Grade 13 A/L ICT · Lesson 9

Lesson 9 A/L Exam Practice: Questions and Answers

This practice paper assesses **Lesson 9: Programming** (syllabus competency 9). Paper I has 30 five-option MCQs. Paper II Part A has four structured questions; Part B has three essays. Marking points are shown in brackets. Every Python answer was checked by running it.

Paper I – Multiple choice questions (30)

1. Breaking a problem into smaller sub-problems is

A. linking
B. top-down design
C. bottom-up testing
D. debugging
E. compiling

2. A diagram showing modules and their sub-modules is a

A. trace table
B. Gantt chart
C. structure chart
D. ER diagram
E. flowchart

3. In a flowchart a decision is drawn as a

A. parallelogram
B. oval
C. rectangle
D. diamond
E. arrow

4. Input and output in a flowchart use a

A. rectangle
B. parallelogram
C. diamond
D. circle
E. oval

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5. The largest of [12, 45, 7, 30] found by the trace is

A. 7
B. 12
C. 30
D. 94
E. 45

6. Machine code is a

A. third-generation language
B. first-generation language
C. fourth-generation language
D. second-generation language
E. fifth-generation language

7. Prolog is mainly a

A. assembly language
B. procedural language
C. query-only language
D. logic paradigm language
E. markup language

8. A translator that converts the whole program before running is a

A. editor
B. interpreter
C. linker
D. debugger
E. compiler

9. A translator that runs a program line by line is an

A. compiler
B. interpreter
C. linker
D. assembler
E. loader

10. Joining object code with library code is done by a

A. interpreter
B. scanner
C. editor
D. linker
E. compiler only

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11. A program that runs but gives a wrong answer has a

A. syntax error
B. linker error
C. logic error
D. hardware fault
E. runtime error

12. Pausing a program at a chosen line in an IDE uses a

A. constant
B. compiler flag
C. syntax colour
D. comment
E. breakpoint

13. 7 // 2 in Python gives

A. 1
B. 3.5
C. 4
D. 3
E. 2

14. 2 **3** 2 in Python gives

A. 512
B. 64
C. 36
D. 12
E. 256

15. 5 ^ 3 (bitwise XOR) gives

A. 125
B. 15
C. 6
D. 8
E. 2

16. The data type of 3.6 is

A. list
B. int
C. str
D. bool
E. float

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17. if / elif / else is an example of

A. selection
B. iteration
C. recursion
D. looping
E. sequence

18. The digit-sum loop prints for 472

A. 472
B. 7
C. 11
D. 14
E. 13

19. range(1, 4) produces

A. 1 2 3
B. 4 3 2 1
C. 0 1 2 3
D. 1 2 3 4
E. 1 4

20. total_price(3) with price=100 by default returns

A. 300
B. 100
C. 3
D. 750
E. None

21. A variable that exists only while its function runs is

A. global
B. local
C. constant
D. built-in
E. default

22. For s = "Sri Lanka", s[4:9] is

A. Sri
B. anka
C. Lank
D. Lanka
E. Sri L

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23. Which structure cannot be changed after creation?

A. list
B. none
C. dictionary
D. a list of lists
E. tuple

24. Key → value pairs are stored in a

A. dictionary
B. file
C. tuple
D. string
E. list only

25. Which file mode adds data to the end?

A. "r"
B. "a"
C. "w"
D. "x" only
E. "rb"

26. The files program prints Total

A. 88
B. 200
C. 211
D. 166
E. 123

27. Changes made through sqlite3 are saved by

A. commit()
B. fetch()
C. execute()
D. cursor()
E. print()

28. Sequential search for 23 in [34, 7, 23, 32, 5, 62] needs

A. 6 comparisons
B. 4 comparisons
C. 2 comparisons
D. 3 comparisons
E. 1 comparison

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29. After pass 1 of bubble sort, [5, 1, 4, 2, 8] becomes

A. [8, 5, 4, 2, 1]
B. [1, 5, 4, 2, 8]
C. [1, 4, 2, 5, 8]
D. [5, 4, 2, 1, 8]
E. [1, 2, 4, 5, 8]

30. Total swaps when bubble sorting [5, 1, 4, 2, 8] are

A. 2
B. 5
C. 4
D. 3
E. 6

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Paper II Part A – Structured questions

1. Problem solving and algorithms *(8 marks)*

(i) State the steps of problem solving. *(2 marks)*
(ii) Draw a flowchart that finds the largest of a list of numbers. *(3 marks)*
(iii) Trace the algorithm for [12, 45, 7, 30] and give the output. *(3 marks)*

