



# Cambridge IGCSE™

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**INFORMATION AND COMMUNICATION TECHNOLOGY**

**0417/21**

Paper 2 Practical Test A

**March 2021**

**MARK SCHEME**

Maximum Mark: 80

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**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the March 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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This document consists of **19** printed pages.

### Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

#### GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

#### GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

#### GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

#### GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

#### GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

#### GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Candidate details

Tawara University Science



Header name, centre number, candidate number on left 1 mark  
 Header text in centre, 100% accurate 1 mark  
 Image on right, 2cm wide, aspect ratio maintained, text wrapped 1 mark

HOPS

Guide produced by: *name*

Name added to subtitle 1 mark

## Laboratory Equipment

Here are some examples of equipment you will use in the physics and engineering laboratories as you do your experimental work. You will find more detailed instructions for using the equipment in the manuals that we have produced for each lab-work experiment. For each piece of equipment, interactive tutorials and activities are provided for you to check your understanding of their use.

Two spelling errors corrected 1 mark

## Vernier Scales

Vernier scales are used in several  
 You will use them in the lab

Section break inserted above *Vernier Scales* 1 mark  
 Two columns to end of document, 1 cm spacing 1 mark

callipers, angular Vernier scales and travelling microscopes. They allow the user to read off values with greater precision than when using more basic scales.

On a measuring device with a Vernier scale, this latter lies next to the main scale. It is designed so that ten of its divisions equal nine of those on the main scale. A rough reading can be taken on the main scale and this can then be refined by measuring a more precise value on the Vernier scale.

## Vernier Scale Callipers

These may be used to measure the:

external diameter of an object

internal diameter

depth of a cavity

1

Header and footer items all present and aligned correctly, no additional items 1 mark

small angles for setting up e.g. an astronomical

Vernier scales may provide readouts on a linear scale, using an analogue dial or with a digital display. The analogue display calliper provides the final readout on a dial, while the digital ones replace the dial with an electronic display.

## Micrometers

These are used to make precise measurements of small objects. They also have a main (coarse) scale and a fine scale to refine the measurement. The micrometer will be equipped with a friction screw to tighten the jaws onto the object to be measured. The friction screw ensures the jaws do not overtighten on the object and possibly damage it. A locking lever locks the jaws in place once fixed on the object to be measured. The first reading is taken on the coarse scale turning the "thimble" the fine reading by moving the jaws by 0.5mm for each rotation.

In footer page number on left 1 mark  
 File name with full path on right 1 mark

C:\Documents\M21LABWORK.docx

Candidate details

## Tawara University Science

**Digital Multimeters**

These can be used to measure various properties of electrical circuits. These properties include voltage, current and resistance. To measure the current, you would use the multimeter as an ammeter. You will also use one to measure voltage, or resistance using

voltage on the vertical axis (Y-axis) plotted against time on the horizontal axis (X-axis). The display will scan repeatedly from left to right across the screen to make a trace or “waveform”.

Correct paragraph indented 1 cm from both margins

1 mark

Single line black border to paragraph

1 mark

Light grey background fill

1 mark

These are just some of the items of equipment you will use in your experiments in the first year of lab work. You should familiarise yourself with them and their functions through the interactive tutorials and activities linked to this introduction.

**Function Generator**

Also known as a signal generator, this device can produce various patterns of voltage at different frequencies and amplitude. You can use it to test the response of a circuit to known signal inputs. Using a signal generator, you can produce sine, square or triangular wave. You can view these by connecting to an oscilloscope. See the interactive tutorials to check your understanding before connecting and using the signal generator in your lab sessions.

**Laboratory Notebook Skills**

You will also need to keep notes of your experiments in your lab report notebook. Conventions for keeping and presenting lab reports can be found in the tutorial, *[insert link to tutorial here]* but you should also consult your lab supervisor.

Correct text and brackets bold and italics 1 mark

**Oscilloscope**

As already mentioned, this piece of equipment will be used to display the output, for example, from a signal generator in visual form. A digital display will represent in two dimensions one or more potential differences. This will usually be

**Why Do We Need Lab Books?**

To keep a record of what you found, how you did it and what you think. An essential part of experimental science is a well-maintained lab book which records all your work. It is a place for you to record your data and the procedure you undertook. It is the place to write down all your ideas and your findings, even if, at the time, you think they are unimportant. In essence it contains all the evidence for your findings and

Candidate details

## Tawara University Science



your logical deductions. The lab book is evidence of good laboratory practice.

