

IBM

C1000-179

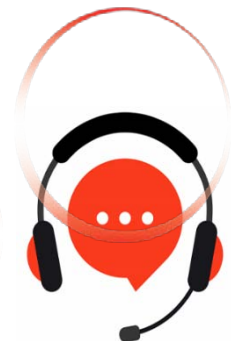
**IBM Fundamentals of Quantum Computing Using Qiskit
v2.X Developer**

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Question: 1

A circuit prepares the single-qubit state $e^{i\pi/3}|0\rangle$ and then measures in the computational basis. What is the probability of obtaining the outcome 0?

Response:

- A. 0.5
- B. 0.0
- C. 1.0
- D. It depends on the value of the phase $e^{i\pi/3}$

Answer: C

Explanation:

A global phase factor has magnitude 1 and is unobservable; $|e^{i\pi/3}|^2 = 1$, so the state is measured as 0 with certainty.

Question: 2

Which method is used to add a barrier across all qubits in a QuantumCircuit object qc?

Response:

- A. qc.barrier()
- B. qc.stop()
- C. qc.wait()
- D. qc.add_barrier()

Answer: A

Explanation:

Calling barrier() with no arguments applies a barrier across all qubits in the circuit.

Question: 3

In OpenQASM 3, which keyword is used to declare a classical floating-point variable?

Response:

- A. float
- B. double
- C. real
- D. decimal

Answer: A

Explanation:

OpenQASM 3 declares real values with the float type, for example float[64] x;

Question: 4

Which Estimator option should be increased to enable advanced techniques like Zero Noise Extrapolation (ZNE)?

Response:

- A. resilience_level
- B. optimization_level
- C. execution_priority
- D. shots_count

Answer: A

Explanation:

Raising the resilience_level turns on stronger error-mitigation methods such as ZNE for expectation values.

Question: 5

Which method adds a controlled-Z gate between qubit 0 and qubit 1?

Response:

- A. qc.cz(0, 1)
- B. qc.control_z(0, 1)
- C. qc.z_ctrl(0, 1)
- D. qc.ccz(0, 1)

Answer: A

Explanation:

cz() appends a controlled-Z using the given control and target qubits.

Question: 6

In Qiskit v2.x, which class is used to create a dynamic circuit that allows real-time feedback and control flow?

Response:

- A. QuantumCircuit

- B. DynamicCircuit
- C. ConditionalCircuit
- D. AdaptiveCircuit

Answer: A

Explanation:

Dynamic circuits are built with the standard QuantumCircuit using mid-circuit measurement and control-flow constructs such as `if_test`.

Question: 7

Which `plot_bloch_multivector` feature allows seeing the state of individual qubits in a multi-qubit system?

Response:

- A. It plots a sphere for each qubit.
- B. It plots one sphere with many arrows.
- C. It plots a 2D projection of the state.
- D. It colors the sphere based on parity.

Answer: A

Explanation:

`plot_bloch_multivector` draws one Bloch sphere per qubit, showing each qubit's reduced single-qubit state.

Question: 8

A single Sampler PUB carries a circuit with two parameters and a `parameter_values` array of shape (3, 4, 2).

What is the shape of this PUB's result data?

Response:

- A. (3, 4, 2)
- B. (12,)
- C. (3, 4)
- D. (2,)

Answer: C

Explanation:

The final axis (size 2) binds the two parameters, leaving the leading grid (3, 4) as the result shape — twelve distributions arranged in a 3-by-4 array.

Question: 9

A backend exposes a basis gate set of {'rz', 'sx', 'x', 'cx'} and a specific coupling map. A circuit containing an h gate and a long-range cx is transpiled to this backend. What must the transpiler do?

Response:

- A. Leave the h gate as-is because Hadamard is universal.
- B. Reject the circuit, since h and a long-range cx are not directly supported.
- C. Decompose the h into the basis gates and insert SWAPs (routing) so every cx acts on connected qubits.
- D. Convert every gate into a single custom unitary and run that directly.

