Grade 12 A/L ICT · Lesson 7

Lesson 7 A/L Exam Practice: Questions and Answers

This practice paper assesses **Lesson 7: System Analysis and Design** (syllabus competency 7). 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.

Paper I – Multiple choice questions (30)

1. A system is best defined as

A. any single computer part
B. related parts working towards a common goal
C. an empty building
D. a random list of data
E. only a program

2. Output information returned to adjust a system is

A. boundary
B. encoding
C. feedback
D. input only
E. environment

3. A business trading with customers is an

A. natural system
B. abstract system only
C. closed system
D. open system
E. living system only

4. A supermarket POS that records each sale is a

A. ESS
B. TPS
C. GIS
D. CMS
E. KMS

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5. What-if analysis for decisions uses a

A. TPS
B. KMS
C. CMS
D. OAS
E. DSS

6. One integrated database for all departments is

A. CMS
B. ERP
C. GIS
D. KMS
E. OAS

7. A risk-driven model in repeated loops is

A. RAD
B. Pilot
C. Waterfall
D. Spiral
E. Direct

8. Short sprints with customer feedback describe

A. Spiral
B. Waterfall
C. SSADM stage 0
D. Parallel running
E. Agile

9. For the 7-task plan, project duration is

A. 11 weeks
B. 16 weeks
C. 18 weeks
D. 14 weeks
E. 20 weeks

10. The critical path of the plan is

A. B–D–F
B. A–B–C–D
C. A–B–D–F–G
D. A–B–C–E–F–G
E. A–C–E–G

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11. SSADM stage 0 is

A. coding
B. maintenance
C. feasibility study
D. physical design
E. testing

12. Table and file layouts are produced in SSADM

A. feasibility
B. acceptance
C. business options
D. current system study
E. physical design

13. Checking if staff will accept a system is

A. gap analysis
B. technical feasibility
C. economic feasibility
D. operational feasibility
E. unit testing

14. Cost Rs. 1,200,000, net benefit Rs. 400,000/year: payback is

A. 3 years
B. 2 years
C. 4 years
D. 2.4 years
E. 6 years

15. 5-year ROI in the feasibility example

A. 100.00%
B. 41.67%
C. 66.67%
D. 33.33%
E. 150.00%

16. “The system shall respond within 2 s” is a

A. test case
B. data store
C. external entity
D. functional requirement
E. non-functional requirement

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17. A level 0 DFD is the

A. context diagram
B. EPD
C. LDS
D. Gantt chart
E. document flow diagram

18. A DFD is balanced when

A. there are no stores
B. flows are unnamed
C. every process loops
D. it has 7 processes
E. parent and child have the same external flows

19. Entities and one-to-many relationships are drawn in an

A. LDS
B. Gantt chart
C. BSO
D. context diagram
E. EPD

20. Field metadata is stored in the

A. data dictionary
B. context diagram
C. Gantt chart
D. test log
E. BSO report

21. Student record size in the design example is

A. 48 bytes
B. 58 bytes
C. 5 bytes
D. 116 bytes
E. 70 bytes

22. Testing with knowledge of the code is

A. acceptance testing
B. black box testing
C. pilot
D. white box testing
E. direct

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23. Users confirming the system meets needs is

A. integration testing
B. unit testing
C. white box testing
D. data migration
E. acceptance testing

24. Boundary tests for a 0–100 field are

A. -1, 0, 1, 99, 100, 101
B. 50 only
C. −50, 150
D. 0 and 100 only
E. 10, 20, 30

25. Old and new systems running together is

A. unit testing
B. parallel running
C. phased
D. direct changeover
E. pilot

26. Trying the system in one branch first is

A. direct
B. phased
C. pilot changeover
D. parallel
E. black box

27. Updating software for a new tax law is

A. adaptive maintenance
B. corrective maintenance
C. perfective maintenance
D. unit testing
E. direct changeover

28. Comparing requirements with package features is

A. LDS
B. direct changeover
C. unit testing
D. gap analysis
E. payback

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29. Fit when 30 of 40 requirements are met

