MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

EC-704B

EMBEDDED SYSTEMS

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable. All symbols are of usual significance.

GROUP A
(Multiple Choice Type Questions)

1. Answer *all* questions. $10 \times 1 = 10$

(i) The instruction set of RISC processor is

(A) simple and lesser in number
(B) complex and larger in number
(C) simple and larger in number
(D) complex and lesser in number

(ii) What is the number of general purpose I/O lines supported by the standard 8051 architecture?

(A) 8 (B) 16
(C) 32 (D) 64

(iii) The timer used for baud rate generation should run in

(A) mode 0 (B) mode 2
(C) mode 3 (D) mode 4

(iv) Which of the following is a hardware description language?

(A) C (B) VHDL
(C) C++ (D) None of these

(v) Multiprocessor system contain

(A) multiple CPUs (B) single CPU
(C) no CPU (D) none of these

(vi) Multitasking involves

(A) context switching (B) context saving
(C) context retrieval (D) none of these

(vii) For a good scheduling algorithm the response time should be

(A) minimum (B) maximum
(C) varying (D) average

(viii) The state where a process is incepted into the memory and awaiting the processor time for execution is known as

(A) blocked state (B) ready state
(C) completed state (D) waiting state

(ix) Which of the processor architecture supports easier instruction pipelining?

(A) Hardvard (B) von Neuman
(C) Both of them (D) None of these

(x) Which of the following synchronizing technique follow the "sleep and wake up" mechanism?

(A) Mutex (B) Semaphore
(C) Critical section (D) Spin lock

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. With suitable examples, classify embedded systems based on their complexity and performances. 5

3. Explain the differences between process and thread. 5

4. Explain the differences between SIMD, MIMD and VLIW architectures. 5

5. State the advantages and disadvantages of programming using C++ in an embedded system. 5

6. Explain the HDLC protocol. 5

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) Compare the SPL, SI and SCI port for serial data communication. 10
   (b) "A good example of an embedded system is a mobile phone" – justify the statement. 5

8. (a) What do you mean by RTOS? List the basic functions of an RTOS in an embedded system. 2+5
   (b) Explain various types of non-preemptive scheduling techniques. 8

9. (a) Differentiate between an embedded system and a general computing system. 5
   (b) Briefly describe the various hardware units of a typical embedded system. 10

10. (a) Explain the various hardware-software codesign issues in embedded systems. 5
   (b) Describe the various building blocks of UML. 10

11. Write short notes on any *three* of the following: 3×5
   (a) Microprocessors vs Micro-controllers
   (b) UART
   (c) USB
   (d) Embedded C
   (e) Semaphore
   (f) DFG vs CDFG program modelling.