



COUNCIL FOR QUALITY ASSURANCE IN GENERAL AND FURTHER EDUCATION AND TRAINING

Exemplar Book on Effective Questioning

Computer Applications Technology

Compiled by the Statistical Information and Research (SIR) Unit

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PREFACE

The National Senior Certificate (NSC) examinations are set and moderated in part using tools which specify the types of cognitive demand and the content deemed appropriate for Computer Applications Technology at Grade 12 level. Until recently, the level of cognitive demand made by a question was considered to be the main determinant of the overall level of cognitive challenge of an examination question.

However, during various examination evaluation projects conducted by Umalusi from 2008-2012, evaluators found the need to develop more complex tools to distinguish between questions which were categorised at the same cognitive demand level, but which were not of comparable degrees of difficulty. For many subjects, for each type of cognitive demand a three-level degree of difficulty designation, *easy, moderate and difficult* was developed. Evaluators first decided on the type of cognitive process required to answer a particular examination question, and then decided on the degree of difficulty, *as an attribute of the type of cognitive demand*, of that examination question.

Whilst this practice offered wider options in terms of *easy, moderate and difficult* levels of difficulty for each type of cognitive demand overcame some limitations of a one-dimensional cognitive demand taxonomy, other constraints emerged. Bloom's Taxonomy of Educational Objectives (BTEO) (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) and the Revised Bloom's Taxonomy are based on the assumption that a cumulative hierarchy exists between the different categories of cognitive demand (Bloom et al., 1956; Bloom, Hastings & Madaus, 1971). The practice of 'levels of difficulty' did not necessarily correspond to a hierarchical model of increasing complexity of cognitive demand. A key problem with using the level of difficulty as an attribute of the type of cognitive demand of examination questions is that, questions recognised at a higher level of cognitive demand are not necessarily categorised as more difficult than other questions categorised at lower levels of cognitive demand. For example, during analyses a basic recognition or

recall question could be considered more difficult than an easy evaluation question.

Research further revealed that evaluators often struggled to agree on the classification of questions at so many different levels. The finer categorization for each level of cognitive demand and the process of trying to match questions to pre-set definitions of levels of difficulty made the process of making judgments about cognitive challenge overly procedural. The complex two-dimensional multi-level model also made findings about the cognitive challenge of an examination very difficult for Umalusi Assessment Standards Committee (ASC) to interpret.

In an Umalusi Report, *Developing a Framework for Assessing and Comparing the Cognitive Challenge of Home Language Examinations* (Umalusi, 2012), it was recommended that the type and level of cognitive demand of a question and the level of a question's difficulty should be analysed separately. Further, it was argued that the ability to assess cognitive challenge lay in experts' abilities to recognise subtle interactions and make complicated connections that involved the use of multiple criteria simultaneously. However, the tacit nature of such judgments can make it difficult to generate a common understanding of what constitutes criteria for evaluating the cognitive challenge of examination questions, despite descriptions given in the policy documents of each subject.

The report also suggested that the Umalusi external moderators and evaluators be provided with a framework for thinking about question difficulty which would help them identify where the main sources of difficulty or ease in questions might reside. Such a framework should provide a common language for evaluators and moderators to discuss and justify decisions about question difficulty. It should also be used for building the capacity of novice or less experienced moderators and evaluators to exercise the necessary expert judgments by making them more aware of key aspects to consider in making such judgments.

The revised Umalusi examination moderation and evaluation instruments for each subject draw on research and literature reviews, together with the knowledge gained through the subject workshops. At these workshops, the proposed revisions were discussed with different subject specialists to attain a common understanding of the concepts, tools and framework used; and to test whether the framework developed for thinking about question difficulty 'works' for different content subjects. Using the same framework to think about question difficulty across subjects will allow for greater comparability of standards across subjects and projects.

An important change that has been made to the revised examination evaluation instrument is that the analysis of *the type of cognitive demand* of a question and analysis of *the level of difficulty* of each question are now treated as two separate judgments involving two different processes. Accordingly, the revised examination evaluation instrument now includes assessment of difficulty as well as cognitive demand.

LIST OF ABBREVIATIONS

Abbreviation	Full name
ASC	Assessment Standards Committee
BTEO	Bloom's Taxonomy of Educational Objectives
CAPS	Curriculum Assessment Policy Statement
DBE	Department of Basic Education
FET	Further Education and Training
IEB	Independent Examinations Board
NSC	National Senior Certificate
NQF	National Qualifications Framework
QAA	Quality Assurance of Assessment
QCC	Qualifications, Curriculum and Certification
SIR	Statistical Information and Research

Subject specific:

CD	Compact Disk
CPU	Central Processing Unit
DVD	Digital Video Disk
ICT	Information and Communication Technology
PAT	Practical Assessment Task
PC	Personal Computer
USB	Universal Serial Bus

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This Computer Applications Technology exemplar book is informed by Umalusi Research Reports of previous years, especially the report by Reeves (Umalusi, 2012) titled '*Developing a framework for assessing and comparing the cognitive challenge of Home Language examinations*'.

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1. INTRODUCTION

The rules of assessment are essentially the same for all types of learning because, to learn is to acquire knowledge or skills, while to assess is to identify the level of knowledge or skill that has been acquired (Fiddler, Marienau & Whitaker, 2006). Nevertheless, the field of assessment in South Africa and elsewhere in the world is fraught with contestation. A review of the research literature on assessment indicates difficulties, misunderstanding and confusion in how terms describing educational measurement concepts, and the relationships between them, are used (Frisbie, 2005).

Umalusi believes that if all role players involved in examination processes can achieve a common understanding of key terms, concepts and processes involved in setting, moderating and evaluating examination papers, much unhappiness can be avoided. This exemplar book presents a particular set of guidelines for both novice and experienced Computer Applications Technology national examiners, internal and external moderators, and evaluators to use in the setting, moderation and evaluation of examinations at the National Senior Certificate (NSC) level.

The remainder of the exemplar book is organised as follows: First, the context in which the exemplar book was developed is described (Part 2), followed by a statement of its purpose (Part 3). Brief summaries of the roles of moderation and evaluation (Part 4) and cognitive demand (Part 5) in an assessment. Examination questions selected from the NSC Computer Applications Technology examinations of assessment bodies, the Department of Basic Education (DBE), and/or the Independent Examinations Board (IEB) are used to illustrate how to identify different levels of cognitive demand as required by the Curriculum and Assessment Policy Statement (CAPS) Computer Applications Technology document (Part 6). Part 7 explains the protocols for identifying different levels of difficulty within a question paper. Application of the Umalusi framework for determining difficulty described in Part 7 is illustrated, with reasons, by another set of questions from a range of Computer

Applications Technology examinations (Part 8). Concluding remarks complete the exemplar book (Part 9).

2. CONTEXT

Umalusi has the responsibility to quality assure qualifications, curricula and assessments of National Qualification Framework (NQF) Levels 1 - 5. This is a legal mandate assigned by the *General and Further Education and Training Act (Act 58 of 2001)* and the *National Qualification Framework Act (Act 67 of 2008)*. To operationalize its mandate, Umalusi, amongst other things, conducts research and uses the findings of this research to enhance the quality and standards of curricula and assessments.

Since 2003, Umalusi has conducted several research studies that have investigated examination standards. For example, Umalusi conducted research on the NSC examinations, commonly known as 'Matriculation' or Grade 12, in order to gain an understanding of the standards of the new examinations (first introduced in 2008) relative to those of the previous NATED 550 Senior Certificate examinations (Umalusi, 2009a, 2009b). Research undertaken by Umalusi has assisted the organisation to arrive at a more informed understanding of what is meant by assessing the cognitive challenge of the examinations and of the processes necessary for determining whether the degree of cognitive challenge of examinations is comparable within a subject, across subjects and between years.

