

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 $F = \Pi M(1,5,7)$ 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 $F = \Sigma m(2,3,4,5,7)$ using PAL. | (5) |

PART B

Answer any two questions, each carries 10 marks

- | | | |
|----|--|-----|
| 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.
$F(A,B,C,D) = \Sigma m(0,1,5,12,13,15) + d(1,3,5,6)$ | (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

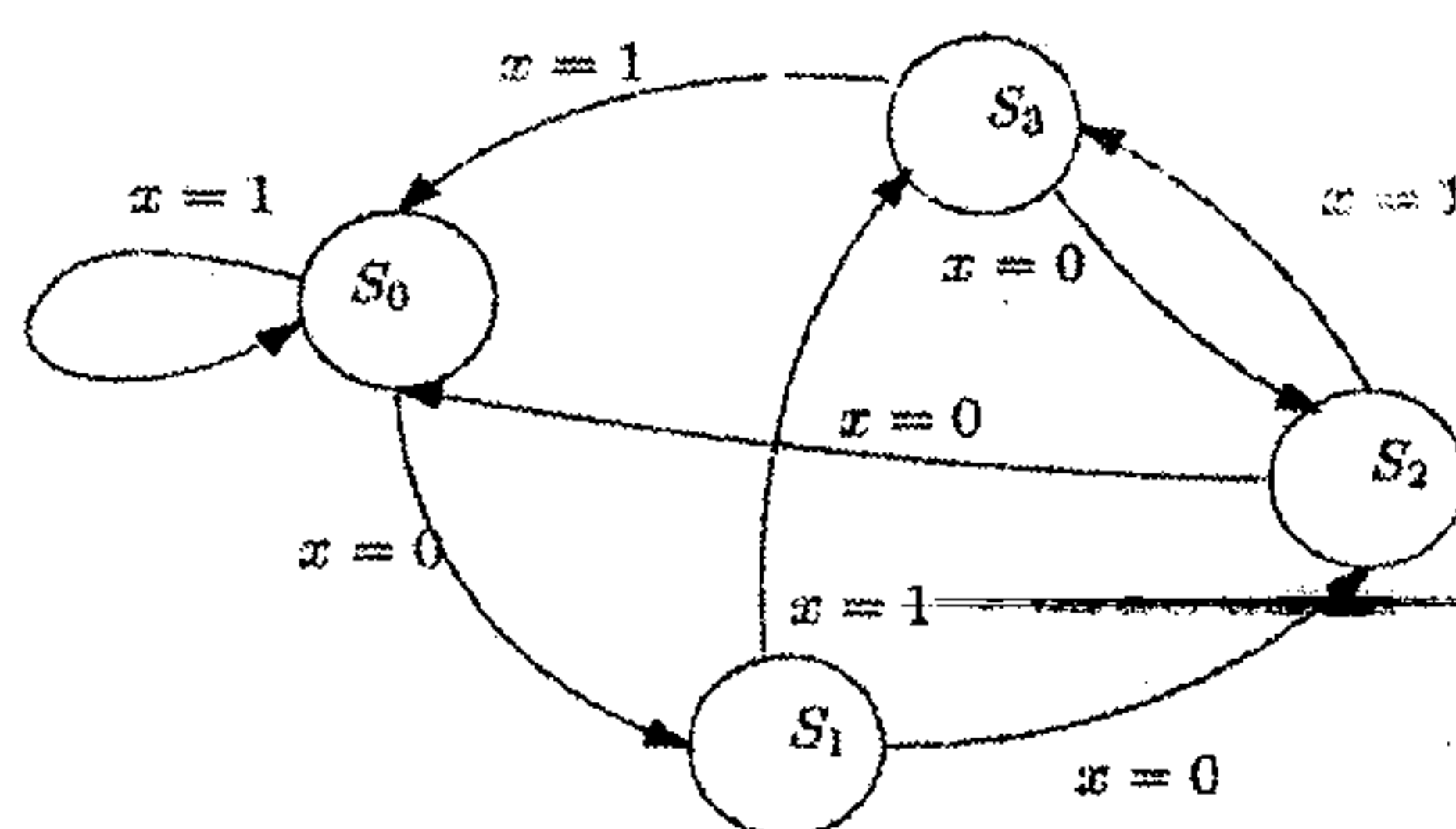
Answer any two questions, each carries 10 marks

- 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)