2. Languages and translators *(8 marks)*

(i) Compare compilers and interpreters (three points). *(3 marks)*
(ii) Explain the role of a linker. *(2 marks)*
(iii) Name three programming paradigms with an example language each. *(3 marks)*

3. Python basics and control *(8 marks)*

(i) Evaluate 7 // 2, 7 % 2 and 2 **3** 2. *(3 marks)*
(ii) Write a while loop that prints the digit sum of 472. *(3 marks)*
(iii) Distinguish iteration and looping. *(2 marks)*

4. Functions and data structures *(8 marks)*

(i) Write a function with a default parameter and show two calls. *(3 marks)*
(ii) Compare local and global variables. *(2 marks)*
(iii) Write code that counts words using a dictionary. *(3 marks)*

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Paper II Part B – Essay questions

1. Developing a marks program *(10 marks)*

(i) Use top-down design to break a marks program into modules and draw a structure chart. *(3 marks)*
(ii) Write Python to read five marks into a list and print the average. *(4 marks)*
(iii) Explain syntax, runtime and logic errors and how an IDE helps find them. *(3 marks)*

2. Files and databases *(10 marks)*

(i) Explain the r, w and a file modes. *(3 marks)*
(ii) Write a program that appends a mark to marks.txt and then prints the total of all marks. *(4 marks)*
(iii) Describe the steps to add, modify, delete and retrieve records with sqlite3. *(3 marks)*

3. Searching and sorting *(11 marks)*

(i) Write a sequential search function and explain why it returns -1. *(3 marks)*
(ii) Find 23 and 99 in [34, 7, 23, 32, 5, 62] and count the comparisons. *(2 marks)*
(iii) Write bubble sort with a swapped flag and show every pass for [5, 1, 4, 2, 8]. *(6 marks)*

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Exam tips

- Steps: understand, plan, implement, test.
- Know every flowchart symbol.
- Draw a full trace table column for each variable.
- Compiler = whole program; interpreter = line by line.
- Syntax, runtime and logic errors are different.
- // floor division, % remainder, ** right to left.
- for = iteration; while = looping.
- Parameters receive arguments; return sends back.
- Lists change; tuples and strings do not.
- w erases, a appends, r reads.
- commit() saves database changes.
- Beyond boxes (AI assistants, type hints) are interest only.

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Answers and explanations

Paper I

1. **B** – Top-down.
2. **C** – Structure chart.
3. **D** – Diamond.
4. **B** – Parallelogram.
5. **E** – Compare each.
6. **B** – 1GL.
7. **D** – Logic.
8. **E** – Compiler.
9. **B** – Interpreter.
10. **D** – Linker.
11. **C** – Logic.
12. **E** – Breakpoint.
13. **D** – Floor division.
14. **A** – Right to left.
15. **C** – 101 XOR 011.
16. **E** – Float.
17. **A** – Selection.
18. **E** – 4 + 7 + 2.
19. **A** – Stop excluded.
20. **A** – 3 × 100.
21. **B** – Local.
22. **D** – Index 4–8.
23. **E** – Tuple.
24. **A** – Dictionary.
25. **B** – Append.
26. **C** – 78 + 45 + 88.
27. **A** – Commit.
28. **D** – 34, 7, 23.
29. **C** – 5 moves right.
30. **C** – 3 + 1.

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Paper II Part A – model answers and marking points

1. *(8 marks)*

(i) (2 marks)
Understand, plan (1); implement, test and evaluate (1).

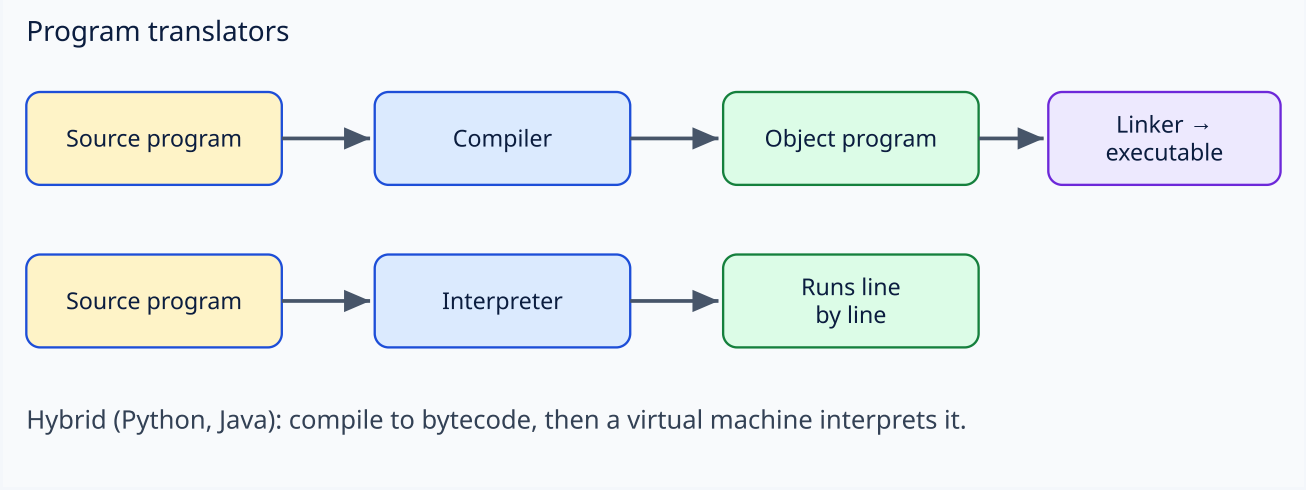
(ii) (3 marks)
Initialise largest (1); loop with decision n > largest (1); output (1).

