

GANPAT UNIVERSITY
B. TECH SEM- III COMPUTER ENGINEERING
REGULAR EXAMINATION- NOV-DEC 2015
2CE302: DIGITAL ELECTRONICS

TIME: 3 HRS

TOTAL MARKS: 60

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
 (2) Figures on right indicate marks.
 (3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1 A. Perform the following conversions and find x_1, x_2 . (5)

1. $(321.12)_4 = (x_1)_2$

2. $(AF5.C8)_{16} = (x_2)_8$

B. Obtain the simplified expression in SOP form using K-map. (5)

$F(a, b, c, d) = \Sigma(0, 2, 4, 5, 7, 8, 10, 12, 13, 15)$

OR

Q.1 A. A warning buzzer with 3 switches A, B and C is to sound (1 in output) when the following conditions apply: (5)

Switches A, B, C are on.

Switches A and B are on but switch C is off.

Switches A and C are on but switch B is off.

Switches C and B are on but switch A is off.

Draw a truth table for this situation and obtain a Boolean expression for it.

B. Convert decimal number 820 into binary and then convert this binary into BCD, excess-3 and gray code. (5)

Q.2 A. Find the complements of the functions $F_1 = x'yz' + x'y'z$ and $F_2 = x(y'z' + yz)$. (6)

B. A logical function of 3 variables is given as $f(A, B, C) = (A+BC)(B+C'A)$. Find the canonical SOP form of expression. (4)

OR

Q.2 A. Perform the following arithmetic operations and find Y_1, Y_2 . (6)

1. $(ADD)_{16} + (DAD)_{16} = Y_1$

2. $(9674)_{16} - (7461)_{16} = Y_2$

B. Find the base (radix) of a number system such that the following equation holds: (4)

$321/20 = 13.1$

Q.3 A. Simplify the following Boolean function by using the tabulation method: (6)

$F(w, x, y, z) = \Sigma(0, 1, 2, 8, 10, 11, 14, 15)$

B. Show that $AB + (AC)' + AB'C (AB + C) = 1$ using Boolean rules and laws. (4)

SECTION: II

Q.4 A. Explain encoder. Design a decimal to BCD encoder. (5)

B. What is difference between multiplexer and de-multiplexer. Implement the Boolean function $F(a, b, c) = \sum(1, 2, 4, 5)$ by using suitable multiplexer. (5)

OR

Q.4 A. Design SR and D flip flop with its truth tables. (5)

B. Draw the truth table of full adder and also design the full adder using 2 half adders. (5)

Q.5 A. Design a 3-bit even parity generator and checker circuit. (5)

B. Derive the characteristic equation of T flip-flop. Also draw the state transition diagram of T flip flop. (5)

OR

Q.5 A. What are the different types of counters? Explain Johnson counter of 4 flip-flops. What are the possible states and number of clock pulses applied to it? (5)

B. Explain parallel in parallel out shift register. List out the various applications of shift register. (5)

Q.6 A. What is the designing procedure of synchronous counters? Design a mod -6 synchronous counter. (5)

B. Design SR flip-flop using JK flip-flop. (5)

-----END OF PAPER-----