KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2014)

Sixth Semester

ELECTICAL AND ELECTRONICS ENGINEERING

U14EET604**:** Embedded System

COURSE OUTCOMES

CO1: Distinguish between general purpose system and embedded system, classify various I/O devices and is able to interpret the protocols used in device.

CO2: Gain in depth knowledge on hardware architecture of basic Microcontroller and able to apply the issues involved in real-time device interfacing along with assembly level programming.

CO3: Outline RTOS concepts and able to apply the hardware and software knowledge to design and develop simple firmware modules.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code   CO2 [K_1]

List I	List II
A. Clear screen	i. 0x04
B. Cursor decrement	ii.0x01
C. Display shifts to left	iii.0x07
D. Display ON, cursor OFF	iv.0x0C

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	ii	iv

2. The address of which register is pushed into the stack by CPU automatically, when an   CO2 [K_2]
    interrupt occurs

    a) Stack pointer   b) Program Counter

    c) Working Register   d) Status Register

3. Which bit condition results in setting the GIE bit of INTCON automatically?   CO3 [K₃]

    1. Execution of RETFIE instruction at the beginning of the ISR

    2. Execution of RETFIE instruction at the end of ISR

    3. Execution of RETFIE instruction along with interrupt enable bit

    4. Execution of RETFIE instruction along with interrupt disable bit

    a) Only 1   b) Only 2

    c) 1,3   d) 2,4

4. Which timer is used to turn off the mobile display when there is no GUI interaction?   CO1 [K₁]

    a) RTC   b) Hardware timer

    c) Watchdog timer   d) Software timer

5. Assertion (A) : Embedded systems are used to give the response in real time.   COL [K_L]

    Reason (R) : It consists of the real time systems that allow the correct information to be

    passed to get the correct responses.

    a) Both A and R are Individually true and   b) Both A and R are Individually true but
        R is the correct explanation of A   R is not the correct explanation of A

    c) A is true but R is false   d) A is false but R is true

6. TRIS registers are   CO1 [K₂]

    a) Read and Write only   b) Not accessible

    c) Read only   d) Write only

7. Sequence the steps involved in the process of pre-emption   CO3 [K₃]

    1. Low priority task is resumed and execution is completed.

    2.   Higher priority task is executed by the CPU

    3. Low priority task is utilizing CPU time

    4. Higher priority tasks interrupts the processor and context switching happens

    a) 2-3-4-1   b) 1-3-2-4

    c) 3-4-2-1   d) 4-1-3-2

8. _____ instructions are present in PIC microcontroller.   COL   [K_L]

    a) 35   b) 12

    c) 120   d) 45

9. Assertion (A): Kernel space functions executes faster than user space functions.   CO3 [K₂]

   Reason (R): Kernel operates in supervisory mode.

   a) Both A and R are Individually true and   b) Both A and R are Individually true but
      R is the correct explanation of A   R is not the correct explanation of A

   c) A is true but R is false   d) A is false but R is true

10. Which register is mandatory to get loaded at the beginning of transferring contents to   CO2 [K₂]
    corresponding destination registers?

    a) Working Register   b) INDF

    c) PCL   d) All of the above

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. Define embedded system.   CO1 [K₁]
12. What is CAN bus? Where is it used?   CO1 [K₁]
13. Draw the frame format of STATUS register in PIC.   CO2 [K₂]
14. Write an assembly language program to continuous turn on and off LED using PIC.   CO2 [K₃]
15. What is the purpose of GIE bit in PIC?   CO1 [K₁]
16. Why hex file format is needed?   CO1 [K₁]
17. What is signal conditioning unit?   CO2 [K₁]
18. Draw the interfacing circuit of temperature sensor with PIC.   CO2 [K₃]
19. Define Semaphore.   CO1 [K₁]
20. Mention the different types of RTOS.   CO3 [K₁]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. With a Real time example how hardware is controlled with software in an embedded   CO3 [K₃]
    system.

22. i) Compare synchronous and Asynchronous communication.   (7)   CO1 [K₁]
    ii) Write short notes on PCI protocol.   (7)

23. Draw and explain the architecture of PIC 16F877 microcontroller. CO2 [K$_2$]

24. Discuss the various instructions in PIC 16F877 with an examples. CO1 [K$_1$]

25. Describe the characteristics and operation of ADC in PIC 16F877 microcontroller. CO1 [K$_1$]

26. Write an embedded c program to interface Multiplexed LED display with PIC microcontroller. CO2 [K$_2$]

27. i. Explain the concept of Interrupt Service Routine in RTOS. (7) CO3 [K$_1$]

ii. Draw the kernel architecture and explain its blocks. (7) CO3 [K$_1$]

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