(iii) (3 marks)
Rows for each n (2); output 45 (1).

🎯 Examiner tip: draw every column of the trace table.

2. *(8 marks)*

(i) (3 marks)
Whole program vs line (1); speed (1); error reporting (1).



Translators.

(ii) (2 marks)
Joins object code (1); with libraries into an executable (1).

(iii) (3 marks)
Procedural C (1); object-oriented Java/Python (1); logic Prolog or functional Haskell (1).

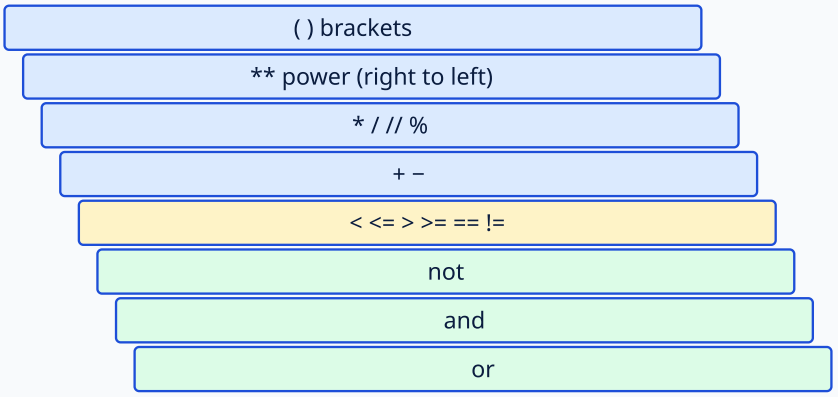
🎯 Examiner tip: give an example language for each paradigm.

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3. *(8 marks)*

(i) (3 marks)
3 (1); 1 (1); 512 (1).

Python operator precedence (high → low)



3 + 4 * 2 = 11

(3 + 4) * 2 = 14

2 ** 3 ** 2 = 512

10 − 4 − 3 = 3

Precedence.

(ii) (3 marks)
while n > 0 (1); add n % 10 and n //= 10 (1); prints 13 (1).

(iii) (2 marks)
Count-controlled for (1); condition-controlled while (1).

🎯 Examiner tip: indent every block correctly.

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4. *(8 marks)*

(i) (3 marks)

def with price=100 (1); return (1); 300 and 750 (1).



Function parts.

(ii) (2 marks)

Where created / scope (1); lifetime (1).

(iii) (3 marks)

split (1); freq.get(w, 0) + 1 (1); red 3, blue 1, green 1 (1).

🎯 Examiner tip: show the output you expect.

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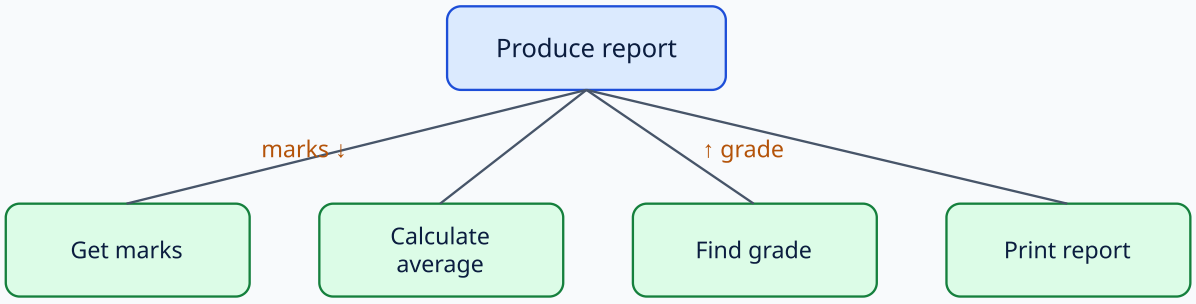
Paper II Part B – model answers and marking points

1. *(10 marks)*

(i) (3 marks)

Modules input, process, output (2); chart (1).