Answer: C

Explanation:

Transpilation performs basis translation ($h \rightarrow rz/sx$) and routing (adding SWAPs) so the circuit conforms to both the basis gates and the coupling map.

Question: 10

Which visualization shows the probability of each computational basis state as a vertical bar?

Response:

- A. `plot_histogram()`
- B. `plot_bloch_vector()`
- C. `plot_state_city()`
- D. `plot_gate_map()`

Answer: A

Explanation:

`plot_histogram` draws each basis state's probability (or counts) as a vertical bar.

Question: 11

Which one of the following images is the output from the code below?

```
from qiskit import *  
qubits = QuantumRegister(2)  
clbits = ClassicalRegister(2)  
circuit = QuantumCircuit(qubits, clbits)  
(q0, q1) = qubits  
(c0, c1) = clbits  
circuit.h(q0)
```

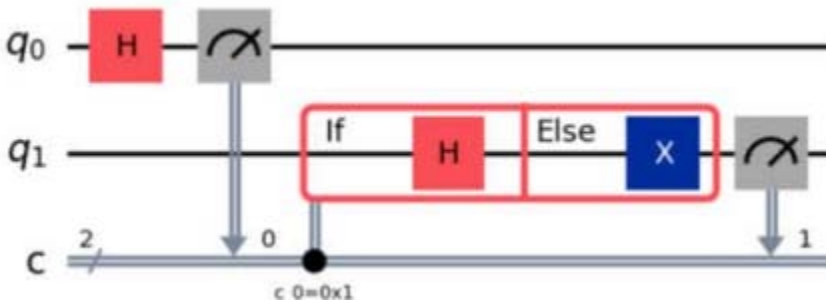
```

circuit.measure(q0, c0)
with circuit.if_test((c0, 1)) as else_: circuit.h(q1)
with else_: circuit.x(q1)
circuit.measure(q1, c1)
circuit.draw(output="mpl")

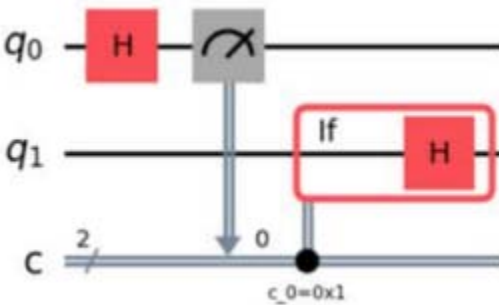
```

Response:

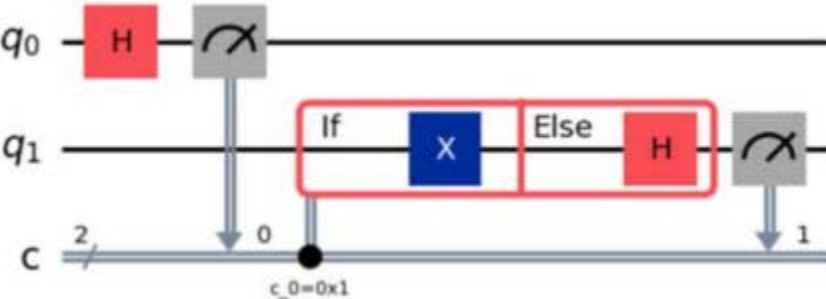
A.



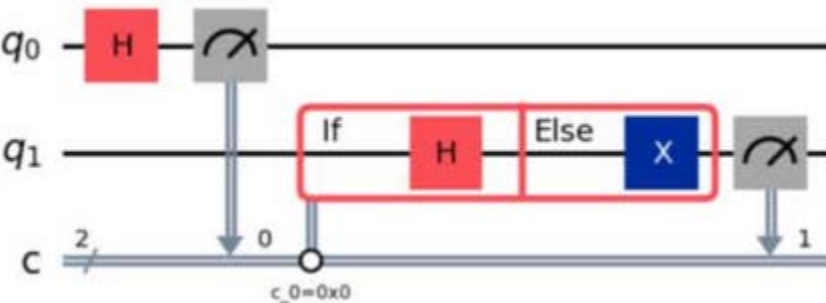
B.



