Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2024

EE3EI02 / EX3EI02 Embedded Systems

Programme: B.Tech. Branch/Specialisation: EE/EX

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. Which of these designs considers both the software and hardware during the embedded design? **1**

(a) Peripheral Design (b) Platform-Based Codesign

(c) Software/Hardware Design (d) Memory Design

ii. Which of the following is distributed embedded system: **1**

(a) Cell Phone (b) Notebook Computer

(c) SCADA (d) All of these

iii. Which memory storage is widely used in PCs and Embedded Systems? **1**

(a) EEPROM (b) Flash memory (c) SRAM (d) DRAM

iv. Which type of memory is suitable for low volume production of embedded systems? **1**

(a) Non-volatile (b) RAM

(c) Volatile (d) ROM

v. Which crucial feature/function of Brown-Out-Reset (BOR) makes the PIC to be completely unique and distinct from other microcontrollers? **1**

(a) It can reset the PIC automatically in running condition

(b) It can reset the PIC even when the supply voltage increases above 4V

(c) It can reset the PIC without enabling the power-up timer

(d) All of these

vi. The watchdog counts up and _____ the MSP430 when it reaches the limit? **1**

(a) Resets (b) Halt

(c) Continue the process in (d) None of these

vii. Which of the following is a part of RTOS kernel? **1**
(a) Register (b) ISR (c) Memory (d) Input

viii. The special tale in the multitasking operating system is also known as- **1**
(a) Task control block (b) Task access block
(c) Task address block (d) Task allocating block

ix. Which one of the following is a synchronization tool? **1**
(a) Thread (b) Pipe (c) Semaphore (d) Socket

x. Remote procedure calls are used _____. **1**
(a) For communication between two processes remotely different from each other on the same system
(b) For communication between two processes on the same system
(c) For communication between two processes on separate systems
(d) None of these

Q.2 i. Classify the various categories of embedded system. **2**
ii. What is an embedded system? What are the components of embedded system? **3**
iii. Explain briefly about characteristics of embedded system. **5**
OR iv. Mention the various applications of an embedded system and explain in detail. **5**

Q.3 i. Write a short note on RAM and its types. **3**
ii. What is sensor? Explain its role in embedded system design. Illustrate with an example. **7**
OR iii. Explain the different external communication interfaces in brief. **7**

Q.4 i. Explain brown-out protection circuit in embedded system. **3**
ii. Describe watch dog timer and real time clock. **7**
OR iii. Explain embedded firmware design approaches. What is the difference between 'Super loop' and 'OS' based embedded firmware design? **7**

Q.5 i. What is an operating system? Where is it used and what are its primary function? **4**
ii. Explain task in the operating system context. Explain how threads and processes are related. What are common to process and threads. **6**
OR iii. Explain multiprocessing and multitasking. Explain the various factors to be considered for the selection of a task scheduling criteria. **6**

Q.6 Attempt any two:
i. Explain task synchronization techniques and issues. **5**
ii. Explain remote procedure call and sockets. **5**
iii. Explain device drivers and its generic functions. **5**

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Marking Scheme
Embedded Systems (T) - EE3EI02/ EX3EI02 (T)

Q.1	i)	Which of these designs considers both the software and hardware during the embedded design? c. Software/Hardware Design		1
	ii)	Which of the following is distributed embedded system: d) All of these		1
	iii)	Which memory storage is widely used in PCs and Embedded Systems? d) DRAM		1
	iv)	Which type of memory is suitable for low volume production of embedded systems? a) Non-volatile		1
	v)	Which crucial feature/function of Brown-Out-Reset (BOR) makes the PIC to be completely unique and distinct from other microcontrollers? a) It can reset the PIC automatically in running condition		1
	vi)	The watchdog counts up and resets the MSP430 when it reaches the limit? **resets**		1
	vii)	Which of the following is a part of RTOS kernel? b) ISR		1
	viii)	The special tale in the multitasking operating system is also known as a) task control block		1
	ix)	Which one of the following is a synchronization tool? c) semaphore		1
	x)	Remote Procedure Calls are used _____ c) for communication between two processes on separate systems		1
Q.2	i.	Classify the various categories of embedded system.		2
	ii.	What is an embedded system? What are the components of embedded system?	1.5 Marks 1.5 Marks	3
	iii.	Explain briefly about characteristics of embedded system.		5
OR	iv.	Mention the various applications of an embedded system and explain in detail.	2 Marks 3 Marks	5
Q.3	i.	Write a short note on RAM and its types.	2 Marks 1 Marks	3
	ii.	What is sensor? Explain its role in embedded system design. Illustrate with an example.	2.5 Marks 2.5 Marks 2 Marks	7
OR	iii.	Explain the different external communication interfaces in brief.	3 Marks 4 Marks	7
Q.4	i.	Explain brown-out protection circuit in embedded system.		3
	ii.	Describe watch dog timer and real time clock.	3.5 Marks 3.5 Marks	7
OR	iii.	Explain embedded firmware design approaches. What is the difference between 'super loop' and 'OS' based embedded firmware design.	5 Marks 2 Marks	7
Q.5	i.	What is an operating system? Where is it used and what are its primary function?	2 Marks 2 Marks	4
	ii.	Explain task in the operating system context. Explain how threads and processes are related. What are common to process and threads.	2 Marks 2 Marks 2 Marks	6
OR	iii.	Explain multiprocessing and multitasking. Explain the various factors to be considered for the selection of a task scheduling criteria.	2 Marks 2 Marks 2 Marks	6
Q.6		Attempt any two:		
	i.	Explain task synchronization techniques and issues.	3 Marks 2 Marks	5
	ii.	Explain remote procedure call and sockets.	3 Marks 2 Marks	5
	iii.	Explain device drivers and its generic functions.	3 Marks 2 Marks	5

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