Research undertaken by Umalusi has revealed that different groups of examiners, moderators and evaluators do not always interpret cognitive demand in the same way, posing difficulties when comparisons of cognitive challenge were required. The research across all subjects also showed that using the type and level of cognitive demand of a question *only* as measure

for judging the cognitive challenge of a question is problematic because cognitive demand levels on their own do not necessarily distinguish between degrees of difficulty of questions.

The new Umalusi framework for thinking about question difficulty described in this exemplar book is intended to support all key role players in making complex decisions about what makes a particular question challenging for Grade 12 examination candidates.

3. THE PURPOSE OF THE EXEMPLAR BOOK

The overall goal of this exemplar book is to ensure the consistency of standards of examinations across the years in the Further Education and Training (FET) sub-sector and Grade 12, in particular. The specific purpose is to build a shared understanding among teachers, examiners, moderators, evaluators, and other stakeholders, of methods used for determining the type and level of cognitive demand as well as the level of difficulty of examination questions.

Ultimately, the common understanding that this exemplar book seeks to foster is based on the premise that the process of determining the type and level of cognitive demand of questions and that of determining the level of difficulty of examination questions are two separate judgements involving two different processes, both necessary for evaluating the cognitive challenge of examinations. This distinction between cognitive demand and difficulty posed by questions needs to be made in the setting, moderation, evaluation and comparison of Computer Applications Technology examination papers.

The exemplar book includes an explanation of the new Umalusi framework which is intended to provide all role-players in the setting of Computer Applications Technology examinations with a common language for thinking and talking about question difficulty. The reader of the exemplar book is taken

through the process of evaluating examination questions; first in relation to determining the type and level of cognitive demand made by a question, and then in terms of assessing the level of difficulty of a question. This is done by providing examples of a range of questions which make different types of cognitive demands on candidates, and examples of questions at different levels of difficulty.

Each question is accompanied by an explanation of the reasoning behind why it was judged as being of a particular level of cognitive demand or difficulty, and the reasoning behind the judgements made is explained. The examples of examination questions provided were sourced by Computer Applications Technology evaluators from previous DBE and the IEB Computer Applications Technology question papers, pre- and post- the implementation of CAPS during various Umalusi workshops.

This exemplar book is an official document. The process of revising the Umalusi examination evaluation instrument and of developing a framework for thinking about question difficulty for both moderation and evaluation purposes has been a consultative one, with the DBE and the IEB assessment bodies. The new framework for thinking about question difficulty is to be used by Umalusi in the moderation and evaluation of Grade 12 Computer Applications Technology examinations, and by all the assessment bodies in the setting of the question papers, in conjunction with the CAPS documents.

4. MODERATION AND EVALUATION OF ASSESSMENT

A fundamental requirement, ethically and legally, is that assessments are fair, reliable and valid (American Educational Research Association [AERA], American Psychological Association [APA] and National Council on Measurement in Education [NCME], 1999). Moderation is one of several quality

assurance assessment processes aimed at ensuring that an assessment is fair, reliable and valid (Downing & Haladyna, 2006). Ideally, moderation should be done at all levels of an education system, including the school, district, provincial and national level in all subjects.

The task of Umalusi examination **moderators** is to ensure that the quality and standards of a particular examination are maintained each year. Part of this task is for moderators to alert examiners to details of questions, material and/or any technical aspects in examination question papers that are deemed to be inadequate or problematic and that therefore, challenge the validity of that examination. In order to do this, moderators need to pay attention to a number of issues as they moderate a question paper – these are briefly described below.

Moderation of the technical aspects of examination papers includes checking correct question and/or section numbering, and ensuring that visual texts and/or resource material included in the papers are clear and legible. The clarity of instructions given to candidates, the wording of questions, the appropriateness of the level of language used, and the correct use of terminology need to be interrogated. Moderators are expected to detect question predictability, for example, when the same questions regularly appear in different examinations, and bias in examination papers. The adequacy and accuracy of the marking memorandum (marking guidelines) need to be checked to ensure that they reflect and correspond with the requirements of each question asked in the examination paper being moderated.

In addition, the task of moderators is to check that papers adhere to the overall examination requirements as set out by the relevant assessment body with regard to the format and structure (including the length, type of texts or reading selections prescribed) of the examination. This includes assessing compliance with assessment requirements with regard to ensuring that the

content is examined at an appropriate level and in the relative proportions (weightings) of content and/or skills areas required by the assessment body.

The role of Umalusi examination **evaluators** is to perform analysis of examination papers after they have been set and moderated and approved by the Umalusi moderators. This type of analysis entails applying additional expert judgments to evaluate the quality and standard of finalised examination papers before they are written by candidates in a specific year. However, the overall aim of this evaluation is to judge the comparability of an examination against the previous years' examination papers to ensure that consistent standards are being maintained over the years.

The results of the evaluators' analyses, and moderators' experiences provide the Umalusi Assessment Standards Committee (ASC) with valuable information which is used in the process of statistical moderation of each year's examination results. Therefore, this information forms an important component of essential qualitative data informing the ASC's final decisions in the standardisation of the examinations.

In order for the standardisation process to work effectively, efficiently and fairly, it is important that examiners, moderators and evaluators have a shared understanding of how the standard of an examination paper is assessed, and of the frameworks and main instruments that are used in this process.

5. COGNITIVE DEMANDS IN ASSESSMENT

The *Standards for educational and psychological testing* (AERA, APA, & NCME, 1999) require evidence to support interpretations of test scores with respect to cognitive processes. Therefore, valid, fair and reliable examinations require that the levels of cognitive demand required by examination questions are appropriate and varied (Downing & Haladyna, 2006). Examination papers

should not be dominated by questions that require reproduction of basic information, or replication of basic procedures, and under-represent questions invoking higher level cognitive demands.

Accordingly, the Grade 12 CAPS NSC subject examination specifications state that examination papers should be set in such a way that they reflect proportions of marks for questions at various level of cognitive demand. NSC examination papers are expected to comply with the specified cognitive demand levels and weightings. NSC examiners have to set and NSC internal moderators have to moderate examination papers as reflecting the proportions of marks for questions at different levels of cognitive demand as specified in the documents. Umalusi's external moderators and evaluators are similarly tasked with confirming compliance of the examinations with the CAPS cognitive demand levels and weightings, and Umalusi's revised examination evaluation instruments continue to reflect this requirement.

Despite that, subject experts, examiners, moderators and evaluators are familiar with the levels and explanations of the types of cognitive demand shown in the CAPS documents, Umalusi researchers have noted that individuals do not always interpret and classify the categories of cognitive demand provided in the CAPS the same way. In order to facilitate a common interpretation and classification of the cognitive demands made by questions, the next section of this exemplar book provides a clarification of each cognitive demand level for Computer Applications Technology followed by illustrative examples of examination questions that have been classified at that level of cognitive demand.

6. EXPLANATIONS AND EXAMPLES OF QUESTIONS ASSESSED AT THE DIFFERENT COGNITIVE DEMAND LEVELS IN THE COMPUTER APPLICATIONS TECHNOLOGY TAXONOMY ACCORDING TO CAPS

The taxonomies of cognitive demand for each school subject in the CAPS documents are mostly based on the Revised Bloom's Taxonomy (Anderson and Krathwohl, 2001) but resemble the original Bloom's taxonomy in that categories of cognitive demand are arranged along a single continuum. Bloom's Taxonomy of Educational Objectives (BTEO) (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) and the Revised Bloom's Taxonomy imply that each more advanced or successive category of cognitive demand subsumes all categories below it. The CAPS Taxonomies of Cognitive Demand make a similar assumption (Crowe, 2012).

