

Total No. of Questions : 12]

[Total No. of Pages : 3

P 1276

[3864] - 253

B.E. (Electronics)

REAL TIME OPERATING SYSTEMS

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

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 Q.2, Q.3 or Q.4 and Q.5 or Q.6 in Section-II attempt Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.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) Discuss the memory requirements in foreground / background and multi tasking system. [8]
- b) Explain clock tick in multitasking system. What are the constraints in selection of the clock tick in multitasking system? How accurate time this can give? [8]

OR

- Q2) a) What is RMS theorem? How it is useful in assigning tasks priorities? Check whether the following set of periodic real-time tasks is schedulable under RMS on a uniprocessor system : $T_1 = (e_1 = 20, p_1 = 100)$, $T_2 = (e_2 = 30, p_2 = 150)$, $T_3 = (e_3 = 60, p_3 = 200)$. [8]
- b) Discuss interrupt and interrupt timings for foreground / background, non-preemptive and preemptive kernel. [8]

- Q3) a) Explain, Locking and unlocking of scheduler in uCOSII, Nesting of scheduler lock, Possible situation and precautions while using scheduler lock/unlock. [8]
- b) What is the use of following members of OS_TCB? And how they are manipulated? [8]

INT8U OSTCBX;
INT8U OSTCBY;
INT8U OSTCBitX;
INT8U OSTCBitY;

OR

P.T.O.

- Q4) a)** Explain, what is ready list in uCOSII? How uCOSII add the task in the ready list? How uCOSII remove a task from ready list? [8]
- b)** What are different events handled using ECB in uCOSII. Explain data structure OS-EVENT. [8]

- Q5) a)** Write short note on any two : [6]
- i) Semaphore management in uCOSII.
 - ii) Mutual exclusion semaphore in uCOSII.
 - iii) Event flag management in uCOSII.
- b)** Explain in detail OSMutexCreate(). [6]
- c)** Enlist different MUTEX services. What configuration constants provided to configure MUTEX? [6]

OR

- Q6) a)** Explain Event Flag Group data structure OS_FLAG_GRP and OS_FLAG_NODE. [6]
- b)** Write short note on any two : [6]
- i) Semaphore management in uCOSII.
 - ii) Mutual exclusion semaphore in uCOSII.
- c)** What is relationship between Task, ISR and Semaphore in uCOSII? [6]

SECTION - II

- Q7) a)** How to use Mailbox as binary semaphore? Explain by using pseudo code. [6]
- b)** What is relationship between Task, ISR and Message Queue in uCOSII? [6]
- c)** What are message queue services in uCOSII? How Message Queue services enabled/disabled in uCOSII. [6]

OR

- Q8) a)** Explain the relationship between tasks, ISR and message queue. [6]
- b)** What are the features of message queue in uCOSII? [6]
- c)** Explain Mailbox services and configuration in uCOSII. [6]

- Q9) a)** Explain Memory Control Block data structure OS_MEM. [4]
- b)** Explain memory partition and multiple memory partition in uCOSII. [4]
- c)** Define porting of uCOSII. What requirements the processor should satisfy to run uCOSII. [4]
- d)** What is testing of port? What are the steps to follow for testing of port? [4]

OR

- Q10)** a) Explain the need of memory management services by OS as compare to compiler functions. [4]
b) What are memory management services in uCOSII? Explain any one of them. [4]
c) How OS_CPU.H makes uCOSII processor and implementation specific? [4]
d) Explain uCOSII hardware/software architecture. [4]

Q11) Answer the following by considering the implementation of temperature controller.

- a) Define the hardware architecture for the system. [4]
b) Define the tasks for the system and assign the tasks priority and explain. [4]
c) Enlist the services of uCOSII required in the system. [4]
d) Write the application software for the system. [4]

OR

Q12) Answer the following by considering the implementation of chocolate vending machine.

- a) Define the hardware architecture for the system. [4]
b) Define the tasks for the system and assign the tasks priority and explain. [4]
c) Enlist the services of uCOSII required in the system. [4]
d) Write the application software for the system. [4]

