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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Scheme for Valuation/Answer Key

Scheme of evaluation (marks in brackets) and answers of problems/key

FOURTH SEMESTER B.TECH DEGREE EXAMINATION July 2021 (2019 Scheme)

Course Code:CST 206

Course Name: OPERATING SYSTEMS

Max. Marks: 100 | Duration: 3 Hours

PART A

		(Answer all questions; each question carries 3 marks)	Marks
1		Three Methods - (1) using registers (2) parameters are stored as a block in memory and address of that block is passed (3) using stack 1 mark each	3
2		If attempted give full credits.	3
3		Difference- 2 marks, Application- 1 mark	3
4		Reason with Explanation	3
5		Mutual Exclusion, hold and wait, circular wait and non-pre-emption	3
6		Wait and signal operations-each carry 1.5 marks.	3
7		Swapping - Explanation.	3
8		Virtual memory concept – 2marks example : demand paging - 1mark	3
9		Comparison – Sequential access vs direct access	3
10		Physical formatting , partition, logical formatting (1+1+1)	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Explanation with difference of each carry 3 marks (Multiprogramming systems, Multitasking systems, Multiprocessor systems.)	9
	b)	The long-term scheduler directly affects the system performance. Explain how. Full 5 marks may be given for explanation with justification of the answer.	5
12	a)	6 marks shall be given for short explanation of any six functions	6

<table>
<tr><td></td><td>b)</td><td>Operating system structures-
Layered – 4 marks Microkernel – 4 marks</td><td>8</td></tr>
<tr><td colspan="4">Module -2</td></tr>
<tr><td>13</td><td>a)</td><td>Explanation</td><td>8</td></tr>
<tr><td></td><td>b)</td><td>7 child process will be created – 1 marks
HELLO will be printed 4 times - 1.5 mark
WELCOME will be printed 8 times. - 1.5 mark
Justification of answer – 2 marks</td><td>6</td></tr>
<tr><td>14</td><td>a)</td><td>Drawing Gantt chart - 4 marks (1+1+1+1)
RR waiting time=10 (2 marks)
FCFS waiting time=8.2 (2 marks)
Priority waiting time=10 (2 marks)
SJF waiting time=5.4 (2 marks)</td><td>12</td></tr>
<tr><td></td><td>b)</td><td>In this case, the sender must block until the recipient receives the message.</td><td>2</td></tr>
<tr><td colspan="4">Module -3</td></tr>
<tr><td>15</td><td>a)</td><td>Total instances (A, B, C, D) = (13, 8, 9, 8) – 1 mark
Need matrix (2 marks)
<table>
<tr><td></td><td>A</td><td>B</td><td>C</td><td>D</td></tr>
<tr><td>P1</td><td>2</td><td>2</td><td>3</td><td>0</td></tr>
<tr><td>P2</td><td>3</td><td>2</td><td>0</td><td>0</td></tr>
<tr><td>P3</td><td>0</td><td>3</td><td>2</td><td>3</td></tr>
<tr><td>P4</td><td>2</td><td>5</td><td>0</td><td>7</td></tr>
<tr><td>P5</td><td>2</td><td>0</td><td>0</td><td>1</td></tr>
</table>
The system is in safe state
Note : There is more than one safe sequence. Hence any valid safe sequence –
(Eg. P5, P2, P3, P1, P4) - 1mark
Steps with proper explanation. (4 marks)</td><td>8</td></tr>
</table>

	b)	Critical section problem - 1 mark Three requirements - 2 marks Solution to a 2 process critical section problem(Petersons solution) – 3 marks	6
16	a)	Description of Bounded-buffer problem (2 marks) + solution for the same using Semaphores (3 marks) + structure of producer and consumer processes. (3 marks)	8
	b)	Reason (2 marks) + Resource allocation graph (i) deadlock (ii) with cycle but no deadlock (2+2 marks)	6
		Module -4	
17	a)	Diagram – 2 marks . Explanation – 6 marks	8
	b)	Diagram – 2 marks . Steps – 4 marks	6
18	a)	FCFS-16 page faults, LRU-15 page faults, Optimal-11 page faults, Each carry three marks with distribution as final output-1 mark and showing the page faults-2 marks	9
	b)	(i) 1850 (ii) 800 (iii) 2670 (iv) 125 (v) 3830 - 1 marks each	5
		Module -5	
19	a)	FCFS-Total seek time=642 SSTF-Total seek time=208 In SCAN scheduling algorithm , two choices are there. Give full credit if atleast one is correct. SCAN,(50->82->140->170->190->199->43->24->16) total seek time=332, if initial movement is towards cylinder number 199 or SCAN (50->43->24->16->0->82->140->170->190) total seek time = 240, if initial movement is towards cylinder number 0. Explaining each carry 2 mark and output carry 1 mark.	9
	b)	Explanation with diagram.	5
20	a)	Explanation of single-level, two-level, tree, acyclic graph and general graph (each carry 2 marks) Note :As directory structure used in file system is not explicitly specified in the syllabus, full credits shall be given if attempted.	10

	b)	Access Controls list, (owner, group, universe) – 4 marks	4
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