Total No. of printed pages = 8

**END SEMESTER/RETEST EXAMINATION**

**NOVEMBER – 2019**

Semester : 5th (New)

Subject Code : CO-504

**OPERATING SYSTEM**

Full Marks – 70

Time – Three hours

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

**Instructions :**

1. Questions on PART–A are compulsory.

2. Answer any *five* questions from PART–B.

**PART – A**

**Marks – 25**

1. State true or false :        1×10=10

   (a) The page number is used as an index into the page table.

   (b) FCFS algorithm of disk scheduling selects the request with the least seek time from the current head positions.

[Turn over

(c) The hardware mechanism that allows a device to notify the CPU is called POLLING.

(d) The Process Control Block is a data structure.

(e) In segmentation, each address is specified by a segment number an offset.

(f) A process can be single threaded or multithreaded.

(g) Concurrent access to shared data may result in data inconsistency.

(h) The FIFO algorithm first executes the job that came in last in the queue.

(i) If the wait for graph contains a cycle then a deadlock does not exist.

(j) The circular wait condition can be prevented by defining a linear ordering of resource types.

2. Fill in the blanks :                1×10=10

(a) In _____ memory allocation, each process is contained in a single contiguous section of memory.

(b) A solution to the problem of external fragmentation is _____.

(c) Logical memory is broken into blocks of the same size called _____.

(d) A _____ is a collection of electronics that can operate a port, a bus, or a device.

(e) The processes that are residing in main memory and are ready and waiting to execute are kept on a list called _____.

(f) Scheduling is making proper use of _____.

(g) If _____ occur frequently, the detection algorithm must be invoked frequently.

(h) In fixed sized partition, the degree of _____ is bounded by the number of partitions.

(i) In segmentation, each address is specified by a _____ and a value.

(j) The _____ register is written by the host to send output.

3. Choose the correct answer :　　1×5=5

(a) The number of processes completed per unit time is known as

　(i) Output　　(ii) Throughput

　(iii) Efficiency　(iv) Capacity

(b) Which of the following is not the state of a process ?

　(i) New

　(ii) Old

　(iii) Waiting

　(iv) Running

　(v) Ready

　(vi) Terminated

(c) The segment of code in which the process may change common variables, update tables, write into files is known as

　(i) program　　(ii) exit section

　(iii) critical section　(iv) entry section

(d) Time quantum is defined in

　(i) shortest job scheduling algorithm

　(ii) multilevel queue scheduling algorithm

　(iii) priority scheduling algorithm

　(iv) round robin scheduling algorithm

(e) A system is in a safe state only if there exists a

　(i) safe sequence　(ii) safe resource

　(iii) safe allocation　(iv) All of these.

## PART – B

## Marks – 45

4. Differentiate between　　3×3=9

(a) Internal fragmentation and External fragmentation

(b) Distributed operating system and Network operating system

(c) Spooling and Buffering

5. (a) Define Critical Section.    2

   (b) What are File Attributes ?    2

   (c) For the Dining Philosophers Problem, write an algorithm to ensure that no starvation occurs using either semaphores or monitor.    5

6. (a) Explain the basic method and hardware support in Segmentation memory management scheme.    6

   (b) How protection is ensured in Paging Scheme?    3

7. (a) Define Virtual Memory.    1

   (b) Under what circumstances do page faults occur ? Describe with the help of diagram the actions taken by the operating system when a page faults occurs.    6

   (c) What is page replacement algorithm ?    2

8. (a) Explain the terms : multitasking, multi-programming, and multi-threading.    3

   (b) Consider the following snap-shot of a system :

| Process | Allocated | | | | Max | | | | Available | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| P0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 1 | 5 | 2 | 0 |
| P1 | 1 | 0 | 0 | 0 | 1 | 7 | 5 | 0 | | | | |
| P2 | 1 | 3 | 5 | 4 | 2 | 3 | 5 | 6 | | | | |
| P3 | 0 | 6 | 3 | 2 | 0 | 6 | 5 | 2 | | | | |
| P4 | 0 | 0 | 1 | 4 | 0 | 6 | 5 | 6 | | | | |

Answer the following questions using banker's algorithm :    6

   (i) What is the content of the matrix NEED ?

   (ii) Is the system in a safe state ? Explain.

9. (a) Consider the following set of processes, with the length of the CPU burst time given in milliseconds :    6

| Process | Burst time | Priority |
|---|---|---|
| P₁ | 12 | 3 |
| P₂ | 3 | 1 |
| P₃ | 5 | 3 |
| P₄ | 2 | 4 |
| P₅ | 8 | 2 |

The processes are assumed to have arrived in the order $P_1$, $P_2$, $P_3$, $P_4$, $P_5$ all at time 0.

(i) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a nonpreemptive priority (a) smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.

(ii) What is the turnaround time of each process for each of the scheduling algorithm in part a?

(iii) What is the waiting time of each process for each of the scheduling algorithms in part a?

(b) What are the performance criteria for CPU scheduling algorithm ? 3

10. Write short notes on any *three* : 3×3=9

   (a) Linked allocation method

   (d) DMA

   (c) Overlay

   (d) Advantages of Distributed System

   (e) Context Switching.