Structure chart (top-down design)



Each box is a module; lines show which module calls which; arrows on lines show data passed.

Structure chart.

(ii) (4 marks)

Loop input (1); int and append (1); sum / len (1); print (1).

(iii) (3 marks)

Three errors defined (2); breakpoint / step / watch (1).

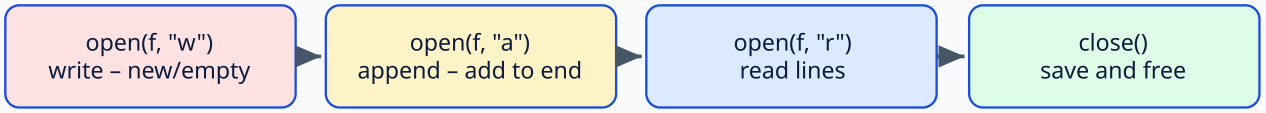
🎯 Examiner tip: test with known values.

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2. *(10 marks)*

(i) (3 marks)
r (1); w (1); a (1).

File modes



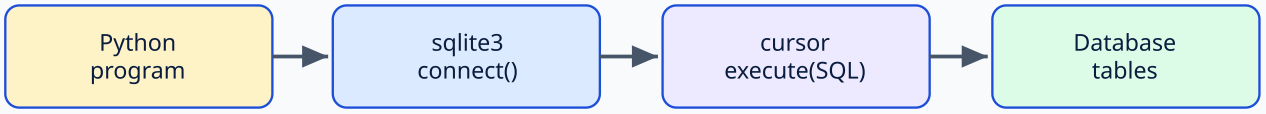
Opening in "w" mode erases an existing file – use "a" to keep old data.

File modes.

(ii) (4 marks)
open a, write, close (1); open r (1); split and int (1); total 211 style output (1).

(iii) (3 marks)
connect and cursor (1); INSERT/UPDATE/DELETE with commit (1); SELECT and close (1).

Python program and a database



INSERT, UPDATE, DELETE need commit(); SELECT rows come back as tuples.

Python and a database.

🎯 Examiner tip: always close files and connections.

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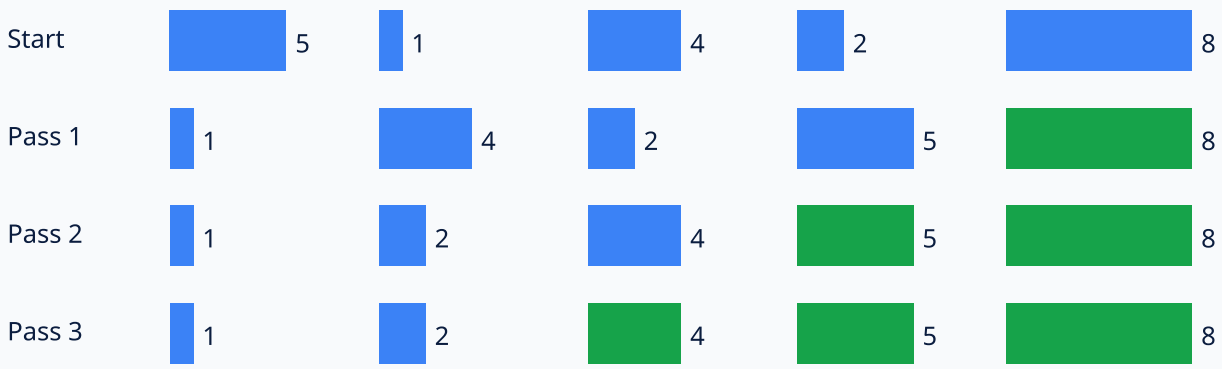
3. *(11 marks)*

(i) (3 marks)
for loop (1); return index (1); -1 when not found (1).

(ii) (2 marks)
23: index 2, 3 comparisons (1); 99: -1, 6 comparisons (1).

(iii) (6 marks)
Nested loops (2); swap (1); flag stop (1); passes [1, 4, 2, 5, 8], [1, 2, 4, 5, 8], [1, 2, 4, 5, 8] (2).

Bubble sort: largest value bubbles to the end each pass



Pass 3 makes no swap, so the algorithm stops early.

Bubble sort.

🎯 Examiner tip: show the list after every pass.

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