

**R09**

Code No: R09220204

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD****B.Tech II Year II Semester Examinations, May-2013****Switching Theory and Logic Design****(Common to EEE, ECE, BME, ETM)****Time: 3 hours****Max. Marks: 75****Answer any five questions  
All questions carry equal marks**

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- 1.a) Convert the decimal number 234 to binary, octal and hexadecimal number systems.
- b) Find the canonical product-of-sums form for the function  $F(x,y,z) = x'y' + z'x'$ .
- c) Find the sum of  $-8 + 2$  using signed 2's complement representation. (5+5+5)
- 2.a) Prove the following identity  $xy + x'y' + yz = xy + x'y' + x'z$ .
- b) Simplify the given function  $F(w, x, y, z) = \Sigma (0, 1, 2, 3, 4, 6, 7)$  to minimum number of literals. (6+9)
- 3.a) For the given function  $F(w, x, y, z) = \Sigma (0, 1, 2, 3, 4, 6, 7, 9, 11, 15)$
- i) Show the K-map
- ii) Find all prime implicants and indicate which are essential.
- iii) Find a minimal expression for F and realize using basic gates. Is it unique?
- b) Design a 16x1 multiplexer using 4x1 multiplexers only. (10+5)
4. Use tabulation procedure to generate the prime implicants and essential prime implicants and to obtain all minimal expression for the given function  $F(A, B, C, D) = \Sigma (1, 5, 6, 12, 13, 14) + d (2, 4)$ . (15)
- 5.a) Define static hazard. Illustrate with example.
- b) Design a combinational circuit that converts the given binary number to excess-3 code. (6+9)
- 6.a) Design a mod-10 counter using JK flip-flops.
- b) Write the characteristic table, characteristic equations and excitation table for RS, T and D flip-flops. (7+8)
- 7.a) Illustrate the completely specified function with example. Write a procedure to design completely specified functions.
- b) Define the terms primitive flow table and reduced flow table. (10+5)
8. Write short notes on
- a) Incompletely specified functions
- b) Asynchronous state machines
- c) Logic synthesis. (5+5+5)

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