

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FOURTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019**

**Course Code: EE204**

**Course Name: DIGITAL ELECTRONICS AND LOGIC DESIGN (EE)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks*

		Marks
1	Convert $AD_{16}$ to its equivalent decimal and binary form.	(5)
2	Express $F = \prod M(1,5,7)$ using SOPs and POSs and minimize the expression.	(5)
3	What is meant by race around condition? How can it be avoided?	(5)
4	Realise a full adder using the 3x8 decoder.	(5)
5	Explain Johnsons ring counter with an example.	(5)
6	What is the difference between a Moore and Mealy machines? Explain with examples?	(5)
7	Explain the working of a three-bit R-2R ladder DAC.	(5)
8	Implement $F = \sum m(2,3,4,5,7)$ using PAL.	(5)

**PART B**

*Answer any two questions, each carries 10 marks*

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|----|--|-----|
| 9  | a) Determine the range of numbers that can be represented using signed bit, 1's complement and 2's complement form for a word length of 8 bits. Also represent and using word length of 8 bit in signed bit, 1's complement and 2's complement form. | (5) |
|    | b) Digital data is to be transmitted with even parity for transmitting the letter A in ASCII code. Discuss how is parity added to digital data to detect errors in transmission?   | (5) |
| 10 | a) Draw and explain the operation of TTL NAND gate.  | (5) |
|    | b) Simplify the Boolean expression using K-map and draw the logic diagram.<br>$F(A, B, C, D) = \sum m(0,1,5,12,13,15) + d(1,3,5,6)$  | (5) |
| 11 | a) Convert gray code to binary and hexadecimal.  | (3) |
|    | b) Minimize the Boolean expression $F=AB'C'+C'D+BD'+A'C$ using K -map and implement the logic circuit using NAND gates only.   | (7) |

## PART C

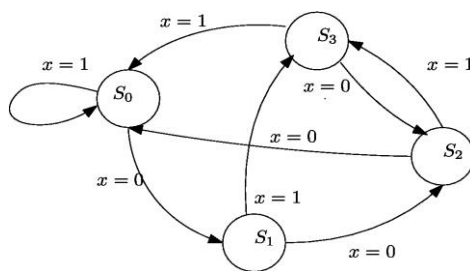
*Answer any two questions, each carries 10 marks*

- 12 a) Realise the Boolean expression  $F = \Sigma m(1,5,7,15)$  using a 4 x 1 Multiplexer (5)  
 b) Realise a full adder using two half adders. (5)
- 13 a) Discuss the different types of shift registers. (5)  
 b) Design a 3 bit asynchronous counter using JK flip flops. (5)
- 14 a) What is a glitch? Show the timing diagram for a Mod 6 asynchronous counter (5)  
 showing the glitches in the diagram.  
 b) How can a 2:4 decoder be used as 1:4 Demultiplexer? (5)

## PART D

*Answer any two questions, each carries 10 marks*

- 15 a) Develop the logic circuit diagram and table for 4-bit ring counter and explain the working. (5)  
 b) Explain the working of Flash type ADC. (5)
- 16 Develop the state diagram and design the sequential circuit using T flip flops. Also, draw the logic circuit diagram. (10)



$$S_0 = 101, S_1 = 111$$

$$S_2 = 110, S_3 = 011$$

- 17 a) Bring out the differences between a PAL and PLA. (4)  
 b) Write a VHDL program for a Full Adder (use structural approach). (6)

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