A good lab book ensures that your colleagues can clearly follow your procedures and understand your logic.

- The lab book is evidence
- The lab book is a resource
- The lab book is NOT a copy of the experimental script
- The lab book is a bound A4 notebook.

You may alternatively keep a digital copy of your lab book using software we recommend.

Bullet style applied to correct text 1 mark

Lab-Subhead and Lab-Body styles retained and match EV3 1 mark  
Document complete/paragraphs intact, original styles retained,  
no widows/orphans, split list, columns balanced at top,  
no unnecessary large white spaces, no blank pages 1 mark

Labels in two columns, eight to the page 1 mark  
 ... Orientation is portrait in labels layout 1 mark

**Approved Supplier**

Tawara Component Supplies  
 Unit 15  
 The Old Sugar Mills  
 Tawara  
 TW21 9PJ  
 191321041  
 Name centre number candidate number

**Approved Supplier**

Tawara Electrical Supplies  
 Unit 17  
 The Old Sugar Mills  
 Tawara  
 TW21 9PJ  
 191321049  
 Name centre number candidate number

**Approved Supplier**

Tawara Food Warehouse  
 101 Main Street  
 The Fort  
 Tawara  
 TW15 0AW  
 191091876  
 Name centre number candidate number

**Approved Supplier**

Tawara Hardware Factors  
 191156191  
 Name centre number candidate number

Selects company name includes Tawara 1 mark  
 All records present and sorted ascending  
 by company name 1 mark

**Approved Supplier**

Tawara Laboratory Supplies  
 PO Box 101  
 Lower Town  
 Tawara  
 TW15 3TY  
 191091687  
 Name centre number candidate number

**Approved Supplier**

Tawara Paint Supplies  
 Waterside Retail Park  
 Harbour Reach  
 Tawara  
 TW12 4RT  
 191156222  
 Name centre number candidate number

**Approved Supplier**

Tawara Stationery Supplies  
 The Old Mill  
 West Way  
 Tawara  
 TW12 0PT  
 191321687  
 Name centre number candidate number

**Approved Supplier**

Tawara Wire Factors  
 7 The Quayside  
 Tawara Old Port  
 Tawara  
 TW12 5QR  
 191123491  
 Name centre number candidate number

Only the fields *Company\_Name*, *Address\_1*, *Address\_2*,  
*Town*, *Postal\_Code* and *Telephone* each on new line 1 mark  
 Each label has heading 100% accurate, larger font, centred 1 mark  
 Candidate details at bottom of each label 1 mark

Title as shown 100% accurate and fully visible 1 mark

New field *Order\_Value* 1 mark  
 Calculated *Net\_Price \* Reorder\_No* 1 mark  
 New field *Order\_Now* 1 mark  
 Calculated *Available<=Min Stock* 1 mark

