NATIONAL OPEN UNIVERSITY OF NIGERIA
University Village, 91 Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja
FACULTY OF SCIENCES
COMPUTER SCIENCE DEPARTMENT
2023_1 POP EXAMINATION.

COURSE CODE*:* CIT752
COURSE TITLE*:* Operating Systems Concept
COURSE CREDIT UNIT: 2
TIME ALLOWED: 2 Hours
INSTRUCTION: Answer Question 1 and any other two (2) Questions

1a) Briefly discuss the following scheduling algorithms as instances of preemptive and non-preemptive scheduling algorithms. State one merit and demerit of each.

     (i)   First-In First-Out (FIFO)   *(5 marks)*

     (ii)   (ii) Round Robin (RR)   *(5 marks)*

b) Identify the major limitations of monitors in the implementation of synchronization. *(3 marks)*

c) Using a well-labelled diagram only, give the communication model for a *rendezvous*. *(4 marks)*

d) Explain the major motivation for *paging* as a memory allocation strategy. *(2 marks)*

e) Identify two disadvantages of paging *(3 marks)*

f) List five disk scheduling policies used by an operating system *(1½ marks)*

g) What are the major disadvantages of dynamic memory allocation? *(3 marks)*

h) Outline all the possible transitions in process state while executing   *(3½ marks)*

2a) Differentiate between *paging* and *segmentation*. *(3 marks)*

b) Using well-labeled diagrams only, describe interrupt processing.   *(5 marks)*

c) Write short notes on Segmentation? *(5 marks)*

d) Outline the sequence of activities involved in an I/O device completing an I/O operation *(7 marks)*

3a) Enumerate the various procedures an operating system would have to take care of the problem of process management.   *(9 marks)*

b) Discuss **Shortest Remaining Time (SRT) scheduling** *(5 marks)*

c) Highest Response Ratio Next (HRRN) scheduling algorithm derives a dynamic priority value based on the estimated run time and the incurred waiting time of each process in the system.

    (i) Give the formula for calculating the priority for each process. *(1 mark)*

    (ii) Using the formula given in (i) above, calculate the priories for jobs A and B with runtimes of 20 and 60 minutes respectively after each has waited 10 minutes. *(3 marks)*

d) What is page fault? *(2 marks)*

4a) Write short notes on the Virtual Memory Concept. *(5 marks)*

b) Briefly explain the following file access methods stating at one advantage and disadvantage of each.

(i) Sequential file   *(5 marks)*
(ii) Direct file   *(5 marks)*
(iii) Index Sequential file *(5 marks)*

5a) What do you understand by Directory structure? *(2 marks)*

b) When considering a particular directory structure, there is need to keep in mind the operations that are to be performed on a directory. State these operations. *(2 marks)*

c) Write short notes on any two directory structure. Use diagram to better illustrate your answer. *(16 marks)*