

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZIANAGARAM
II B. Tech II Semester Supplementary Examinations NOV-2025
ANALOG CIRCUITS DESIGN
(ECE)

Time: 3 hours**Max. Marks: 70**

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions.

Part B Answers any one question from each unit.

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| 1 | PART-A | (20Marks) |
| | a) Draw the frequency response of an amplifier and how to determine its bandwidth. [2]
b) List out the methods of coupling that are used in multistage amplifiers. [2]
c) Present the classification of basic amplifiers. [2]
d) Draw the symbol and electrical model of a piezoelectric crystal. [2]
e) List out the types of Class A power amplifiers. [2]
f) What is meant by crossover distortion in power amplifiers? [2]
g) Draw the circuit diagrams of series and parallel tuned circuits. [2]
h) What are the applications of tuned amplifiers? [2]
i) Draw the basic positive and negative diode clamper circuits. [2]
j) Draw the V-I characteristics curve of Tunnel diode and mention the region of operation. [2] | |
| | PART-B
Unit - I | (50Marks) |
| 2 | a) Perform the analysis of Boot-Strapped emitter follower circuit. [5]
b) Design a two-stage CE-CE amplifier for the given data. $h_{fe1}=h_{fe2}=180$, $R_L=1K\Omega$, $I_{E1}=I_{E2}=1mA$, $S=3$, $V_{CC}=12V$, $f=100Hz$. Assume identical transistors. [5] | |
| | (OR) | |
| 3 | a) Draw the circuit diagram of differential amplifier using BJT and perform the analysis with equivalent circuits [5]
b) Three identical non-interacting amplifier stages are cascaded with an overall gain of 0.3dB down at 50 kHz compared to midband. Calculate the upper cutoff frequency of the individual stages. [5] | |
| | Unit - II | |
| 4 | a) Draw the circuit diagram and derive the expression for frequency of oscillations and condition for oscillations of BJT-LC Colpitt's oscillator. [5]
b) Calculate the Voltage gain, Input Impedance and Output Impedance of a Voltage Series Feedback amplifier having an Open-loop gain $A=300$, $R_i=1.5K\Omega$, $R_o=50K\Omega$ and $\beta=-1/20$. [5] | |
| | (OR) | |
| 5 | a) Draw the circuit diagram and derive the expressions for gain, input resistance and output resistance of a voltage shunt feedback amplifier. [5]
b) In a Colpitts oscillator, the values of the inductors and capacitors in the tank circuit are $L=40\text{ mH}$, $C_1=100pF$ and $C_2=500pF$. (a) Find the frequency of oscillations. (b) If the output voltage is 10V, find the feedback voltage. (c) Find the minimum gains if the frequency is changed by changing L alone. [5] | |

Unit - III

- 6 a) Show that class B push pull amplifiers exhibit half wave symmetry. [5]
b) Consider the Class B amplifier with load resistance of 16 ohm and DC power supply voltage of 12V. If the input ac signal produces a peak voltage output of 6V across the load resistor, find the input power, output power, amplifier efficiency and the power dissipated by the transistor. [5]

(OR)

- 7 a) Derive the expression for maximum value of conversion efficiency of Class A Power amplifier. [5]
b) Draw and explain the circuit diagram of complementary symmetry push pull amplifier. [5]

Unit - IV

- 8 a) Derive the expression for the gain of a single-tuned capacitance coupled amplifier. Discuss about its Selectivity. [5]
b) Explain the effect of cascading doubled tuned amplifiers on bandwidth. [5]

(OR)

- 9 a) Draw the circuit diagram of a double-tuned amplifier and explain different stages of simplification of its equivalent circuit. [5]
b) Write notes on quality factor and bandwidth of parallel tuned circuit. [5]

Unit - V

- 10 a) Perform the analysis of RC differentiator circuit for different input signals. [5]
b) Draw and explain the circuit diagram and wave forms of astable multivibrator using BJT [5]

(OR)

- 11 a) Draw and explain the basic circuit diagrams of positive, negative, biased and combinational diode clippers. [5]
b) Draw and explain the circuit diagram and V-I characteristics of UJT. [5]
