

Python for Cheminformatics & Bioinformatics

Quiz: Answer Key (Instructor Copy) - 100 Questions

AI-Driven Drug Development Training

February 2026

Quick Reference Answer Key

Q	Ans								
1	B	11	A	21	A	31	B	41	A
2	C	12	A	22	B	32	A	42	B
3	B	13	A	23	C	33	B	43	C
4	A	14	B	24	B	34	B	44	C
5	D	15	A	25	B	35	A	45	A
6	A	16	B	26	B	36	B	46	B
7	A	17	C	27	B	37	A	47	A
8	B	18	B	28	B	38	B	48	C
9	A	19	C	29	B	39	B	49	C
10	B	20	B	30	A	40	A	50	B

Q	Ans								
51	B	61	B	71	B	81	B	91	B
52	C	62	A	72	C	82	B	92	B
53	B	63	B	73	B	83	A	93	C
54	B	64	B	74	A	84	B	94	C
55	B	65	A	75	A	85	C	95	B
56	A	66	B	76	B	86	B	96	A
57	B	67	B	77	A	87	B	97	B
58	B	68	B	78	B	88	C	98	C
59	B	69	C	79	B	89	B	99	A
60	A	70	A	80	B	90	A	100	B

1 Detailed Answers with Rationales

Section 1: Variables & Data Types (Q1-Q5)

Q	Ans	Rationale
1	B	<code>mw</code> is a float (180.16) and <code>pic50</code> is a string ("8.28"). They have different types, so the comparison returns False.
2	C	Tuple unpacking assigns values positionally: <code>name = "Ibuprofen"</code> , <code>mw = 206.28</code> , <code>logp = 3.97</code> .
3	B	<code>None</code> , 0, and empty string "" are all falsy values. <code>bool()</code> returns False for each.
4	A	<code>int(5.8)</code> truncates to 5, <code>int(-2.3)</code> truncates to -2. Sum is $5 + (-2) = 3$.
5	D	All options create valid multi-line strings: A uses \n, B uses backslash in triple quotes, C combines both, and D acknowledges all work.

Section 2: Operators (Q6-Q10)

Q	Ans	Rationale
6	A	<code>17 // 5 = 3</code> (floor division), <code>17 % 5 = 2</code> (remainder), <code>17 / 5 = 3.4</code> (true division).
7	A	<code>450 <= 500</code> is True, <code>4.5 <= 5</code> is True. <code>True and True</code> equals True (Lipinski's Rule of 5 passes).
8	B	Parentheses first: $9 - 8 = 1$. Then $10 ** 1 = 10$.
9	A	"ATGCGC" has 2 G's and 2 C's = 4 GC. Length is 6. $4/6 * 100 = 66.67\%$.
10	B	String values are equal (<code>==</code>), list contents are equal, but lists are different objects in memory (<code>is</code> returns False).

Section 3: Strings (Q11-Q15)

Q	Ans	Rationale
11	A	<code>[:3] = "ATG"</code> (first 3), <code>[-3:] = "TCG"</code> (last 3), <code>[::3] = "AGC"</code> (every 3rd char: index 0, 3, 6).
12	A	<code>replace('T', 'U')</code> creates a new string with T replaced by U: "AUGC" (DNA to RNA transcription).
13	A	SMILES "c1ccccc1" contains digit '1' for ring closure. <code>any(c.isdigit()...)</code> finds it, returns True.
14	B	f-string <code>{pic50:.1f}</code> formats 5.28 to 1 decimal place: "5.3" (rounds up).
15	A	Strings are immutable in Python. Attempting item assignment raises <code>TypeError</code> .

Section 4: Lists (Q16-Q20)

Q	Ans	Rationale
16	B	<code>library_b = library_a</code> creates a reference to the same list. Appending to <code>library_a</code> affects both. Length becomes 4.
17	C	<code>extend()</code> adds each element from the iterable. 2 original + 2 new = 4 compounds.

Q	Ans	Rationale
18	B	Values ≥ 6.0 are: 6.8, 7.3, 8.1 = 3 active compounds.
19	C	<code>descriptors[1]</code> = Ibuprofen row, [1] = second element (<code>LogP</code>) = 3.97.
20	B	Sorting by <code>pIC50</code> descending puts (“Drug_X”, 8.1) first. [0][0] gets the name: “Drug_X”.

Section 5: Tuples & Sets (Q21-Q25)

Q	Ans	Rationale
21	A	Tuples are immutable. Attempting item assignment raises <code>TypeError</code> .
22	B	Extended unpacking: <code>first=1, last=7, *middle</code> captures [2,3,4,5,6] = 5 elements.
23	C	& is set intersection. Common elements: {“CMP002”, “CMP003”}.
24	B	Sets automatically remove duplicates. Unique scaffolds: benzene, pyridine, furan = 3.
25	B	Set difference – removes tested from all. Result: {“A”, “C”}.

