

**N.B. :** (1) Question No. 1 is **compulsory**.

(2) Attempt any **three** questions out of **remaining five**.

(3) **Each** question carries **20** marks and sub-questions carry **equal** marks.

(4) Assume suitable **data** if required.

1. (a) Draw the state diagram for non-overlapping sequence "1100". 5
- (b) What is the difference between signal and variable. 5
- (c) Explain various elements used in ASM charts. 5
- (d) Explain the clock management used in FPGA. 5
  
2. (a) For the given logic diagram in Figure 1 below, draw the state diagram 10

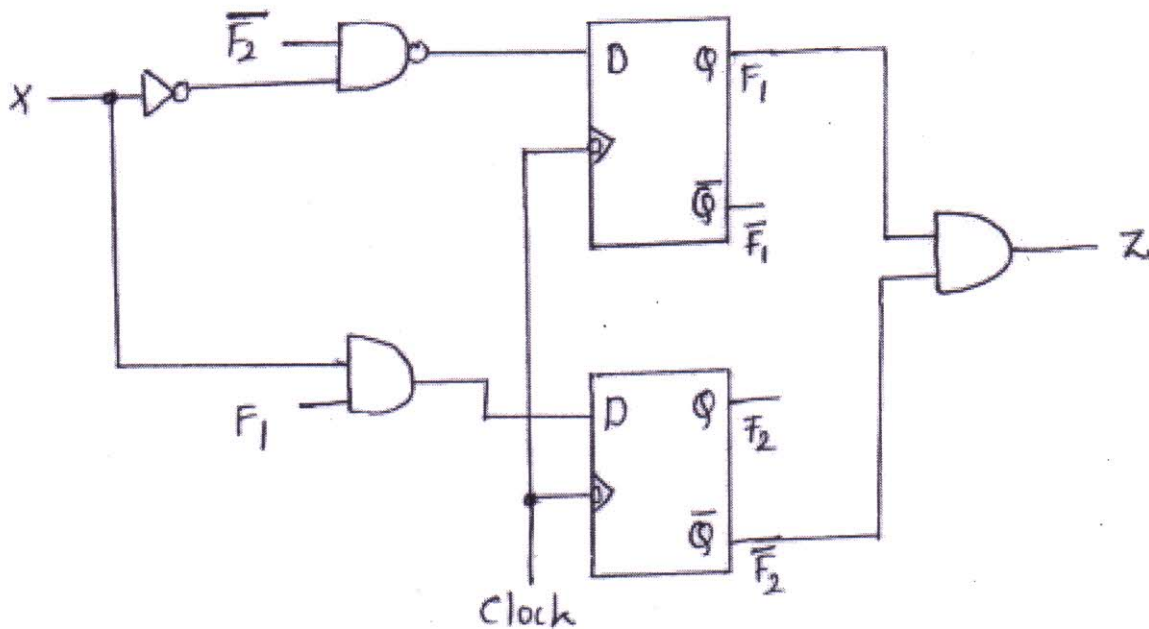


Figure 1

[ TURN OVER

- (b) A state diagram of a sequential machine is shown in Figure 2 below. Recognize the type of machine. Identify the redundant state. Obtain the simplified state diagram. Also design the machine. 10

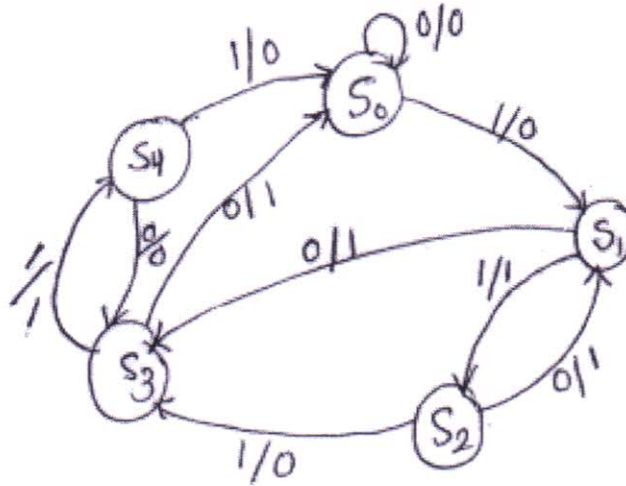


Figure 2

3. (a) Draw state diagram for BCD counter. Write a VHDL code for this state machine. 10
- (b) Write a VHDL code for shift register. Use "Generic" and attributes in the code. List all the attributes used. 10
4. (a) Using Data / controller partitioning method. Draw ASM charts for bit counting circuit and explain it. 10
- (b) Using WITH / SELECT / WHEN write a VHDL code for 8 : 1 multiplexer. 10
5. (a) Explain in detail the structure of SRAM based FPGA. 10
- (b) Write VHDL code for 4 bit carry look ahead adder. 10
6. Write short notes on any **three** of the following :— 20
  - (a) RTL Simulation
  - (b) Data Types in VHDL
  - (c) State Reduction Techniques
  - (d) ARRAYS in VHDL.