A. 40%
B. 30%
C. 75%
D. 80%
E. 70%

30. Radical redesign of business processes is

A. white box testing
B. phased changeover
C. business process reengineering
D. prototyping
E. data migration

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Paper II Part A – Structured questions

1. Systems and information systems *(8 marks)*

(i) Define a system and list four characteristics. *(3 marks)*
(ii) Classify a hospital as open/closed, natural/manmade with reasons. *(2 marks)*
(iii) Compare TPS, MIS and ESS by users and output. *(3 marks)*

2. Models, SSADM and planning *(8 marks)*

(i) Compare Waterfall and Agile (two points). *(2 marks)*
(ii) List SSADM stages 0–6. *(3 marks)*
(iii) For the 7-task plan find duration and critical path. *(3 marks)*

3. Feasibility and analysis *(8 marks)*

(i) Name and explain four types of feasibility. *(2 marks)*
(ii) Cost Rs. 1,200,000, benefit Rs. 500,000/yr, running Rs. 100,000/yr: payback and 5-year ROI. *(3 marks)*
(iii) Draw a context diagram for an order system and state the balancing rule. *(3 marks)*

4. Design, testing and deployment *(8 marks)*

(i) Fields of sizes 6, 30, 8, 4, 10: record size and size of 1500 records. *(2 marks)*
(ii) Give boundary test data for marks 0–100 and name the four test levels. *(3 marks)*
(iii) Recommend a changeover method for a bank and justify. *(3 marks)*

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Paper II Part B – Essay questions

1. From system concept to SDLC model *(10 marks)*

(i) Explain system characteristics and classification with examples. *(3 marks)*
(ii) Describe six information system types and how they support management levels. *(3 marks)*
(iii) Compare Waterfall, Spiral, Agile and Prototyping and suggest one for a school app with changing needs. *(4 marks)*

2. Analysing and designing a new system *(10 marks)*

(i) Describe preliminary investigation and the four feasibility types; include the payback calculation. *(4 marks)*
(ii) Explain requirement types, DFD levels, EPDs and LDS. *(3 marks)*
(iii) Describe logical and physical design including a data dictionary. *(3 marks)*

3. Building, deploying and buying systems *(11 marks)*

(i) Explain white/black box testing and the four testing levels with test data. *(4 marks)*
(ii) Compare four deployment methods and three maintenance types. *(4 marks)*
(iii) Off-the-shelf package vs bespoke: 3-year costs, gap analysis and BPR. *(3 marks)*

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Exam tips

- Learn the system characteristics: input, process, output, boundary, environment, feedback, control.
- TPS → MIS → DSS → ESS follows the management levels.
- Waterfall for stable needs; Agile/prototyping for changing needs; Spiral for risk.
- Critical path = longest chain; slack zero.
- SSADM has stages 0–6; analysis 1–3, design 4–6.
- Payback = cost ÷ (benefit − running cost).
- Functional = what; non-functional = how well.
- Name every DFD flow and keep levels balanced.
- Record size = sum of field sizes; table = record × records.
- Boundary tests: below, on and above each limit.
- Justify a changeover method with risk and cost.
- Beyond boxes (DevOps, SaaS, AI) are interest only.

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Answers and explanations

Paper I

1. **B** – Goal-directed parts.
2. **C** – Feedback.
3. **D** – Open.
4. **B** – TPS.
5. **E** – DSS.
6. **B** – ERP.
7. **D** – Spiral.
8. **E** – Agile.
9. **B** – Longest path.
10. **D** – Zero slack.
11. **C** – Stage 0.
12. **E** – Stage 6.
13. **D** – Operational.
14. **A** – Cost ÷ net.
15. **C** – Net gain ÷ cost.
16. **E** – Quality.
17. **A** – Context.
18. **E** – Same flows.
19. **A** – LDS.
20. **A** – Data dictionary.
21. **B** – Sum of fields.
22. **D** – White box.
23. **E** – Acceptance.
24. **A** – Below/on/above.
25. **B** – Parallel.
26. **C** – Pilot.
27. **A** – Adaptive.
28. **D** – Gap analysis.
29. **C** – 30/40.
30. **C** – BPR.

