

2020

B.C.A.

[HONOURS]

(Principles of OS and Unix)

Paper : BCA-202

Full Marks : 80

Time : 4 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **Q. No.1** and any **four** from the rest.

1. Answer any **eight** questions: $2 \times 8 = 16$
- What is page fault?
 - What is internal fragmentation?
 - Explain the purpose of 'mount' and 'unmount' commands.
 - What do you mean by resource allocation graph?
 - Define starvation.
 - What is response time?

- What is context switch?
 - What do you mean by overlays?
 - What is dual-mode operation?
 - Define race condition.
 - Explain the use of 'grep' command in unix.
 - What are the different types of multiprocessing?
2. a) What is independent and co-operating processes?
b) Define critical section and race condition.
c) What do you mean by Binary semaphore? What are the limitation of binary semaphore?
 $(2+2)+6+(2+4)=16$
3. a) Discuss the paging with proper diagram.
b) What are the two major differences between paging and segmentation?
c) Consider the following segment table of a system –

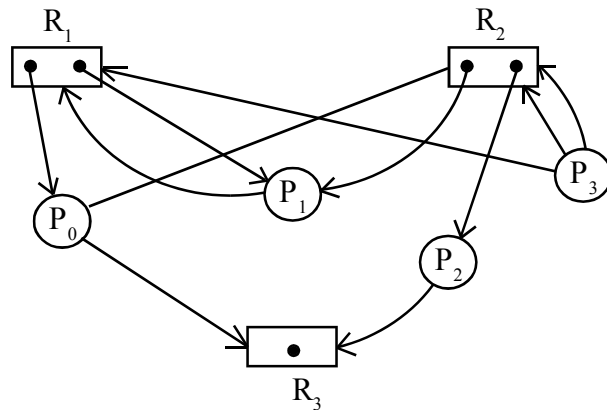
Segment	Base	Length
0	330	80
1	876	211
2	111	99
3	498	302

What are the physical addresses for following logical addresses?

- i) 0, 99
- ii) 2, 78
- iii) 1, 265
- iv) 3, 222
- v) 0, 35

$$9+2+5=16$$

4. a) Define safe and unsafe state.
 b) Write down safety and Resource-request algorithm.
 c) Consider the resource allocation graph in the figure –



Is the system is in safe state? If yes, find the safe sequence.

- d) A system has two processes and three identical resources. Each process needs a maximum of two resources to complete its task. Is deadlock possible? Explain your answer.

$$(1\frac{1}{2}+1\frac{1}{2})+6+4+3=16$$

5. a) Explain the differences between internal and external fragmentation.
 b) Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames.

- i) How many bits are in the logical address?
- ii) How many bits are in the physical address?

- c) Explain swapping and overlaying in connection with memory management.

- d) What is thrashing? $3+(2+2)+6+3=16$

6. a) What is deadlock? What are the condition that must hold for the occurrence of deadlock?

- b) How does spooling improve efficiency of an OS?

- c) On a disk with 1000 cylinders number 0 to 999, compute the no of tracks the disk arm must move to satisfy all therequest serviced was at track 345 and the head is moving toward track 0. The queue in FIFO order contains requests requests for the following track:

123, 874, 692, 475, 105, 376

Perform the computation for the following scheduling algorithm:

i) SSTF

ii) Scan

iii) Look $(2+4)+4+(3\times 2)=16$

7. Write short notes on any **four** : $4\times 4=16$

a) C-SCAN and C-LOOK disk scheduling

b) Virtual Machine

c) Priority scheduling

d) PCB and context switching

e) Batch system

f) Distributed OS
