Q1: Select the correct answer:

1. Spooling is an acronym for?
   a. Simultaneous Peripheral Operation On Line
   b. Simultaneous Peripheral Operation On Link
   c. Simultaneous Peripheral Operation On Light
   d. None

2. A program in execution is referred to as?
   a. Processed
   b. Process
   c. Processor
   d. All

3. ___________ is single sequence stream which allows a program to split itself into two or more simultaneously running tasks?
   a. Process
   b. Thread
   c. Queue
   d. None

4. Because threads can share common data, they do not need to use ___?
   a. Layered Communication
   b. Interprocess Communication
   c. Both
   d. None

5. ___________ can be described by a resource allocation graph?
   a. Interprocess Communication
   b. Deadlocks
   c. Synchronization
   d. None
6. __________ algorithm requires each process to make in advance the maximum number of resources of each type that it may need?
   a. Deadlock Occurrence
   b. Deadlock Avoidance
   c. Both
   d. None

7. Which of the followings are the Basic architectures for multiprocessor interconnections?
   a. Bus-Oriented systems
   b. Crossbar-connected systems
   c. both a and b
   d. Uniform memory access (UMA)

Q2: Explain what is Virtual Memory and why it is used?
Q3: Choose the right choice:

1) An interpreter is a program that

   a) places programs into memory and prepares them for execution.
   b) automates the translation of assembly language into machine language.
   c) accesses a program written in a high level language and produces an object program.
   d) appears to execute a source program as if it were machine language.

2) Advantage of using assembly language rather than machine language is that

   a) it is mnemonic and easy to read
   b) addresses any symbolic not absolute
   c) introduction of data to program is easier
   d) All of these

3) __________ are statements that generally produce no executable code.
   a) declaration statements
   b) control statements
   c) computation statements
   d) structure statements

4) The syntax directed translation scheme is useful because it enables the compiler designer to express
   the generation

   a) intermediate code
   b) source code
   c) machine code
   d) syntactic code

5) A compiler program written in a high level language is called

   a) source program
   b) object program
   c) machine language program
   d) none of these

6) A grammar that produce more an parse tree for same sentence is said to be

   a) Ambiguous
   b) context free grammar
   c) normal form grammar
   d) syntactic grammar

7) Operator precedence parse is especially suitable for parsing

   a) expression
   b) recursive routines
   c) associative operators
   d) all above

Q4: Give the difference between compiler time and run time error?
Q5: Choose the correct answer:

1. Which of the following registers is used to keep track of address of the memory location where the next instruction is located?
   A. Memory Address Register
   B. Memory Data Register
   C. Instruction Register
   D. Program Register

2. Minimum time delay required between the initiation of two successive memory operations is called
   A. Memory cycle time
   B. Memory access time
   C. Transmission time
   D. Waiting time

3. PC Program Counter is also called ...................
   A. instruction pointer
   B. memory pointer
   C. data counter
   D. file pointer

4. Memory address refers to the successive memory words and the machine is called as ...............
   A. word addressable
   B. byte addressable
   C. bit addressable
   D. Tera byte addressable

5. Micro instructions are stored in
   A. computer memory
   B. primary storage
   C. secondary storage
   D. control memory
   E. cache memory

6. Systems that do not have parallel processing capabilities are
A. SISD  
B. SIMD  
C. MIMD  
D. All of the above

7. **Pipelining strategy** is called implement

A. instruction execution  
E. instruction prefetch  
B. instruction decoding  
C. instruction manipulation

**Q6: explain briefly the main role of the cache memory in program execution.**
Q7) **Choose the correct answer:**

1- If A and B are two invertible matrices, then..
   
   a) $AB = BA$,  
   b) $AB \neq BA$,  
   c) $A^2 = B^2$

2- $\frac{d}{dx} \sec^{-1} x$ is … ……… ……
   
   a) $\frac{1}{|x| \sqrt{1 - x^2}}$  
   b) $\frac{1}{|x| \sqrt{x^2 - 1}}$  
   c) $\frac{1}{|x| \sqrt{1 - x}}$

