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Code No. : 22667

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

M.E. (E.C.E.) II-Semester Main Examinations, August-2023

Embedded Real Time Operating Systems

(Embedded Systems & VLSI Design)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Differentiate between Hard and Soft Real time systems	2	2	1	1
2.	Define the following terms with respect to Real time Systems a) Precedence of Jobs b) Absolute Dead line	2	1	1	1
3.	Considering a Real time system having only one periodic task [$T_i = (e_i, p_i, d_i)$], $T_1 = (50ms, 80ms, 80ms)$ and a Background task (T_b) with $e_b = 1000ms$ compute C_{tb} ?	2	3	2	2
4.	Justify the significance of IPC techniques in a real time operating system?	2	3	2	1
5.	Differentiate between the system calls Fork() and Vfork()?	2	2	3	3
6.	List the functions of Kernel in real time operating system?	2	1	3	3
7.	Define the terms Concurrency and Race condition?	2	1	4	1
8.	Justify the necessity of Parallel Processing in real time operating system?	2	3	4	2
9.	Define the terms a) Triple modular redundancy b) Primary back up fault tolerance	2	1	5	2
10.	Differentiate between Permanent, Temporary and Intermittent faults in RTOS?	2	3	5	3
Part-B (5 × 8 = 40 Marks)					
11. a)	Explain the working model of a Real time Operating System with the help of a neat diagram?	5	2	1	1
b)	Differentiate between Preemptive and Non-Preemptive kernel? Explain suitably with an example?	3	4	1	1
12. a)	Define Inter process Communication? Explain the Function of Semaphore as an IPC technique?	5	2	2	2

	b)	Compute a suitable frame size for the following task set $T_i = (e_i, p_i, d_i)$ Note: Assume all time constants in milliseconds $T_1(1,4,4)$ $T_2(1,5,5)$ $T_3(1.5,20,20)$ Justify your answer for choosing the frame size?	3	3	2	3
13.	a)	Explain the task state diagram with a suitable state model?	4	2	3	1
	b)	Explain the architecture of Linux 2.X kernel with a neat diagram?	4	2	3	2
14.	a)	Define System call? Write the function of any four System calls used in Linux 2.X kernel?	4	3	4	1
	b)	List the functions of Device Drivers and explain the operation of character drivers?	4	1	4	1
15.	a)	Explain the BIST as a debugging technique for Linux Kernel?	4	2	5	3
	b)	Explain the case study of Porting Linux Kernel for Automatic air traffic control application?	4	3	5	3
16.	a)	Justify the necessity of a Scheduler in Real Time Operating System and List any three functions of a Scheduler?	4	3	1	1
	b)	Explain the Operation of Message Queue as an Inter Process Communication Technique?	4	2	2	2
17.		Answer any <i>two</i> of the following:				
	a)	Explain the memory management algorithms in Linux Operating systems with a suitable example?	4	3	3	1
	b)	Write a short note on Interrupt Execution process in Linux Kernel?	4	1	4	1
	c)	Explain the case study of Porting Linux Kernel for Image processing Application?	4	3	5	3

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	38%
iii)	Blooms Taxonomy Level - 3 & 4	42%