Note:

In classifying the type and level of cognitive demand, each question is classified at the highest level of cognitive process involved. Thus, although a particular question involves recall of knowledge, as well as comprehension and application, the question is classified as an 'analysis' question if that is the highest level of cognitive process involved. If 'evaluating' is the highest level of cognitive process involved, the question as a whole should be classified as an 'evaluation' question. On the other hand, if one or more sub-sections of the question and the marks allocated for each sub-section can stand independently, then the level of cognitive demand for each sub-section of the question should be analysed separately.

The CAPS documents for many subjects also give examples of descriptive verbs that can be associated with each of the levels of cognitive demand. However, it is important to note that such 'action verbs' can be associated with more than one cognitive level depending on the context of a question.

The Computer Applications Technology CAPS document states that Grade 12 NSC Computer Applications Technology examination papers should examine three levels of cognitive demand (Table 1).

Table 1: Types and levels of Cognitive Demand for CAT according to the CAPS document

	Level 1 Lower Order	Level 2 Middle Order	Level 3 Higher Order
Practical examination	Routine procedures (Knowledge/ Remembering)	Multi-step procedures (Understanding/ Applying)	Problem-solving (Analysing/ Evaluating/ Creating)
Theoretical examination	Knowledge/ Remembering	Understanding/ Applying	Analysing/ Evaluating/ Creating
Weighting	30%	40%	30%

**SOURCE: CAPS COMPUTER APPLICATIONS TECHNOLOGY (CAT) FET 2011 P. 50
CAT EXAMINATION GUIDELINES (2014) P.5-6**

Note:

Be mindful that analyses of *the level of cognitive process* of a question and *the level of difficulty* of each question are to be treated as two separate judgments involving two different processes. Therefore, whether the question is easy or difficult should not influence the categorisation of the question in terms of the type and level of cognitive demand. Questions should NOT be categorised as higher order evaluation/synthesis questions because they are difficult questions. Some questions involving the cognitive process of recall or recognition may be more difficult than other recall or recognition questions. Not all comprehension questions are easier than questions involving analysis or synthesis. Some comprehension questions may be very difficult, for example explanation of complex scientific processes. For these reasons, you need to categorise the level of difficulty of questions separately from identifying the type of cognitive process involved.

To facilitate reading of this section, each of the above cognitive demand levels in the Computer Applications Technology Taxonomy is explained, and the explanation is followed by at least **three** examples of questions from previous Computer Applications Technology NSC examinations classified at each of the levels of cognitive demand shown in Table 1 above. These

examples were selected to represent the **best and clearest** examples of each level of cognitive demand that the Computer Applications Technology experts could find. In the discussion below each example question explains the reasoning processes behind the classification of the question at that particular type of cognitive demand (Table 2 to Table 7).

PAPER 1 - PRACTICAL

In order to answer the questions in this section data files are required. The data files for each of the questions cited in this section can be found at the Department of Basic Education's website:

<http://www.education.gov.za/Examinations/PastExamPapers/tabid/351/Default.aspx>

In order to obtain the data files, follow the appropriate links on the website. For example, in order to find the data file for the first example provided in Table 2 below, access the above site, identify the year in which the paper was set (i.e. NSC 2011 November Exam Papers), then locate the subject name (i.e. Computer Applications Technology) and then download the data files which are found by clicking on "Data Disk to Schools" in the list of files that are displayed. A zipped folder will be downloaded and all the data files required for the November 2011 practical examination will be available in the unzipped folder. Unzip the folder to a suitable location.

In addition to a data file each of the questions is based on a general scenario applicable to most questions in the question paper. To facilitate a better understanding of each question in all the CAT examples provided a brief synopsis of the scenario is provided before each question so as to establish the context of the question.

In general questions from the three main applications studied, viz. word processor application, spreadsheet application and database application have been selected in each set of examples.

**Table 2: Examples of lower order questions in PRACTICAL EXAMINATIONS:
Level 1 - Routine procedures**

Notes:

In general questions that are categorised as Level 1 questions include elementary or routine procedures found in the application packages studied (namely word processor application, spreadsheet application and database application). These questions include:

- basic operations, such as;
 - changing font types, font sizes, margin sizes, page size, page orientation, levels of indentation, paragraph spacing, line spacing, etc. in a document,
 - changing row heights/column widths, formatting cells, headers/footers, etc. in a spreadsheet, and
 - changing field properties, etc. in a database table,
- basic calculations, such as SUM, AVERAGE, MAX/MIN, LARGE, etc. in spreadsheets;
- basic file actions, such as copying/moving/deleting/renaming of files, creating folders, etc.; and
- specific instructions such as inserting a table of a given size or drop caps into a document, inserting a graphic image in a form header, changing the chart type in a spreadsheet, simple queries in a database, etc.

Example 1:

Reference: DBE, November 2011, CAT Paper 1, Question 4.3

Synopsis of scenario on which question is based:

Your school has a media exchange centre which allows learners to borrow books, CDs and DVDs. The CAT learners have been requested to assist the media exchange centre. Part of your responsibility will be to request donations to purchase more media resources.

Data file: 4MediaS

Question:

The manager of the media exchange centre has created a spreadsheet to help with various calculations. Open the spreadsheet **4MediaS** and work in the **Resources_Bronne** worksheet.

Display all the values in column F as the South African currency with NO (zero) decimal places. (2)

Discussion:

This question is considered to be a Level 1 type question. Answering this question entails carrying out a series of simple routine procedures including:

- opening a given spreadsheet;
- locating the appropriate worksheet within the spreadsheet;
- highlighting a range of cells; and then
- changing the format of the highlighted cells so that the values in the highlighted cells are displayed as South African currency with no decimal places.

These actions constitute routine procedures carried out in a spreadsheet; and normally form part of the Grade 10 curriculum.

Memorandum/Marking guidelines

- Values in column F formatted as South African currency (rand) ✓
- With NO (zero) decimal places ✓

Example 2:

Reference: DBE, November 2010, CAT Paper 1, Question 6.1.5

Synopsis of scenario on which question is based:

A few CAT learners got involved in a community project and offered their computer skills to the local health clinic. The clinic assists people on a daily basis and also has a facility where patients can stay over.

Data file: 6Clinic_Kliniek

Question:

6.1 Open the database called **6Clinic_Kliniek** and go to the **Patients_Pasiënte** table.

Make the following changes to the Patients_Pasiënte table:

6.1.5 Make sure that the user has to enter a value for the **Visits_Besoeke** field when entering a new record in the table. (1)

Discussion:

This question is categorised as a Level 1 question involving routine procedures. In order to answer the question, Grade 12 learners have to complete a number of straightforward procedures each of which would be routine at this stage of their school careers when they have been studying CAT for a number of years. The simple procedures involved, which are explicitly stated in the question, include the following:

- open the given database;
- open the relevant table in the given database in design view;
- locate the field where the property needs to be changed; and then
- change the appropriate field property.

All learners need to do is recognise which property needs to be changed in order to ensure that a value has to be entered into the field. Recall and recognition are lower order cognitive processes.

