

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Summer 2022 - 23 Examination**

**Semester: 4**  
**Subject Code: 203107253**  
**Subject Name: Analog Circuits**

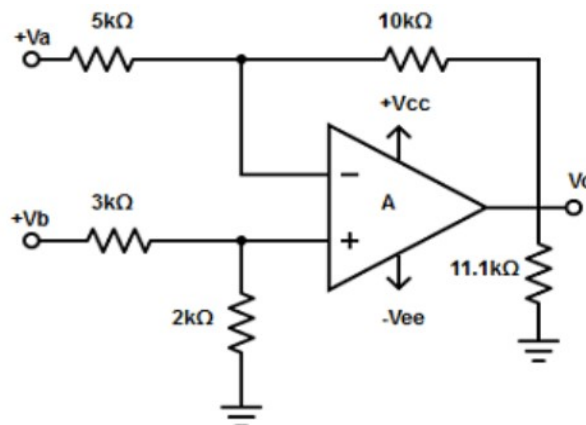
**Date: 22/03/2023**  
**Time: 02:00 pm to 04:30 pm**  
**Total Marks: 60**

**Instructions:**

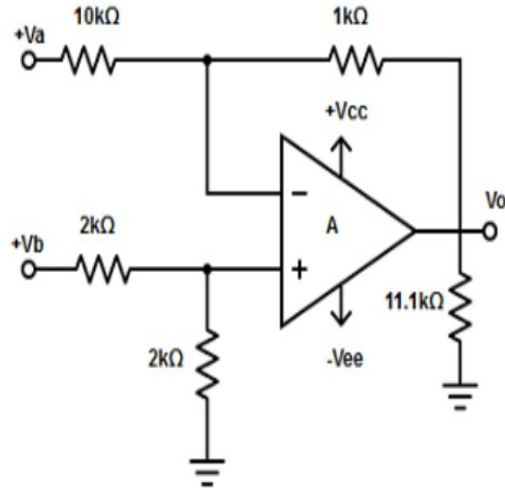
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1 Objective Type Questions - ( Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) (15)**

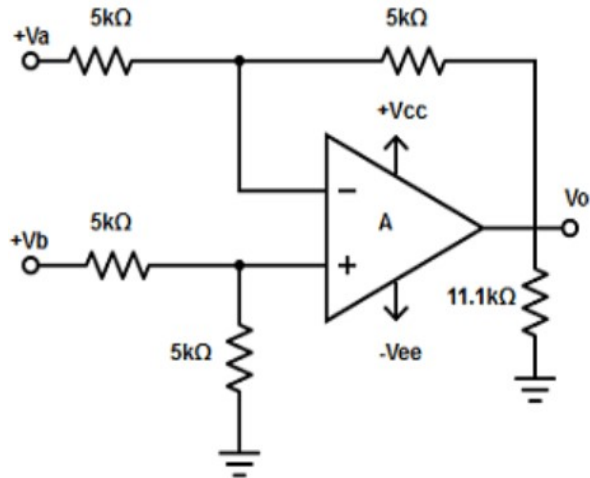
1. For  $\mu A$  741C ,value of Slew Rate is \_\_\_\_\_.
2. The bandwidth of a non-inverting amplifier with feedback is equal to \_\_\_\_\_.
3. Circuit which converts irregularly shaped waveform to regular shaped waveforms is called as \_\_\_\_\_.
4. The circuit in which the output voltage waveform is the integral of the input voltage waveform is called \_\_\_\_\_.
5. In the sample and hold circuit, the period during which the voltage across capacitor is equal to input voltage is \_\_\_\_\_.
6. Write the formula for closed loop voltage gain of inverting amplifier with feedback using open loop voltage gain and gain of feedback circuit.
7. What is the gain of voltage follower?
8. In the frequency response plot, the frequency is expressed in which scale?
9. What is the frequency of oscillation of Wein Bridge Oscillator?
10. What makes the output voltage equals to zero in practical op-amp?
11. Which among the following is not a special case of voltage shut feedback amplifier?
  - a) Voltage follower
  - b) Current to voltage connector
  - c) Inverter
  - d) None of the mentioned
12. Which is not the internal circuit of operational amplifier?
  - a) Differential amplifier
  - b) Level translator
  - c) Output driver
  - d) Clamper
13. Find the differential amplifier configured as a subtractor from the given circuit.
  - a)



