GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER V • EXAMINATION - WINTER - 2012

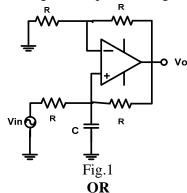
Subject code: 151003 Date: 12-01-2013

Subject Name: Integrated Circuits and Applications

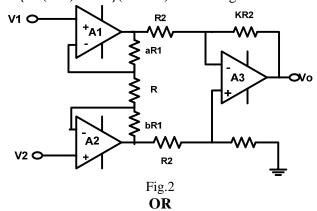
Time: 02:30 pm to 05:00 pm Total Marks: 70

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) What is the difference between active and passive filters? Classify filters 07 based on roll off factors, operating range, and frequency response.
 - **(b)** Draw block diagram of XR 2206 function generator IC and describe **07** function of internal blocks. Also state its applications.
- Q.2 (a) Explain the requirement of Instrumentation amplifier along with its 07 advantage and discuss one of its applications in detail.
 - (b) Prove that output is the integral of input for the given Fig.1 07



- (b) What is the limitation of the basic differentiator circuit? Discuss practical **07** differentiator circuit with necessary derivations and frequency response.
- Q.3 (a) What is the limitation of basic log amplifier? Explain the remedy for the or same and prove it.
 - **(b)** Derive $Vo=K\{1+(a+b) R1/R\}(V2-V1)$ for the Fig.2 shown below. **07**



- Q.3 (a) Explain Schimitt trigger circuit along with circuit diagram and necessary 07 waveforms. State its advantages and applications.
 - (b) For the given Fig.3 prove that $I_L=-2V1/R1$ if R1+R2=R1'

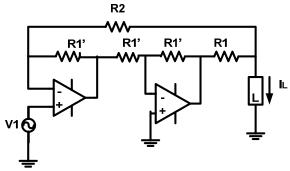


Fig.3

- **Q.4** Design a 1.5 KHz low pass second order butterworth filter. Use the Sallen 07 and Key equal component model. Assume the damping factor to be 1.414
 - Explain triangular wave generator circuit. **07**

- **Q.4** Analyze second order butterworth High Pass filter. Draw its frequency 07 (a) response and state design procedure.
- **Q.4 (b)** Design a circuit shown in Fig.4 to work as positive full wave rectifier. **07**

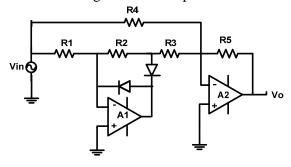


Fig.4

- Q.5 Draw and explain Monostable multivibrator using 555 timer IC. **07**
 - Discuss magnitude and frequency scaling in filter design. 07

OR

- **Q.5** Write a short note on PLL (a)
- **07** Design an astable multivibrator for an output frequency of 5 KHz and 07
 - duty cycle 40%. Consider C=0.047 μF.
