Jaypee Institute of Information Technology, Noida

T1 Examination, 2018
B.Tech, III Semester

Course title: Digital Electronics — **Maximum Time: 1Hr**
Course Code: 15B11EC312 — **Maximum Marks: 20**

Q1. (A) Convert the following numbers with the indicated bases to decimal: **1+1+2+1+1= 6 Marks**

(a) $(4310)_5$

(b) $(ABCD)_{16}$

(B) The following decimal numbers are shown in sign-magnitude form: +9,286 and +801. Convert them to signed-10's-complement form and perform the following operations:

(a) (-9,286) + (+801)

(C) Express the following function as a sum of minterms and as a product of maxterms:

(a) F (A, B, C, D) = B'D + A'D + BD

(D) Perform following operation using R's complement

(a) $(2120)_9 - (78)_9$

(E) Reduce the following Boolean expressions to the indicated number of literals:

(a) (x'y' + z)'+ z + xy + wz) to three literal

Q2. Minimize the following Boolean function using K-MAP and also find prime implicants and essential prime implicants: **3 Marks**

$F(A, B, C, D,E) = \Sigma(0, 1, 4, 5, 16, 17, 21, 25, 29)$

Q3. Simplify the following Boolean functions, using Quine McCluskey method **3 Marks**

$F(A, B, C, D)$ = A'BC'D'+A'BC'D+ A'BCD'+ A'BCD+ ABCD

Q4. (a)Design a code converter circuit that converts a decimal digit from the 8, 4, –2, –1 code to BCD code. **3 Marks**

(b) Design a 3-bit magnitude comparator circuit. **3 Marks**

(c) Design a full-subtractor circuit with three inputs x, y, B_{in} and two outputs *Diff* and B_{out}. The circuit subtracts $x - y - B_{in}$, where B_{in} is the input borrow, B_{out} is the output borrow, and *Diff* is the difference. **2 Marks**