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B.E. (Electronics)

REAL TIME OPERATING SYSTEMS

(404212) (2003 Course) (Elective - II)

Time : 3 Hours] [*Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***In Section-I attempt Q.1 or 2, Q.3 or 4 and Q.5 or 6 in Section-II attempt Q.7 or 8, Q.9 or 10 and Q.11 or 12.***
3) ***Neat diagrams, flow charts must be drawn and well commented pseudo code written wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain memory requirements in foreground/background and multi tasking kernel. **[8]**

b) What are common methods of obtaining exclusive access to shared resources? Explain with suitable example and diagram. **[8]**

OR

Q2) a) Discuss advantages and disadvantages of RTOS. **[8]**

b) Discuss interrupt and interrupt timings for foreground/background, non-preemptive and preemptive kernel. **[8]**

Q3) a) Explain the ready list in uCOSII with following: **[8]**

i) Making a task ready to run.

ii) Removing a task from the ready list.

iii) Finding the highest priority task ready to run.

b) Explain uCOSII initialisation along with variables, data structures and free pools. **[8]**

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OR

Q4) a) How uCOSII handles critical section of code? Explain all the available methods. **[8]**

b) Explain ECB and event wait list with following: **[8]**

i) Making a task wait for an event.

ii) Removing a task from an ECB wait list.

iii) Finding the highest priority task waiting on an ECB.

Q5) a) What is semaphore? Explain diagram showing relationship between tasks, ISR, and semaphore. **[6]**

b) Explain in detail OSMutexCreate(). **[6]**

c) Explain relationship between event flag group, event flag nodes, and TCBs. **[6]**

OR

Q6) a) Explain in detail OSSemQuery(). **[6]**

b) Explain the use of MUTEX using example pseudo code. What are MUTEX configuration constants? **[6]**

c) Explain in detail OSFlagCreate(). **[6]**

SECTION - II

Q7) a) What are Mailbox services and configuration constants provided in uCOSII? Explain relationship between tasks, ISR and MailBox. **[8]**

b) Explain the data structure used in message queue. **[8]**

OR

Q8) a) What are message Queue services and configuration constants provided in uCOSII? Explain relationship between tasks, ISR and message Queue. **[8]**

b) Explain OSMboxQuery() in detail. **[8]**

Q9) a) Define porting of uCOSII. Discuss general requirements of processor to port uCOSII along with hardware/software architecture. **[8]**

b) What is Memory Control Block? Explain its data structure. **[8]**

OR

Q10) a) What is the need of memory management services in uCOSII as compare to compiler functions? **[8]**

b) Discuss testing of port with reference to uCOSII port. **[8]**

Q11) Design the chocolate vending machine using uCOSII considering following points.

a) Hardware and software architecture of the system. **[6]**

b) Define the tasks, assign the tasks priority and enlist objects of uCOSII required for system implementation. **[6]**

c) Write the application software for the system. **[6]**

OR

Q12) Answer the following by considering the implementation of temperature controller.

a) Hardware and software architecture of the system. **[6]**

b) Define the tasks, assign the tasks priority and enlist objects of uCOSII required for system implementation. **[6]**

c) Write the application software for the system. **[6]**

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