Memorandum/Marking guidelines

Required property of **Visits_Besoeke** set to Yes ✓

(Note to marker: Accept if candidates have set a primary key)

Example 3:

Reference: DBE, November 2014, CAT Paper 1, Question 7.4.1

Synopsis of scenario on which question is based:

The African continent offers many beautiful places to visit. Your school is planning a tour of the African continent for the Grade 12 learners. The travel agency, Ace Travel, used by the school wants to promote their business in the South African market.

Data file: 7Attract_Besiens

Question:

7.4 The marketing manager has created a draft version of a document that he wishes to send out.

Open the **7Attract_Besiens** document.

7.4.1 Insert a footnote on the text 'How many people visit South Africa?' to read 'Refer to www.attractions.com'. (2)

...

Discussion:

This question is classified as a Level 1 type question. In this case the task, which is based on a word processor, requires learners to perform a relatively simple and straightforward procedure which is explicitly identified in the question.

In answering the question learners only have to

- find and select the text (which is in any event highlighted in the data file);
- click on the "Insert Footnote" option in the "References" menu; and then
- type in the wording required in the answer.

So, the learner has to execute simple actions which constitute routine procedures.

Memorandum/Marking guidelines

- Footnote added to the text 'How many people visit South Africa?' ✓
- Footnote reads: 'Refer to the website www.attractions.com' ✓

**Table 3: Examples of middle order questions in PRACTICAL EXAMINATIONS:
Level 2 – Multi-step procedures**

Notes:

In general questions categorised as Level 2 questions include

- extended tasks/actions/procedures such as reproduction of documents, adapting given documents to meet new known requirements, etc.
- more complex instructions or longer calculations such as:
 - inserting a table of contents according to a given specification in a word-processed document,
 - combining functions, using nested-IF function, using simple VLOOKUP/HLOOKUP functions, etc. in a spreadsheet, and
 - inserting calculated fields, etc. in a database query,
- multi-step procedures such as performing a mail merge, creating more complex database queries, creating a database report based on specific criteria, etc.

Example 1:

Reference: DBE, November 2012, CAT Paper 1, Question 5.7.1

Synopsis of scenario on which question is based:

Weather patterns are changing.

Data file: 5Weather_Weer

Question:

5.7 Open the **5Weather_Weer** database. Open the existing form called **FrmForm_Vorm**.

5.7.1 Make the following changes to the form header:

- Create a label in the form header and type in your examination number.
- Move the image from the form footer to the form header.
- Place a shadowed border around the image. (4)

Discussion:

This question is a Level 2 type question as learners need to carry out a number of different, yet related, steps in order to satisfy the requirements of the question. In order to answer the question, learners have to apply their knowledge of the various elements that constitute a database form (i.e. header, footer, body) and where these elements are located on the form to perform three distinct, albeit simple steps, namely

- the insertion of a label with contents;
- the moving of an image; and
- tweaking the properties of the image.

A key property of this category of question and one that distinguishes it from Level 1 questions is that, in order to answer the question as a whole, learners are required to execute multiple steps to arrive at the solution. So, while moving the image from the footer to the header would be classified as a Level 1 type of operation, if asked by itself, the fact that learners are also required to create a label and modify the border of the image means that multiple operations are required making the process more cognitively demanding.

Memorandum/Marking guidelines

- Label is added to form header ✓
- Examination number appears ✓
- Image moved to header ✓

(Note to marker: Image does not appear in both the header and footer Mark this question in Design View and Form View)

- Shadow border placed around the image ✓

Example 2:

Reference: DBE, November 2011, CAT Paper 1, Question 2.8

Synopsis of scenario on which question is based:

Your school has a media exchange centre which allows learners to borrow books, CDs and DVDs. The CAT learners have been requested to assist the media exchange centre.

Data file: 2MediaW

Question:

Open the document called **2MediaW**.

Create a table of contents on page 1 under the heading 'TABLE OF CONTENTS'.

The table of contents should have a format similar to the one shown in the screenshot below.

1) Background	ii
2) Organising a book club	ii
3) Advertise your book club -	iii
4) The first meeting	iii
5) Book reading	v
6) Choosing a book	v
7) Outcomes in the USA	vi
8) List of material in the media exchange centre	vii

NOTE:

- Only headings formatted with the style Heading 2 must appear in the table of contents.
- The heading 'TABLE OF CONTENTS' does NOT appear in the table of contents.
- Page numbers may differ from that shown. (3)

Discussion:

This question is classified as a Level 2 question because learners have to complete multiple steps to arrive at the final answer. Answering the question requires learners to:

- examine the screenshot so that they understand what is required and how the final product must look;
- insert the table of contents using the appropriate method found in the "References" menu and tweak the various properties of the table. In order to accomplish this task, learners have to follow a number of steps that include:
 - the creation of the table of contents;
 - changing the properties of the table so as to ensure that:
 - only specifically formatted headings appear in the table; and
 - the correct dot leaders are applied.

These multiple steps make answering the question a more cognitively demanding process than merely changing formatting or inserting a standard table of contents with no adjustments to formatting, levels, etc. each of which would have been classified as Level 1 questions.

Memorandum/Marking guidelines

- Automatic table of contents is created
- All (eight) headings formatted with the style Heading 2 appear
- No other headings appear

(Note to marker: Do not penalise if a different style for the table of contents has been used or if page numbering differs.)

Example 3:

Reference: DBE, November 2013, CAT Paper 1, Question 3.9

Synopsis of scenario on which question is based:

Your school governing body decides to run a campaign to educate parents, teachers and learners about cyberbullying. The committee asks you to assist.

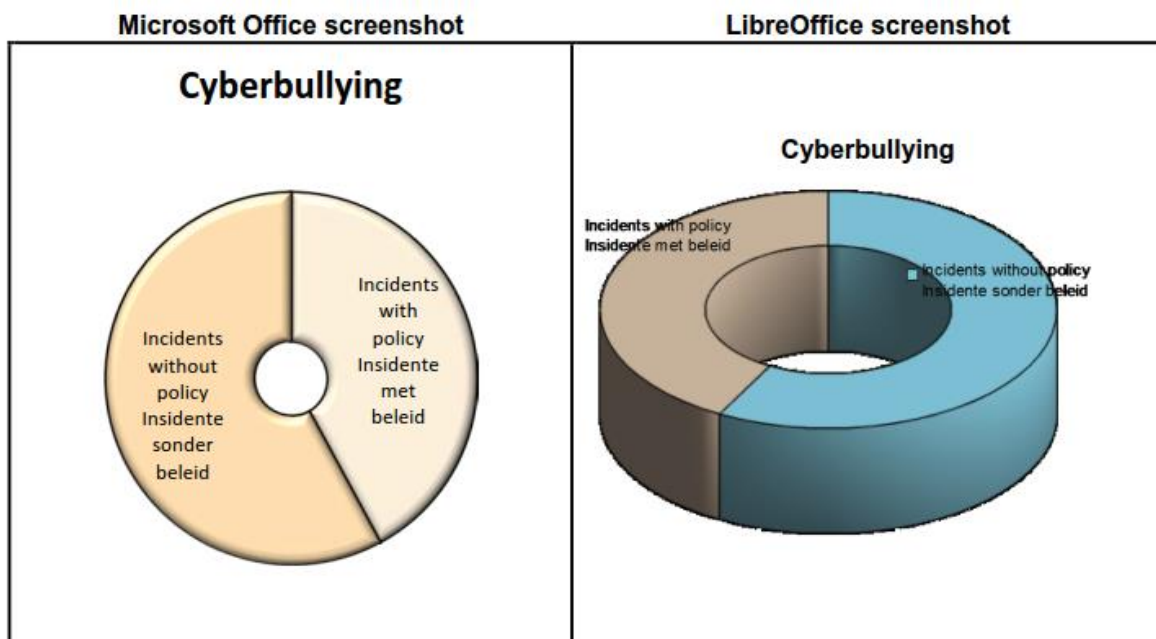
Data file: 3Schools_Skole

Question:

The details of the schools and their bullying policies are stored in a spreadsheet called **3Schools_Skole**.

