



COMP 3 – 6 (RC)

S.E. (Comp.) (Semester – III) (RC) Examination, November/December 2010 INTEGRATED ELECTRONICS

Duration : 3 Hours

Total Marks : 100

Instructions: 1) Attempt 5 questions.

2) Attempt at least one question from each Module.

3) Assume suitable data if necessary.

MODULE – I

1. a) Draw the circuit diagram of voltage series feedback amplifier and derive an expression for 8
 - i) Voltage gain
 - ii) Input impedance
 - iii) Output impedance
 - iv) Total output offset voltage.
- b) Explain the working of a non-inverting comparator. 6
- c) With the help of a diagram explain the working of an instrumentation amplifier and list the various applications. 6
2. a) Using op-amp implement $V_O = -\left[\frac{V_a + V_b + V_c}{3}\right]$ where V_a , V_b and V_c are the inputs. 6
- b) Explain the electrical characteristics of an ideal op-amp. Also explain the ideal voltage transfer curve with the help of a diagram. 6
- c) Explain the working of an integrator. What are the drawbacks and how are they overcome ? 8

MODULE – II

3. a) Draw a circuit of a voltage regulator based on IC 723 for a higher current rating and a higher output voltage (greater than 10 V). 6
- b) Draw the internal diagram of IC 555 timer and explain the working of IC 555 as an astable multivibrator. 8
- c) Explain the operating principle of PLL. 6

P.T.O.



4. a) Design a regulator for the following specification :
 $V_O = 5\text{ V}$, output current $I_O = 50\text{ mA}$, $V_{in} = 12\text{ V}$, short circuit current $I_{sc} = 75\text{ mA}$, $V_{sense} = 0.65\text{ V}$. 6
- b) Explain the various application of phase locked loop. 6
- c) Write a note on the following (any 2) : 8
- i) Phase detector
 - ii) Low pass filter
 - iii) Applications of Monostable Multivibrator.

MODULE – III

5. a) Define the following terms with respect to logic gates :
i) Fan-out
ii) Power supply requirement
iii) Power dissipation
iv) Noise margin of a logic gate. 4
- b) Draw the circuit diagram of a 2 input TTL Nand gate and explain its operation .
Also verify that it performs Nand logic for all possible input combinations. 8
- c) Explain the working of Diode-Transistor Logic (DTL) circuit. State its advantages over Resistor Transistor Logic (RTL) circuit. 8
6. a) Discuss the advantages of Schottky TTL. 4
- b) With the help of a neat diagram explain ECL OR/NOR gate. State the advantages and disadvantages of ECL gate. 8
- c) Compare the following logic families : 8
- a) TTL (standard)
 - b) ECL
 - c) HTL
 - d) RTL.



MODULE – IV

7. a) Explain the following terms with respect to D/A converter 4
i) Resolution ii) Setting time.
- b) Explain D/A converter with R and 2R resistors. What is the advantages of R and 2R D/A converter over binary weighted resistors D/A converter ? 8
- c) State the advantages of Dual Slope A/D converter. 2
- d) Design a 4 bit weighted resistor DAC whose full scale output voltage is – 5 V. The logic levels are logic 1 = + 5 V and logic 0 = 0 V. What is the output voltage when the input is 6
i) 1101
ii) 0110 ?
8. a) Explain voltage to frequency converter. Derive the necessary expressions for the same. 8
- b) With the help of a neat diagram explain the working of successive approximation A/D converter. 8
- c) Explain the following specification of D/A converter 2
i) Nonlinearity or linearity error
ii) Gain error or offset error.
- d) 8 bit ADC output for all 1's is 5.1 volts. Determine its resolution. 2
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