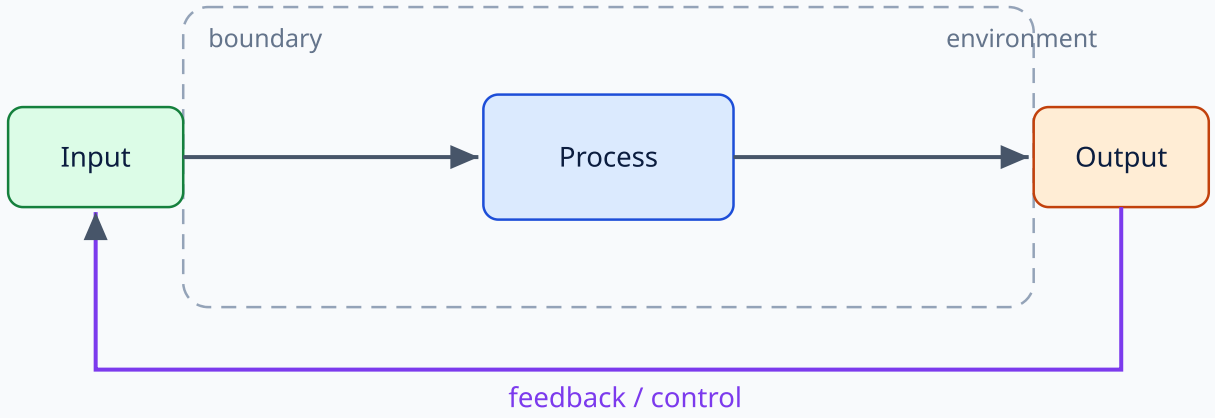
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Paper II Part A – model answers and marking points

1. *(8 marks)*

(i) (3 marks)
Definition (1); input, process, output, boundary/feedback (2).

A system: input → process → output, with feedback and a boundary



System.

(ii) (2 marks)
Open – patients in/out (1); manmade (1).

(iii) (3 marks)
TPS operational records (1); MIS middle reports (1); ESS top dashboards (1).

🎯 Examiner tip: give one example for each system type.

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2. *(8 marks)*

(i) (2 marks)
Sequential vs iterative (1); fixed vs changing requirements (1).

(ii) (3 marks)
Feasibility; current; BSO; requirements; technical; logical; physical (3).

SSADM stages (0–6)



Analysis: stages 1–3 Design: stages 4–6

SSADM.

(iii) (3 marks)
Forward pass (1); 16 weeks (1); A–B–C–E–F–G (1).

🎯 Examiner tip: show ES/EF for each task.

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3. *(8 marks)*

(i) (2 marks)
Technical, economic, operational, organisational (2).

(ii) (3 marks)
Net Rs. 400,000 (1); payback 3 years (1); ROI 66.67% (1).

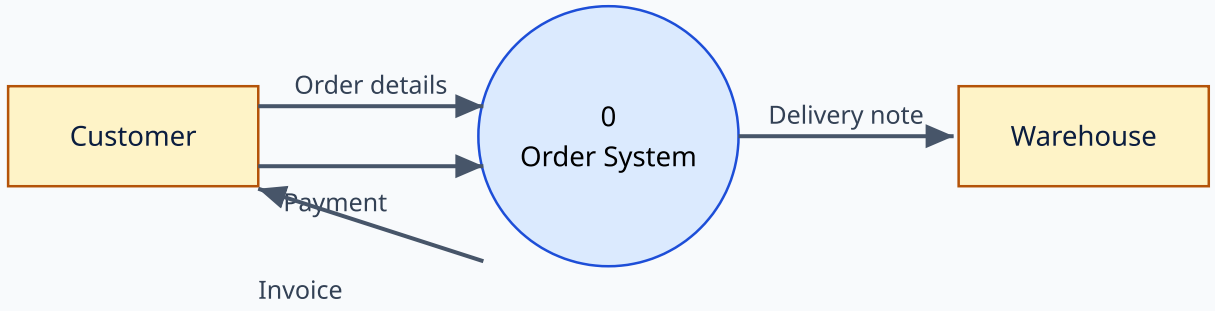
Cumulative cash flow – payback at year 3



Payback.