C.



D.



Answer: A

Explanation:

The If block applies H to q1 when c0 equals 1 and the Else applies X, the condition reads c0=0x1, and q1 is measured afterward, exactly as the code defines.

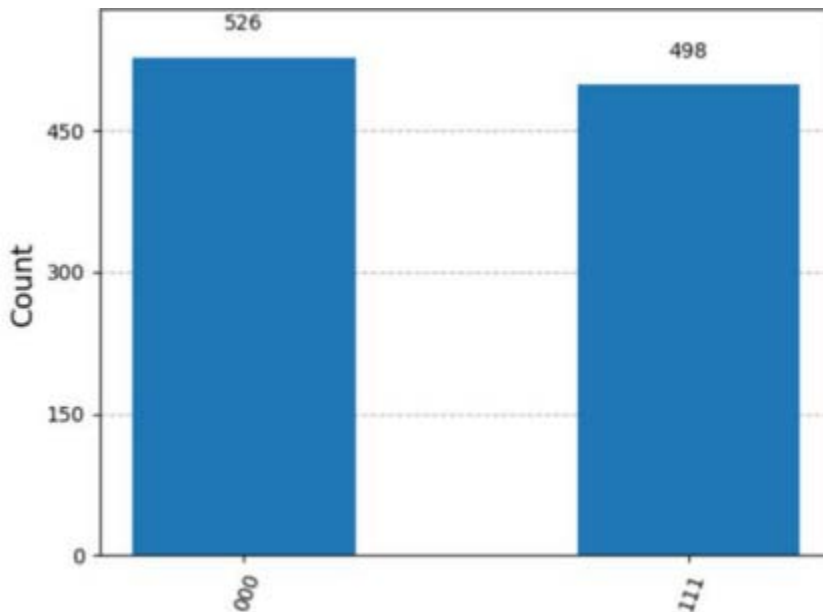
Question: 12

Given the code fragment below, which image is the expected output?

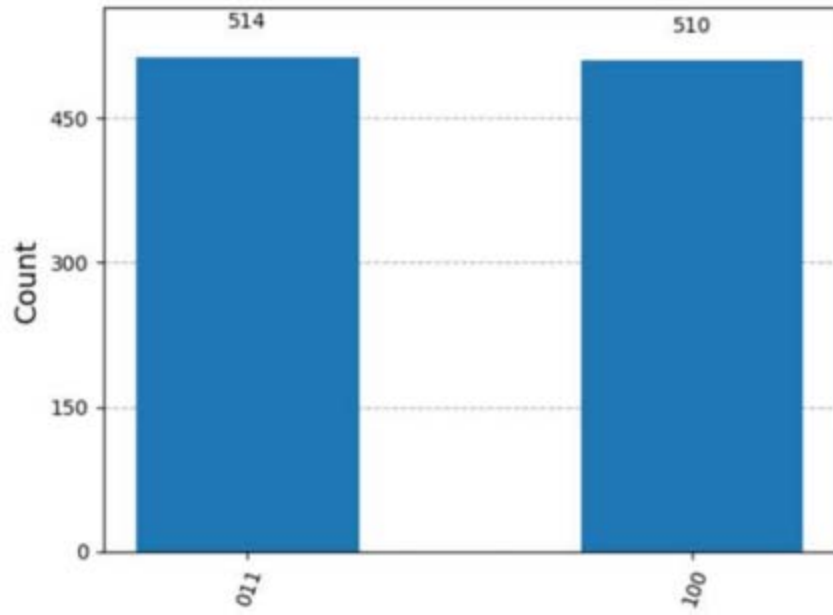
```
from qiskit.quantum_info import Statevector
from qiskit.visualization import plot_histogram
state = Statevector([0.+0.j, 0.+0.j, 0.70710678+0.j, 0.+0.j, 0.+0.j, -0.70710678+0.j, 0.+0.j, 0.+0.j])
counts = state.sample_counts(shots=1024)
plot_histogram(counts)
```