Open the **3Schools_Skole** spreadsheet and work in the **Policy_Beleid** worksheet.

Create a doughnut chart/graph across **cells K15:N30** based on the data in **cells L1:M2** to resemble the example below.



NOTE:

- The doughnut chart/graph has a 3-D bevel effect.
- The size of the doughnut's hole is approximately 20%.
- The heading 'Cyberbullying' appears above the chart/graph.
- All labels (legend) must appear in the segments of the chart/graph. (6)

Discussion:

This question is classified as a Level 2 question. Inserting a chart or graphic into a spreadsheet could be considered a routine procedural action, in essence a Level 1 type question. However, a number of the properties of the chart need to be tweaked. These multi-step procedures include:

- setting the 3-D bevel effect;
- changing the size of the doughnut hole;
- inserting a chart header; and
- making sure that the legend labels appear in the pie chart segments.

The additional requirements of this question, viz. changing the chart shape to an unusual shape, changing the characteristics of the chart shape, placement of the data labels in specific locations, etc. raise the cognitive demand of this question from Level 1 to Level 2.

Memorandum/Marking guidelines

- 3-D bevel/realistic format (on chart/chart area, top/bottom) ✓ Doughnut chart/graph created ✓ placed across cells K15:N30 ✓
- Heading appears above the chart/graph ✓
- Doughnut hole is approximately 20% (MSO) ✓ /Object borders are applied in 3-D view (LO)

(Note to marker: Check the Format Selection in MSO to mark the Doughnut Hole Size.)

- Category names appear as labels (legend) in segments of chart/graph ✓

Example 4:

Reference: DBE, November 2014, CAT Paper 1, Question 6.5

Synopsis of scenario on which question is based:

The African continent offers many beautiful places to visit. Your school is planning a tour on the African continent for the Grade 12 learners. The school has appointed Ace Travel to assist with the tour. The company has stored a list of their clients in a spreadsheet.

Data file: 6Serengeti.html

Question:

Insert a link on the words 'Contact us', found below the bulleted list, to link to the text 'Contact details' in the table at the end of the page. (3)

Discussion:

The question is considered to be a Level 2 question as it requires the learner to insert an additional short segment of code in the given code.

In order to do this the learner has to first read and understand the given code, recall which instructions are required to achieve the required objective and then apply this knowledge to the relevant section of the code.

Although this is not a multi-step procedure in the sense of other questions in the practical examination, learners need to understand and apply what they have learnt to a new situation thereby making this a Level 2 question.

NB. The term "multi-step" really only applies to questions related to the applications contained within an office suite. HTML questions should be rated using the levels contained in "Bloom's Revised Taxonomy".

Memorandum/Marking guidelines

`Contact us`

- `<a href= ✓`
- `"#Contact" ✓>`
- `Contact us ✓`

**Table 4: Examples of Higher order questions in PRACTICAL EXAMINATIONS:
Level 3 – Problem-solving**

Notes:

In general questions categorised as Level 3 questions include questions that comprise multi-step actions/strategies/procedures where learners are also required to create their own solutions to challenges different to those they may have encountered in the classroom. These questions could include

- analysing documents
- advanced file actions
- advanced calculations and interpreting data
- advanced database manipulations
- interpretation and decision making

Example 1:

Reference: DBE, November 2013, CAT Paper 1, Question 6.7

Synopsis of scenario on which question is based:

Your school governing body decides to run a campaign to educate parents, teachers and learners about cyberbullying. The committee asks you to assist.

Data file: 6Data_Data

Question:

Open the **6Data_Data** document. Working in the **6Data_Data** document, prepare a mail merge for return slips.

- Use the **52Type_Tipe** table of the **5Cyber_Kuber** database as the data source.
- Select only Grade 10 male learners who reported cyberbullying to their parents.
- Add the merge fields *Name_Naam* and *Surname_Van* in the space provided in the table.
- Right align the merged fields *Name_Naam* and *Surname_Van* and ensure that there is a space between the two fields.
- Save the document as **6Ready_Gereed**.
- Complete the merge and save the new merged document as **6Merge_Saamvoeg**. (7)

Discussion:

Under normal circumstances a mail merge question would, as per the definition, be categorised as a Level 2 type question. The reason for a Level 2 categorisation would be that learners should have been taught how to do a mail merge involving a Word document with either a spreadsheet or a database. They should have practiced the process in class and in practical class tests and end of term examinations. What raises the cognitive demand of this particular question to that of a Level 3 categorisation is the fact that the merge

- has to be done with a selected group of records, namely, Grade 10 male learners who reported cyberbullying to their parents (three conditions); and
- fields have to be formatted.

There are two ways of going about the task of selecting the records to be included. One approach is to create a query in the database and then use the query to populate the merge. The other option is to use the facilities provided by the mail merge wizard. Both of these solutions require high level problem solving processes requiring a high cognitive demand.

Memorandum/Marking guidelines

- *Name_Naam* and *Surname_Van* fields appear ✓
- Name and surname fields right aligned ✓ with a letter space between ✓

- *Reported_Aangemeld* field filter is equal to *Parents_Ouers* ✓
- *Grade_Graad* field filter is equal to 10 ✓
- *Gender_Geslag* field filter is equal to M ✓
- Merge completed ✓ (**6Merge_Saamvoeg**)

Data Source	<input checked="" type="checkbox"/>	StasID_StatsID	Name_Naam	Sumame_Van	Gender_Geslag
5Cyber_Kuber.acc...	<input checked="" type="checkbox"/>	FBAR	Masemola	Barkhuizen	M
5Cyber_Kuber.acc...	<input checked="" type="checkbox"/>	MFOX	Chris	Fox	M
5Cyber_Kuber.acc...	<input checked="" type="checkbox"/>	MSAF2	Babalwa	Safiyah	M

Example 2:

Reference: DBE, November 2014, CAT Paper 1, Question 3.9

Synopsis of scenario on which question is based:

The African continent offers many beautiful places to visit. Your school is planning a tour on the African continent for the Grade 12 learners. The school has appointed Ace Travel to assist with the tour. The company has stored a list of their clients in a spreadsheet.

Data file: 3Clients_Kliënte

Question:

Work in the **Draw_Trekking** worksheet.

The **Draw_Trekking** worksheet contains the names, surnames and gender of all the clients.

The points for each client, which will be used for the lucky draw, appear in the **3Draw-Trekking** text file. The order of the details in this file is the same as the order of the names in the **Draw_Trekking** worksheet, in other words Bennett has 266 points and Jarvis has 267 points.

Use any appropriate method to display the number of male clients who have 200 or more points in cell G1 in the **Draw_Trekking** worksheet.

NOTE: Show ALL the steps used to determine the number. (3)

Discussion:

This question is classified as a Level 3 problem solving question because of the following three factors (in combination):

- Unlike many of the questions that appear in this particular question paper and in other past papers, this question is not scaffolded and so learners are required to consider various approaches in order to obtain an answer. Essentially, they are provided with raw data and have to analyse the data in order to find a solution. Analysis is considered to be a higher order cognitive skill.

