Student Exam No: _____

GANPAT UNIVERSITY
B.TECH SEM-IV ELECTRICAL ENGINEERING
REGULAR EXAMINATION MAY / JUNE – 2013
2EE 401:- ANALOG AND DIGITAL ELECTRONICS

Time: 3 Hours   Totalmarks: 70

Instruction: - 1 Attempt all questions.
              2 Make suitable assumptions wherever necessary.
              3 Figures to the right indicate full marks.

SECTION – I

Q - 1 (A) List and Discuss all ideal characteristics of an Op Amp   [3]
       (B) Define OP-AMP. Briefly explain (1) SVRR (2) Output voltage swing   [4]
            (3) Slew Rate
       (C) The 741 op amp is configured as a non inverting amplifier with   [5]
            feedback. The following data are given for the circuit. A = 400000, Ri =
            33 MΩ, R1 = 470Ω, RF= 4.7KΩ, R$_O$= 60Ω, Supply voltage = ±15 V,
            Maximum output voltage swing = ±13 V, UGB = 0.6 MHz. Compute the
            closed loop parameter A$_F$, Ri$_F$, Ro$_F$, F$_f$, and Voo$_T$.

Q - 1   OR
       (A) What are the feedback configurations? Draw an Op-amp circuit with voltage   [6]
            series feedback amplifier and Derive an expression of closed loop voltage gain
            for it.
       (B) Explain summing, scaling and averaging amplifier using inverting   [6]
            configuration.

Q - 2 (A) Draw the input and output characteristics of common emitter connection.   [4]
       (B) Give the relation between β and α.   [3]
       (C) A transistor is connected in common emitter configuration in which   [4]
            collector supply is 8V and the voltage drop across resistance R$_C$
            connected in the collector circuit is 0.5 V. The value of R$_C$ = 800 Ω. If
            α=0.96, determine: (I) collector emitter voltage, (II) base current.

                                               OR
Q - 2 (A) List out the various methods used for transistor biasing. Explain any one   [4]
            in details.
       (B) Explain the construction and working of a JFET.   [4]
       (C) Find the value of I$_C$ for potential divider method of biasing if V$_{CC}$ = 9V, [3]
            R$_E$= 1KΩ, R$_1$ = 39 KΩ, R$_2$=10KΩ, R$_C$=2.7 KΩ, V$_{BE}$=0.15V and β=90.

Q - 3   Answer the following question. (Any Three)   [12]
       (A) Sketch the circuit of Op-amp as Differentiator and explain with necessary
            waveforms.
       (B) Explain principle of Basic Comparator. Describe operation of Schmitt
            Trigger with necessary diagram.
       (C) Draw & Discuss IC 555 as astable multivibrator.
       (D) Draw typical connection diagram of LM317 voltage regulator. Find its
            output voltage

Q - 4 (A) Convert following.   [6]
          (I) $(1101)_{10} = (?)_2$
          (II) $(E52C9)_{16} = (?)_2$
          (III) $(25C.E)_{16} = (?)_8$

     (B) (I) Convert following by using stream line method.   [6]
             $(111001.101)_2 = (?)_{10}$
        (II) What is parity? Types of Parity? Explain even parity.
        (III) Convert following in Excess-3 code.
             $(8794)_{10} = (?)_{EX-3}$

OR

Q - 4 (A) (I) Using 1's complement method perform following binary subtraction.   [6]
             $(0101)_2-(1010)_2$
        (II) Convert following in Excess-3 code.
             $(3512)_{10} = (?)_{EX-3}$
     (B) Convert following.   [6]
          (I) $(25.FA)_{16} = (?)_8$
          (II) $(8135)_{10} = (?)_2$
          (III) $(110011)_2 = (?)_{Gray}$

Q - 5 (A) Explain rules for simplification of k-map.   [6]
     (B) Simplify following function using k-map.   [5]
          $f(A,B,C,D) = \sum m(1,2,9,10,12,13,14)$

OR

Q - 5 (A) Explain NAND, EX-OR and EX-NOR gates with electrical circuits and   [6]
        truth tables.
     (B) Using De Morgan's theorem prove that following.   [5]
        $A\bar{B}C + B + B\bar{D} + AB\bar{D} + \bar{A}C = B + C$

Q - 6 Answer the following question. (Any Three)   [12]
     (A) Draw the full adder circuit and explain it by using two half adder circuit
        with their truth table.
     (B) Explain BCD to 7 segment decoder? Draw the Truth table for common
        cathode display.
     (C) Explain R-S flip flop.
     (D) Explain T flip flop.

END OF PAPER