



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2023**

Digital Technology

Assessment Unit AS 1

assessing

Approaches to System Development

[SDT11]

TUESDAY 16 MAY, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

- 1 (a) To test code
 ... during module, integration, system testing/using black box, white box testing
 ... using the test plan
 2 × [1]

To debug code
 To detect/correct errors
 ... discovered during testing
 2 × [1]

To document code
 ... to make code meaningful/readable
 ... by including indentation/comments/white space
 2 × [1]
 2 × [2]

[4]

- (b) Questionnaires
 Observation
 Document sampling
 Interviews
 3 × [1]

[3]

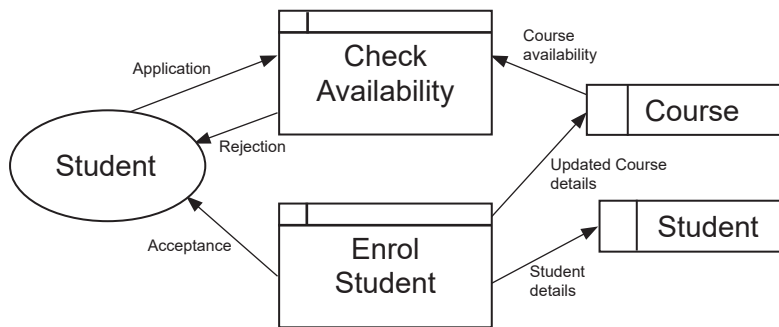
(c)

ID	F or NF?	Reason
R40	NF [1]	Performance factor [1]
R43	F [1]	Directly related to stock movements [1]
R55	F [1]	Directly related to managing stock levels [1]
R61	NF [1]	Security factor [1]

[8]

15

2 (a)



[1] for each of two processes [2]
 [1] for each of two datastores [2]
 [1] for external entity
 [1] for each of three new data flows [3]
 [1] for input from external entity
 [1] for outputs to external entity

[10]

- (b) Storyboarding
 Diagrams are used
 ... to show the content of screens
 ... and the inputs and outputs
 ... to show the sequence of screens
 ... including different navigation paths/branches
 3 × [1]

Prototyping

An initial non-functioning model
 ... of the user interface is created
 This has no database access/it might use dummy data
 Additional interaction is added
 ... from feedback from the user
 3 × [1]

[6]

16

3 (a) Parallel changeover

The old system and the new system are operated together
 ... for a short period of time
 ... using the same data
 The results from both systems are compared
 ... until the new system is working correctly/fit for purpose
 ... the old system is discarded

Direct changeover

The old system is discontinued
 ... and the new system replaces it
 ... immediately/with no overlap

Suitability for a hotel room booking system

Parallel changeover

Plus

If there is a fault with the new system, the old system is available as a backup
 ... the hotel's bookings will not be affected

Minus

There is duplication of effort
 ... extra cost/workload/extra staff/additional resources

Direct changeover

Plus

No duplication of effort/resources is involved

Minus

No backup in the event the new system fails
 ... records of bookings would be lost/implication for service to guests/loss of income

Level	Marking criteria	Marks
Band 2	The candidate <ul style="list-style-type: none"> Provides a detailed description of both changeover methods which is correct Addresses the suitability of both methods in the given context with justification Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling, punctuation and grammar are of a high standard.	[5]–[6]
Band 1	The candidate <ul style="list-style-type: none"> Provides a detailed description of both changeover methods which is correct Refers to the suitability of one method with limited justification Uses some relevant Digital Technology terminology Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.	[3]–[4]

Band 0	<p>The candidate</p> <ul style="list-style-type: none"> • Provides a description of one changeover method which is correct but which lacks detail • Makes limited use of Digital Technology terminology <p>Presentation, spelling, punctuation and grammar are such that the intended meaning is not completely clear.</p>	[1]–[2]
--------	--	---------

AVAILABLE MARKS
20

- [6]
- (b) (i)** User guide/operating instructions
 Installation guide
 The HW/SW required
 Help/troubleshooting/FAQ support
 Training materials/tutorials
 4 × [1] [4]
- (ii)** System specification/module specifications/user requirements
 Used to identify what the system was intended to do
 [1] + [1]
- Design components – DFDs, ERDs, storyboards, flowcharts, pseudocode/data dictionaries/IO formats/menu structures
 Used to check data flows/program logic/user interface
 [1] + [1]
- Database structures/tables/queries/reports
 Used to identify problems with reports and queries
 [1] + [1]
- Program documentation/listings/code/restrictions
 Used to detect programming errors
 [1] + [1]
- Test plans/test schedule/test data/test results/test schedule
 Used to debug or re-test programs
 [1] + [1]
- Hardware and software configuration/specification/requirements
 Used to check that the HW/SW is appropriate
 [1] + [1]
 2 × [2] [4]
- (iii)** Perfective [1]
 Amendments to improve the performance of the system
 Code can be made more efficient
 ... to improve response times
 More up-to-date hardware/software can be installed
 2 × [1]
- Adaptive [1]
 Additional/new functions must be added
 The environment within which the system is used has changed/ the user's requirements have changed
 ... for internal reasons/new business requirements
 ... for external reasons/ changes in legislation
 2 × [1] [6]