Section 6: Dictionaries (Q26-Q30)

Q	Ans	Rationale
26	B	<code>.get(key, default)</code> returns default if key not found. “LogP” doesn’t exist, returns “N/A”.
27	B	Iterating over a dict iterates over keys only: “MW”, “LogP”, “HBD”.
28	B	Nested dict access: <code>compounds[‘Aspirin’]</code> returns inner dict, then [‘pIC50’] = 5.2.
29	B	For $IC50=10nM$: $pIC50 = 9 - \log_{10}(10) = 9 - 1 = 8.0$.
30	A	“AUG” maps to “M” (Methionine/Start), “UGG” maps to “W” (Tryptophan). Concatenated: “MW”.

Section 7: Control Flow (Q31-Q35)

Q	Ans	Rationale
31	B	<code>pIC50=7.5</code> : First condition ($i=8$) is False, second ($i=6$) is True. Prints “Active”.
32	A	<code>range(0, 10, 2) = [0, 2, 4, 6, 8]</code> . Sum = $0+2+4+6+8 = 20$.
33	B	First value ≥ 7.0 is 7.5. <code>break</code> exits immediately after printing “Found potent: 7.5”.
34	B	<code>continue</code> skips falsy values (None, “”). Prints: “valid active potent”.
35	A	No values ≥ 6.0 , so loop completes without break. The <code>else</code> clause executes.

Section 8: Functions (Q36-Q40)

Q	Ans	Rationale
36	B	Default threshold=6.0. 5.5 \nmid 6.0, so returns “Inactive”.
37	A	Empty string is falsy, function returns early (implicit None). Prints “None”.
38	B	<code>*values</code> collects args as tuple. $(5.2+6.8+7.3)/3 = 19.3/3 \approx 6.43$.

Q	Ans	Rationale
39	B	<code>**kwargs</code> collects keyword arguments into a dictionary. Returns dict type.
40	A	Lambda computes: $9 - \log_{10}(100) = 9 - 2 = 7.0$.

Section 9: File & Error Handling (Q41-Q45)

Q	Ans	Rationale
41	A	<code>with</code> statement is a context manager that automatically closes file after block exits.
42	B	File opened in read mode ("r") doesn't support write operations. Raises <code>io.UnsupportedOperation</code> .
43	C	<code>ValueError</code> is caught, prints "Error". Execution continues, prints "Done".
44	C	<code>finally</code> always executes, even with return. Prints "Cleanup", then returns "Processed".
45	A	<code>float('invalid')</code> raises <code>ValueError</code> (not <code>TypeError</code>). First matching except block catches it.

Section 10: Advanced Topics (Q46-Q50)

Q	Ans	Rationale
46	B	List comprehension creates all values in memory immediately. Generator expression uses lazy evaluation—computes values on demand, using far less memory.
47	A	<code>map</code> applies lambda to each: $9-\log_{10}(10)=8$, $9-\log_{10}(100)=7$, $9-\log_{10}(1000)=6$. Result: [8.0, 7.0, 6.0].
48	C	<code>filter</code> keeps values where lambda returns True. Values ≥ 7.0 : [7.3, 8.1].
49	C	<code>zip</code> pairs corresponding elements. First pair: ("Aspirin", 5.2) as a tuple.
50	B	<code>enumerate(start=1)</code> begins counting at 1. First iteration: idx=1, smiles="CCO". Prints "1: CCO".

Section 11: Classes & OOP (Q51-Q60)

Q	Ans	Rationale
51	B	<code>__init__</code> sets instance attributes. <code>aspirin.name</code> returns "Aspirin".
52	C	Class variable <code>atom_count</code> is shared. Both instances add to it: $10+15=25$.
53	B	<code>@property</code> decorator makes <code>name</code> a computed property returning uppercase.
54	B	<code>__len__</code> magic method allows <code>len()</code> on custom objects. Returns 150.
55	B	<code>__str__</code> defines string representation. <code>print(c)</code> outputs "Compound: Caffeine".
56	A	<code>Drug</code> inherits from <code>Molecule</code> . <code>isinstance</code> checks inheritance chain.
57	B	Method overriding: <code>Drug.describe()</code> overrides parent method. Returns "Therapeutic drug".
58	B	<code>@staticmethod</code> doesn't need instance. $100/0.5 = 200.0$.

59	B	<code>@classmethod</code> modifies class state. First call returns 1, second returns 2.
60	A	<code>--eq--</code> compares names only. Both have “Aspirin” so they’re equal.

