



140

COMSATS - Lancaster Dual Degree Programme
COMSATS Institute of Information Technology Lahore

Terminal – Spring 2017

Course Title:	Digital Logic and Design [Theory]	Course Code:	EEE 241	Credit Hours:	4(J,1)
Course Instructor/s:	Ramsha Bukhari, Amna Arif, Taimoor Naeem, Ayesha Ali				
Semester:	3 rd	Batch:	FA14 + Fall 16	Section:	G1+ A
Time Allowed:	180 Minutes		Maximum Marks:	100	
Student's Name:			Reg. No.	CIIT/	

Important Instructions / Guidelines:

- All answers must be given on the answer books.
- The exam is closed book, closed notes.
- Mobile phones are not allowed in the examination room.
- There will be no negative marking.
- Sharing of Calculator is not allowed. (Use your own calculator).

Question No. 1:

[4*5=20 Marks]

- a. Convert the decimal number 430 to Excess-3 code.
- b. Convert the binary number 10110 to Gray code.
- c. How to design AND gate using 2:1 Multiplex.
- d. Design D Latch from S-R Latch.
- e. What is difference between latch and flip-flop.

Question No. 2:

[20 Marks]

Specify the truth table of an octal-to-binary priority encoder. Provide an output V to indicate that at least one of the inputs is present. The input with the highest subscript number has the highest priority. What will be the value of the four outputs if inputs D2 and D6 are 1 at the same time.

Question No. 3:

[6+6+8=20 Marks]

A sequential circuit has two JK flip-flops A and B, two inputs x and y, and one output z. The flip-flop input equations and circuit output equation are:

$$J_A = Bx + B'y' \quad K_A = B'xy' \quad J_B = Ax' \quad K_B = A + xy'z = Ax'y' + Bx'y'$$

- A. Draw the logic diagram of the circuit.
- B. Tabulate the state table.
- C. Derive the state equations for A and B.

Question No. 4:

[20 Marks]

K10

Design a sequential circuit with two D flip-flops A and B and one input x-in.

- (a) When x-in = 0, the state of the circuit remains the same. When x-in = 1, the circuit goes through the state transitions from 00 to 01, to 11, to 10, back to 00, and repeats.
- (b) When x-in = 0, the state of the circuit remains the same. When x-in = 1, the circuit goes through the state transitions from 00 to 11, to 01, 10, back to 00, and repeats.

Question No. 5:

[10+10=20 Marks]

- a) Design a synchronous counter that counts through the sequence 2, 6, 1, 7, 5.
- b) Design a sequential circuit that detects the serial input sequence of '10010' and produces a HIGH output as a response