## Tawara University Science Stores

Company_Name	Product	Net_Price	Reorder_No	Order_Value	Order_Now
Tawara Electrical Supplies	Battery Studs Miniature	£0.13	20	£2.60	-1
Tawara Electrical Supplies	Connector Crimp Blue Shrouded	£0.09	20	£1.80	-1
Tawara Electrical Supplies	Connector Push On Receptacle Small	£0.10	20	£2.00	-1
Tawara Electrical Supplies	Flange Blanking Dn16	£4.10	20	£8.20	-1
Tawara Electrical Supplies	Fuseholders 20mm Panel	£1.15	14	£15.82	-1
Tawara Electrical Supplies	Fuses 20mm 2.0 Amp Anti-surge	£0.01	20	£0.20	-1
Tawara Electrical Supplies	Fuses 20mm 315ma Anti-surge	£0.14	15	£2.10	-1
Tawara Electrical Supplies	Fuses Mains 3 Amp	£0.10	11	£1.10	-1
Tawara Electrical Supplies	Kf25 Carrier (pf-110-025-t)	£1.86	20	£37.20	-1
Tawara Electrical Supplies	Kf25 Clamp (pf-100-025-t)	£2.45	16	£39.20	-1
Tawara Electrical Supplies	Kf40 Carrier	£3.24	20	£64.80	-1
Tawara Electrical Supplies	Mains Lead BS to C5	£3.56	20	£71.20	-1
Tawara Electrical Supplies	Mains Lead BS to Fig 8	£0.47	16	£7.52	-1
Tawara Electrical Supplies	Plug 3 Amp Mains Mk646 Ivy	£2.58	20	£51.60	-1
Tawara Electrical Supplies	Socket Trailing 4 Way Complete	£9.69	20	£193.80	-1
Tawara Electrical Supplies	Tape Pvc Black 19mm	£0.65	20	£13.00	-1
Tawara Electrical Supplies	Tape Pvc Black 38mm	£1.04	13	£13.52	-1
Tawara Electrical Supplies	Tape Pvc Red 12mm	£0.78	16	£12.48	-1
Tawara Electrical Supplies	Tape Pvc Red 19mm	£0.76	11	£8.36	-1
Tawara Electrical Supplies	Tape Pvc White 12mm	£0.79	14	£11.06	-1
Tawara Electrical Supplies	Tape Pvc White 19mm	£1.20	13	£15.60	-1

Supplier\_Code is TES 1 mark  
 Order\_Now is -1 1 mark

Only fields *Company\_Name*, *Product*, *Net\_Price*, *Reorder\_No*,  
*Order\_Value* and *Order\_Now* in this order 1 mark  
 Data and labels displayed in full 1 mark  
 Sorted Ascending on *Product* 1 mark

Printed in landscape and one page wide 1 mark

Name, centre number, candidate number bottom left of each page 1 mark

**PUBLISHED**

<b>Company_Name</b>	<b>Product</b>	<b>Net_Price</b>	<b>Reorder_No</b>	<b>Order_Value</b>	<b>Order_Now</b>
Tawara Electrical Supplies	Tape Pvc Yellow 12mm	£0.79	16	£12.64	-1
Tawara Electrical Supplies	Tape Pvc Yellow 19mm	£0.88	13	£11.44	-1
Tawara Electrical Supplies	Thread Tape Ptfe	£0.30	20	£6.00	-1
Tawara Electrical Supplies	Tube Pvc Braided 1/2 (unit Mtr)	£2.03	20	£40.60	-1
Tawara Electrical Supplies	Tube Pvc Braided 1/4 (unit Mtr)	£1.07	17	£18.19	-1
Tawara Electrical Supplies	Tube Pvc Clear 13 Id X 19 Od (unit Mtr)	£1.63	20	£32.60	-1
Tawara Electrical Supplies	Tube Pvc Clear 19 @d X 25 Od (unit Mtr)	£2.44	16	£39.04	-1
Tawara Electrical Supplies	Tube Pvc Clear 3 Id X 6 Od (unit Mtr)	£0.18	16	£2.88	-1
Tawara Electrical Supplies	Tungsten Lamp 60w Bc Pearl	£1.55	20	£31.00	-1

Net value of this order £822.75

VAT on this order £164.55

Candidate details

Net value of order positioned under <i>Order_Value</i> field	1 mark
VAT value on order positioned under <i>Order_Value</i> number	1 mark
Two labels to left of calculated values 100% accurate and fully visible	1 mark
All currency values all with same symbol and to two decimal places	1 mark



# Tawara University Science Stores

## Delivery Note

Deliver to: «Title» «Initials» «Last\_Name»  
«Room» «Building»

Delivery for	Week «Week»	«Delivery_Day»
<b>Code</b>	<b>Description</b>	<b>Quantity ordered</b>
«Product_Code»	«Product»	«Quantity_Ordered»

Order prepared by: Name, centre number, candidate number

Name, centre number, candidate number on delivery note master	1 mark
Text replaced with these field codes <i>Title, Initials, Last_Name, Room</i> and <i>Building</i> with correct spacing	1 mark
Text replaced with these field codes <i>Week, Delivery_Day, Product_Code, Product</i> and <i>Quantity_Ordered</i> with correct spacing	1 mark

