Match the following translation mechanisms with their respective operational characteristics:
1. Assemblers A. Translate entire source code at once and generate an object code
2. Interpreters B. Process source code line by line during execution
3. Compilers C. Convert high-level language into machine code before execution
4. Just-In-Time Compiler (JIT) D. Translate code during runtime, optimizing frequently used sections
Choose the correct answer from the options given below:
(1) 1-C, 2-B, 3-A, 4-D
(2) 1-B, 2-A, 3-D, 4-C
(3) 1-A, 2-D, 3-B, 4-C
(4) 1-D, 2-C, 3-A, 4-B
Answer Key: 2
Solution:
? Assemblers: Convert assembly language to machine code in one go, producing object code suitable for linking.
? Interpreters: Read and execute source code line by line, without generating an independent executable.
? Compilers: Convert the entire high-level program into machine code before execution, creating an executable.
? JIT Compilers: Translate code during runtime, often used in virtual machines, to optimize performance dynamically.
Hence, Option (2) is the right answer.

Match the following data communication components with their correct roles in a data transmission system:
1. Components of Data Communication System Characteristics
I. Modulator A. Converts digital signals into analog for transmission
II. Encoder B. Converts data into a form suitable for transmission
III. Transceiver C. Combines transmitter and receiver functions into a single device
IV. Demodulator D. Converts received analog signals back into digital data
Choose the correct answer from the options given below:
(1) I-B, II-A, III-C, IV-D
(2) I-A, II-B, III-D, IV-C
(3) I-C, II-D, III-A, IV-B
(4) I-D, II-C, III-B, IV-A
Answer Key: 2
Solution:
? Modulator: Converts digital data into analog signals for transmission over analog channels.
? Encoder: Transforms data into a suitable format, often involving encoding techniques for error detection or correction.
? Transceiver: A device that transmits and receives data, integrating both functions, typically used in communication links.
? Demodulator: Converts received analog signals back into digital data, completing the modulation-demodulation process.
Hence, Option (2) is the right answer.

3. Match the following C programming constructs with their respective functionalities:
C Programming Concepts Functionality
I. Array Initialization A. Allocates memory dynamically during runtime
II. Pointer Arithmetic B. Accesses elements via address computations
III. Structure Declaration C. Groups different data types under a single name
IV. File Handling D. Reads or writes data to external files
Choose the correct answer from the options given below:
(1) I-B, II-A, III-C, IV-D
(2) I-C, II-D, III-A, IV-B
(3) I-A, II-B, III-D, IV-C

(4) I-D, II-C, III-B, IV-A
Answer Key: 1
Solution:
? Array Initialization: Sets initial values for array elements at declaration.
? Pointer Arithmetic: Performs computations on pointers to access array elements efficiently.
? Structure Declaration: Defines a new data type that groups various data fields.
? File Handling: Involves reading from or writing to files using fopen, fread, fwrite, fclose, etc.
Hence, Option (1) is the right answer.

Match the following layers of OSI model with their primary functions:
1. Data Link Layer A. Establishes, manages, and terminates connections
2. Network Layer B. Handles addressing, routing, and packet forwarding
3. Transport Layer C. Provides end-to-end communication, error recovery, flow control
4. Physical Layer D. Transmits raw bit streams over physical medium
Choose the correct answer from the options given below:
(1) 1-C, 2-B, 3-A, 4-D
(2) 1-D, 2-C, 3-B, 4-A
(3) 1-A, 2-D, 3-C, 4-B
(4) 1-B, 2-A, 3-D, 4-C
Answer Key: 3
Solution:
? Data Link Layer: Ensures reliable node-to-node data transfer, framing, and error detection.
? Network Layer: Responsible for logical addressing, routing, and packet forwarding across networks.
? Transport Layer: Provides end-to-end communication, error recovery, and flow control between hosts.
? Physical Layer: Handles the transmission of raw bits over the physical medium, including electrical and mechanical specifications.
Hence, Option (3) is the right answer.

2. Match the following NLP processing techniques with their primary functions:
Natural Language Processing Technique Function
I. Parsing A. Assigns semantic meaning to syntactic structures
II. Semantic Analysis B. Analyzes the grammatical structure of a sentence
III. Pragmatics C. Determines the intended meaning in context
IV. Tokenization D. Breaks text into meaningful units like words or tokens
Choose the correct answer from the options given below:
(1) I-B, II-A, III-C, IV-D
(2) I-A, II-B, III-D, IV-C
(3) I-C, II-D, III-A, IV-B
(4) I-D, II-C, III-B, IV-A
Answer Key: 2
Solution:
? Parsing: Analyzes the grammatical structure of sentences, identifying syntactic relations.
? Semantic Analysis: Assigns meaning to syntactic structures, interpreting semantics.
? Pragmatics: Looks beyond syntax and semantics to understand contextual or implied meanings.
? Tokenization: Segments text into tokens, the basic units for further linguistic processing.
Hence, Option (2) is the right answer.

Match the following network access methods with their operational principles:
1. CSMA/CD A. Carrier sense detects the channel is free before transmitting, with collision detection
2. CSMA/CA B. Carrier sense with collision avoidance, used mainly in wireless networks
3. Token Passing C. Passes a token sequentially to regulate access in a ring or bus topology
4. Reservation D. Allocates specific time slots or resources for stations to transmit
Choose the correct answer from the options given below:

(1) 1-A, 2-B, 3-C, 4-D
(2) 1-B, 2-A, 3-D, 4-C
(3) 1-C, 2-D, 3-A, 4-B
(4) 1-D, 2-C, 3-B, 4-A
Answer Key: 1
Solution:
? CSMA/CD: In wired Ethernet, stations sense the carrier before transmitting, detecting collisions during transmission and backing off.
? CSMA/CA: Used in wireless networks; stations sense the channel and use collision avoidance techniques to reduce collisions.
? Token Passing: Stations pass a token around the network, allowing only the holder to transmit, ensuring collision-free access.
? Reservation: Stations reserve resources or time slots in advance, often in TDMA or similar protocols, to minimize contention.
Hence, Option (1) is the right answer.