UNIVERSITY EXAMINATIONS

EXAMINATION FOR SEPTEMEBR/DECEMBER 2015/2016 FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

RCCS 205 OPERATING SYSTEMS

DATE 30TH November 2015 TIME: 2 HOURS

GENERAL INSTRUCTIONS:
Students are NOT permitted to write on the examination paper during reading time.
This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:
This examination paper consists Questions in Section A followed by section B.
Answer **Question 1 and any Other Two** questions.
QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. **PLEASE start the answer to EACH question on a NEW PAGE.**
2. **Keep your phone(s) switched off at the front of the examination room and NOT on your person.**
3. **Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material before or during the course of the examination.**
4. **ALWAYS show your working.**
5. **Marks indicated in parenthesis i.e. ( ) will be awarded for clear and logical answers.**
6. **Write your REGISTRATION No. clearly on the answer booklet(s).**
7. **For the Questions, write the number of the question on the answer booklet(s) in the order you answered them.**
8. **DO NOT use your PHONE as a CALCULATOR.**
9. **YOU are ONLY ALLOWED to leave the exam room 30minutes to the end of the Exam.**

(SECTION A – COMPULSORY)

QUESTION ONE (30 Marks)

a. Define the following terms

i. Operating System **(1 Mark)**

ii. Deadlock **(1 Mark)**

iii. Synchronization **(1 Mark)**

iv. Scheduling **(1 Mark)**

v. Virtual Memory **(1 Mark)**

b. Describe the process concept as used in Operating Systems. **(6 Marks)**

c. Briefly explain the term memory management. **(6 Marks)**

d. Describe the file system structures and system calls. **(6 Marks)**

e. Briefly explain the Operating System protection domains and mechanisms. **(7 Marks)**

SECTION B (ANSWER ANY TWO QUESTIONS)

QUESTION TWO (15 Marks)

a. Define process. What are the states of a Process? **(2 Marks)**

b. Compare, contrast Multiprogramming, Multitasking and Multiprocessing. **(6 Marks)**

c. Explain the following:

i. Batch operating system

ii. Time sharing operating system **(2 Marks)**

iii. Real Time System **(2 Marks)**

iv. Threads **(1 Mark)**

QUESTION THREE (15 Marks)

a. Differentiate between preemptive and non-preemptive scheduling. **(5 Marks)**

b. What do you mean by deadlock avoidance? **(4 Marks)**

c. Write the Banker's algorithm for multiple resources. **(6 Marks)**

QUESTION FOUR (15 Marks)

a. What is memory allocation? Differentiate between contiguous and non contiguous memory allocation. (**5 Marks**)

b. Compare and contrast paging with segmentation and describe issues related to fragmentation. **(10Marks)**

QUESTION FIVE (15 Marks)

Consider a system with five processes < P0, P1, P2, P3, P4> and three resource types named P, Q and R. Resource type P has 12 Instances, Q has 9 and R has 11 instances. Suppose at time t0 we have the given situation as:

Process	Allocation			Max			Available		
	P	Q	R	P	Q	R	P	Q	R
P0	2	5	4	4	6	5	1	2	1
P1	1	0	2	2	1	3			
P2	4	0	3	5	2	5			
P3	3	2	1	4	4	2			
P4	1	0	0	2	1	1			

i. Show the content of Need Matrix. **(5 Marks)**

ii. Is the given system in safe state? If yes, then generate the Safe sequence using Banker's Algorithm. **(10 Marks)**