



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2022**

Digital Technology

Assessment Unit AS 1

assessing

Approaches to System Development

[SDT11]

FRIDAY 27 MAY, MORNING

**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.

COVID-19 Context

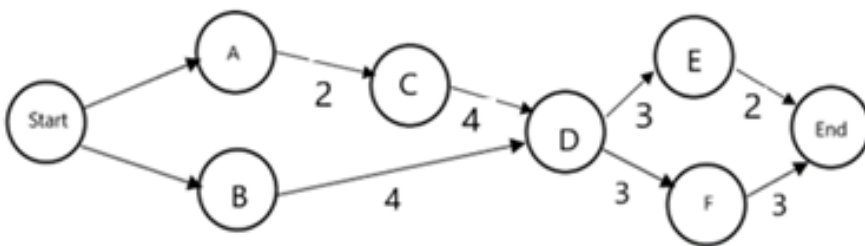
Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021–2022 only.

1 (a) A restriction/limit on the project
 Example: the available budget/the required development time/the need to integrate with other IT systems/the software development expertise available
 (2 × [1]) [2]

(b) Problems with scheduling
 Problems meeting the budget
 Availability of key personnel
 Productivity issues
 Incomplete/incorrect specification
 Requirements inflation
 (4 × [1]) [4]

(c) **Contents include**
 A graphical view of the project's plan/current status
 The name/reference number of the stage
 The finish date of each stage/the duration of each stage
 The predecessor of each stage
 The successor of each stage
 The current status of the project
 Dependencies between stages
 The resources required for each stage
 (4 × [1]) [4]

(d)



[1] for each of four activities (B, C, D, E) in correct sequence
 [1] for each of four labelled arrows [8]

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<p>2 (a) Data modelling Data objects are identified and defined ... and the relations between the data objects are established (2 × [1])</p>	[2]
<p>Process modelling Process descriptions are identified ... for any additions/modifications/retrieval to/from data objects (2 × [1])</p>	[2]
<p>(b) Build The project is subdivided into subtasks ... with its own development team ... each of which undergoes its own separate lifecycle These are developed in parallel (2 × [1])</p>	[2]
<p>Time frame Each build/subtask is given its own timescale ... during which it must be developed if the project is to meet its schedule (2 × [1])</p>	[2]
<p>(c) The development team must all be working from the same version of the software/documentation All changes must be recorded ... and who made them ... and the date There must be a method of tracking changes ... and reversing changes All documents/code modules should have version numbers Old versions of documents/code should be archived (4 × [1])</p>	[4]
<p>(d) Banded response</p> <p>Waterfall model This consists of a sequence of discrete stages A stage must be complete before the next one starts Deliverables are produced at the end of each stage An earlier stage may be revisited if an error is found during a later stage</p> <p>Agile The project is split into a number of small independent modules Each module is developed by a separate team. The teams work concurrently. Agile is an iterative/incremental approach.</p> <p>Points of comparison</p> <p>Waterfall model More suited to large scale projects where the users requirements are established and set during the Analysis stage. It is very difficult to amend these without repeating earlier stages</p> <p>Agile More suited to changing user requirements due to the end users involvement at each iteration</p>	[6]

**AVAILABLE
MARKS**

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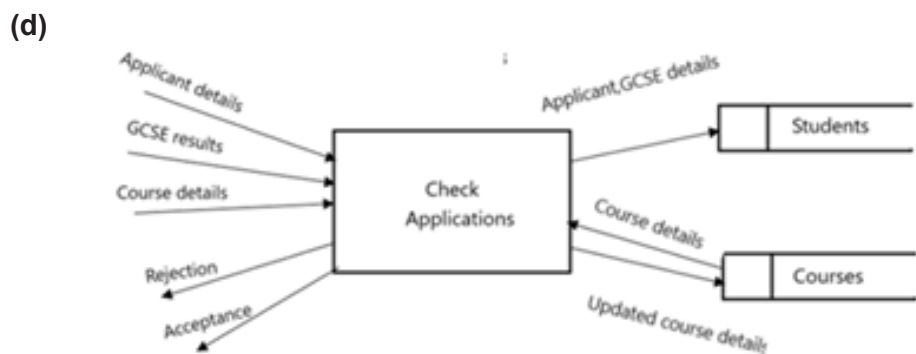
Band	Criteria	Marks
2	<p>The candidate</p> <ul style="list-style-type: none"> Provides a complete and accurate description of both approaches Accurately compares the approaches with respect to changing user requirements Uses the appropriate Digital Technology terminology accurately throughout the response <p>Presentation, spelling, punctuation and grammar are of a high standard</p>	[5]–[6]
1	<p>The candidate</p> <ul style="list-style-type: none"> Provides a complete and accurate description of both approaches Uses some relevant Digital Technology terminology <p>Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear</p>	[3]–[4]
0	<p>The candidate</p> <ul style="list-style-type: none"> Provides a description of both approaches which are correct but lack detail Makes some use of Digital Technology terminology <p>Presentation, spelling, punctuation and grammar such that the intended meaning is not completely clear</p>	[1]–[2]

