

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 based on roll off factors, operating range, and frequency response. **07**
- (b) Draw block diagram of XR 2206 function generator IC and describe function of internal blocks. Also state its applications. **07**
- Q.2** (a) Explain the requirement of Instrumentation amplifier along with its advantage and discuss one of its applications in detail. **07**
- (b) Prove that output is the integral of input for the given Fig.1 **07**

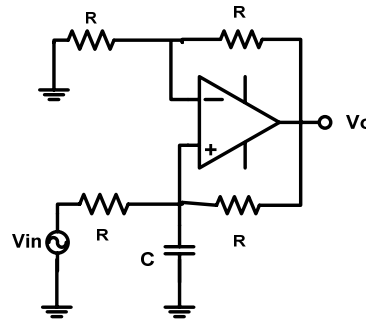


Fig.1

OR

- (b) What is the limitation of the basic differentiator circuit? Discuss practical differentiator circuit with necessary derivations and frequency response. **07**
- Q.3** (a) What is the limitation of basic log amplifier? Explain the remedy for the same and prove it. **07**
- (b) Derive $V_o = K\{1 + (a+b) R_1/R\}(V_2 - V_1)$ for the Fig.2 shown below. **07**

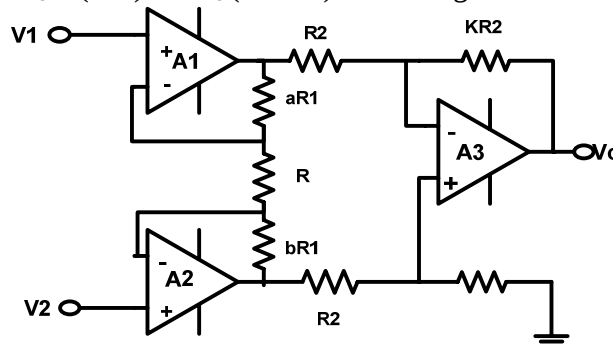


Fig.2

OR

- Q.3** (a) Explain Schmitt trigger circuit along with circuit diagram and necessary waveforms. State its advantages and applications. **07**
- (b) For the given Fig.3 prove that $I_L = -2V_1/R_1$ if $R_1 + R_2 = R_1'$ **07**

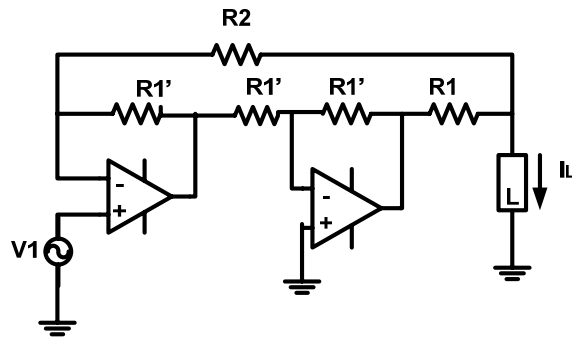


Fig.3

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

OR

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

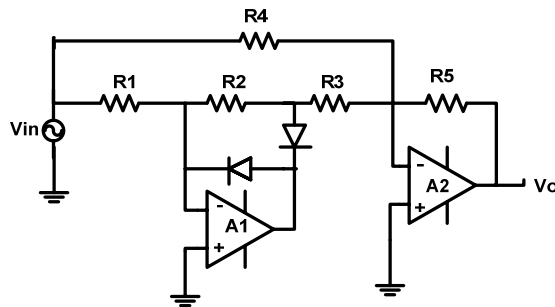


Fig.4

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

OR

- Q.5 (a) Write a short note on PLL 07
 (b) Design an astable multivibrator for an output frequency of 5 KHz and duty cycle 40%. Consider $C=0.047 \mu\text{F}$. 07
