

Total number of printed pages-4

53 (IT 502) OPSY

2021

**OPERATING SYSTEM**

Paper : IT 502

Full Marks : 100

Time : Three hours

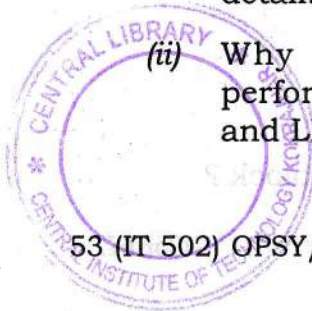
**The figures in the margin indicate  
full marks for the questions.**

Answer **any five** questions.

1. Answer in short:  $2 \times 10 = 20$ 
  - (a) What is a spinlock ?
  - (b) State the priority inversion problem.
  - (c) What is a critical region ?
  - (d) What is a thread ?
  - (e) What is a safe state ?
  - (f) What is process control block ?

Contd.

- (g) What are the disadvantages of single contiguous memory allocation ?
- (h) What is demand paging ?
- (i) What is semaphore ?
- (j) What are the functionalities of reincarnation server and init processes ?
2. (a) What is a process ? Explain the various states of processes with state transition diagram. 5
- (b) Write the functions and syntaxes of *any five* processes and I/O related system calls. 5
- (c) What is race condition ? What are the four different conditions needed to hold for avoiding race condition ? 5
- (d) Give the Peterson's solution to the critical section problem. 5
3. (i) How does deadlock avoidance differ from deadlock prevention ? Write about a deadlock avoidance algorithm in detail. 4+6=10
- (ii) Why should Page replacement be performed ? Compare FIFO, Optimal and LRU page replacement algorithms. 3+7=10



4. (i) What are the throughput and turnaround time? Consider 5 processes and their CPU burst time, then discuss how shortest job first scheduling is more optimal than first come first serve.

10

(ii) Consider the following processes arrived for execution at the time indicated:

Process	Arrival time	Burst time (ms)
P1	0	10
P2	1	2
P3	2	3
P4	3	1
P5	4	5

Draw the Gantt chart and calculate the average turnaround time for each process using Round Robin Scheduling Algorithm.

10

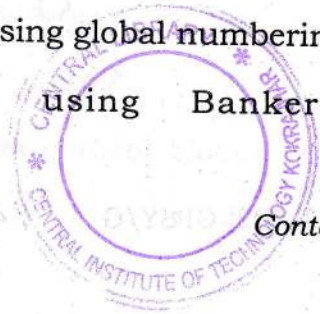
5. (i) Compare and contrast the following policies of resource allocation:

15

(a) All resources request together

(b) Allocation using global numbering

(c) Allocation using Banker's Algorithm



(ii) What is swapping and when is it used ? 5

6. Write short notes on : **(any four)** 5×4=20

- (i) Readers-Writers Problem
- (ii) Timesharing vs Multiprogramming
- (iii) Process Control Block
- (iv) Priority Inversion Problem
- (v) Monolithic System.

