Cairo University **Faculty of science** **Mathematics Department**		**Computer Sciences Division** **Solution Sheet 2 Chapter 2** **Operating System 2025** **Dr. Hatem Moharram**

Q(1): Check in Black only one of the choices following each statement.

1. **The execution context**

O 1- is an executable program	O 4- includes information of use to the OS
O 2- is the associated data needed by a program	O **5- 3 and 4**
O 3- includes the contents of the various processor registers	O 6- 1 and 2

2. **Which of the following features are applicable at Time Sharing systems?**

O 1- Processor's time is shared among multiple users.	O **4- all of the previous**
O 2- Multiple users simultaneously access the system through terminals.	O 5- none of the previous
O 3- the OS interleaves the execution the users' programs.	

3. **In systems that use Virtual Memory:**

O **1- Programmers are allowed to address memory from a logical point of view.**	O 4- all of the previous
O 2- Programs' size is limited to the amount of main memory physically available.	O 5- none of the previous
O 3- A program references a word by means of a physical address.	

4. **Which of the following is needed for supporting multiprogramming?**

O 1- I/O interrupts and DMA	O 2-memory management unit	O 3- algorithm for scheduling.	O **4- all of the previous**	O 5- none of the previous

5. **the actual location in main memory is known as**

O **1- the physical address**	O 2- The logical addresses	O 3- the virtual address
O 4- 1 and 3.	O 5- all of the previous	O 6- none of the previous

6. **instructions of the user programs execute in :**

O 1- Control mode	O 2- More-privileged mode	O 3- Kernel mode
O 4- all of the previous	O **5- none of the previous**	O

7. **Less-privileged instructions can be executed in the**

O 1- user mode	O 2- kernel mode	O 3- nucleus mode
O 4- 1 and 2	O **5- all of the previous**	O 6- none of the previous

8. **In multiprogramming system which of the following is needed:**

O 1- a hardware that supports I/O interrupts	O 2- hardware that supports DMA	O 3- memory management unit O
O 4- scheduling algorithm.	O **5- all of the previous**	O 6- none of the previous

9. **In paging systems, a program references a word by means of a**

O **1-virtual address**	O 2-real address	O 3-page number	O 4-all of the previous	O 5-none of the previous

10. **the kernel**

O 1- A portion of the OS residents in main memory	O **4- all of the previous**
O 2- contains the most frequently used functions in the OS	O 5- none of the previous
O 3- is the nucleus of the OS	

11. **The execution context is ……**

O 1- an executable program	O 2- the associated data needed by a program	O 3- the contents of the memory
O 4- information about data	O 5- 3 and 4	O **6- none of the previous**

12. **Which of the following is needed for supporting multiprogramming?**

O 1- cache memory	O 2-memory unit	O **3- Algorithm for scheduling.**	O 4- all of the previous	O 5- none of the previous

Q(2): Put √ in front of the right statements and × in front of the wrong statements and correct them.

1. **The allocation of MM is controlled by the OS. False jointly by the OS and memory management hardware in the processor.**

2. **When an error occurs, the OS must provide a response that clears the error condition with the least impact on running applications. True**

3. **In the kernel mode, certain areas of memory are protected from the user's use. False user mode**

4. **Time sharing systems is limited to one or a few applications and the system response time is important. False transaction processing system**

5. **Process isolation means: programs should be dynamically allocated across the memory hierarchy as required. False prevent independent processes from interfering each other's memory**

6. **There is no need for a hardware mechanism for translating relative addresses to physical main memory addresses. False we need**

7. **With paging a program may occupy more than one partition, and these partitions need to be contiguous. False need not**

8. **even with multiprogramming, a processor could be idle most of the time. True**

9. **The locality of reference principle states that "memory references by the processor tend to cluster". True**

10. **The OS functions in the same way as ordinary computer software; that is, it is a program or suite of programs executed by the processor. true**

11. **In the kernel mode, certain areas of memory are protected from the user's use and in which certain instructions may not be executed. False user mode**

12. **The processor is a resource. true**

13. **In multiprogramming environment, the processor is never idle. False is often**

14. **The principal objective of Time Sharing systems is to maximize processor use. False Minimize response time or multiprogramming.**

15. **A transaction processing system is limited to one or a few applications and the system response time is minor. False major or principle.**

16. **Programs allocation across the memory hierarchy is the programmer responsibility. False should be transparent to the programmer.**

17. **Virtual memory was invented to meet the requirement of having multiple user jobs reside in main memory concurrently. true**

18. The long-term queue is a list of processes that are in main memory and are ready to run as soon as the processor is made available. **false short-term**

1) What are the factors that must be considered by any resource allocation and scheduling policy?

- **Fairness**
  - **give equal and fair access to all processes**
- **Differential responsiveness**
  - **discriminate (distinguish) between different classes of jobs**
- **Efficiency**

maximize throughput, minimize response time, and accommodate as many uses as possible

2) Mention the three factors that any resource allocation and scheduling policy must consider

Fairness:
Differential responsiveness
Efficiency