

(Please write your Exam Roll No.)

Exam Roll No

**Bharati Vidyapeeth's
Institute of Computer Applications and Management
A-4, Paschim Vihar, New Delhi-63**

SECOND SEMESTER [MCA] Internal Examination, March 2018

Paper Code: MCA - 106

Subject: Operating Systems

Time: 2 Hours

Maximum Marks: 45

Note: Q. 1 is compulsory. Attempt one question from each section.

SECTION - A

1. Answer all the following questions briefly:- 1.5 × 10 = 15
- (a) What is a monitor? Is it like critical regions?
 - (b) Differentiate between logical memory and physical memory address space? How are these mapped by MMU?
 - (c) Differentiate between symmetric and asymmetric multiprocessing.
 - (d) Differentiate between multiprogramming and multiprocessing.
 - (e) Show with an example that the presence of a cycle in resource allocation graph does not guarantee a deadlock in a computer system in which each resource may have more than one unit.
 - (f) Given a memory partition of 100k, 500k, 200k, 300k and 600k (in order), how would best and worst fit algorithms place processes 212k, 417k, 112k and 426k (in order)? Justify.
 - (g) How are inter-process communication achieved by OS?
 - (h) Define semaphores. How is it better than test and set command?
 - (i) On a system using demand paging memory, it takes 120 ns to satisfy a memory request if page is in memory. If page is not in memory it takes 5000000 ns. What would be the page fault rate to achieve an EAT of 1000000ns?
 - (j) Consider a logical address space of 8 pages of 1024 words each, mapped in to a physical memory of 32 frames. How many bits are there in logical address and in the physical address?

SECTION - B (UNIT - I)

2. (a) What is deadlock detection? Give an algorithm to detect it. 5
- (b) Compare and contrast Paging and Segmentation in a tabular form. 5
- (c)
- | Process | Arrival Time | Burst Time |
|---------|--------------|------------|
| A | 0 | 10 |
| B | 0 | 5 |
| C | 2 | 3 |
| D | 5 | 20 |
| E | 10 | 2 |

For the process listed in above table, make Gant charts and calculate average turnaround time and waiting time using: i) Shortest remaining time first (PREEMPTIVE), and ii) Round Robin (quantum = 3).

OR

(a) Differentiate between network operating system and distributed operating system. 5

(b) A system has four processes P1 through P4 and two resource types R1 and R2. It has 2 units of R1 and 3 units of R2. 5

Given that: P1 requests 2 units of R2 and 1 unit of R1

P2 holds 2 units of R1 and 1 unit of R2

P3 holds 1 unit of R2

P4 requests 1 unit of R1

Show the resource graph for this state of the system. Is the system in deadlock, and if so, which processes are involved?

(c) State the disadvantages of contiguous allocation and also suggest three ways of improvement in it. 5

SECTION - C (UNIT - II)

3. (a) What is meant by critical section? Give its solution through reference of a multiprocess algorithm. Give the algorithm in detail. 5

(b) What is Dynamic Linking? How is it different from dynamic loading? 5

(c) What is hashed page table and inverted page table? 5

OR

(a) Under what circumstances a page fault occurs? Describe the action taken by operating system when a page fault occurs. 5

(b) Describe producer consumer problem and give its solution using semaphores. 5

(c) Explain resource sharing in process creation and process deletion. 5