B Tech (COE/SE/IT) IVth semester
Digital Electronics- (EC-262)

Max marks :30   Time:1.5Hrs

Note: Attempt ALL questions. Assume suitable missing data, if any.

Q1 (a) Simplify the following expression using relations of Boolean algebra
$$F(w,x,y,z)=wxy' + ((w'y')\odot x) +(y\oplus wz)$$ (3)

(b) What are various ways in which signed numbers can be represented? (2)

(c) Given $F1 = \pi(0, 4, 5, 6)$ and $F2 = \pi(0, 4, 7)$, find the maxterm expression for f where f= F1.F2.   (3)

(d) Determine the base of the numbers in each case for the following operations to be correct:

  i)   54/4=13   ii) 24+17=40   (2)

Q2. Using tabulation method Realize the function F given by
$$F(A,B,C,D)= \sum m(0,1,2,4,6,10,14)+ d(3,11,13)$$ (5)

Q3. Design a circuit which will multiply a 2-bit binary number CD by 2, 3, or 5, depending on the value of a 2-bit code AB (00, 01, or 10 respectively), to produce a 3-bit result XYZ. If the result has a value greater than or equal to 7 , XYZ should be 111 to indicate an overflow. Assume that the code AB= 11 will never occur. Design your circuit using only two, three, and four-input NOR gates and inverters.   (5)

Q4. Design full subtractor using only two 4x1 multiplexers   (5)

Q5. Design a binary full adder circuit using 3-to-8 decoder with active low output and any gates.   (5)