OR

Q.3 **(a)** Briefly explain the term sensitivity related to active filter design. **04**

(b) Explain in detail compensation of input offset error in OP-Amp. **10**

Q.4 **(a)** How performance of integrator may improved by selecting the high quality of capacitor? **07**

(b) Find n for a low pass butterworth response with fc=1kHz, fs=2kHz, Amax=1dB and Amin= 40 dB. **07**

OR

Q.4 **(a)** Draw and explain band pass multiple feedback filter with its equation with Q factor. Also design the multiple feedback band pass filter with fo=1kHz, Q=10 and Ho=20dB. **14**

Q.5 **(a)** Design a 6^{th} order causer low pass filter with fc=1kHz and Ho=0dB. **14**
f_{01}=648.8Hz, f_{02}=916.5Hz, f_{03}=1041.3Hz, f_{z1}=4130.2Hz, f_{z2}=1664.3Hz, f_{z3}=1329.0Hz Q1=0.625, Q2=1.789 Q3=7.880

OR

Q.5	**(a)**	Design a 5^{th} order elliptic high pass filter(direct design) with fc=300Hz, fs=150Hz, Amax=0.1dB and Amin= 40 dB. L1=1.02789H, L2=0.15134H, L3=1.63179H, L4=0.44083H and L5=0.81549H, and C1=1.215134F and C2=0.93525F	**14**

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