Registration no: | | | | | | | | | | |

Total Number of Pages: 2 **M.TECH**
CSPE210

2nd Sem Mtech Regular / Back Examination – 2014-15
EMBEDDED SYSTEMS
BRANCH(S): CSE
Time: 3 Hours
Max marks: 70
Q.CODE:T412/ T413

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

a) What are the major features of an embedded system?
b) Why are micro controllers used to design embedded systems?
c) Briefly explain the design flow of embedded systems.
d) How are VLSI and SOC related to embedded systems?
e) Differentiate between serial and parallel I/O ports.
f) What are the bits available in CPSR?
g) What are the major features of a real time operating system?
h) List the different type of power dissipation in embedded systems.
i) Which approach of I/O is energy efficient – Polling or Interrupt driven? Explain briefly.
j) What is state chart?

Q2 a) Write an assembly language programs using ARM instruction set to read a byte from an I/O mapped port addressed 80H and write its 2's complement to another I/O mapped port addressed 82H (i) using polling, and (ii) using interrupt I/O. (5)

b) Suppose the input and output ports are memory mapped with addresses 2002H and 2004H. What are the changes required to rewrite the programs asked in Q2. (a)? (5)

Q3 a) Differentiate between hard real time, firm real time and soft real time scheduling. (5)

b) Explain periodic, sporadic, and aperiodic tasks with suitable examples. (5)

Q4 Discuss the various dynamic and static power reduction techniques used to design energy efficient embedded systems at (i) Architecture level, (ii) Operating system level and (iii) compilation level. (10)

Q5 a) What is a bus? What are the different types buses found in processor? (5)

b) Explain the utilities of serial and parallel I/O bus. (5)

Q6 a) How a processor is selected for to design an embedded system? (5)

b) Draw the UML and state chart diagrams for an embedded system that (5)

will behave as an Electronic Voting Machine.

Q7 a) What is hardware-software partitioning? Briefly discuss the approaches of software-hardware partitioning. (5)

b) A micro controller-based system to monitor the temperature of a water bath can be realized (i) by a hardware approach with the help of an Analog-to-Digital converter, and (ii) by a hardware-software mix using a Digital-to-Analog converter and a comparator. Compare the two approaches with respect to cost, performance and power. (5)

Q8 (5 x 2)

a) What are device drives?

b) Differentiate between clock driven and event drive scheduling.

c) Why is it necessary to design embedded systems which are thermal aware and battery aware?

d) Considering the hardware-software partitioning schemes K-L partitioning, partitioning using genetic algorithm, and particle swarm optimization, whichscheme is superior, whenand why?