

Uva Wellassa University of Sri Lanka  
 Faculty of Science and Technology  
 Department of Computer Science and Technology  
 400 level 1<sup>st</sup> Semester Examination – May/July 2017  
 IIT413-2 Operating Systems Concepts and Design



**Instructions to candidates**

**Duration:** Two (02) hours

**Number of questions:** Four (04)

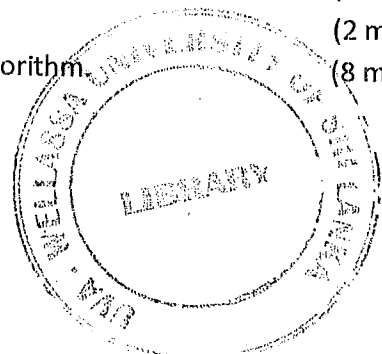
**Mark allocation:** 100

**Answer all the questions**

1.
  - a. Describe the essential properties of batch operating system. (4 mark)
  - b. Write a short note on **system calls**. (5 mark)
  - c. Briefly explain the working process of **kernel** in operating system. (4 mark)
  - d. "Thread is called as light weight process". Do you agree with this statement? Justify your answer. (4 mark)
  - e. Define **context switching** and explain it with necessary diagram/s. (6 mark)
  
2.
  - a. Differentiate preemptive and non-preemptive CPU scheduling. (8 mark)
  - b. List the criteria for evaluating the performance of CPU scheduling algorithms. (4 mark)
  - c. Explain the **convey effect** in CPU scheduling. (4 mark)
  - d. What is meant by **starvation** in an operating system? (4 mark)
  - e. Briefly explain the **paging** with Translation Lookaside Buffer (TLB). (8 mark)
  
3. Consider a system with five (05) processes and three (03) resource types. At the time  $t_0$  the following snapshot of the system has been taken.

	Allocated			Maximum			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	1	1	2	4	3	3	3	1	0
P2	2	1	2	3	2	2			
P3	4	0	1	9	0	1			
P4	0	2	0	7	5	3			
P5	1	1	2	11	2	3			

- a. Determine the total amount of resources of each type. (3 mark)
- b. Compute the need matrix. (2 mark)
- c. Determine whether the state is safe or not using Banker's algorithm. (8 mark)



- d. Would the following request be granted in the current state?
- i. P1 < 3, 3, 1 > (2 mark)
  - ii. P2 < 2, 1, 0 > (2 mark)
- e. What are the weaknesses of Banker's algorithm? (4 mark)

4.

- a. Compare and contrast internal and external fragmentation in memory management. (6 mark)
- b. Describe the various RAID levels in detail. (8 mark)
- c. Write short notes on main three (03) file access methods. (6 mark)
- d. Consider the page reference string "2 3 2 1 5 2 4 5 3 2 5 2" and find how many page faults will occur for the Least Recently Used and Optimal page replacement algorithms.  
(Note: Consider frame size as three (03)) (8 mark)