BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO 2022)

CLASS: B.TECH (MINOR) **SEMESTER : VII**
BRANCH: EEE/ECE/BT/ME/PIECE/CHEMICAL/CP&P **SESSION : MO/2022**

SUBJECT: CS211 OPERATING SYSTEM

TIME: 03 HOURS **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Write the advantages of multiprogramming operating system.	[2]	1	2
Q.1(b)	Distinguish between processes and threads in multitasking environment.	[3]	1	2
Q.1(c)	Explain System call. Illustrate Fork system call with example.	[3] + [2]	1	3
Q.2(a)	Classify CPU scheduling algorithms.	[2]	2	2
Q.2(b)	Define turn around time, waiting time and response time with suitable examples.	[3]	2	2,3
Q.2(c)	Consider the set of 5 processes whose arrival time and burst time are given below.	[5]	2	5

Processes	Arrival Time	Burst Time	Priority
P1	0	4	2
P2	1	3	3
P3	2	1	1
P4	3	6	4
P5	4	3	5

If the CPU scheduling policy is priority preemptive, calculate the average waiting time and average turn around time. (Higher number represents higher priority).

Q.3(a)	Describe race condition of co-operative processes with suitable example.	[3]	3	3
Q.3(b)	Explain critical section problem and its solution.	[2]	3	3
Q.3(c)	Explain binary semaphore and its operations with suitable example. Consider a counting semaphore where the final value of S becomes 14 after performing 5 ‘P’operations, 3 ‘V’operations and 2 ‘P’ operations in sequence. Derive the initial value of S.	[3] + [2]	3	4
Q.4(a)	Explain Dining-Philosopher problem and its solution using semaphore.	[5]	3	3
Q.4(b)	A system is having 3 processes; each requires 2 units of resource ‘R’. Calculate the maximum number of units of ‘R’ so that no deadlock will occur.	[3]	3	4
Q.4(c)	State the drawbacks of static partitioning.	[2]	4	2
Q.5(a)	Consider five memory partitions of size 130 KB, 510 KB, 220 KB, 460 KB and 620 KB in same order. If sequence of requests for blocks of size 212 KB, 417 KB, 112 KB and 426 KB in same order come, then calculate the total space remaining after applying Best fit algorithm. Assume the partitioning is variable partitioning.	[3]	4	5
Q.5(b)	State Belady’s anomaly. Calculate the number of bits needed to represent an address of a logical address space of size 8 GB.	[2]	4	3,4
Q.5(c)	Consider a typical disk that transfer data at a rate of 40 MBPS and rotates at 5000 RPM. The average seek time is thrice the average rotation delay. Assume there is no controller transfer time. Calculate the average time (in milli seconds) to read or write 2 MB of data.	[5]	5	5

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