COURSE CODE (CREDITS) : 18B11EC411 (3) /17B11EC511(4)   MAX. MARKS: 35

COURSE NAME: ANALOG INTEGRATED CIRCUITS/ LINEAR INTEGRATED CIRCUITS

COURSE INSTRUCTOR : Dr. SHRUTI JAIN   MAX. TIME: 2 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

1. (a) Sneha has designed the circuits shown in Fig 1. What circuit she has designed and for what cutoff frequency and roll-off.
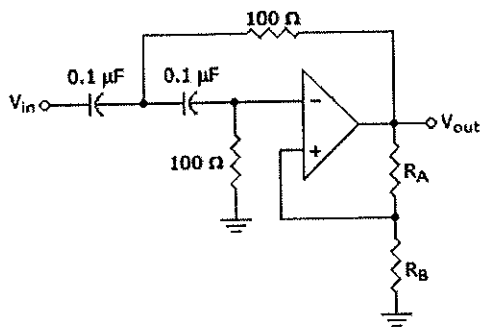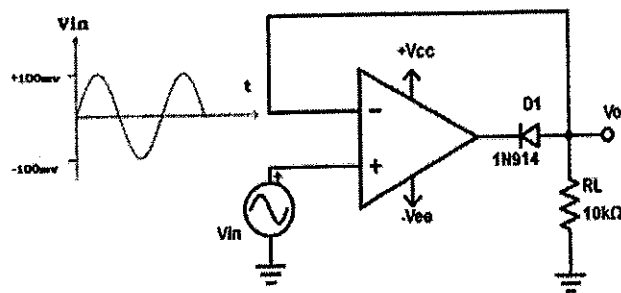

Fig 1   Fig 2

   (b) Determine the input frequency for all-pass filter with phase angle as 62°. Consider the value of resistor and capacitor are 3.3kΩ and 4.7μF.   [3 + 2 = 5]

2. (a) Design a filter with a roll-off rate of −60 dB/decade, gain 27, and a corner frequency of 1 kHz.

   (b) A band-pass filter has a bandwidth of 250Hz and center frequency of 866Hz. Find the quality factor of the filter?   [3 + 2 = 5]

3. (a) Calculate the ON time, OFF time, Total time period, Duty cycle, and Frequency of the output generated by an astable multivibrator using resistors R_A = 5kΩ, R_B =5kΩ, and capacitor C = 10μf.

   (b) Anushka is explaining the function of Trigger and Control voltage of 555 IC to Ananya. Explain how? Draw neat diagram for explanation   [3 + 2 = 5]

4. (a) A monostable multivibrator has R = 120 kΩ and the time delay T = 1000 ms, calculate the value of C?

   (b) What is the difference between a basic comparator and Schmitt Trigger? Explain diagrammatically.   [2 + 3 = 5]

5. (*a*) Determine the output waveform of the circuit shown in Fig 2. Which circuit is this?

(*b*) What happens if the input voltage is higher than the reference voltage in a positive clipper?

(*c*) How can we use an operational amplifier for non-linear applications? Explain anyone.

[2 +2 + 1 = 5]

6. (a) What are the drawbacks of binary weighted resistor D/A converter? How to overcome it. Draw the circuit diagram.

(b) Explain the Single Slope Analog Digital Converter. What is the disadvantage of the circuit? How to overcome it. [2.5 + 2.5 = 5]

7. (a) Explain to Sia the basic building blocks of Phased Locked Loop (PLL)? What are the important characteristics of PLL? Explain.

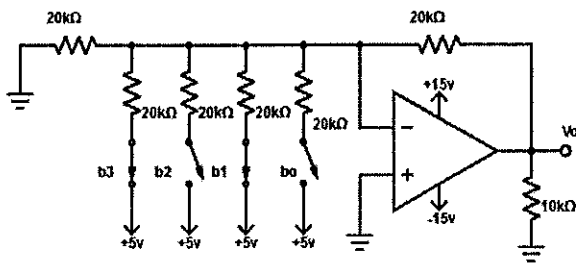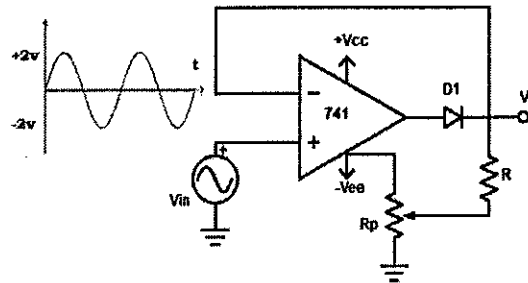(b) For the circuit shown in Fig 3, find the output voltage?

Fig 3

Fig 4

(c) Find the output waveform when $V_{in} < V_{ref}$ for the circuit shown in Fig 4.

[2 + 2 + 1 = 5]