

BE1-R4: EMBEDDED SYSTEMS

NOTE:

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.
 - a) Why do we need multiple action and multiple controlling tasks for devices in an embedded system? Explain with the help of example.
 - b) How do you measure the performance of an embedded system?
 - c) Why should the embedded system RTOS be scalable.
 - d) What are two features provided by the ARM architecture that are unique to the FIQ exception (than other types of exceptions), which minimize the overhead involved in executing the FIQ handler routine?
 - e) Discuss any four applications of embedded system with examples.
 - f) What are the two essential units of a processor of an embedded system? Explain.
 - g) Define ROM image and explain its each section in brief.

(7x4)

2.
 - a) Explain the Embedded System design flow. Give the Embedded System design hierarchy.
 - b) What is prototyping?

([6+4]+8)

3.
 - a) Compare CISC and RISC processors? Define system on chip (SOC) with an example.
 - b) List the advantage of a processor that maps the addresses of IO ports and devices like a memory device. Give a diagram to interface the port devices with the system buses.

([6+4]+[4+4])

4.
 - a) What is UART? Discuss its types.
 - b) What is scheduling policy?

(16+2)

5.
 - a) Discuss the three methods by which an RTOS responds to a hardware source call on interrupt?
 - b) Explain the three alternative systems in three RTOS for responding a hardware source call with the diagram.

(6+12)

6.
 - a) With a neat sketch, explain the CAN data frame format and typical bus transactions on the IC bus.
 - b) What is simulator? Explain its features. What are the improvements over firmware software debugging?

(6+[5+7])

7. Write short notes on **any three** of the following:
 - a) Watchdog timer
 - b) SET-TOP box
 - c) Challenges in embedded system design
 - d) Analog-digital converters

(3x6)