Total No. of Pages : 3

| Seat No. | |
|---|---|

# S. Y. (ETC) (Sem. IV)

## Examination, May - 2025

## Linear Integrated Circuits

## Sub. Code : 79182

**Day and Date : Thursday, 15/05/2025** **Total Marks : 70**

**Time : 10.30 a.m. to 1.00 p.m.**

**Instructions : i) Attempt all questions.**

**ii) Use of non-programmable calculator is allowed.**

**iii) Assume necessary data if required and highlight.**



**Q.1 Solve the Following MCQs.** **[14]**

1) The conditions for Oscillation are

A) Loop gain = 1 & total phase shift = 180

B) Loop gain = 1 & total phase shift =90

C) Loop gain =1 & total phase shift =360

D) Loop gain = 1 & total phase shift =270

2) 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

3) For an ideal comparator, what should be the value of the response time?

A) Zero B) Unity

C) Infinite D) Unpredictable

4) What happens when the operating frequency of an op-amp increase?

A) Gain of the amplifier decrease

B) Phase shift between output and input signal decrease

C) Gain and phase shift of amplifier decreases

D) None of these

5) The feedback circuit in Hartley Oscillator is buildup of .....

A) One inductor & two capacitors

B) Two inductor & two capacitors

C) One inductor & one capacitor

D) Two inductor & one capacitor

6) What will be the frequency of output waveform of a square wave generator if $R_2 = 1.16R_1$?

A) $f_0 = (1/2RC)$ B) $f_0 = (1/2RC)$

C) $f_0 = (In/2 \times \sqrt{RC})$ D) $f_0 = (In/2 \times \sqrt{RC})$

7) If the input voltage at non inverting terminal is 3V and output voltage is 12V, Assume gain is 3, then find the input voltage at inverting terminal of Op-amp.

A) -1V B) 2V

C) 1V D) -3V

**Q.2 Answer any TWO.** **[14]**

a) With the help of AC analysis of DIBO differential amplifier / derive an expression for differential gain, common mode gain and input resistance.

b) Explain full wave rectifier circuit using OP-AMP with waveform.

c) Differenciate between inverting and non-inverting amplifier.

**Q.3 Answer any TWO.** **[14]**

a) Derive an expression for summing, scaling and averaging amplifier for inverting configuration.

b) Explain subtractor circuit in detail.

c) An OP-AMP has a slew rate of 0.5V/μs. If the signal varies by 0.25V in l0 μs. Find the maximum voltage gain.

**Q.4 Answer any TWO.** **[14]**

a) Draw internal structure of IC 555 and explain it in detail.

b) Explain in detail square wave generator using OP-AMP and state its applications.

c) Derive an expression for cut of frequency of second order low pass butterworth filter.

**Q.5 Answer any TWO.** **[14]**

a) Design second order L.P.F. for cutoff frequency of 300 Hz. Draw a circuit diagram. Assume C = 0. 1 μF, Pass band Gain= 1.5.

b) Explain IC OP 177 OP-AMP in detail.

c) Classify the oscillators and explain RC phase shift oscillator.