Time : 3 Hours

[Total Marks: 80]

Note: 1. Question No. 1 is compulsory.

2. Solve any three from the remaining questions.

3. All questions carry equal marks.

1 .a. Explain Content providers and Intents w.r.t. Android operating system (05)

b. Explain low power features for ARM Cortex M3. (05)

c. List and explain the factors that contribute to Interrupt latency in Embedded systems. (05)

d. Explain OSFlagPost() and OSFlagPend() functions of the MicroOS/II (05)

2. a. Explain Multi-processor Priority Ceiling Protocol with a relevant example. (10)

b. Explain the Context Saving process and Retrieval process in MicroOS/II (10)

3. a. Schedule the following Task Set using the next Fit algorithm for RM (10)

scheduling where  $T_i=(e_i, p_i)$

T1(5,10)            T2(7,21)            T3(3,22)            T4 (1,24)            T5(10,30)

T6(16,40)            T7 (1,50)            T8(3,55)            T9(9,70)            T10 (17,90)

T11(21,95)

b. Explain the structure of Android applications. (10)

4. Design an embedded system for a Railway Ticketing database system. For this design (20)

(a) Requirement Analysis

(b) Describe system functioning using appropriate method/model

(c) Draw hardware block-diagram of the system

(d) Show software modules/functions/drivers

(e) Testing and Debugging techniques

5. a. Explain the working principle of RFID. Elaborate on the RFID Middleware Functionality. (10)

b. Explain the Memory Management Unit of ARM Cortex M3. (10)

6. Write short notes on: (Any Two) (20)

a. Real-time sytem Design Issues

b. New strategies for assigning Real-time tasks to Multi-processor systems

c. Hardware-Software Co-Design issues

ME ELX SEM-II (CBCGS) DATE- 23/05/2017. Q.P. Code: 13535

Duration-3 hrs

Maximum Marks: 80

- N.B : 1. Question No. 1 is Compulsory  
 2. Answer any 3 questions from remaining five questions  
 3. Figures to right indicate full marks  
 4. Assume suitable data if required.

- Q.1 a) Describe multistage implementation of sampling rate conversion. (20)  
 b) Derive Wiener Hopf equation.  
 c) Explain RLS algorithm.  
 d) Define Periodogram .How it can be smoothed?
- Q.2 a) Derive the equation for the spectrum of an interpolated signal by a factor  $I$ . Draw the spectral diagrams. (20)  
 b) Describe sampling rate conversion by a rational factor  $I/D$  with equations.
- Q.3 a) Derive Schur algorithm. (20)  
 b) Derive AR lattice structure.
- Q.4 a) Describe any one nonparametric method of PSD estimation. (20)  
 b) Explain the Blackman and Tukey method of smoothening the periodogram.
- Q.5 a) Explain the LMS algorithm with equations. (20)  
 b) Describe the properties of RLS algorithm.
- Q.6 Explain the following topics in details with diagrams. (20)  
 a) Biomedical applications of DSP.  
 b) Applications of DSP in speech processing.

ME ELX / SEM II / CBCGS / DT-25/5/2017

Q.P. Code :18262

(Time: 3 hours)

Total Marks: 80

Please check whether you have got the right question paper.

- NOTE: 1. Question 1 is compulsory. Attempt any three of the remaining five questions  
2. Draw figures wherever necessary

- Q.1. **Answer any four of the following:** 20
- Explain the Power control and Power saving mechanisms in Wireless networks.
  - Bring out the salient features of MANETS.
  - Differentiate between Cellular networks and Adhoc Networks.
  - Explain the significance of "Hidden stations" and "Exposed stations" in Wireless networks.
  - Bring out the advantages and disadvantages of Reactive (On demand) routing protocols.
- Q.2.a) Explain the following operations of Mobile IP: 10  
(i) how the Correspondent Node(CN) communicates with Mobile Node(MN)  
(ii) Tunnelling
- b) Give the classification of MAC protocols. Explain any one Contention based MAC protocol. 10
- Q.3.a) Give the classification of routing protocols for MANETS.Explain DSDV routing protocol with an example. 10
- b) Bring out the features of Clustering and Hierarchical Routing. In WSN. Explain the LEACH (Low –Energy Adaptive Clustering Hierarchy) Protocol in detail. 10
- Q.4.a) What is meant by data gathering in WSN? Discuss briefly few algorithms that implement data gathering. 10
- b) Explain with a neat diagram , sensor node technology of Wireless sensor networks 10  
And discuss the various applications of WSN.
- Q.5.a) Explain the issues and design goals of Transport layer protocol for Adhoc networks. Explain briefly why the TCP does not perform well in Adhoc wireless networks 10
- b) Explain Data Dissemination methods in WSN. 10
- Q.6 **Write short note on (any FOUR)** 20
- Spectral sensing in Cognitive Radio networks
  - MAC Frame format in Wireless LANs
  - Classification of Multicast routing in MANETS
  - Dynamic source Routing and its advantages.
  - QOS issues in MANETS