

2003000205020091
EXAMINATION OCTOBER 2024
BACHELOR OF SCIENCE (FIFTH SEMESTER)
ELECTRONICS-VI LEVEL-2
THEORY OF OPERATIONAL AMPLIFIER

[Time: As Per Schedule]

[Max. Marks: 50]

Instructions:

1. Fill up strictly the following details on your answer book

- a. Name of the Examination : **BACHELOR OF SCIENCE (FIFTH SEMESTER)**
 - b. Name of the Subject : **ELECTRONICS-VI LEVEL-2 THEORY OF OPERATIONAL AMPLIFIER**
 - c. Subject Code No : **2003000205020091**
2. Sketch neat and labelled diagram wherever necessary.
 3. Figures to the right indicate full marks of the question.
 4. All questions are compulsory.

Seat No:

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Student's Signature

Q.1 Write the answer briefly

2X4=8

1. What does the term "balanced output" mean in differential amplifier?
2. What is a special case of non-inverting amplifier?
3. What are the characteristics of an ideal op-amp?
4. Draw the pin configuration of IC 741C

Q.2

- A. Derive the expression for closed loop voltage gain in an inverting amplifier. 7
- B. The 741C is configured as an inverting amplifier with $R_1 = 2k\Omega$, $R_F = 30k\Omega$. Compute the closed loop voltage gain. What will be its input resistance? 7

OR

- A. Discuss the ac analysis in a dual input unbalanced output differential amplifier 7
- B. Design a dual input unbalanced output differential amplifier using the diode constant current bias to meet the following specifications. 7
 $V_s = \pm 15V$, Emitter current from each transistor = 4mA, Voltage gain = 100.

- Q.3**
- A. Explain summing and averaging amplifiers using op-amps (non-inverting configuration). 7
- B. In a voltage follower using IC 741C, calculate the values of A_F , R_{iF} , R_{oF} and f_F . 7

OR

- A. Explain the working principle of constant current bias circuit 7
- B. The following specifications are given for the dual- input, unbalanced output differential amplifier: $R_c = 2.2k\Omega$, $R_E = 4.7k\Omega$, supply voltage = $\pm 10V$, $\beta = 100$ and $V_{BE} = 0.7V$. Determine the operating point, voltage gain, input and output resistances 7

- Q.4**
- A. Explain peaking amplifier with a neat diagram and frequency response. 7
- B. Design a peaking amplifier to provide a gain of 50 at a peaking frequency of 20 kHz. 7

OR

- A. Explain the working principle and design of integrator circuit 7
- B. Determine the output voltage in each of the following cases for the open loop differential amplifier using 741C. a) $V_{in1} = 5V$ dc, $V_{in2} = -7V$ dc b) $V_{in1} = 10mV$ rms, $V_{in2} = 20mV$ rms 7
