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BIEL-024

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

December, 2015

BIEL-024 : EMBEDDED SYSTEMS DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *Question no. **1** is **compulsory**. Attempt any **four** from the rest. All questions carry equal marks. Use of scientific calculator is permitted.*

1. Choose the correct answer for the following questions : *7×2=14*

(a) An embedded system hardware can

(i) have microprocessor(s) or microcontroller(s) or single purpose processor(s)

(ii) have digital signal processor(s)

(iii) one or several microprocessor(s) or microcontroller(s) or digital signal processor(s) or single purpose processor(s)

(iv) not have single purpose processor(s)

(b) Which of the following best describes the RTOS design philosophy ?

(i) Maximize the throughput of the system.

(ii) Maximize the processor utilisation.

(iii) Maximize the response time.

(iv) Response within certain stipulated time period.

(c) Which of these scheduling policies is most suitable for controlling a set of periodic tasks ?

(i) FCFS

(ii) Least laxity first

(iii) Earliest deadline first

(iv) Rate monotonic policy schedule

(d) A CALL instruction allows specifying _____ address in the instruction and calling subroutine within _____ program memory block.

(i) 2 bytes, 3 k

(ii) 11 bits, 2 k

(iii) 9 bits, 2 k

(iv) 1 byte, 3 k

(e) Which of the following instructions is a logical instruction ?

(i) CPL A

(ii) JC rel

(iii) DA A

(iv) ANL A, Rn

(f) Seven-segment LED display glows on vertical and middle segments only. The displayed character will be _____ .

(i) H

(ii) B

(iii) A

(iv) E

(g) Integrated Development Environment (IDE) consists of

(i) editor, compiler

(ii) RTOS, debugger

(iii) emulator, simulator

(iv) editor, simulator and debugger

2. (a) Discuss various software tools in the designing of an embedded system.

(b) What are the various processors used in designing an embedded system as a SOC (system on chip) ? 7+7

3. Briefly explain the following Addressing modes with reference to the 8051 microcontroller : *4+4+3+3*

(a) Immediate Addressing mode

(b) Register Addressing mode

(c) Direct Addressing mode

(d) Indirect Addressing mode

4. (a) Interface an 8-bit DAC to an 8051-based system to generate a Triangular waveform with an amplitude of +4 V and a frequency of 256 Hz.

(b) Explain the interrupt routines in an RTOS environment. *7+7*

5. (a) Explain the basic architecture of 8051 microcontroller with a suitable diagram. *6*

(b) Discuss the following briefly : *4×2=8*

(i) Interrupt handling

(ii) Timing subroutines

(iii) Serial data transmission

(iv) Serial data communication

6. (a) Explain how a stepper motor is interfaced to an 8051 microcontroller, with the help of a circuit diagram.

(b) Write an assembly language program for arranging the given array of numbers in an ascending order. *7+7*

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) The I2C BUS

(b) SHARC Link Ports

(c) IEEE 1149.1