- 4 (a) (i)** Data conversion is the process of transferring data
... from the old system to the new system
2 × [1] [2]
- (ii)** Data is taken from existing documents
... such as forms/reports/invoices/orders
The data may need reorganising for new database structure, e.g. tables
created/modified
The database structure is created on the system
Data is keyed in/transcribed
... and verified/validated
The database tables are populated with data
4 × [1] [4]
- (b) (i)** System testing is performed in house by the development team
... using the test plan/schedule
Comprises system testing, module or unit testing, integration testing
White box/black box testing may be used
3 × [1] [3]
- (ii)** Acceptance testing is performed by the user to ensure the user
requirements are met
... using real volumes of data
... in a realistic environment
... before sign off
3 × [1] [3]

**AVAILABLE
MARKS**

12

- 5 (a) (i) Aim - the rapid delivery of a system which meets the users' needs
 Development is divided into small tasks
 ... each of which is developed incrementally
 ... over a number of iterations
 A series of teams each work simultaneously
 ... on planning, requirements analysis, coding, and testing
 3 × [1] [3]

- (ii) Waterfall model
 Consists of a number of separate stages
 Each stage must be completed before the next one can begin
 At the end of each stage the project is reviewed and a deliverable produced
 A previous stage may have to be re-visited if an error is found
RAD
 Is an incremental model - the whole project is subdivided into a series of builds
 Each build undergoes its own separate lifecycle
 Each of the builds are developed in parallel, within a given time frame
 All the builds are assembled to produce a working prototype which is delivered to the user for feedback
Evaluation
Waterfall
 Not suitable – the stages must be completed and reviewed one after the other
RAD
 Suitable - it leads to a reduction in development time
 Makes use of automated code generation/modelling tools/code re-use

Level	Marking Criteria	Marks
Band 2	The candidate <ul style="list-style-type: none"> Provides a detailed description of both approaches which is correct Addresses the suitability of both approaches in the given context with justification Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling, punctuation and grammar are of a high standard.	[5]–[6]
Band 1	The candidate <ul style="list-style-type: none"> Provides a detailed description of both approaches which is correct Refers to the suitability of one approach with limited justification Uses some relevant Digital Technology terminology Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.	[3]–[4]
Band 0	The candidate <ul style="list-style-type: none"> Provides a description of one approach which is correct but which lacks detail Makes limited use of Digital Technology terminology Presentation, spelling, punctuation and grammar are such that the intended meaning is not completely clear.	[1]–[2]

[6]

			AVAILABLE MARKS
<p>(b) (i) Resources [1]</p>		[1]	
<p>(ii) <u>Constraint</u> A restriction/limit which the project must comply with [1] Example: available budget/required development time/the need to integrate with other IT systems/the software development expertise available [1]</p> <p><u>Risk</u> A factor which could delay the completion of the project[1] Example: Problems with scheduling/meeting the budget /the non-availability of key personnel/productivity issues /Incomplete or incorrect specification/requirements inflation [1]</p>		[4]	
<p>(iii) A Gantt chart is a type of bar chart It shows the planned start and finish dates of the parts of a project The project manager uses it allocate resources ... and monitor the current progress ... and to respond to any deviations 4 × [1]</p>		[4]	18

- 6 (a) Project file management support/directory trees/Solution Explorer
 Design tools/GUI builder [1]
 Smart editor/syntax checker/syntax suggestions/automatic tabs/automatic
 comments/automatic white space/automatic line numbering [1]
 Debugging tools/breakpoints/variable inspection [1] [3]
- (b) Syntax
 The set of rules
 ... defining the format/structure
 ... of each type of program statement/command/instruction
 Includes the permitted symbols, punctuation characters and words
 2 x [1]
- Variable
 A name/identifier
 ... of a memory location
 ... which holds data
 ... during program execution
 The value may change
 2 x [1] [4]
- (c) Error
 The variable **min** is set to zero and will stay at zero as all the input values
 are positive [1]
Correction
 Input the first number and set min to this [2]
- Error
 The values of **min** and **max** are output every time the loop is executed [1]
Correction
 Output **min** and **max** after the loop has been completed [2] [6]

AVAILABLE
MARKS

(d) The OO approach makes use of objects when designing and building applications

An object can perform actions and interact with other objects

Objects are defined in blueprints called classes which define their properties/attributes and methods/behaviours

Evaluation

The OO approach encourages code reuse

Existing objects can be re-used in other applications

... and new objects can inherit from existing objects

... reducing the time needed to create new objects

Reused objects will already have been tested

... reducing the time needed to be spent on testing

Level	Marking Criteria	Marks
Band 2	<p>The candidate</p> <ul style="list-style-type: none"> Provides a detailed description of the OO approach which is correct Evaluates the OO approach in producing SW faster with detailed justification Uses the appropriate Digital Technology terminology accurately throughout the response <p>Presentation, spelling, punctuation and grammar are of a high standard.</p>	[5]–[6]
Band 1	<p>The candidate</p> <ul style="list-style-type: none"> Provides a detailed description of the OO approach which is correct Explains why the OO approach produces SW faster with limited justification Uses some relevant Digital Technology terminology <p>Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.</p>	[3]–[4]
Band 0	<p>The candidate</p> <ul style="list-style-type: none"> Provides a description of the OO approach which is correct but which lacks detail Makes limited use of Digital Technology terminology <p>Presentation, spelling, punctuation and grammar are such that the intended meaning is not completely clear.</p>	[1]–[2]

[6]

19

Total

100

AVAILABLE MARKS