Government College of Engineering, Amravati
(An Autonomous Institute of Government of Maharashtra)

Third Semester B. Tech. (Instrumentation Engineering)

Winter – 2016

Course Code: INU305   **Course Name: Digital Electronics**

Time: 2 Hrs. 30 Min.   **Max. Marks: 60**

Instructions to Candidate
1) All questions are compulsory; solve any two sub-questions from Q1, Q2 and Q3.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.

Q1 A Describe the ways of representing negative numbers in binary. Why 2's complement method is preferred more for signed number representation? **6M**

B Describe the Gray's Code, enlist their properties and importance and explain BCD to Gray's code convertor. **6M**

C Perform following substraction using 9's and 10's complement methods; Why complemented addition is performed instead of substraction?
$(786-538.85)_{10}$ **6M**

Q2 A Simplify the given function using Quine-McCluskey method and verify the result using K-maps.
$Y(A,B,C,D,E)=\Sigma m\{0,2,5,7,13,15,18,20,23,28,31\}+d(21,29)$ **6M**

B Convert the following standard SOP form expression to equivalent reduced SOP form, reduced POS form and Standard POS form expressions
$$Y = \bar{A}\bar{B}C + A\bar{B}\bar{C} + ABC$$ **6M**

C What is the need of look ahead carry generator circuit? Design the same suitable for four bit *parallel addition*.   **6M**

Q3 A Design a 1-bit magnitude comparator. Draw and explain logic circuit of 5 bit magnitude comparator using minimum number of IC7485 ICs.   **6M**

B Describe the working of Master-Slave JK flip-flop mentioning its importance.   **6M**

C What are the types of Shift Registers? Describe a shift register having facility of parallel loading and shifting along with parallel outputs.   **6M**

Q4 A What are the types of Digital to Analog(D/A) convertor? Describe R-2-R ladder and define the term resolution concern with D/A conversion.   **6M**

B Describe the following semiconductor memories
   a. CCD   b. Flash Memory   c. RAM Cell   **6M**

Q5 A Describe field programmable gate array (FPGA)? Explain the configurable logic blocks with necessary block diagram.   **6M**

B Describe following characteristics of digital ICs: **6M**
   i. Fan-in   ii. Fan-out   (2M)
   iii. Propagation delay   iv. Noise Margin   (4M)