**Tawara University Science Stores****Delivery Note**

Deliver to: Mr P J Armass

Practical Labs Nano Technology

Delivery for	Week 6	Wednesday
<b>Code</b>	<b>Description</b>	<b>Quantity ordered</b>
TPS0013	Brush Paint 2	6

Order prepared by: Name, centre number, candidate number

Only the three correct delivery notes printed 1 mark

**Tawara University Science Stores****Delivery Note**

Deliver to: Mr S P Annerman

Practical Labs Nano Technology

Delivery for	Week 6	Wednesday
<b>Code</b>	<b>Description</b>	<b>Quantity ordered</b>
TLS0025	Cleanroom Disposable Gloves XL	8

Order prepared by: Name, centre number, candidate number

**Tawara University Science Stores****Delivery Note**

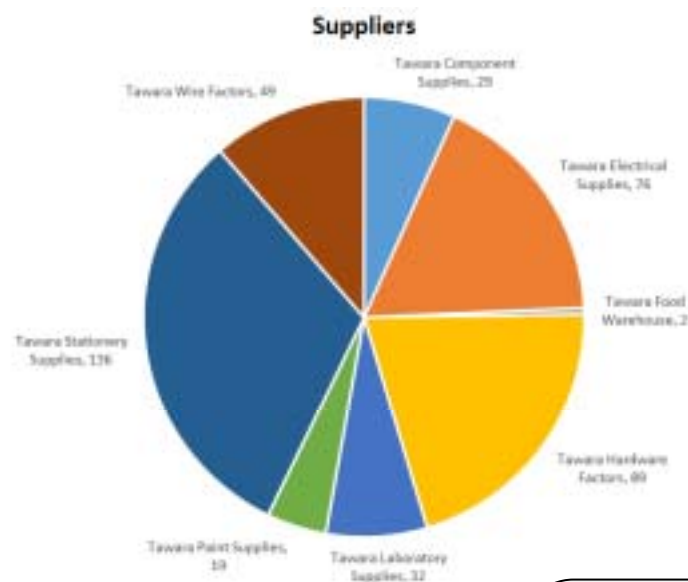
Deliver to: Mr S P Annerman

Practical Labs Nano Technology

Delivery for	Week 6	Wednesday
<b>Code</b>	<b>Description</b>	<b>Quantity ordered</b>
TLS0020	Cleanroom Respirator Aura Fold Flat	5

Order prepared by: Name, centre number, candidate number

## *Our local approved suppliers*



Name, centre number, candidate number

- Based in Tawara
- You can see the relative number of products these each supply to us

Pie chart created from correct data	1 mark
Placed on this slide to left of bullets	1 mark
Correct chart title 100% accurate	1 mark
Segments show company name and values	1 mark
No legend	1 mark

**Tawara Science Stores**

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- Stores Manager: Candidate Name

➔

**Purpose of the stores**

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- To supply day-to-day needs of departments
- Not for capital investments
- Not for equipment over \$10,000
- See university regulations for the above

➔

**Departments served**

---

- Newly reorganised with our new buildings
- Now serves:
- Biology
- Chemistry
- Physics

➔

**Our local approved suppliers**

---



- Based in Tawara
- You can see the relative number of products these each supply to us

➔

**How to order**

---

- Check in the catalogue
- Fill out an order form
- We deliver on three days per week
- You can collect them 10:00 to 14:00