(iii) (3 marks)
One process + Customer/Warehouse entities and named flows (2); same external flows at level 1 (1).

Context diagram (level 0) – one process, external entities



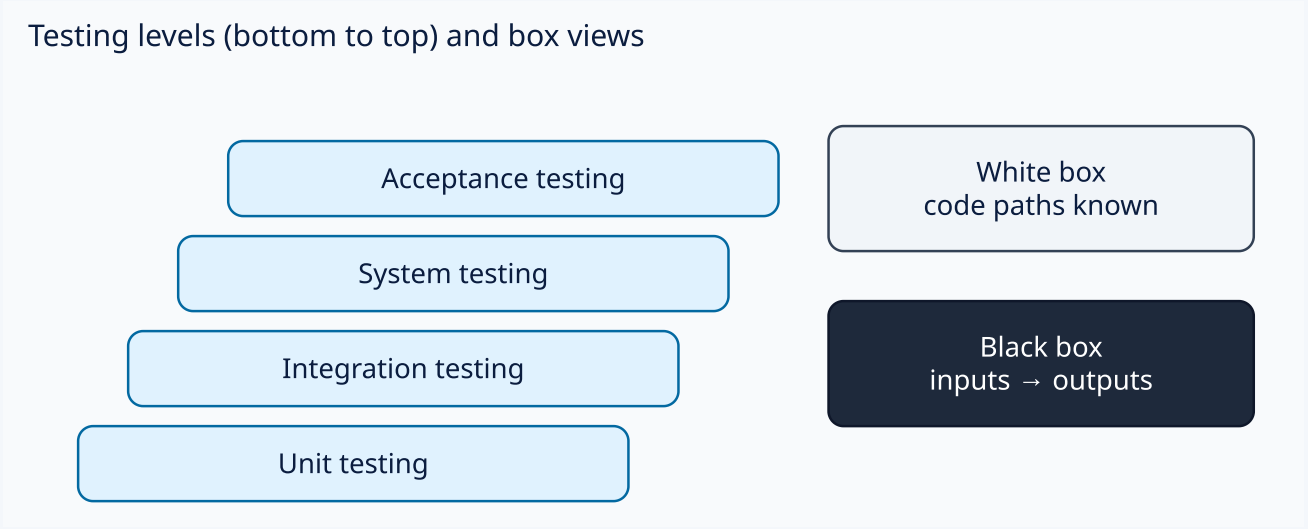
Context DFD.

🎯 Examiner tip: label every data flow.

4. *(8 marks)*

(i) (2 marks)
58 bytes (1); 87,000 bytes (1).

(ii) (3 marks)
-1, 0, 1, 99, 100, 101 (1.5); unit, integration, system, acceptance (1.5).



Testing.

(iii) (3 marks)
Parallel or pilot (1); low risk / compare outputs (1); drawback cost or time (1).

🎯 Examiner tip: always justify the method you choose.

Paper II Part B – model answers and marking points

1. *(10 marks)*

(i) (3 marks)
Characteristics (1.5); three classification pairs with examples (1.5).

(ii) (3 marks)
Six types (2); levels link (1).

(iii) (4 marks)
Four models (3); Agile/prototyping justified (1).

🎯 Examiner tip: use a table for the comparison.

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2. *(10 marks)*

> **(i)** (4 marks)
> Tasks (1); four types (2); payback 3 years (1).

> **(ii)** (3 marks)
> Requirements (1); context/level 1/elementary (1); LDS (1).

> **(iii)** (3 marks)
> Logical (1); physical tables/keys (1); data dictionary (1).

> 🎯 Examiner tip: draw at least one diagram.

3. *(11 marks)*

> **(i)** (4 marks)
> White/black (1); four levels (2); normal/boundary/erroneous data (1).

> **(ii)** (4 marks)
> Methods with pro/con (2); maintenance types (2).

> **(iii)** (3 marks)
> Costs Rs. 1,350,000 vs Rs. 1,800,000 (1); gap/fit 75% (1); BPR (1).

> 🎯 Examiner tip: a Sri Lankan school or bank example earns clarity marks.

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