Response:

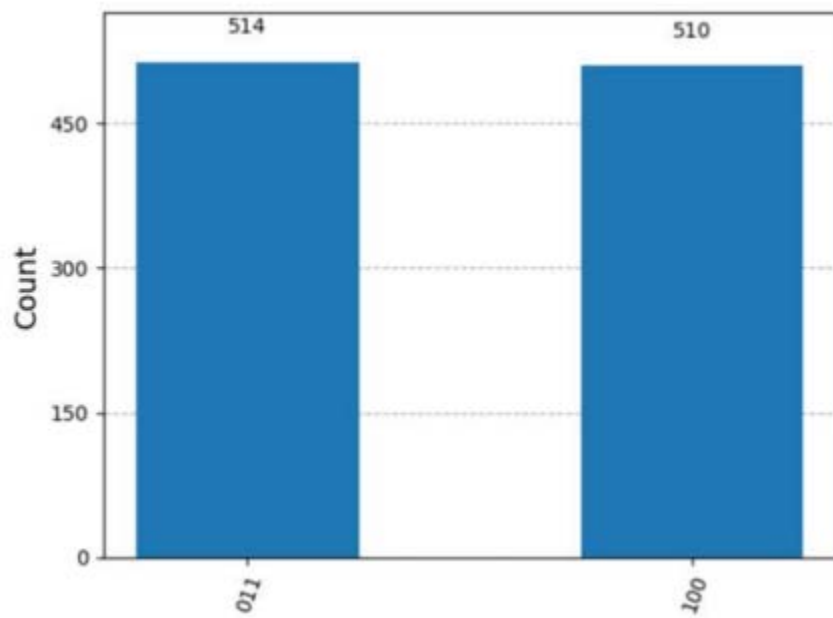
A.



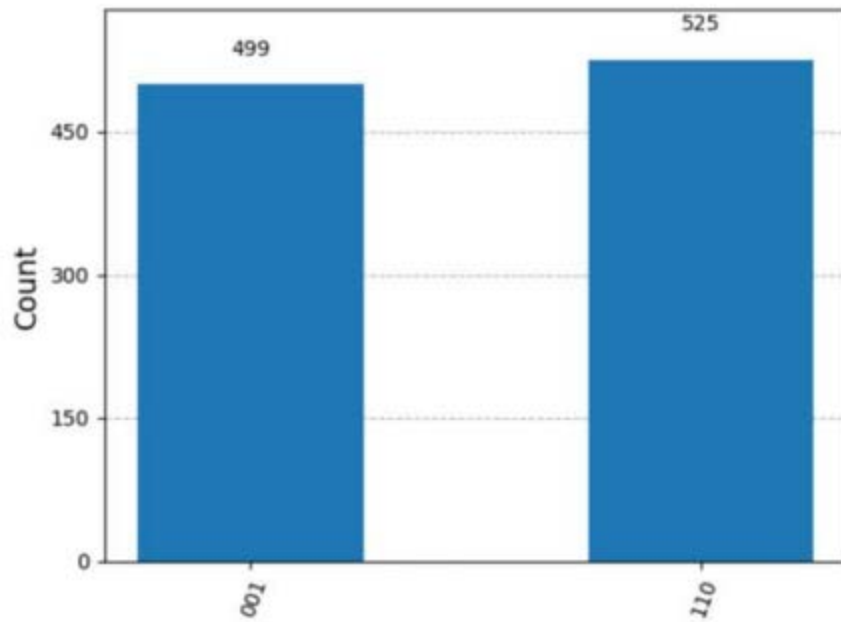
B.



C.



D.



Answer: C

Explanation:

Only indices 2 and 5 have nonzero amplitude (magnitude 0.707, so probability 0.5 each), which sample to the basis states '010' and '101' with roughly equal counts; the sign on index 5 does not affect probability.

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