

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B. Tech. Winter 2019 - 20 Examination**

**Semester: 4<sup>th</sup>/ 5<sup>th</sup>**  
**Subject Code: 03107254**  
**Subject Name: Integrated Circuit and Application**

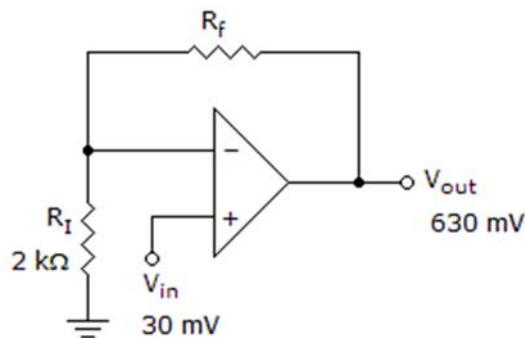
**Date: 07/12/2019**  
**Time: 10:30am to 01:00pm**  
**Total Marks: 60**

**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** (Each of 1 mark)**(15)**

1. Total output offset voltage with feedback is given as \_\_\_\_\_.
2. \_\_\_\_\_ is the example of transducer used in Instrumentation Amplifier using Op-Amp.
- 3.



- The given circuit is \_\_\_\_\_ configuration.
4. Cut off frequency of second order high pass filter is given as \_\_\_\_\_.
  5. The expression for resonant frequency of the op-amp
    - a)  $f_p = 1/[2\pi \times \sqrt{LC}]$ .
    - b)  $f_p = (2\pi \times \sqrt{L})/C$
    - c)  $f_p = 2\pi \times \sqrt{LC}$
    - d)  $f_p = 2\pi/\sqrt{LC}$
  6. The common-mode gain is .....
    - a) very high
    - b) very low
    - c) always unity
    - d) unpredictable
  7. The Op-amp can amplify
    - a) a.c. signals only
    - b) d.c. signals only
    - c) both a.c. and d.c. signals
    - d) neither d.c. nor a.c. signals
  8. What is Barkhausen criterion for oscillation?
    - a)  $A\beta > 1$
    - b)  $A\beta < 1$
    - c)  $A\beta = 1$
    - d)  $A\beta \neq 1$
  9. Define Slew Rate.
  10. Define CMRR.
  11. Draw a differentiator circuit with input-output waveforms.

12. What is VCO?
13. Draw Schmitt trigger circuit.
14. Draw Voltage Follower circuit.
15. List out any four ideal characteristics of OP\_AMP.

**Q.2 Answer the following questions. (Attempt any three) (15)**

- A) Draw block diagram of a typical op-amp and explain functions of each block
- B) What are advantages of negative feedback over positive feedback
- C) What is PLL? Draw block diagram of the PLL system and explain function of each block.
- D) List out applications of 555 as astable multivibrator & monostable multivibrator and explain any one in detail.

**Q.3 A) IC 741 C is connected in Inverting Configuration .Compute the closed loop parameters Af, Rif, Rof, fF, VooT. (07)**

The following data are given for the circuit:

A = 200,000 ,Ri= 2 MOhm ,R0= 75 Ohm ,R1= 470 Ohm ,RF= 4.7 KOhm ,Supply voltage= +/- 15 V ,Maximum Output Voltage swing = +/- 13 V ,UGB= 0.6 MHz, f0 = 5 KHZ

- B) Derive all necessary expressions for voltage gain, input resistance, output resistance and bandwidth for inverting amplifier using op-amp. (08)

**OR**

- B) Design summing, scaling and averaging circuit using Operational amplifier in Inverting configuration. (08)

**Q.4 A) Discuss operation of op-amp based Square wave generator circuit with relevant diagram and waveforms. (07)**

**OR**

- A) Explain wide band-pass filter with necessary circuit, derivation and waveforms (07)
- B) Draw 555 timer block diagram. Explain its working principle. (08)