

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2023)**

**CLASS: IMSc
BRANCH: MATHEMATICS AND COMPUTING**

**SEMESTER : VI
SESSION : SP/2023**

SUBJECT: CS303 OPERATING SYSTEM

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 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) List various services provided by an operating system.	[2]	1	1																				
Q.1(b) Why the operating system is regarded as a resource manager? Explain with a suitable diagram.	[3]	1	2																				
Q.2(a) Differentiate between multiprogramming and time sharing systems.	[2]	1	4																				
Q.2(b) Describe the characteristics of modern operating systems.	[3]	1	2																				
Q.3(a) Specify the purpose of each element of a process.	[2]	1	1																				
Q.3(b) Demonstrate the use of suspend state with process state transition diagram.	[3]	1	3																				
Q.4(a) Specify the characteristics of a long term scheduler.	[2]	2	1																				
Q.4(b) Consider the following scenario of processes with their priority:	[3]	2	3																				
<table style="border-collapse: collapse; margin-left: 20px;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Process</th> <th style="text-align: center; border-bottom: 1px solid black;">Arrival Time</th> <th style="text-align: center; border-bottom: 1px solid black;">Execution Time</th> <th style="text-align: center; border-bottom: 1px solid black;">Priority</th> </tr> </thead> <tbody> <tr> <td>P₁</td> <td style="text-align: center;">0</td> <td style="text-align: center;">5</td> <td style="text-align: center;">2</td> </tr> <tr> <td>P₂</td> <td style="text-align: center;">2</td> <td style="text-align: center;">4</td> <td style="text-align: center;">1</td> </tr> <tr> <td>P₃</td> <td style="text-align: center;">3</td> <td style="text-align: center;">7</td> <td style="text-align: center;">3</td> </tr> <tr> <td>P₄</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>	Process	Arrival Time	Execution Time	Priority	P ₁	0	5	2	P ₂	2	4	1	P ₃	3	7	3	P ₄	5	6	4			
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Draw the Gantt chart for the execution of processes, showing their start time, end time, using priority number based scheduling. Calculate average waiting time and average turnaround time for the system.																							
Q.5(a) Calculate the exponential averaging with predicted burst time of first process (S_1) = 0, smoothing factor (α) = 0.5; and the algorithm is Shortest Job First (SJF) with previous run times of processes P ₁ , P ₂ , P ₃ and P ₄ as 8, 7, 4, 16 respectively.	[2]	2	3																				
Q.5(b) Explain the need for fair-share scheduling with suitable examples.	[3]	2	2																				

:21/02/2023:M