- Learners are required to combine the data in the spreadsheet with the data in a standard text file. This process involves the importing of the data from the text file into the worksheet and ensuring that the data is correctly aligned. This task entails performing multiple steps.
- The combined data then has to be manipulated so as to obtain only the male clients who have 200 or more points. This task could be done using built-in filters or more complex Excel functions.

Memorandum/Marking guidelines

- Data from text file **3Draw_Trekking** combined with the worksheet **Draw_Trekking** ✓
- Only Male clients extracted ✓
- Clients that have ≥ 200 extracted ✓

(Notes to marker:

- *19 records expected if both criteria are met – award all three marks.*
- *If 26 records only male extracted – award the first two marks.*
- *If 40 records only ≥ 200 extracted – award the first and last marks.*
- *Candidates may first sort by gender and delete all female records and then sort by lucky draw points and delete all records less than 200.*
- *OR Candidates may sort according to two rules, first gender and then points.*
- *OR Candidates may use filter to obtain the answer.*
- *Accept any suitable method to obtain the answer.)*

Example 3:

Reference: DBE, November 2009, CAT Paper 1, Question 7.3

Synopsis of scenario on which question is based:

You are a Small Office Home Office (SOHO) business called Konnexions that acts as an agent on a commission basis to connect various business ventures. You find business opportunities for people who are contracted to you and who work mostly from their homes as well.

Data file: 6Konnexions

Question:

Konnexions wishes to send out a list of all the party themes available.

Create a word-processing document called **7Themes** that will provide an alphabetical list of all the different party themes available, using the data in the **Stock** table of the **6Parties** database.

NOTE: Party themes may not be repeated.

Display the number of themes in the document.

(6)

Discussion:

This question is classified as a Level 3 type question. The question relies on a candidate's abilities to integrate the use of two of the applications studied, namely, a word processor and a database. Candidates first have to create a word-processing document which in itself is not a cognitively demanding task. However, to answer this particular question, the document needs to include very specific information as detailed in the question. There are two different ways of obtaining the data that have to be displayed in the document.

- One of these ways is to develop an appropriate query in the database – the query will not only select the themes individually using the group by feature but also arrange them in alphabetical order and indicate how many records satisfy the query. The query can be run and the results then either exported to the document or copied and pasted into the document.
- Another way is to use the reporting feature of the database and then to export the resultant report to a Word processor where it can be manipulated using the features of the Word processor program.

The task thus involves problem solving processes, making decisions and advanced actions. What makes the task a problem-solving one is that candidates are required to decide for themselves which of the two possible methods is the best method, given the requirements of the question.

Memorandum/Marking guidelines

- Word-processing document called 7Themes created. ✓
- Contains a table/list of themes ✓
- Data is sorted ✓
- Table/list contains 52 unique entries ✓✓
- The number of entries is displayed in the document ✓

Example 4:

Reference: DBE, November 2014, CAT Paper 1, Question 6.7

Synopsis of scenario on which question is based:

The African continent offers many beautiful places to visit. Your school is planning a tour on the African continent for the Grade 12 learners. The school has appointed Ace Travel to assist with the tour. The company has stored a list of their clients in a spreadsheet.

Data file: 6Serengeti.html

Question:

You need to assist Ace Travel to complete their web page.

6.7 Edit the table as follows:

- Change the table to consist of two rows and two columns.
- Place the headings in the first column.
- Place the data/information in the second column.

- Change the thickness of the border to 2.

NOTE: Use the example on the previous page to guide you with this question. (4)

Discussion:

This question is rated as a Level 3 question as it involves analysing some given HTML code and then adapting the code to meet new requirements by applying the knowledge learnt in the CAT course. Analysing and creating are considered to be higher order cognitive skills.

Memorandum/Marking guidelines

```
<table border="2" width="500">
  <tr>
    <td>
      <h2>Serengeti Facts</h2>
    </td>
    <td>
      Country Tanzania</br>
      Coordinates 17.9233S, 25.856E</br>
      Plain 5 km</br>
      Water Course Olduvai</br>
      UNESCO World Heritage Site1989</br>
    </td>
  </tr>
  <tr>
    <td>
      <h2><a name="Contact">Contact Details</a></h2>
    </td>
    <td>
      Tel: 997 521 8547</br>
      Fax: 998 521 8547</br>
      Email: serengeti@africa.com</br>
    </td>
  </tr>
</table>
```

- The table consists of two rows and two columns ✓
- Only headings appear in column 1 ✓
- Data/information appears in column 2 ✓
- Border thickness set to 2 ✓

(Note to marker: Mark this question from HTML code.)

PAPER 2 – THEORY

Each of the example questions from CAT theory examinations provided on the following tables is based on a general scenario. A brief synopsis of the scenario is provided with each example question so as to explain the context of the particular question.

**Table 5: Examples of lower order questions in THEORY EXAMINATIONS:
Level 1 - knowledge/remembering**

Note:

In general, questions categorised as Level 1 questions in the theory paper include recalling or remembering previously learnt information. This information is primarily information contained in a textbook or notes handed out by the teacher and that learners could memorise “off by heart”.

Example 1:
<p><u>Reference:</u> DBE, February/March 2012, CAT Paper 2, Question 3.4.1</p> <p><u>Synopsis of scenario on which question is based:</u></p> <p>Ms Khumalo works for a local charity shop. She has asked you, as a Computer Applications Technology (CAT) learner, to assist her with any computer-related problems.</p> <p><u>Question:</u></p> <p>The charity shop was given a box containing a number of computer parts and devices.</p> <p>3.4 The charity shop was given some more CPUs.</p> <p>3.4.1 What is the general function of the CPU? (1)</p>
<p><u>Discussion:</u></p> <p>All CAT textbooks contain a wealth of information on the components of a central processing unit (CPU) and the role of each of these components in the functioning of not only the CPU, but the computer as well.</p> <p>In terms of Bloom's Revised Taxonomy this question falls into the “remembering” category in that learners are essentially required to recall and state what they have learnt in class or read in a textbook about the CPU of a computer.</p>

Memorandum/Marking guidelines

It does all the processing on the computer ✓

Example 2:

Reference: DBE, November 2010, CAT Paper 2, Question 4.1.1

Synopsis of scenario on which question is based:

You are part of a team of CAT learners who have set up a helpdesk in the local community centre to solve any computer-related problems. Your team (Lindi, Pete, Tiffany, Shannon, Mpho and Zinhle) has five computers available to administer the helpdesk. Some of the computers will need to be upgraded.

Question:

- 4.1 Microsoft Office 2000 was installed on all the computers at the helpdesk. Shannon has a copy of Microsoft Office 2010 and suggests that they install it on all the computers.
- 4.1.1 Microsoft Office is a popular form of software known as an office suite. Name ONE advantage of using an office suite, besides the actual programs available in the suite. (1)

Discussion:

This question is classified as a Level 1 question. As part of the practical component of this subject Grade 12 learners are exposed to the use of an office suite, mainly Microsoft Office but in some instances also office suites such as LibreOffice, OpenOffice, WordPerfect or other similar packages. These office suites usually contain a word processing application, a spreadsheet application, a database application and a presentation application. In using the different applications contained within the office suite learners' attention is drawn to various aspects of the different applications. These include aspects such as:

- Similar look and feel/user interface;
- Integration/exchange of data between the various applications; and
- Similar menu functions.

Answering the question requires learners to list only one of the advantages of using an office suite. Grade 12 learners would have spent much of their 3-year course using applications where attention should have been paid to knowing the advantages of using an office suite. This question is classified as a 'remembering' task as all learners are required to do is recall one of the advantages they would have learnt.

