**GRIFFITH COLLEGE DUBLIN**

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**QUALITY AND QUALIFICATIONS IRELAND**

**EXAMINATION**

**HIGHER CERTIFICATE IN COMPUTING**

**STAGE II**

**OPERATING SYSTEMS DESIGN**

**Module code: HCC-OSD**

**BACHELOR OF SCIENCE IN COMPUTING**

**STAGE II**

**OPERATING SYSTEMS DESIGN**

**Module code: BSCO-OSD**

**BACHELOR OF SCIENCE (HONS) IN COMPUTING SCIENCE**

**STAGE II**

**OPERATING SYSTEMS DESIGN**

**Module code: BSCH-OSD**

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**THIS PAPER CONSISTS OF FOUR QUESTIONS**

**THREE QUESTIONS TO BE ATTEMPTED**

**SECTION A - COMPULSORY**

**SECTION B - TWO QUESTIONS TO BE ATTEMPTED**

**SECTION A – COMPULSORY**

**QUESTION 1**

1. Distinguish between Fixed Partition and Dynamic Partition memory management schemes?

**(10 marks)**

1. Explain the following:
2. Hybrid Operating System

**(2 marks)**

1. Aging of a process,

**(2 marks)**

1. Microcomputer

**(2 marks)**

1. Device spooling,

**(2 marks)**

1. Context switching in processor management.

**(2 marks)**

1. Explain with the use of a diagram what a Process Control Block is. In your answer explain the key information it holds.

**(10 marks)**

1. A program requests pages in the following order: a b c d a c d a b c b e c b d

Construct a **page trace analysis** indicating page faults with an asterisk (**\***) using the **Most Recently used** policywhere 4 page frames were allocated to the program in main memory. Find the number of page faults incurred.

**(10 marks)**

1. With regard to storage media:
   1. What is the difference between seek time and search time in a hard-disk?

**(5 marks)**

* 1. Differentiate between tracks and sectors in a hard disk and on an optical disk.

**(5 marks)**

**Total (50 marks)**

**SECTION B - TWO QUESTIONS TO BE ATTEMPTED**

**QUESTION 2**

1. With reference to Processor Scheduling:
   1. Explain the role of the Job Scheduler and also state its goals.
   2. What is the effect of having too many CPU-bound jobs in a system?

**(8 marks)**

1. With reference to Demand Paged Virtual Memory Allocation systems,
   1. Explain the working set for a process in demand paged memory system.

**(2 marks)**

* 1. Suggest and explain a method of how the optimal size of a working set can be determined

**(6 marks)**

* 1. What is the referenced bit? and when is it used?

**(3 marks)**

1. With reference to process scheduling:
   1. Explain Kernel Mode and User Mode.
   2. What is the Operating System Kernel?
   3. Explain the difference between waiting and blocked processes.

**(6 marks)**

**Total (25 marks)**

**QUESTION 3**

1. Explain **hashing** in direct record file organisation. List three advantages of hashing and one disadvantage. Use an example to illustrate this disadvantage.

**(8 marks)**

1. Describe what happens when a deadlock situation occurs. Your answer should clearly state and describe all of the conditions that are necessary for deadlock.

**(9 marks)**

1. What is the difference between a mutex and a counting semaphore? Using an example, explain how each semaphore is used.

**(8 marks)**

**Total (25 marks)**

**QUESTION 4**

1. Explain how the following seek strategies work showing the difference between them:

* C-SCAN
* C-LOOK

Outline the advantages and disadvantages of each strategy.

**(8 marks)**

1. Describe with the aid of a diagram Demand Paged Memory Allocation. List two advantages of Demand Paged Memory over non-Demand Paged Memory.

**(9 marks)**

1. List and describe four events that would cause an executing process to lose its allocation of the processor. Support your answer with a suitable diagram.

**(6 marks)**

1. What are the functions of the following special purpose registers:
2. Bounds Register
3. Relocation Register

**(2 marks)**

**Total (25 marks)**