

his question paper contains 4 printed pages.]

**Your Roll No.....**

**No. of Question Paper : 48**

**G**

**Unique Paper Code : 234461**

**name of the Paper : CSPT-404 : Operating System**

**name of the Course : B.Sc. (Phy. Sc.) / B.Sc. (Math. Sc.)**

**mester : IV**

**uration : 3 Hours**

**Maximum Marks : 75**

**Instructions for Candidates**

Write your Roll No. on the top immediately on receipt of this question paper.

Question No. 1 is compulsory.

Attempt any **five** from remaining **seven** questions.

All parts of a question must be done together.

(a) Define Operating System. (1)

(b) Which scheduling policy is suitable for time sharing systems ? Also give reason. (2)

(c) List one main advantage of acyclic graph directory structure. (2)

P.T.O.

(d) Consider a logical address space of 32 pages of 1024 words each, mapped onto a physical memory of 1024 frames.

(i) How many bits are there in the logical address ?

(ii) How many bits are there in the physical address ?

(e) What are system calls ? Discuss any two system calls regarding to process management.

(f) Explain bit vector method of free disk space management.

(g) What is race condition and how does it occur ?

(h) Define process. Explain various states of process execution. Also draw the diagram.

2. Define the following :

(a) System programs

(b) Page fault

(c) Convoy effect

(d) Virtual memory

(e) Context switch

(a) Distinguish among Long term, Medium term and Short-term scheduler. (6)

(b) Distinguish between internal and external fragmentation by taking suitable example. (4)

(a) Describe various scheduling criteria for comparing different CPU scheduling algorithms. (5)

(b) Consider the following page reference string :

1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

Determine the number of page faults for the FIFO page replacement algorithm. Assume that there are four available frames and all of them are initially empty. (5)

Consider the following set of processes, with the length of the CPU burst time given in ms

Processes	Burst Time	Arrival Time
P1	12	1
P2	6	0
P3	3	2

P.T.O.

- (i) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF (non-preemptive), and a RR (time quantum=1) scheduling.  $(1+1.5+1.5=4)$
- (ii) Calculate average waiting time and average turnaround time for all above mentioned scheduling algorithms.  $(6)$
6. (a) Explain how virtual memory is implemented using demand paging technique.  $(6)$
- (b) Explain the following terms with respect to file:
- File open count  $(4)$
  - Access rights  $(5)$
7. (a) Why the page size is always the power of 2 in paging memory allocation scheme? Give reason. Also explain with the help of a suitable example.  $(5)$
- (b) What is multithreaded programming? What are its benefits?  $(5)$
8. (a) List various methods of allocating disk space. Explain linked allocation scheme in detail.  $(5)$
- (b) Explain microkernel approach to Operating System design.  $(5)$
- $(400)$