Memorandum/Marking guidelines

- Similar interface presented in the different programs/Navigation structure/methods are similar between programs;
- Easier to integrate/export/import data between programs;

- Easy to learn to use other programs in suite because of similar/common ribbons/toolbars/shortcuts/menu structures; and
- Often cheaper to purchase than purchasing the applications unbundled, etc.

(Do not accept any answer referring to types of programs available in a typical suite)

(Any one) ✓

Example 3:

Reference: DBE, November 2011, CAT Paper 2, Question 4.6

Synopsis of scenario on which question is based:

A team of CAT learners have decided to work at a cyber café to raise funds for their school. They will be required to answer computer-related questions for the owner, Mr Wu.

Question:

Name TWO computer housekeeping tasks or good maintenance habits, besides the regular updating of security software, that Mr Wu should carry out regularly.

(2)

Discussion:

This question requires learners to list two maintenance tasks that would usually be performed by a computer user. Regular maintenance tasks include scanning for viruses, defragmenting the hard drives, emptying the Recycle bin, scanning for bad hard drive sectors, etc. Such tasks are standard procedures when using computers.

As part of their practical activities all Grade 12 learners should have been exposed to the kinds of tasks that should be carried out on a regular basis in all contexts, including home office, schools, corporate environments, etc. They should also have been exposed to this information through their textbooks or through notes provided by their teachers.

All learners therefore have to do to answer the question is recall two of these tasks. The question is thus classified as a Level 1 'remembering' question.

Memorandum/Marking guidelines

- Regular virus/spyware/adware scans
- Operating system/software updates
- Disk defragmentation
- Backup on a weekly basis
- Empty the Recycle bin regularly
- Run Scandisk to check for file system errors/bad sectors
- Run disk cleanup/Delete unnecessary data files, etc.

(Any two) ✓✓

**Table 6: Examples of middle order questions in THEORY EXAMINATIONS:
Level 2 - Understanding/Applying**

Note:

In general questions categorised as Level 2 questions include questions:

- Testing the ability to explain ideas and concepts; and
- Applying what has been learnt to new situations.

Example 1:
<p><u>Reference:</u> DBE, November 2010, CAT Paper 2, Question 3.5.1 (ADAPTED)</p> <p><u>Synopsis of scenario on which question is based:</u></p> <p>You are part of a team of CAT learners who have set up a helpdesk in the local community centre to solve any computer-related problems. Your team (Lindi, Pete, Tiffany, Shannon, Mpho and Zinhle) has five computers available to administer the helpdesk. Some of the computers will need to be upgraded.</p> <p><u>Question:</u></p> <p>3.5 Some of the older PCs are running very slowly. Someone suggested that the PCs must be defragmented to free up disk space.</p> <p>3.5.1 Briefly explain the term disk fragmentation and why a fragmented disk can slow down a computer. (2)</p>
<p><u>Discussion:</u></p> <p>At first glance, this particular question could possibly be classified as a Level 1 question because it appears to require the recall of factual information learnt in class. However, the action verb 'explain' suggests that this could be a middle order question. Explaining an idea or concept requires <i>understanding</i>. Because learners have to explain <i>why</i> a fragmented disk can slow down a computer, they need to provide a relatively technical explanation. To answer the question, they also need to apply what they have learnt in an unfamiliar situation; it is unlikely that learners would have encountered this particular scenario previously in the classroom. Thus, the question also falls into the <i>applying</i> category of Bloom's Revised Taxonomy. These factors raise the classification of the question to Level 2.</p>
<p><u>Memorandum/Marking guidelines</u></p> <ul style="list-style-type: none"> • Fragmentation occurs when files are 'scattered' across a disk/not stored contiguously. ✓ • The computer slows down as it will take longer to read/load the (scattered) file(s). ✓

(Important information: When the word “explain” is used in a question and the answer would require a lengthier explanation than in Example 1, the marks allocated may be 2 marks per answer.)

Example 2:

Reference: DBE, February/March 2013, CAT Paper 2, Question 5.4.2 (ADAPTED)

Synopsis of scenario on which question is based:

The CAT learners have been asked to work with Mr Nda to set up a computer centre at the local community hall.

Question:

5.4 The people who will use the community centre have asked Mr Nda to provide Internet access.

5.4.2 Discuss THREE issues to consider when deciding on an ISP.
(3)

Discussion:

The action verb 'discuss' suggests that this question could be classified as a Level 2 type question. The question requires that learners discuss issues that need to be considered when choosing an Internet Service Provider (ISP). In order to discuss three issues learners need to have a good understanding of the services that an ISP provides and, on the basis of their understanding, they must then identify and elaborate on three issues that are important in making a decision in this particular scenario.

This task is NOT an evaluation type question (Level 3) because learners do not have to actually choose between a number of different ISPs and identify which one would be most appropriate for the community centre to use. Rather it is an understanding/applying type of question where learners have to apply their understanding in a particular context in order to identify three issues that should be taken into consideration in the particular situation.

Memorandum/Marking guidelines

- What the costs are;
- Bandwidth/speed of connection;
- Whether it controls standard viruses;
- What the cap is on the amount of data that can be downloaded;
- Whether it hosts websites for clients;
- What the different types of connections to the ISP are;
- What type/hours of support can be expected; or
- Network coverage, for example 3G, etc.

(Any three) ✓✓✓

(Important information: When the word “discuss” is used in a question and the answer would require a lengthier discussion than in Example 2, the mark allocated may be 2 marks per answer.)

Example 3:

Reference: DBE, November 2012, CAT Paper 2, Question 7.5

Synopsis of scenario on which question is based:

The CAT learners have been asked to work with Mr Joe, their teacher, to set up a new computer centre at the school. As a CAT learner, you need to assist with any computer-related problems.

Question:

Mr Joe received an e-mail with an attachment that he cannot open because the computer does not recognise the type of file. Suggest TWO ways in which to solve this problem. (2)

Discussion:

In order to answer this question learners have to understand what an attachment to an e-mail is; what types of files can be attached to an e-mail; the various ways in which attachments can be opened; and what applications are required to open an attachment. All Grade 12 learners should have been taught this knowledge in class. To answer the question and resolve this particular problem, learners have to apply their understanding to the particular context. First, they need to understand the problem. Then, they have to identify why the computer does not recognize the type of file. Next, they have to apply their knowledge and suggest two ways of overcoming the problem.

The question is classified as a Level 2 ‘understanding’ or ‘applying’ question rather than a Level 3 ‘analysis’ or ‘creating’ (problem-solving) question because the problem has already been identified i.e. that the computer does not recognise the type of file. Learners do not have to ‘analyse’ the situation to identify the problem. They simply need to show that they know and understand how Mr Joe can ‘fix’ this particular problem.

Memorandum/Marking guidelines

- Source the original program that will open the file from the Internet/install the program that will open the file on the computer;
- Ask the sender to re-send the file in a format/version that your computer can open; or
- Try opening with another program, etc.

(Any two) ✓✓

**Table 7: Examples of HIGHER order questions in THEORY EXAMINATIONS:
Level 3 – Analysing/Evaluating/Creating**

Note:

In general questions categorised as Level 3 questions include questions requiring learners to:

- break information into parts (synthesise) so as to explore understandings and relationships;
- make judgements and to justify a decision or course of action; and
- generate new ideas/solutions/ways of viewing concepts or constructing new meaning out of diverse elements.

