| COMPUTER SCIENCE DEPARTMENT <br> AL aL-BAYT UNIVERSITY |  | TIME ALLOWED: 120 MINUTES MAXIMUM MARKS: 50 MARKS |
| :---: | :---: | :---: |
| FINAL EXAM, FALL EXAMINATION 2018 |  | OPERATING SYSTEM 901332 <br> RECIPT OF THIS QUESTION/ANSWER PAPER.) |
| NAME |  |  |

## Q1. Give short answer for the following ( 2 points each):

1. What is FIFO?
2. What is the "dispatcher"?
3. What is throughput?
4. What is FCFS?
5. What is SJF?
6. What is contained in the page table?
7. What is virtual memory?
8. What is demand paging?
9. What is a page fault?
10. What is the LRU algorithm?

## Q 2 (10 points):

A. Here is a table of processes and their associated running times. All of the processes arrive in numerical order at time 0 . Show the scheduling order for these processes under 2 policies: First Come First Serve, Round-Robin with time-slice quantum $=1$.

| Process ID | CPU Running <br> Time |
| :---: | :---: |
| Process 1 | 2 |
| Process 2 | 6 |
| Process 3 | 1 |
| Process 4 | 4 |
| Process 5 | 3 |

B. Calculate the average waiting time for each method in part A (First Come First Serve , Round-Robin with time-slice quantum = 1).

## Q3. (5 points):

A. Explain the difference between logical and physical addresses.
B. List the common memory allocation methods.

Q4. (6 points):
A. List four conditions for deadlock
1.
2.
3.
4.
B. Briefly in at most three sentences each describe two approaches to avoiding deadlock.
C. Producer consumer problem can be solved using
1.
2.
3.

## Q5. (10 points)

Suppose a program references pages in the following sequence:

## ACBDBAEFBFAGEFA

Suppose the computer on which this program is running has 4 pages of physical memory.
Show how LRU-based demand paging would fault pages into the four frames of physical memory.

Notes: use $\sqrt{ }$ to represent a hit.

|  | A | C | B | D | B | A | E | F | B | F | A | G | E | F | A |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