Section 12: Modules & Imports (Q61-Q65)

Q	Ans	Rationale
61	B	<code>from math import sqrt</code> imports only <code>sqrt</code> function directly.
62	A	Using alias <code>lg</code> for <code>log10</code> : $9 - \lg(100) = 9 - 2 = 7.0$.
63	B	<code>__name__ == "__main__"</code> is True when script runs directly, not imported.
64	B	<code>random.seed(42)</code> makes random numbers reproducible—same sequence each run.
65	A	<code>Counter</code> counts occurrences. “ATGCGATCGATCG” has 3 G’s.

Section 13: List Methods (Q66-Q70)

Q	Ans	Rationale
66	B	<code>insert(1, x)</code> inserts at index 1. “Metformin” is now at position 1.
67	B	<code>pop(1)</code> removes and returns element at index 1 (8.1). List now has 3 elements.
68	B	<code>count()</code> returns occurrences. “CC” appears twice in the list.
69	C	<code>reverse()</code> reverses in-place. “Ibuprofen” moves to index 0.
70	A	<code>copy()</code> creates shallow copy. Appending to original doesn’t affect copy. Length stays 3.

Section 14: String Methods (Q71-Q75)

Q	Ans	Rationale
71	B	<code>strip()</code> removes leading/trailing whitespace. “CCO” has length 3.
72	C	<code>split("G")</code> splits at each G. “ATGCGATCG” splits into 4 parts.
73	B	<code>join()</code> concatenates with separator. Result: “Aspirin, Ibuprofen, Caffeine”.
74	A	<code>capitalize()</code> uppercases first letter. <code>upper()</code> makes all uppercase.
75	A	<code>startswith("c")</code> is True, <code>endswith("1")</code> is True.

Section 15: Dictionary Methods (Q76-Q80)

Q	Ans	Rationale
76	B	<code>update()</code> merges dicts. Existing key “MW” gets overwritten to 180.2.
77	A	<code>keys()</code> returns dict keys. Converted to list: [“MW”, “LogP”].
78	B	<code>pop()</code> removes and returns value. 180.16 returned, “MW” no longer in dict.
79	B	<code>setdefault()</code> only sets if key missing. “name” exists, keeps “Aspirin”.
80	B	Dict unpacking with **. Later dict overwrites: <code>d2["b"] = 3</code> wins.

Section 16: Comprehensions (Q81-Q85)

Q	Ans	Rationale
81	B	Filter MW > 200: 206 and 267 pass. Result: [206, 267].
82	B	Transform each to uppercase. First element is “ASPIRIN”.
83	A	Set comprehension from “ATGC”. All 4 bases are unique. Length is 4.
84	B	Dict comprehension maps name to length. “Caffeine” has 8 characters.
85	C	Nested comprehension. <code>matrix[1][2] = 2*3 = 6.</code>

Section 17: Sorting & Ordering (Q86-Q90)

Q	Ans	Rationale
86	B	<code>sorted()</code> returns new sorted list. Last element (<code>[-1]</code>) is max: 8.1.
87	B	<code>sort()</code> sorts in-place alphabetically. “Aspirin” comes first.
88	C	<code>key=len</code> sorts by length. Shortest is “C” (length 1).
89	B	Tuples sort by first element. Descending: (8.1, “B”) is first. Answer is “B”.
90	A	<code>min()</code> returns 1, <code>max()</code> returns 9.

Section 18: Type Conversion (Q91-Q95)

Q	Ans	Rationale
91	B	<code>float("180.16")</code> converts string to float type.
92	B	<code>set()</code> removes duplicates from (1,2,3,2,1). Unique values: 1,2,3. Length is 3.
93	C	<code>list()</code> on string creates list of characters: [“A”, “T”, “G”, “C”].
94	C	<code>"".join()</code> concatenates without separator. Result: “ATGC”.
95	B	<code>int(7.8)</code> truncates to 7. <code>round(7.8)</code> rounds to 8.

Section 19: Boolean & None (Q96-Q100)

Q	Ans	Rationale
96	A	<code>result is None</code> is True, so prints “No data”.
97	B	<code>True and False = False. True or False = True.</code>
98	C	Falsy values (0, “”, None) filtered out. “active” and 42 remain. Length is 2.
99	A	<code>not (5 > 10) = not False = True. 5 != 10 = True.</code>
100	B	Empty string is falsy, so <code>or</code> returns default. “CCO” is truthy, returned as-is.

Grading Scale

Grade	Score Range	Performance
A	90-100 (45-50 correct)	Excellent
B	80-89 (40-44 correct)	Good
C	70-79 (35-39 correct)	Satisfactory
D	60-69 (30-34 correct)	Needs Improvement
F	Below 60 (<30 correct)	Unsatisfactory

This answer key is for instructor use only. Do not distribute to students.