No. of Printed Pages : 4 **BIEL-011**

00832

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING

Term-End Examination

December, 2011

BIEL-011 : LINEAR INTEGRATED CIRCUITS

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any seven** questions. Each question carries **ten marks**. Use of scientific calculator is allowed. Q - **10** is compulsory.*

1. Draw the circuit diagram of a Dual-Input balanced output differential Amplifier. **10**

Following specifications are provided for a dual input balanced output differential amplifier : $V_{CC} = 10V, -V_{EE} = -10V$ $R_C = 2.2k\Omega$, $R_E = 4.7$, $R_{in1} = R_{in2} = 50\Omega$, $\beta_{dc} = \beta_{ac} = 100$ and $V_{BE} = 0.715V$ typical.

(a) Determine I_{CQ} and V_{CEQ} values.

(b) Determine the voltage gain.

(c) Determine the input and output resistances, (R_{in1}, R_{in2} are source resistances)

2. Draw the basic block diagram of a typical OP-AMP. Explain the role of each block. What is the power supply requirement of an OP-AMP chip. **10**

3. For the inverting Amplifier shown in FIG (3), determine the maximum possible output offset voltage due to : **10**

(a) Input offset voltage

(b) Input Bias current I_B, Assume $V_{io}(MAX) = 6mV$, $I_B(MAX) = 500nA$. What value of ROM is needed to reduce the effect of I_B.

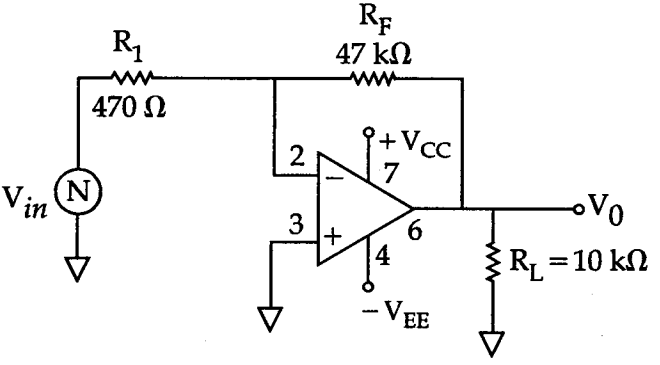

Figure - (3)

4. What is slew rate ? What are its causes ? Derive a general expression for slew rate. **10**

5. What is a Summing Amplifier ? Derive an expression for the output voltage of a summing Amplifier shown in fig (5). **10**

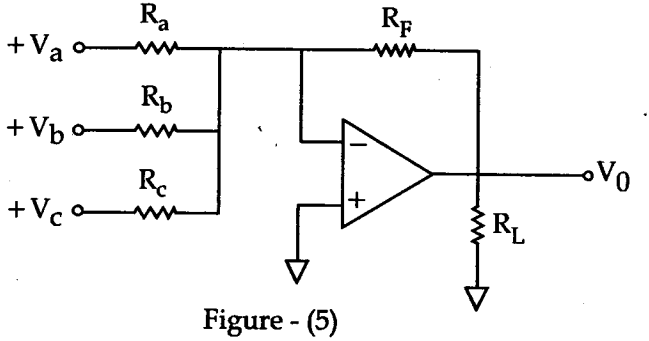

Figure - (5)

6. Draw the circuit diagram of a phase-shift oscillator using OP-AMP. Derive the necessary condition and the frequency of oscillations for the same. **10**

7. Draw the circuit diagram of a sample and hold circuit using OP-AMP IC 741. Explain its operation. **10**

8. Draw the circuit for a First-order high pass butterworth filter. Draw its frequency response and derive an expression for its transfer function. **10**

9. What is a Current Mirror ? Draw a circuit for the same and prove that the output current is approximately equal to the input current. **10**

10. Write short notes on *any two* : **2x5=10**

(a) Zero crossing detector

(b) CMRR

(c) Inverting Amplifier with feedback
