Total No. of printed pages = 4

EE 1816 OE 21

21/6/23

Roll No. of candidate | | | | | | | | | | |

2023

B.Tech. 6th Semester End-Term Examination

EE

OPERATING SYSTEMS

New Regulation (w.e.f. 2017-2018) & New syllabus (w.e.f. 2018-2019)

Full Marks – 70 Time – Three hours

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

Answer the following.

1. Tick the correct among the following. (10 × 1 = 10)

(i) What is the use of a banker's algorithm?

(a) Rectify deadlock (b) Prevent deadlock

(c) Solve deadlock (d) None of the above

(ii) Which of the following programs runs just after booting the computer and loading GUI?

(a) Windows Explorer (b) File Manager

(c) Authentication (d) Desktop Manager

(iii) Which of the following usually provides the interface to get access to the services of OS?

(a) System Call (b) Library

(c) API (d) All of the above

(iv) In which of the following components is paging implemented?

(a) Software (b) Operating System

(c) Hardware (d) None of the above

(v) Which of the following is a strong password?

(a) 19thAugust 88 (b) Delhi88

(c) P@ssw0rd (d) !augustdelhi

[Turn over

(vi) What is not a best practice for password policy?

(a) Deciding maximum age of password

(b) Restriction on password reuse and history

(c) Password encryption

(d) Having change password every 2 years

(vii) What does the OS create from a physical computer?

(a) Virtual Computer (b) Virtual Space

(c) Virtual Device (d) None of the above

(viii) Where is the operating system placed in the memory?

(a) Either low or high memory (depending on the location of interrupt vector)

(b) In the low memory

(c) In the high memory

(d) None of the above

(ix) In Operating Systems, which of the following is/are CPU scheduling algorithms?

(a) Priority (b) Round Robin

(c) Shortest Job First (d) All of the above

(x) To access the services of the operating system, the interface is provided by the ———

(a) Library (b) System calls

(c) Assembly instructions (d) API

2. (a) Fill in the Blanks- $(5 \times 1 = 5)$

(i) An operating system acts as a/an _____ between hardware and software.

(ii) _____ infects or destroys data in the computer without the permission or knowledge.

(iii) _____ is a facility that allows programs to address memory from a logical point of view, without regard to the amount of main memory physically available.

(iv) The process is said to be operating in a _____ fashion if each process in the queue is given a certain amount of time, in turn, to execute and then returned to the queue, unless blocked.

(v) A process in the _____ state is in main memory and available for execution.

(b) What is a deadlock in OS? What are the necessary conditions for a deadlock? (5)

3. (a) What is Cache Mapping? Consider a 4-way set associative mapped cache with block size 64B. The size of main memory is 4MB and the tag bits is 10. Find PA split and Cache size. (2+3)

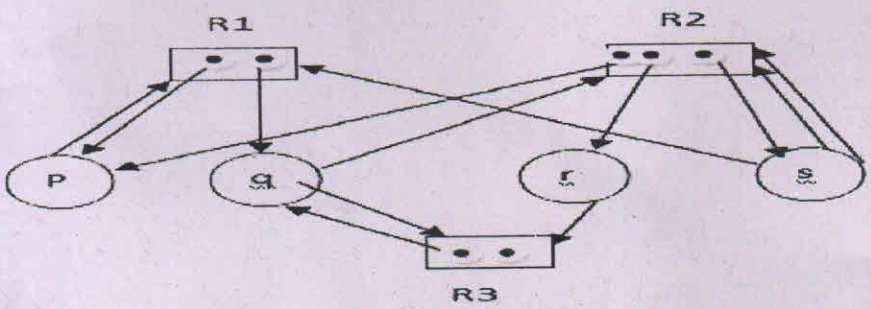
(b) Define Paging. Consider the LAS of 8 pages of 1024 words mapped into physical memory of 32 frames. Find how many bits are there in PA and LA. (2 +3)

4. (a) What is Bankers algorithm? Using Deadlock avoidance algorithm, Calculate Availability and remaining needs also find the safe sequence (Given A=3 B=14 C=12 D=12). (2+5)

Process	Allocation				Maximum need				Available				Remaining need			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2								
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								

(b) What do you mean by Semaphore in OS? Why is it used also find how many processes can enter into the critical section successfully if S=10. (3)

5. (a) Define RAG? Figure below shows multi instance RAG, Check is there any deadlock? Write the sequence of execution .What is the las availability. (2+4)



(b) A system uses 3 page frames for storing process pages in the main memory. It uses the Optimal Page replacement policy. Assume that all the page frames are initially empty. What is the total number of page fault that occurs while processing the given reference string-3 2 1 3 4 1 624 3 4 2 1 4 5 2 1 3 4. (4)

6. (a) What is IPC? What are the different IPC mechanisms? Using following scheduling algorithm design Gantt chart to calculate CT,TAT,WT and RT of the following process - (2+2.5+2.5)

(i) Use Round robin technique (given TQ=3)

Process	AT	BT	CT	TAT	WT	RT
P1	0	8				
P2	5	2				
P3	1	7				
P4	6	3				
P5	8	5				

(ii) LRTF

Process	AT	BT	CT	TAT	WT	RT
P1	0	2				
P2	1	5				
p3	4	3				
P4	5	2				

(b) Write difference between micro kernel and monolithic kernel? (3)

7. Discuss briefly the following (any two) (5 × 2 = 10)

(a) Virtual memory

(b) Segmentation

(c) Context switching

(d) Process management

(e) Monitors