3- The solution of following differential equation $[y'' + 9y = 0]$ is……
   
   a) $y = c_1 \cos x + c_2 \sin x$,  
   b) $y = c_1 \cos 3x + c_2 \sin 3x$,  
   c) $y = c_1 e^{3x} + c_2 e^{-3x}$

4- The solution of following differential equation $[y''' = 0]$ is……
   
   a) $y = c_1 + c_2 e^x + c_3 e^{-x}$,  
   b) $y = c_1 + xc_2 + x^2 c_3$,  
   c) $y = c_1 + xc_2$

5- If $f(x)$ is Fourier series, and $2\pi$ is periodic number of it. Then $a_n = \ldots$
   
   a) $\frac{1}{\pi} \int_{0}^{2\pi} f(x) \cos nx \, dx$,  
   b) $\frac{2}{\pi} \int_{0}^{2\pi} f(x) \cos nx \, dx$,  
   c) $\frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \sin nx \, dx$.

6- If $f(x)$ is Fourier series, and $2\pi$ is periodic number of it. Then $b_n = \ldots$
   
   a) $\frac{2}{\pi} \int_{0}^{2\pi} f(x) \sin nx \, dx$,  
   b) $\frac{1}{\pi} \int_{0}^{2\pi} f(x) \sin nx \, dx$,  
   c) $\frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \cos nx \, dx$

7- If $[f(s) = \frac{1}{s^2 - 1}]$, the inverse of Laplace transformation $[f(t) = L^{-1}\{\frac{1}{s^2 - 1}\}]$
   
   is……(a) $f(t) = \sin t$,  
   (b) $f(t) = \cos t$,  
   (c) $f(t) = \sinh t$.
Let \( f(t) = e^{-iat} \). Show that

\[
\begin{align*}
& a) \quad L\{\cos at\} = \frac{s}{s^2 + a^2}, \\
& b) \quad L\{\sin at\} = \frac{a}{s^2 + a^2}
\end{align*}
\]

Where \( L \) is Laplace transformation.
Q9: choose the correct answer:
1. Viruses are an older type of virus and not so common. They are used to infect a computer's startup program so that the virus would become active as soon as the computer started up.
   a. Boot Sector  b. Macro  c. Trojans  d. Worm

2. In computer security, protection afforded to an automated information system in order to attain the applicable objectives of preserving the integrity, confidentiality and --------------------- of information system resources.
   a. privacy  b. availability  c. permissions  d. interruption

3. ------------------ attack is used to prevent hackers from capturing your password from your computer’s hard disk or while it transits the network, passwords can be encrypted using a one-way function to keep them from being revealed.

4. ------------------ has two forms. The first is to stop an attack and to assess and repair any damage caused by that attack.

5. ------------------ This attack is relevant for cryptographic communication and key exchange protocols.
   a. Man-in-the-middle attack  c. Chosen-plaintext attack:
   b. Known-plaintext attack  d. Timing Attack:

6. ------------------ A record containing information that identifies a user, including a secret password.
   a. Cookies  b. User account  c. Smart card  d. Sniffer

7. ------------------ are students who hack and are currently enrolled in some scholastic endeavor—junior high, high school, or college.
   a. Security experts’  c. Script kiddies
   b. Underemployed adults  d. Ideological hackers

8. ------------------ does not infect the end users directly. It is more towards infecting a website which is vulnerable to this attack, it will gain unauthorized access to the database and the attacker can retrieve all the valuable information stored in the database.

