PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 - 19 Examination

Semester:4/5   Date:01/05/2019
Subject Code: 03107254   Time:02:00pm to 04:30pm
Subject Name: Integrated Circuits and Applications   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.

Do as Directed.   (15)

Multiple choice Questions (1 to 5).

1. Find the output voltage of an ideal op-amp. If V1 and V2 are the two input voltages

    a) $V_O = V_1 - V_2$

    b) $V_O = A \times (V_1 - V_2)$

    c) $V_O = A \times (V_1 + V_2)$

    d) $V_O = V_1 \times V_2$

2. What does the discharge transistor do in the 555 timer circuit?

    a)   charge the external capacitor to stop the timing

    b)   charge the external capacitor to start the timing over again

    c)   discharge the external capacitor to stop the timing

    d)   discharge the external capacitor to start the timing over again

3. Find the unity gain bandwidth for voltage series feedback amplifier?

    a) $UBG = Af_o$

    b) $UBG = Af_F$

    c) $UBG = Af_o f_F$

    d) $UBG = A_F f_o$

4. The two input terminals of an op amp are labeled as

    a)   High and low

    b)   Inverting and non inverting

    c)   Positive and negative

    d)   Differential and non differential

5. A certain noninverting amplifier has R_i of 1 kΩ and R_f of 100 kΩ. The closed-loop voltage gain is

    a)   100,001

    b)   10001

    c)   1001

    d)   101

Fill in the blanks (6 to 10).

6. For Differentiator, if Square wave is input signal than _____wave will be output signal.

7. A voltage follower has _____ voltage gain.

8. For pin diagram of IC741, _____ will be applied on pin number 7.

9. If Vin > + Vref for inverting comparator than _____ will be the output voltage.

10. If $A_{DM} = 3500$ and $A_{CM} = 0.35$, the CMRR is _____.

Define the following terms (11 to 15).

11. Input Offset Voltages

12. Input Capacitance

13. Slew Rate

14. CMRR

15. Offset Voltage Adjustment Range

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

A) List out characteristics of Ideal Op-Amp.

B) Explain the inverting Comparator circuit with waveform.

C) Explain the integrator circuit of Op-Amp with proper waveform.

D) Explain Monostable multivibrator operation for 555 IC.

Q.3 A) Explain Low pass filter using op-amp in detail.   **(07)**

B) Derive the expression of Summing and averaging for non-inverting configuration.   **(08)**

<div align="center">OR</div>

B) Explain Schmitt trigger circuit with waveform and derive the equation of V_{hy}.   **(08)**

Q.4 A) Derive the expression of closed loop voltage gain for inverting amplifier with necessary diagram.   **(07)**

<div align="center">OR</div>

A) Explain in detail : Voltage regulators   **(07)**

B) The 741 Op-amp having the following parameters as a non-inverting amplifier with $R_1 = 1K\Omega$ **(08)**
and $R_F = 10K\Omega$. $A = 200,000$, $R_i = 2M\Omega$, $Ro = 75\Omega$ and $f_o = 5Hz$. Supply voltage $= \pm 15V$ and
Output voltage swing $= \pm13V$. Compute the values of A_f, R_{if}, R_{of}, F_f and V_{ooT}.