Student Name: _____ Student ID: _____

Instructions:

1. Time limit: 40 minutes
2. The exam consists of 20 multiple choice questions.
3. The answers must be clearly marked inside this exam book. There is no separate answer sheet.
4. Choose a single **best** choice in each question, fill in the answer box, and circle the letter of your choice.
5. You must not use any books, notes, calculators, cell phones, or electronic devices during the exam.
6. You may not leave the exam room to use the restroom or other personal issues.

1	2	3	4

5	6	7	8

9	10	11	12

13	14	15	16

17	18	19	20

1. Suppose a page table indicates page 2 corresponds to frame 3. Suppose each frame is size 4 bytes. The translation of the page offset 5 will be: A. 3 B. 4 **C. 5** D. 12 E. 15 F. none of the above

2. Consider a hard disk with 4 one-sided platters, each with 3 concentric circles of data on it, with each circle divided into 5 sections. Then the number of cylinders is: **A. 3** B. 4 C. 5 D. 12 E. 15 F. none of the above

3. Consider a hard disk with 4 one-sided platters, each with 3 concentric circles of data on it, with each circle divided into 5 sections. Then the number of sectors per platter is: A. 3 B. 4 C. 5 D. 12 **E. 15** F. none of the above

4. Which pair is relatively prime: **A. 3,4** B. 4,6 C. 3,6 D. 5,100 E. 14,21 F. none of the above

5. Preemptive CPU scheduling
   - **A. allows equal time to all processes**
   - B. lets a process to use as much CPU time as it needs
   - C. has greater context switch overhead than non-preemptive
   - D. is very efficient with very small quantum
   - E. has effect of rapid context switching

6. Pure priority scheduling has the following serious problem:
   - A. bad average turnaround time
   - B. bad average waiting in the ready queue
   - **C. some jobs may never get chance to run**
   - D. some jobs may exhibit aging
   - E. some jobs may use more CPU than their need

7. What effect will a greater number of cylinders in disk have on rotational latency:
   - A. decrease it if the platters are decreased
   - B. decrease it if the platters are increased
   - **C. keep it the same**
   - D. increase it if the platters are decreased
   - E. increase it if the platters are increased
   - F. depends on the radius of the cylinder in the disk

8. The TLB is
   - A. a register with translation of program counter
   - B. a cache on the disk user data
   - C. a thread that is related to the current process
   - **D. a subset of the page table**
   - E. used to translate long frame addresses in memory

9. The permission string `----rwx---` for a file indicates:
   - A. all permissions for owner and all for group

B. all permissions for owner and all for world

C. all permissions for group and none for owner

D. all permissions for owner none for group

E. all permissions for group none for owner

10. Suppose a virtual memory system has 8 virtual pages, 4 frames, 8 bytes in each frame. Then the number of bits required for each page number is: A. 2 **B. 3** C. 4 D. 6 E. 12 F. none of the above

11. Suppose a virtual memory system has 8 virtual pages, 4 frames, 8 bytes in each frame. Then the number of bits required for each virtual address is: A. 2 B. 3 C. 4 **D. 6** E. 12 F. none of the above

12. Suppose a memory system has two pages and it is initially empty. Assume that we reference pages 1, 2, 1, 2, 5, 1. Using **Optimal** page replacement policy the memory at the end will look like: A. 1,2 B. 2,1 **C. 1,5** D. 5,1 E. 2,5 F. 5,2

13. Suppose a memory system has two pages and it is initially empty. Assume that we reference pages 1, 2, 2, 1, 5, 1. Using **FIFO** page replacement policy the memory at the end will look like: A. 1,2 B. 2,1 C. 1,5 **D. 5,1** E. 2,5 F. 5,2

14. Suppose a memory system has two pages and it is initially empty. Assume that we reference pages 1, 2, 2, 1, 5, 1. Using **LRU** page replacement policy the memory at the end will look like: A. 1,2 B. 2,1 **C. 1,5** D. 5,1 E. 2,5 F. 5,2

15. Linux commands "`mkdir j; touch a; cd j; cd ..; ls`" will produce:

A. system error

B. a

C. j

D. a j

E. nothing

F. network error

16. Linux commands `cat a b` will:

A. combine files a and b into b

B. display files a and b

C. replace content of file b by file a

D. replace content of file a by file b

E. display a smiley of a cat surrounded by a's and b's

F. none of the above

17. Integrity of data means that the data is

A. unchanged and secret

B. unchanged

C. secret

D. virus free

E. all of the above

18. Confidentiality of data means that the data is

    A. unchanged and secret
    B. unchanged
    C. secret
    D. virus free
    E. all of the above

19. In symmetric cryptography (eg. AES) secret key is used for:

    A. signature and encryption
    B. encryption only
    C. signature only
    D. decryption only
    E. signature and decryption
    F. encryption and decryption
    G. none of the above

20. In asymmetric cryptography (eg. RSA) private key is used for:

    A. signature and encryption
    B. encryption only
    C. signature only
    D. decryption only
    E. data shearing & splicing
    F. signature and decryption
    G. none of the above