**AVAILABLE
MARKS**

3 (a) The user can interact with/communicate with/control the computer system
 The user can input data
 The system outputs results
 Types: command line/GUI(Windows)/menu driven/form based/natural language
 (3 × [1]) [3]

(b) Diagrams are used
 ... to show the content of screens
 ... to show the sequence of screens
 ... including different navigation paths/branches
 (4 × [1]) [4]

(c) 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
 (4 × [1]) [4]



[1] correct symbols must be used
 [1] for labelled process
 [1] for each of two data stores
 [1] for one way dataflow to Students
 [1] for each of two dataflows to Courses
 [1] for correct dataflows into process
 [1] for correct dataflows out of process
 [1] for overall correctness [9]

(e) The new system operates alongside the old system
 ... using the same data
 ... until the new system is fit for purpose
 The results from both systems are compared
 (3 × [1]) [3]

4 (a) **Variable**

The name/identifier
... of a memory location
... which holds data during program execution
(3 × [1])

[3]

Algorithm

The sequence
... of steps
... designed to solve a particular problem
Written in psuedocode/as a flowchart
(3 × [1])

[3]

Syntax

The set of rules
... defining the format/structure
of each type of program statement/command/instruction
(3 × [1])

[3]

(b) **Sequence**

A series/number of instructions is executed
... in the order in which they are listed/one after the other
(2 × [1])

[2]

Selection

An action will be executed
... only if a condition is true
(2 × [1])

[2]

(c) **Banded response**

A count-controlled loop

A variable governs the number of times the loop is executed
... for which start/end/increment values are specified

A condition-controlled loop

The loop is controlled by a Boolean variable/one which is either true or false
The condition may be tested at the start of the loop (while) or at the end of the loop (until)

Comparison

If the number of iterations is known in advance the count-controlled loop is suitable

If the number of iterations is not known in advance the count-controlled loop is suitable [6]

Band	Criteria	Marks
2	The candidate <ul style="list-style-type: none"> Provides a complete and accurate description of both loops Describes a situation in which each type of loop is suitable Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling, punctuation and grammar are of a high standard	[5]–[6]

1	<p>The candidate</p> <ul style="list-style-type: none"> Provides a complete and accurate description of both loops Describes a situation in which one type of loop is suitable Uses some relevant Digital Technology terminology <p>Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear</p>	[3]–[4]
0	<p>The candidate</p> <ul style="list-style-type: none"> Provides a description of both loops which are correct but lack detail Makes limited use of Digital Technology terminology <p>Presentation, spelling, punctuation and grammar such that the intended meaning is not completely clear</p>	[1]–[2]

AVAILABLE MARKS
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(d) It outputs the sum of the first three odd numbers

Output: 9

[1] + [1]

[2]

(e) Output will be produced during each iteration

1 4 9

[1] + [1]

[2]

5 (a) Interpreter

Translates one line at a time.
 If there is an error, translation terminates.
 If there is no error, the statement is expected.
 No object code is produced
 Interpretation can be resumed
 (3 × [1])

Compiler

Translates the entire program into machine code... before executing it if there are no errors. If there are errors, an error list is produced.
 (3 × [1]) [6]

(b) The source code could be edited by the user
 ... introducing errors/unauthorised changes/depriving the developer of maintenance work
 (2 × [1]) [2]

(c)

Term	Description
Class	A template ... for a group of similar objects Defines the properties/attributes ... and methods/behaviours (3 × [1])
Property [1]	<i>A data value within an object</i>
Method [1]	<i>A program routine within an object</i>
Inheritance	A new class can automatically ... have the properties/attributes ... of methods/behaviours ... of an existing class Additional properties/methods can be defined (3 × [1])
Base/parent/super class [1]	<i>An existing class whose properties and methods are inherited</i>
Derived/child/sub class [1]	<i>A class resulting from the inheritance process</i>

[10]

Total

AVAILABLE MARKS
18
100