Total No. of printed pages = 3

EI/Co/It-403/DE/4th Sem/2013/N

DIGITAL ELECTRONICS

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Convert the following : 2×5=10

(i) 10101011.11_2 = ...10

(ii) 587.50_{10} = ...16

(iii) $AFF4_{16}$ = ...8

(iv) 427_8 = ... 16

(v) 10111010_2 = ... gray

(b) (i) Write the next two octal numbers :

25, 26, 27, ——— , ———.

(ii) Write the next two hexadecimal numbers

1C, 1D, 1E, ———, ——— 4

[Turn over

2. (a) Perform subtraction using 1's and 2's complement : 2×5=10

(i) 101011 – 10110

(ii) 11011 – 100111

(b) Define 1's complement and 2's complement. Convert 11010110 into 1's and 2's complement. 4

3. (a) State and prove De Morgan's theorems. 2×5=10

(b) Find dual of : 2×2=4

(i) $A + 1 = 1$

(ii) $A\overline{A} = 0$

4. (a) Using K-map minimize the following :
$f(A, B, C, D) = \Pi M\ (4, 5, 6, 10, 14)$
(M stands for maxterms). 10

(b) Draw the logic diagram for the above minimize expression. 4

5. (a) Using Boolean algebra prove : 2×5=10

(i) $(A+B)(B+C)(C+A) = AB + BC + CA$

(ii) $\overline{A}\,\overline{B}\,\overline{C} + \overline{A}BC + A\overline{B}\,\overline{C} + AB\overline{C} = \overline{C}$

(b) Define NAND gate with truth table and draw the logic symbol. 4

6. (a) Draw the logic diagram of a JK flip-flop and explain its working principle. 8

(b) Draw and explain a four bit serial-in serial-out shift register. 6

7. Write short notes on any *two* : 7×2=14

(i) Full subtractor

(ii) Digital comparator

(iii) ASCII code.