Q10: Define a digital signature (electronic signature), how it works?
Q11: Select the correct answer:

1) Frame knowledge base is very reasonable for ___________.
   a- Relationship          b- Intelligent Databases
   c- Drawing               d- Machine learning

2) The fault tolerance is an important feature in ____________.
   a- Fuzzy logic          b- Heuristic search
   c- Artificial Neural Network d- Propositional logic

3) The cost function uses in ________ algorithm.
   a- A                        b- Hill-climbing
   c- BFS                     d- A*

4) In the diagnostic applications it is better to choice the ___________ chaining of expert system.
   a- Hybrid                  b- Any
   c- Backward                d- Forward

5) Backtracking is an important feature in the __________ algorithm.
   a- BFS                      b- Hill-climbing
   c- A                        d- SSS

6) In the genetic algorithm it is always that Pc is ________ Pm.
   a- Equal                   b- Less than
   c- Greater than            d- Equal or Less than
7) Hopfield NN is __________ learning algorithm.
   a- Supervised  b- Unsupervised
   c- Metaheuristic  d- Self-organization

8) Any one of the following is not from NLP stages?
   a- Syntactic analysis  b- Morphology
   c- Coding  d- Semantic analysis

Q12: Draw the conceptual graph for the following paragraph.
"Ali have the red big nice car, he will go to home with his brother Mohammed at night.
Maha is sister of Ali, she read the A.I. book every night. Ali is an electric's engineer."
Q13: Identify the choice that best completes the statement or answers the question.

1. Which of the following database object does not physically exist?
   (A) Base table  (B) Index  (C) View  (D) None of the above

2. In a relation
   (A) Ordering of rows is immaterial  (B) No two rows are identical
   (C) (A) and (B) both are true  (D) None of these.

3. Key to represent relationship between tables is called
   (A) Primary key  (B) Secondary Key  (C) Foreign Key  (D) None of these.

4. An advantage of the database management approach is
   (A) Data is dependent on programs.  (B) Data redundancy increases.
   (C) Data is integrated and can be accessed by multiple programs.
   (D) None of the above.

5. The method in which records are physically stored in a specified order according to a key field in each record is
   (A) Sequential.  (B) Direct.
   (C) Hash.  (D) All of the above.

6. Related fields in a database are grouped to form a
   (A) Data file.  (B) Menu.
   (C) Data record.  (D) Bank.

7. In the architecture of a database system external level is the
   (A) Physical level.  (B) Logical level.
   (C) View level.  (D) Conceptual level

8. DML is provided for
   (A) Description of logical structure of database.
   (B) Addition of new structures in the database system.
   (C) Manipulation & processing of database.
   (D) Definition of physical structure of database system.

Q14: Draw the three level architecture of the database system
Q15: choose the correct answer:
1) Which of the following data structures are indexed structures?
   a. linked lists
   b. arrays
   c. both of above
   d. none of above

2) Which of the following data structure can store the non-homogeneous data elements?
   a. Arrays
   b. Records
   c. Pointers
   d. None

3) queues serves major roles in
   a. simulation of recursion
   b. simulation of arbitrary linked list
   c. simulation of resource allocation
   d. none of the above.

4) The initial configuration of a queue is a, b, c, d. to get the configuration d, c, b, a one need a minimum of
   a. 3 deletion and 3 addition
   b. 2 deletion and 3 addition
   c. 3 deletion and 2 addition
   d. 4 deletion and 4 addition

5) The five items A, B, C, D, and E are pushed in a stack one after the other starting from A. then the stack is poped four times and each elements is inserted in a queue. Then two elements are removed from the queue and pushed back on the stack. Now one item is poped from the stack. The poped item is:
   a. A
   b. E
   c. C
   d. D
6) Stack cannot be used to:
   
a. Evaluate an arithmetic expression in postfix form
b. Implement recursion
c. Convert an arithmetic expression in infix form to its equivalent postfix form
d. Allocate resource by operating systems

7) Traversing a binary tree first root and then left and right sub trees is called
   
a. Inorder traversal
b. Postorder traversal
c. Preorder traversal
d. None of the above

8) Which of the following choices is used by binary search but the linear search ignores:
   
a. Order of the list
b. Length of the list
c. Maximum value of the list
d. Minimum value of the list

Q16: How to find middle element of linked list in one pass?