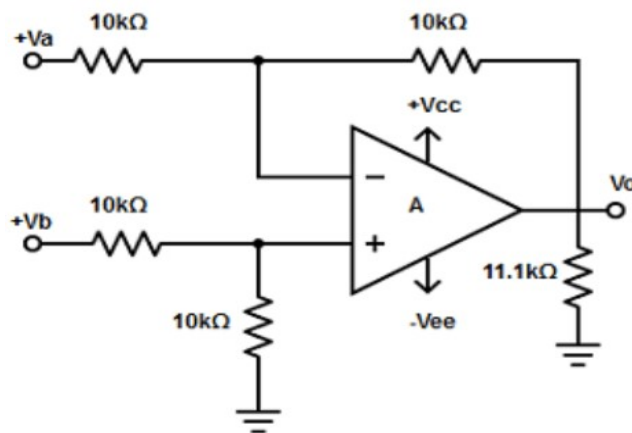
b)



c)



d)



14. Free running frequency of Astable multivibrator?

- a)  $f=1.45/(RA+2RB)C$
- b)  $f=1.45(RA+2RB)C$
- c)  $f=1.45C/(RA+2RB)$
- d)  $f=1.45 RA/( RA+RB)$

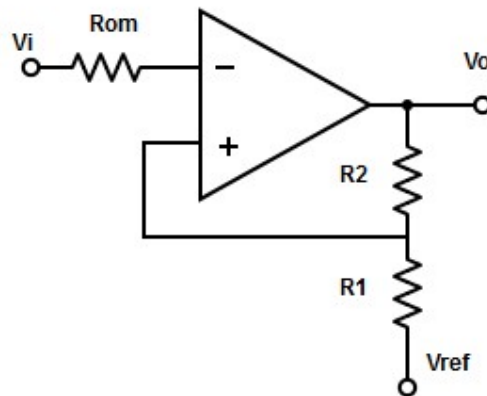
15. Narrow band-pass filters are defined as

- a)  $Q < 10$
- b)  $Q = 10$
- c)  $Q > 10$
- d) None of the mentioned

**Q.2 Answer the following questions. (Attempt any three)**

**(15)**

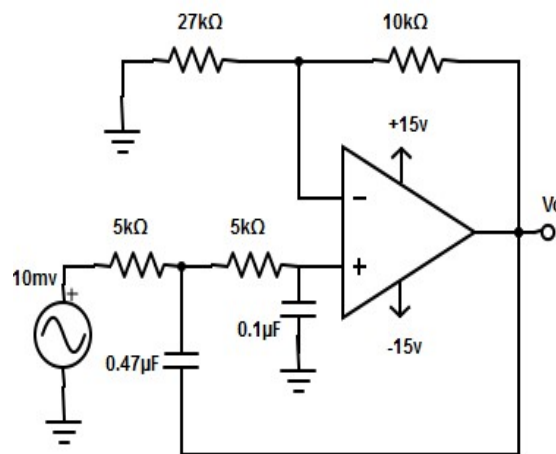
- A) Define below terms: CMRR, PSRR, Input offset voltage, Capture range of PLL and Resolution (ADC).
- B) Draw summing and averaging amplifier in inverting configuration and explain its operation in detail.
- C) Draw Phase shift and Wein Bridge Oscillator and write oscillation frequency equations.
- D) Calculate the hysteresis voltage for the schmitt trigger from the given specification:  
 $R2 = 56k\Omega$ ,  $R1 = 100\Omega$ ,  $V_{ref} = 0v$  &  $V_{sat} = \pm 14v$ .



**Q.3 A) Draw Integrator and differentiator circuit and write output voltage equation of both circuits.**

**(07)**

Consider the following specifications and calculate the high cut-off frequency for the circuit given?



B) Draw first order Low Pass and first order High pass filter along with frequency response and write equations of cut off frequencies.

**(08)**

**OR**

B) List out types of ADCs and DACs. Explain any one type of ADC also find Quantization size of 4 Bit ADC for 0 to 20 V analog signal.

**(08)**

Q.4 A) Explain working of 555 Timer as Monostable Multivibrator. (07)

OR

A) Draw block diagram of Phase Locked Loop . Explain function of each block. (07)

B) Find closed loop voltage gain, the input and output resistance with feedback, bandwidth with feedback and total output offset voltage for the circuit shown. (08)  
Specification for 741 op-amp :  $A=400000$  ;  $R_i = 33M\Omega$ ;  $R_o = 60\Omega$ ;  
 $R_F = 11k\Omega$ ;  $R_1 = 2k\Omega$ ; Supply voltage =  $\pm 15v$ ; Maximum output voltage swing =  $\pm 13v$ .