**If product not in the catalogue**

---

- Make an order
- Suggest suppliers from the approved list
- Make your request

File imported as six slides with titles and bullets

1 mark

Slide numbers top right

1 mark

3-4 point red line across slide below title

1 mark

Name, centre number, candidate number bottom left

1 mark

Filled arrow bottom right

1 mark

No overlap of items

1 mark

Name entered on first slide after text *Stores Manager:*

1 mark

Move slide 3 with title *Purpose of the stores* to become slide 2

1 mark

Print six slides to the page and the single slide *Our local approved suppliers*

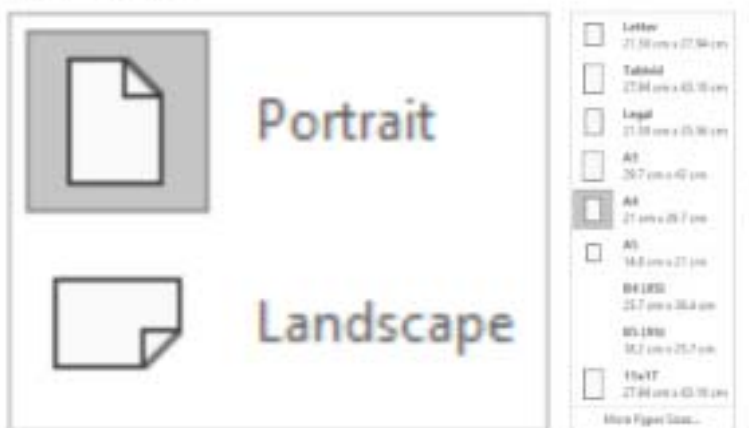
1 mark

## Evidence 1



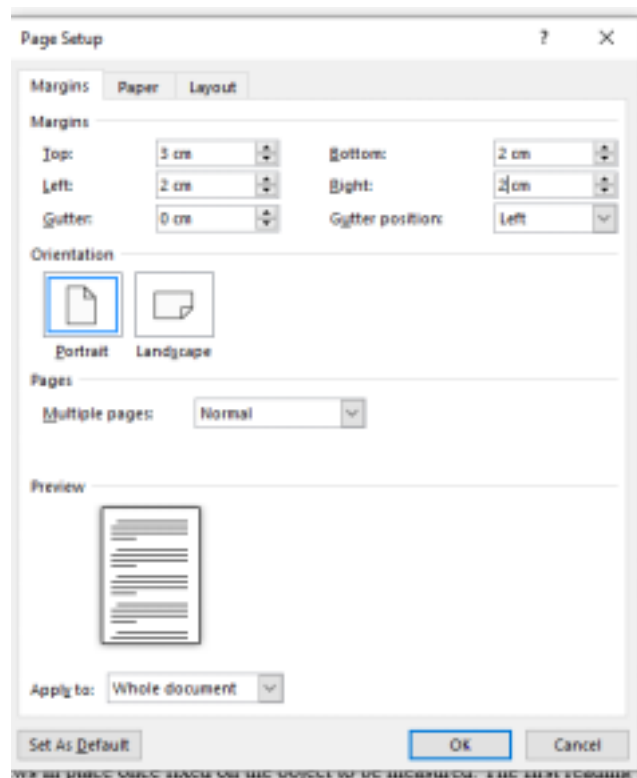
File saved as M21LABWORK with evidence of file type 1 mark

## Evidence 2



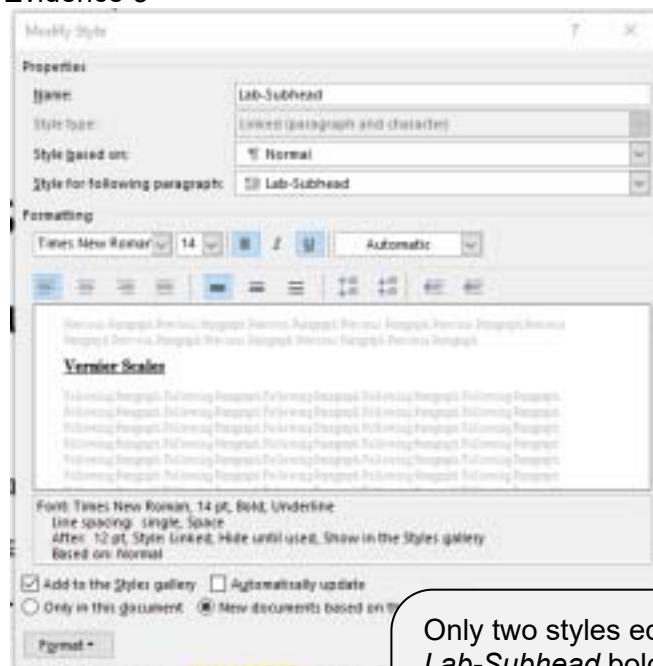
Page size A4 portrait and document matches

