

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No.: 22602 M

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
M.E. (ECE: CBCS) II-Semester Make Up Examinations, September-2017
(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. Differentiate hard real-time system Vs soft real-time system ideal-characteristics.
2. Summarize the notable differences between General Purpose OS Vs RTOS.
3. Define context switching in RTOS. When does it happen in preemptive kernel?
4. What is deadlock or starvation problem? Mention any one method to avoid it.
5. Define Copy-on-Write (CoW) technique and justify its importance in process creation.
6. Mention any two important responsibilities of Slab allocator of Linux scheduler.
7. List the shell commands for inserting and deleting device driver modules.
8. Mention the differences between `kmalloc()` and `malloc()` functions in Linux.
9. Justify the importance of Board Support Package (BSP) in Linux.
10. List any two example RTOS used in the embedded system product industry.

Part-B (5 × 10 = 50 Marks)

11. a) What is a kernel? Explain the Kernel services and interaction with the hardware with the help of a block diagram. [5]
b) Exemplify Round Robin polled loop software algorithm. Summarize pros and cons of it. [5]
12. a) State Earlier Deadline First (EDF) scheduling algorithm. Prove that the three tasks T1(4,1); T2(5,2) and T3(7,2) with absolute and relative deadlines as given are failed to meet the headline if scheduled using Rate Monotonic Scheduler (RMS). [6]
b) What is priority inversion problem? Mention the method used to avoid it with suitable timing diagram. [4]
13. a) With the help of a neat diagram, discuss salient features of Linux kernel architecture. [6]
b) Mention the important differences between `fork()` Vs `vfork()` [4]
14. a) Define device drivers. What are the different data structures which are associated with the device drivers? [6]
b) What is a tasklet? Justify its importance for a process running in Linux. [4]
15. a) For a development hardware, list the pros and cons of opting RT-Linux Vs a commercial proprietary micro kernel. [5]
b) Summarize the notable differences among Linux 2.4 & Linux 2.6 kernels? [5]
16. a) With a neat timing diagrams, describe preemptive Vs non preemptive kernel scheduling. [5]
b) Define Semaphore. With the relevant examples demonstrate the usage of binary and counting Semaphores. [5]
17. Answer any *two* of the following:
 - a) Discuss in brief about the dynamic partition buddy Memory Management Scheme. [5]
 - b) Steps to be followed for compiling the Linux kernel when a module is modified/added. [5]
 - c) Short note on cross compiler debugging tools for RTOS scheduling. [5]