

Time: 3 Hours

Marks: 80

- 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) With respect to power, performance and cost state and explain the associated design metrics for an embedded system.
 - b) List and explain issues in H/W-S/W co-design
 - c) With the help of an example explain APERIODIC task. List and explain the various types of tasks in an embedded system
 - d) Explain briefly interrupt and exception handling in Cortex-M3 architecture.
 - e) What is a deadlock condition? Suggest any 2 techniques to mitigate it.
- Q2 a) With regards to Cortex – M3 architecture, explain the various states and its modes of operation. (10)
- b) Explain Priority Inheritance Protocol and Priority Ceiling Protocol with a suitable example (10)
- Q3) a) Explain the CAN Protocol with a suitable Real Life example. (10)
- b) State and explain the criteria for tasks schedulability and explain various scheduling mechanisms. (10)
- Q4) a) Design an embedded system for a Microwave highlighting its a) Specification requirements (choice of components), hardware requirement (Block Diagram) and c) Software architecture (10)
- b) Explain the operation and significance of following freeRTOS functions. (10)
- i) Task Creation, Task Delete
 - ii) Message Queue
 - iii) Semaphore
- Q5) a) Explain resource management and interrupt management feature in FreeRTOS. (10)
- b) List key features of ARM Cortex processors and highlight its suitability for few embedded applications. (10)
- Q6) Write short notes on (Any Four) (20)
- a) Waterfall model used in EDLC.
 - b) NVIC of ARM cortex.
 - c) Write short note on Time Management features in free-RTOS.
 - d) Binary, Counting Semaphores with suitable example
 - e) Black box and White box testing.