1 mark



Margin settings top 3 cms, others 2 cms 1 mark

## Evidence 3



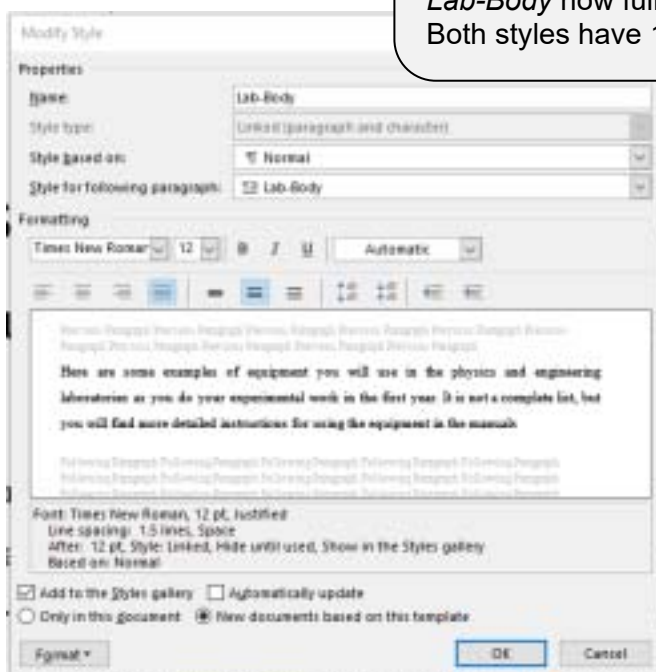
Only two styles edited *Lab-Subhead* and *Lab-Body*  
*Lab-Subhead* bold, not italic and still underlined, aligned left  
*Lab-Body* now fully justified, 1.5 line spacing  
 Both styles have 12 point space after

1 mark

1 mark

1 mark

1 mark



## Evidence 4

Field Name	Data Type
Product	Short Text
Product_Code	Short Text
Supplier_Code	Short Text
Available	Number
Net_Price	Number
Min_Stock	Number
Reorder_No	Number

Only field names as given with correct data types,  
*Net\_Price* is Number/currency  
*Product\_Code* set as primary key

1 mark

1 mark



## Evidence 5

Field Name	Data Type	
Supplier_Code	Short Text	
Company_Name	Short Text	
Address_1	Short Text	
Address_2	Short Text	
Town	Short Text	
Postal_Code	Short Text	
Telephone	Short Text	

Only field names as given with correct data types,

*Telephone* is text

1 mark

*Supplier\_Code* set as primary key

1 mark

## Evidence 6

### Product Suppliers Form

Enter the supplier code:  This should be a 3 letter code

Enter the company name:

Enter the first line of the address:

Enter the second line of the address:

Enter the town:

Enter the postal code:

Enter the telephone number:

Form created with all fields from suppliers table

1 mark

Four different design enhancements added e.g.

Navigation buttons, title, colour, meaningful field labels,  
user notes, suitable field lengths to match data – at least  
1 change per feature

2 marks

Two or three different features

1 mark

One or fewer features

0 marks

New record 100% accurate

1 mark

## Evidence 7



One to many relationship seen 1 mark

**Edit Relationships**

Table/Query: M21SUPPLIERS    Related Table/Query: M21STORES

Supplier\_Code    Supplier\_Code

☐ Enforce Referential Integrity

☐ Cascade Update Related Fields

☐ Cascade Delete Related Records

Relationship Type: One-To-Many

OK    Cancel    Join Type..    Create New..

## Evidence 8

Net value of this order	=Sum([Order_Value])
VAT on this order	=Sum([Order_Value])*0.2

Correct formula for sum of *Order\_Value* 1 mark  
 Correct formula for VAT calculation 1 mark

## Evidence 9

PDF Tawara University Science Stores

09/23/2019 14:19

PDF File

Report exported as pdf

1 mark

## Evidence 10

Query Options

**Filter Records** | Sort Records

	Field:	Comparison:	Compare to:
	Department	Equal to	Physics
And	Delivery_Day	Equal to	Wednesday
And			

Clear All OK Cancel

Automated selection where –  
*Department* is Physics 1 mark  
 AND *Delivery\_Day* is Wednesday 1 mark

## Evidence 11

Transition to Next Slide

1. Tawara Science Stores

2. Purpose of the stores

3. Departments served

4. Our local approved suppliers

5. How to order

6. If product not in the catalogue

Evidence of same transition between all slides 1 mark