EASTERN UNIVERSITY, SRILANKA
EXTERNAL DEGREE EXAMINATION IN SCIENCE
SECOND YEAR FIRST SEMESTER - 2003/2004
2004/2005 (July/ August, 2008)
EXTCS 202 – OPERATING SYSTEMS
(Proper and Repeat)

Answer all questions **Time allowed: 2 Hours**

Q1)

a. What are the advantages of a spooling system over a batch processing system?

b. What is a process control block (PCB)? Explain the usage of a PCB during the process scheduling?

c. Draw and briefly explain the process state diagram.

d. What is a race condition? How they can be prevented?

e. Describe the operations **P(s)** and **V(s)** on a semaphore '**s**'?

f. Explain how the semaphores can be used to solve the "Critical section" problem?

Q2)

a. Explain the 'preemptive' and 'non preemptive' scheduling policy stating suitable examples?

b. Discuss the advantages and disadvantages of each of the following scheduling methodologies:
- First come first served (FCFS);
- Round robin (RR);
- Priority scheduling (PS).

c. Given the following information:

Process	Burst time	Arrival time	Priority
A	8	0	3
B	3	2	2
C	7	3	4
D	4	5	3
E	5	7	2
F	8	8	1

i. Draw the Gantt chart for each of the following scheduling algorithms and calculate the average waiting time and average turnaround time for each algorithm.
- Round robin (using a time quantum of 4);
- Preemptive Priority scheduling.

ii. Which is the most efficient algorithm for the particular problem? Justify your answer.

Q3)

a. Explain, compare and contrast the following partitioning schemes:
   - Fixed partition;
   - Dynamic partition.

b. Explain the following memory allocation methods
   - First-fit allocation;
   - Best-fit allocation.

c. The following tables focus the job details and the list of memory blocks of a system

Job List:

Job no	Memory requested (Kb)
J1	20
J2	20
J3	10
J4	30

Memory List:

Memory Location	Block Size (Kb)
100	30
200	15
300	50
400	20

i. You are requested to allocate the jobs in the memory and to find th fragmentation using the above two allocation methods.

ii. Which is the most efficient allocation policy for the particular proble given above? Justify your answer.

Q4)

a. What do you mean by a "**Deadlock**"?

b. Briefly describe the necessary conditions for a dead lock to occur.

c. How can you prevent the system from a dead lock?

d. Consider the following system:
   - Process A holds R and wants S.
   - Process B holds nothing but wants T.
   - Process C holds nothing but wants S.
   - Process D holds U and wants S and T.
   - Process E holds T and wants V.
   - Process F holds W and wants S.
   - Process G holds V and wants U.

i). Draw the resource allocation graph for the above system.

ii). Examine the system for deadlock situation and if the system is deadlocke list processes involved in deadlock.