

Name :
Enrollment No.:

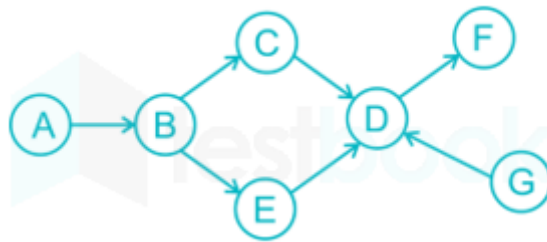
Tutorial:

Date :
Programme:

1. **Question:** Let $G = (V, E)$ be a directed graph where V is the set of vertices and E is the set of edges. Then which one of the following graphs has the same strongly connected component as G ?

- $G_1 = (V, E_1)$ where $E_1 = \{(u, v) \mid (u, v) \notin E\}$
- $G_2 = (V, E_2)$ where $E_2 = \{(u, v) \mid (u, v) \in E\}$
- $G_3 = (V, E_3)$ where $E_3 = \{(u, v) \mid \text{there is a path of length } \leq 2 \text{ from } u \text{ to } v \text{ in } E\}$
- $G_4 = (V_4, E)$ where V_4 is the set of vertices in G which are not isolated

2. **Question:** Consider the following graph:



The number of strongly connected components for the above graph is

- 1
 - 5
 - 6
 - 7
3. **Question:** Let G be a graph with $100!$ vertices, with each vertex labelled by a distinct permutation of the numbers $1, 2, \dots, 100$. There is an edge between vertices u and v if and only if the label of u can be obtained by swapping two adjacent numbers in the label of v . Let y denote the degree of a vertex in G , and z denote the number of connected components in G .

- Then, $y + 10z = ?$

4. **Question:** Count the possible paths from A to E of given graph:

