

--Question Starting--

Match the following graph concepts with their correct definitions:

1. Graph Concepts Definition

I. Eulerian Paths A. A path that visits every vertex exactly once

II. Bipartite Graphs B. A graph that can be colored with two colors such that no two adjacent vertices have the same color

III. Spanning Trees C. A cycle that uses every edge of a graph exactly once

IV. Hamiltonian Circuits D. A tree that includes all the vertices of the graph

Choose the correct answer from the options given below:

(1) I-C, II-B, III-D, IV-A

(2) I-D, II-A, III-B, IV-C

(3) I-A, II-C, III-D, IV-B

(4) I-B, II-D, III-A, IV-C

Answer Key: 1

Solution:

? Eulerian Paths: It refers to a cycle that utilizes every edge of a graph exactly once, indicating that it must return to the starting vertex.

? Bipartite Graphs: These can be colored using two different colors for adjacent vertices, ensuring no two connected vertices share the same color.

? Spanning Trees: It is a subset of Graphs, which includes all the vertices and is a tree, meaning it has no cycles and connects all the vertices with the minimum number of edges.

? Hamiltonian Circuits: These are a type of circuit that visits every vertex of the graph exactly once and returns to the origin point.

Hence, Option (1) is the right answer.

--Question Starting--

Match the following types of virtual machines with their primary function or characteristic:

1. Virtual Machine Types Function/Characteristic

I. System VM A. Offers a separate operating environment within the same physical hardware

II. Process VM B. Provides system-level virtualization, including hardware and network resources

III. Hardware VM C. Designed for running specific programs and can support multiple execution environments

IV. Application VM D. Simulates entire hardware systems, useful for hosting multiple OS environments

Choose the correct answer from the options given below:

(1) I-B, II-A, III-D, IV-C

(2) I-D, II-C, III-A, IV-B

(3) I-C, II-B, III-D, IV-A

(4) I-A, II-D, III-B, IV-C

Answer Key: 2

Solution:

? System VM: Provides a complete system-level environment that simulates the underlying hardware, often used for running multiple operating systems.

? Process VM: Each process VM can offer a separate execution environment for computer programs, allowing a single host to run multiple guest processes simultaneously.

? Hardware VM: This type of virtual machine emulates complete hardware systems, such as computers, which can be very useful in complex computing environments and data centers.

? Application VM: Primarily focused on running specific applications, ensuring that the application can operate across different operating systems.

Hence, Option (2) is the right answer.

--Question Starting--

Match the following 2-D geometrical transformations with their matrix operations:

1. Transformations Matrix Operations

- I. Translation A. Multiplication by a matrix with cos and sin terms corresponding to the angle of rotation
II. Scaling B. Addition of a constant vector to coordinates
III. Rotation C. Multiplication by a diagonal matrix with scaling factors
IV. Reflection D. Multiplication by a matrix with values ± 1 on the diagonal

Choose the correct answer from the options given below:

- (1) I-B, II-C, III-A, IV-D
(2) I-C, II-A, III-D, IV-B
(3) I-A, II-D, III-B, IV-C
(4) I-D, II-B, III-C, IV-A

Answer Key: 1

Solution:

? Translation: This involves adding a constant vector to the coordinates of each point in the object, effectively moving it in space.

? Scaling: Involves multiplying coordinates by a diagonal matrix where each diagonal element represents the scaling factor for that dimension.

? Rotation: This transformation is accomplished by multiplying the coordinates by a rotation matrix, which includes cosine and sine of the rotation angle.

? Reflection: This can be represented by a matrix with diagonal entries of ± 1 , reflecting the object across specific axes depending on the sign and placement of these entries.

Hence, Option (1) is the right answer.