

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech/(EE-NEW)/SEM-6/EE-604D/2013
2013
EMBEDDED SYSTEMS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :
10 × 1 = 10

- i) RTOS is one which
 - a) allows flexible scheduling of the system resource to several task
 - b) controls task synchronization
 - c) it is an operating system for microcontroller
 - d) it is an operating system for preemptive scheduling.
- ii) An architecture used in any microcontroller is called
 - a) Harvard architecture
 - b) Vonneuman architecture
 - c) Princeton architecture
 - d) both (a) and (c).

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- iii) Which of the following describes the ROTS design philosophy best ?
 - a) Maximize the throughput of the system
 - b) Maximize the processor utilization
 - c) Maximizing the response time
 - d) Response within certain stipulated time period.
- iv) Which one of the following scheduling algorithms checks the rate of occurrence of the task ?
 - a) RAM
 - b) EDF
 - c) Co-operative
 - d) All of these.
- v) Cyclic scheduling is best for which of the following tasks ?
 - a) Aperiodic
 - b) Sporadic
 - c) Periodic
 - d) None of these.
- vi) Which software architecture is the most complex ?
 - a) Round robin
 - b) Round robin with interrupt
 - c) Functional queue scheduling
 - d) RTOS.
- vii) 8051 is bit microcontroller.
 - a) 16
 - b) 8
 - c) 32
 - d) none of these.
- viii) A small scale embedded system is designed with bit microcontroller.
 - a) 8
 - b) 16
 - c) 32
 - d) 8 or 16.

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- ix) Automobile engine control system is the example of
- a) soft real time b) hard real time
 - c) both (a) and (b) d) none of these.
- x) Which of the following devices is not an embedded system ?
- a) Cell phone b) Mainframe
 - c) Modem d) Automobile.
- xi) Real time means
- a) actual time
 - b) time from start of task
 - c) time measure using system clock of RTOS
 - d) time that has a fixed unalterable zero reference in which a clock advances at constant interval and which cannot be reloaded
- xii) Object code is
- a) input of assembler b) output of assembler
 - c) intermediate code d) none of these.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Explain Round robin scheduling algorithm in embedded system.
3. What is shared data problem ? Briefly discuss the solution to overcome this problem.
4. What is priority inversion problem ?
5. Describe the design methodology of embedded system.
6. How to initialize USART in synchronous mode ?

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GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. What is an embedded system ? What its applications ?
What are the components of embedded system hardware ?
In how many times can the embedded system be classified ?
Describe them. $2 + 2 + 5 + 6$
8. a) What is Round robin architecture ?
b) What are its drawbacks ?
c) How Round robin with interrupt can solve the problem ?
d) Why do we need an RTOS in an advanced system ?
 $7 + 5 + 3$
9. Compare SPI, I²C, USART stating the possible application areas. How to decide the clock source and the reference voltages for 16F877 AD module operation ? $3 + 3 + 3 + 6$
10. What is target system ? What is an emulator ? What are the various components of an emulator ? What are the advantages of using an ICE ? $2 + 3 + 4 + 6$
11. a) Explain the functioning of input-output ports of PIC16F877.
b) What is watchdog timer ?
c) Discuss the CCP module of PIC16F877. $6 + 2 + 7$
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