

2.2 PROGRAMMING TECHNIQUES · 2.2.1(E)

Using an IDE — Mark scheme

30 marks · spec 2.2.1(e)

AO key: AO1 = knowledge · AO2 = application · AO3 = reasoned judgements. For "describe" questions award 1 for the feature + 1 for how it helps. A product name alone scores 0.

Q	ANSWER	AO	MARKS
1(a)	A single application/environment (1); that combines the tools to write, run, test and debug a program (1). (2)	AO1	2
1(b)	1 mark each, max 2: syntax highlighting · auto-complete/suggestion · auto-indentation · error highlighting · code search/navigation. (2)	AO1	2
1(c)	1 mark each, max 2: breakpoints · stepping (step through) · watch window/variable inspection · call-stack view · error console. (2)	AO1	2

Q	ANSWER	AO	MARKS
2	3 features × (feature 1 + how it helps 1), max 6: • Syntax highlighting — colours keywords/strings so structure is clear and typos stand out. • Auto-complete — suggests variable/function names, reducing typing and spelling errors. • Auto-indentation — lays out blocks neatly so the structure is easy to read. • Error highlighting — underlines syntax errors as you type, before running. (Accept code navigation/search.) (6)	AO1	6

Q	ANSWER	AO	MARKS
3	3 features × (feature 1 + how it helps 1), max 6: • Breakpoint — pauses execution at a chosen line so the state can be inspected. • Stepping — runs one line at a time so you can see what each line does. • Watch window / variable inspection — shows current variable values, revealing where one goes wrong. • Call-stack view — shows the active subroutines (useful for recursion). • Error console — reports run-time errors with a line number. (6)	AO2	6

Q	ANSWER	AO	MARKS
4(a)	Error highlighting catches syntax errors (breaking the language rules), found as you type/before running (1); the debugger helps find logic errors, where the program runs but gives the wrong result (1). (2)	AO1	2
4(b)	A watch window / variable inspection (accept "watch"). (1)	AO1	1

Q	LEVELS-OF-RESPONSE MARK SCHEME (9 MARKS)	AO	MARKS										
5	Mark using the levels descriptors below. AO1 (knowledge of IDE features), AO2 (application to developing a large program), AO3 (reasoned judgement & conclusion). <table><tr><th>LEVEL</th><th>DESCRIPTOR</th></tr><tr><td>Level 3 (7–9)</td><td>Thorough discussion of several IDE benefits, well applied to writing and debugging a large program, with a justified conclusion (and may note minor downsides). Accurate terminology.</td></tr><tr><td>Level 2 (4–6)</td><td>Several benefits with some development and application; a basic conclusion.</td></tr><tr><td>Level 1 (1–3)</td><td>A few benefits listed with little development.</td></tr><tr><td>0</td><td>Nothing creditworthy.</td></tr></table> Indicative content (credit any valid point): • Writing: syntax highlighting, auto-complete and auto-indent speed up writing and reduce errors; error highlighting catches syntax mistakes early. • Debugging: breakpoints, stepping and watch windows make logic errors far quicker to find than print statements. • Productivity: one environment to edit, run and test; error console with line numbers; refactoring for large code bases. • Balance: IDEs are large and can be complex/overwhelming for a beginner or a tiny program. • A justified conclusion (an IDE is worthwhile for a large program because the debugging and productivity gains outweigh the learning curve).	LEVEL	DESCRIPTOR	Level 3 (7–9)	Thorough discussion of several IDE benefits, well applied to writing and debugging a large program, with a justified conclusion (and may note minor downsides). Accurate terminology.	Level 2 (4–6)	Several benefits with some development and application; a basic conclusion.	Level 1 (1–3)	A few benefits listed with little development.	0	Nothing creditworthy.	AO1 ×3 AO2 ×3 AO3 ×3	9
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Total for paper: 30 marks