

(3 Hours)**Total Marks: 80****NB:**

- 1) Question no. 1 is compulsory
- 2) Solve any three from the remaining five questions.
- 3) Assume suitable additional data if necessary.

Q1 Answer the following questions.**(20)**

- a) Justify the need for brown-out detection circuit in embedded systems environment and the mechanism of implementing the same.
- b) With respect to power, performance and cost state and explain the associated design metrics for an embedded system.
- c) Explain the structure of typical C source program for ARM based target processor. Typically list the various data types along-with memory size supported by a C compiler.
- d) What are interrupts and explain the factors that contribute to interrupt response time in a system.

Q2 a) With regards to Cortex – M3 architecture, explain the various states and its modes of operation. **(10)**

b) Explain the utilisation bound in task scheduling in light of Rate Monotonic Scheduling algorithm. **(10)**

Q3 a) What is a task and various states that a task can lie in for an embedded environment. **(10)**

b) Explain briefly the memory and bus structure in Cortex-M3 architecture. **(10)**

Q4 a) Explain briefly the serial communication protocol RS 232. What are the advantages of RS – 485 over RS -232 communication. **(10)**

b) Explain the operation and significance of following MicroC/OS – II functions

a) OSSemCreate(); OSSemPend(); OSSemPost(); b) OSInit(); OSStart(); (10)

Q5 a) Compare the features of Cortex – A8 and Cortex - R4 architectures. (10)

b) Explain the various inter-process/task communication and synchronisation

tools like semaphores, mutex, mailbox and pipe used by an RTOS environment.

(10)

Q6) Write short notes on (Any two) (10 x 2) (20)

a) Problem of priority inversion and mechanism to prevent the same.

b) MSP-430 architecture and its low power capability.

c) Design metrics for a typical embedded system.

d) Black-box and White-box testing
