

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
SUMMER SEMESTER (JULY 2016)  
END TERM EXAM

**COURSE CODE: 13B1WEC731**  
**COURSE NAME: CMOS ANALOG CIRCUIT DESIGN**  
**COURSE CREDITS: 3**

**MAX. MARKS: 50**  
**MAX.TIME:2 HRS**

1. Derive the expression for scaling and averaging amplifier of an inverting configuration of operational amplifier. [5]
2. Design a second order low pass filter at a high cutoff frequency of 1kHz. [5]
3. Draw the high frequency model of an operational amplifier with single break frequency. Derive the expression for open loop voltage gain as a function of frequency. [5]
4. Design the Wein bridge oscillator so that  $f_0 = 965\text{Hz}$ . [5]
5. Prove that closed loop gain of voltage series feedback is  $A_f = \frac{A}{1+AB}$  while its input resistance with feedback is  $R_{if} = R_i (1+AB)$ . [5]
6. Explain positive clipper circuit with  $V_{\text{ref}}$  as 1V. [5]
7. Explain the difference between integrator and differentiator and give one application of each. [10]
8. Draw and explain the circuit diagram of differential amplifier with different op-amp. [10]