Hall Ticket Number:

Code No. : 6212

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
M.E. I Year (ECE) II-Semester (Main) Examinations, July-2016
(Embedded Systems & VLSI Design)

Embedded Real Time Operating Systems

Time: **3** hours   Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Suppose a new process in a system arrives at an average of six processes per minute and each such process requires an average of 8 seconds of service time. Estimate the fraction of time the CPU is busy in a system with a single processor.

2. What is preemptive scheduling? Explain with an example.

3. Why the communication between any two processes is required? Give an example for such a method.

4. What are relative deadlines and absolute deadlines of a task? How are they considered in an EDF algorithm?

5. Define Zombie state of a process in Linux.

6. Draw the architecture of Linux.

7. What is the use of a device tree in device drivers?

8. When do we need mknod in Linux?

9. Draw the state transition diagram in VxWorks.

10. List the different types of semaphores used in VxWorks RTOS. Which is the fastest?

Part-B (5 × 10=50 Marks)

11. a) What is a kernel? Classify them. [4]

    b) Explain the use of RTOS by taking one practical example and also brief why can't we use GPOS in that example. [6]

12. a) In the following, the partial behavior of a telephone system is given. [6]
    i) If you press the button of the handset for less than 15 sec it connects to the local operator. If you press the button for any duration lasting between 15 to 30 sec, it connects to the international operator. If you keep the button pressed for more than 30 sec, then on releasing it would produce the dial tone.
    ii) Once the receiver of the handset is lifted, the dial tone must be produced by the system within 20 sec, otherwise a beeping sound is produced until the handset is replaced.
    Draw the EFSM model for telephone system (above two cases).

    b) How does a semaphore overcome the shared data problem? [4]

13. a) What are system calls and how system calls are implemented in Linux? [5]

    b) List the various memory management algorithms used in Linux. [5]

14. a) Briefly write about Device drivers in user space and kernel space. [5]

    b) Distinguish vmalloc and kmalloc. Which one is preferred to use in device drivers? [5]

15. a) List the important features of µCOS. [5]

    b) Compare and contrast between the interprocess communication methods of VxWorks, µcos and RTLinux. [5]

16. a) Explain priority inversion in the context of real-time scheduling. [5]

    b) Describe the Rate Monotonic Scheduling algorithm with an example. [5]

17. Write short notes on any *two* of the following:

    a) Shell programming [5]

    b) Pipes in Linux. [5]

    c) Memory management in RTLinux. [5]

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