

Government College of Engineering, Amravati

Department of Electronics and Telecommunication

Course Code: ETU 501

Course Name: Linear Integrated Circuit

Date: 5/08/15

Duration: 01 Hr

Marks: 15

Class Test I

Solve following

- ⑥ 1) Explain the Inverting and Non-inverting amplifier of OP-AMP application and find V_o for both amplifier with $V_{sat} = \pm 15V$, $R_1 = 1.5k$, $R_f = 5k$, and $V_{in} = 4V$ **6 MARKS**
- ⑧ 2) Explain OP-AMP integrator with following points **5 MARKS**
 - i) derivation of V_o
 - ii) integrator as low pass filter
 - iii) derivation of cut-off frequency
- ② 3) Explain Astable multivibrator with waveform and calculation of time. ($T = t_d + t_c$) using IC555 Timer **4 MARKS**

GOVERNMENT COLLEGE OF ENGINEERING, AMRAYATI.
Electronics and Telecommunication department.
Sub-ETU501 Linear Integrated Circuits and Applications(Set-A)

(A) Solve any three from following questions

All questions carries equal marks

Q1. With the help of examples explain the term decibel and its advantages over other scheme. An amplifier has a power gain of 800. What is the decibel power gain?

Q2. With the help of sketch and examples explain Bode plot for lead network gain response.

Q3. With the help of a neat sketch explain DC analysis of differential amplifier.

Q4. With the help of a neat sketch explain biasing of Op-Amp by current mirror technique.

Q5. Derive the expression of time delay of a mono-stable multivibrator.

GOVERNMENT COLLEGE OF ENGINEERING AMRAVATI

(An Autonomous Institute of Government of Maharashtra)

Department of Electronics and Telecommunication

Class Test I

Subject: ETU 501 Linear Integrated Circuits and Applications

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Date: 4/08/2016

SOLVE ANY THREE

Q1. List requirements of Instrumentation amplifier and explain three OP-AMP instrumentation amplifier. (5 M)

Q2. (A) Common mode input to certain differential amplifier having differential gain of 125 is $4\sin 200\pi t$. Determine common mode output if CMRR is 60dB. (3 M)

(B) What is need of constant current bias circuit? (2 M)

Q3. Explain voltage to current converter with grounded load. For same converter if $V_{in} = 10$ V and $R = 20$ K Ω and $V_1 = 1$ V, find value of load current and output voltage. (5 M)

Q4. The output voltage of the circuit is as shown in fig(P.T.O) is given by expression $A_1V_1 + A_2V_2$ where V_1, V_2 are input voltages, assuming ideal OP-AMP find A_1 and A_2 . (5 M)

Find output voltage V_o if $V_1 = 10$ V and $V_2 = 5$ V

$$\frac{V_o - V_1}{R} = \frac{V_o - V_2}{R}$$
$$V_o - V_1 = V_o - V_2$$
$$V_o = V_1 = V_2 = V_{in}$$

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GOVERNMENT COLLEGE OF ENGINEERING AMRAVATI

ELECTRONICS AND TELECOMMUNICATION DEPARTMENT

COURSE CODE: ETU501

CT I

MARKS: 15

TIME: 1 Hr

COURSE NAME: Linear Integrated Circuits and Applications

All questions are compulsory; Solve any one sub-question from Q.1

Q.1a

In what different configurations can a differential amplifier be used? 03

Q.1b

Explain the working of Op-Amp non-inverting amplifier. Derive the Expression for its voltage gain. 03

Q.2a

Realize a circuit to obtain $V_{out} = -[2V_1 + 3V_2 + 4V_3]$ using an operational amplifier. Use minimum value of resistance as $10k\Omega$. 03

Q.2b

Why are integrators preferred to differentiator? Explain the various errors in an ideal integrator circuit. How these errors are minimized? 03

Q.2c

Derive voltage to current and current to voltage converter with its application. 03

Q.2d

Explain the working of non-inverting summing amplifier. Derive the Expression for it. 03

Winter 2019 Semester: ____ V

Date: ____ 26/8/2019

CT-1 EXAMINATION

Course: _ETU501LIC

Time: 1 Hr

Marks:15

A) Solve the following questions.(3M)

1. An emitter bias Dual Input Balanced Output differential amplifier has $V_{CC}=20V$, $\beta=100$, $V_{BE}=0.7V$, $R_E=1.3k\Omega$. Find I_E

- a) 7.42mA
- b) 9.8mA
- c) 10mA
- d) 8.6mA

2. Find I_C , given $V_{CE}=0.77V$, $V_{CC}=10V$, $V_{BE}=0.37V$ and $R_C=2.4k\Omega$ in Dual Input Balanced Output differential amplifier

- a) 0.4mA

- b) 0.4A
- c) 4mA
- d) 4A

3. Obtain the collector voltage, for collector resistor (R_C) = $5.6k\Omega$, $I_E=1.664mA$ and $V_{CC}=10V$ for single input unbalanced output differential amplifier

- a) 0.987V
- b) 0.682V
- c) 0.555V
- d) None of the mentioned

B). Find the correct match(2M)

- | Configuration | Voltage gain and I/p resistance |
|-----------------------------------|---|
| 1. Single Input Unbalanced Output | i. $A_d = R_C/r_e$, R_{i1} , $R_{i2} = 2\beta_{ac}R_E$ |
| 2. Dual Input Balanced Output | ii. $A_d = R_C/2r_e$, R_{i1} , $R_{i2} = 2\beta_{ac}R_E$ |
| 3. Single Input Balanced Output | iii. $A_d = R_C/r_e$, $R_i = 2\beta_{ac}R_E$ |
| 4. Dual Input Unbalanced Output | iv. $A_d = R_C/2r_e$, $R_i = 2\beta_{ac}R_E$ |

- a) 1-i, 2-iii, 3-iv, 4-ii
- b) 1-iv, 2-ii, 3-iii, 4-i
- c) 1-ii, 2-iv, 3-i, 4-iii
- d) 1-iii, 2-i, 3-ii, 4-iv

C) Solve Any Two from the following questions.(10M)

- ✓ 1. With the help of graph, discuss the external frequency compensation in detail
- 2. Draw a circuit and explain difference between constant current bias and current mirror circuit.
- 3. Write a short note on, a) Input resistance b) Active load c) Level Translator d) output stage