

Course Instructor:	M. Hassan Aslam and Nesrumnillah	Programme Name:	OSE
Semester:	2 nd	Batch:	FA16
Time Allowed:	180 Minutes	Maximum Marks:	50
Student's Name:		Reg. No.	CHT/ /LHR

Important Instructions / Guidelines:

- This is a closed book examination.
- Use of mobile & calculator is strictly forbidden during the examination.
- Attempt all the questions; there is NO choice in the questions.
- All answers must be given on the answer books.

Question 1:

[5]

Convert the following numbers from the given base to the other three bases as indicated in Table 1.

Table 1

Hexadecimal	Octal	Binary
EE		
	24	
		11100

Question 2:

[5]

Find the minimum SOP (Sum of Product) expression of the following function.

$$F(A, B, C, D) = \sum m(2, 4, 8) + \sum d(0, 3, 7)$$

Question 3:

[10]

In a production line of XYZ company, rods of different weights travel on a conveyor belt. A mechanical arm pushes rods that are not within weight specification off the belt to one side. Rods that are within weight specification remain on the belt. The conveyor belt is equipped with weight sensor system; this system has three outputs: i.e. overweight, underweight and normal, one of these outputs give HIGH signal depending upon the weights of the rod. Whereas, the mechanical arm is activated by HIGH input signal. The production manager wants that If the rod is in normal weight range, then it should remain on the conveyor else the mechanical arm should be activated to push the rod off the belt to one side. Furthermore, if the weight sensor system gives no value or more than one value as an output then a red light must be indicated to show that the weight sensor system is not working accurately. Now being a design engineer you are required to design a system that can control the mechanical arm and red light, so that only overweight and underweight rods can be pushed off the conveyor belt.



Question 4:

115

Refer to the circuit provided in Figure 1. Derive the state table, state equations, output equation and state diagram of the circuit.

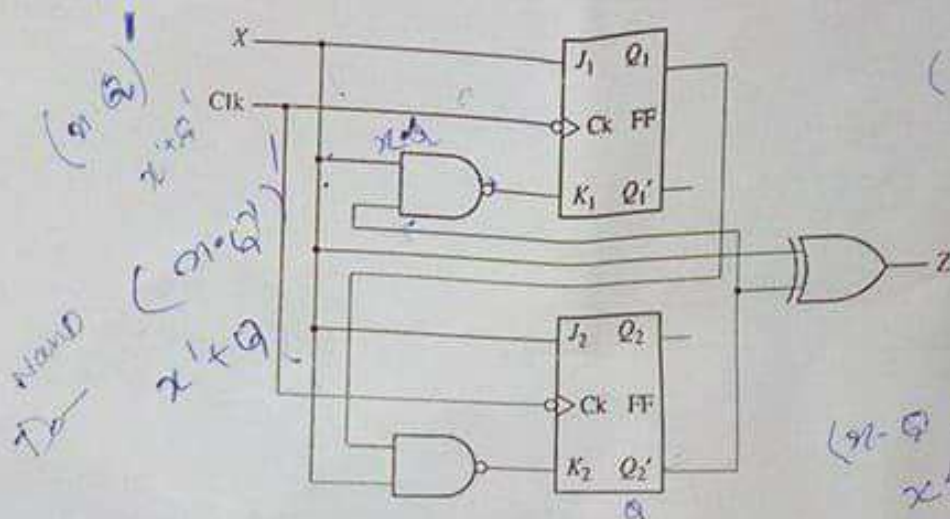


Figure 1

Question 5:

[15]

Design a sequential circuit that produces a HIGH output when three consecutive 0s have been applied to input, and LOW otherwise. You are required to provide the state diagram, state table, state equations and circuit diagram. You may choose the flipflop of your own choice.

End of Paper

Q8' $\oplus$ x

Q8'		
1	0	
1	1	0
0	0	0
0	1	1
1	0	1
1	1	1
0	0	0
0	1	1