Example 1:

Reference: DBE, February/March 2013, CAT Paper 2, Question 4.6.1

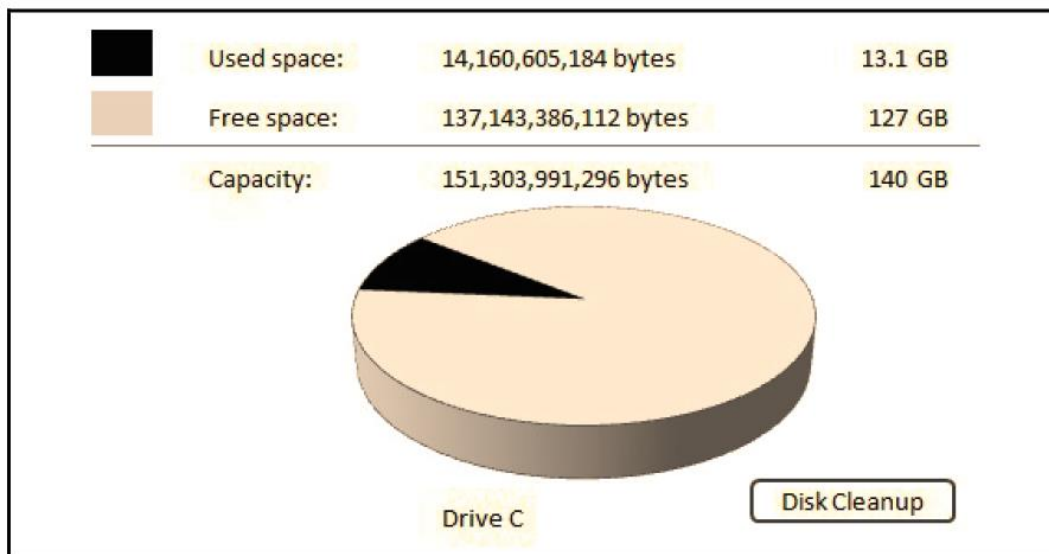
(ADAPTED)

Synopsis of scenario on which question is based:

The CAT learners have been asked to work with Mr Nda to set up a computer centre at the local community hall.

Question:

4.6 Study the screenshot to answer QUESTION 4.6.1. Mr Nda has an older computer. He opened the disk properties. The window below appeared:



4.6.1 What does the screenshot above show you about the state of the hard drive?
(1)

Discussion:

This question is classified as a Level 3 'analysing' question. In order to answer the question learners are required to:

- examine the screenshot which they would not have seen before;
- analyse the information provided; and
- then having done the above analysis, describe in their own words "*the state of the hard drive*".

Unlike Example 3 in the previous table (Table 6), learners here have to analyse the situation to identify the problem for themselves. In terms of Bloom's Revised Taxonomy 'analysis' is a higher order cognitive process.

Memorandum/Marking guidelines

It is not full/there is a lot of free space/very little is stored on the hard drive ✓

Example 2:

Reference: DBE, November 2008, CAT Paper 2, Question 6.6

Synopsis of scenario on which question is based:

Your school is holding a fund-raising event in the form of a variety concert with guest artists. The school has decided to use FIVE computers to make this task easier. Grade 12 CAT learners have been asked to assist with this project. You have been appointed as the team leader.

Question:

Evaluate the street pole advertisement for the concert below and suggest FOUR ways in which the layout could be improved.

Variety Concert

Date **Come and enjoy**

16 December 2008

Time

08:00

Venue Skyview High School

Performing Artists

Lolo and the pops
The Queens
Grotgesigte
Teen Rockettes
North Road Choir
Tincan Jaloppies

(4)

Discussion:

This question is classified as an 'analysing', 'evaluating' and 'creating' Level 3 type question. In order to answer the question learners are required to:

- critique the poster in the diagram; and
- then to propose changes that would make it more effective.

In the process of critiquing the poster learners are required to:

- identify and understand (analyse) why the poster is not acceptable;
- assess (evaluate) what can and cannot be done using a word processor or presentation package;
- consider (evaluate) various options before proposing (creating) a different layout/design.

In terms of Bloom's Revised Taxonomy critiquing or evaluating and creating are classified as higher order cognitive processes.

Memorandum/Marking guidelines

- Use appropriate font sizes, i.e. smaller or bigger fonts;
- Limit the number of different font types/styles;
- Correct vertical/horizontal (text) alignment, e.g. centre performing artists
- Correct/change the text direction of 'Time';
- Structure the content on the page in groups/structure information logically, e.g. bullets/tables/columns/tabs/lines/AutoShapes/text boxes;
- Emphasise the important information, e.g. performers; or
- Add appropriate graphics/colour/background/borders

(any 4 valid responses) ✓✓✓✓

Example 3:

Reference: DBE, November 2011, CAT Paper 2, Question 7.2.6

Synopsis of scenario on which question is based:

A team of CAT learners have decided to work at a cyber café to raise funds for their school. They will be required to answer computer-related questions for the owner, Mr Wu.

Question:

7.2 One of the learners was trying to help Mr Wu with a spreadsheet.

Study the screenshot of the spreadsheet below.

	A	B	C	D	E	F	G
6					<i>Percentage</i>	10%	
7	Name	Rate	Hours	Bonus	Fees	Total	Statistics
8	Beth	9	14.00	100	126.00	12.60	226.00
9	Ruby	2	24.00	100	48.00	#VALUE!	148.00
10	James	6	21.00	100	126.00	15.88	#NAME?
11	Sharney	5	14.00	120	70.00	#VALUE!	62.00
12	Blessing	4	14.00	100	56.00	8.89	4.857143
13	Happiness	5	17.00	110	85.00	#VALUE!	7
14	Julie	3	12.00	110	36.00	3.20	#DIV/0?
15							

7.2.6 The value in cell F8 is calculated by using the formula =E8*F6. When this formula is copied down to the rest of the column, error messages and incorrect values appear in column F.

Suggest ONE way of solving this problem.

(1)

Discussion:

This question is classified as an 'analysing', 'evaluating' and 'creating' Level 3 type question. In order to answer the question learners are required to:

- study the screenshot in order to understand (analyse) what it does, how it is supposed to do what is required and how the various cell values might interact with one another;
- determine why (analyse) the errors in cells F9, F11 and F13 occur;
- identify why (analyse) the values in cells F10, F12 and F14 are incorrect;
- as there may be many possible correct answers, decide (evaluate) what would be the best approach to solving the problem; and
- then propose, in their own words, what the solution should be (create).

In terms of Bloom's Revised Taxonomy analysing, evaluating or creating are classified as higher order cognitive processes.

Memorandum/Marking guidelines

Use absolute cell referencing/use function key F4 ✓ on cell F6

(Note to marker: Also accept =E8*\$F\$6)

To accomplish the goal of discriminating between high achievers, those performing very poorly, and all candidates in between, examiners need to vary the challenge of examination questions. Until recently, the assumption has been that 'alignment' with the allocated percentage of marks for questions at the required cognitive demand levels meant that sufficient examination questions were relatively easy; moderately challenging; and difficult for candidates to answer.

However, research and candidate performance both indicate that a range of factors other than type of cognitive demand contributes to the cognitive challenge of question. Such factors include the level of content knowledge required, the language used in the question, and the complexity or number of concepts tested. In other words, cognitive demand levels on their own do not necessarily distinguish between degrees of difficulty of questions.

This research helps, to some extent, explain why, despite that some NSC examination papers have complied with the specified cognitive demand weightings stipulated in the policy, they have not adequately distinguished between candidates with a range of academic abilities in particular between higher ability candidates. As a result, examiners, moderators and evaluators are now required to assess the difficulty of level of each examination question in addition to judging its cognitive demand.

Section 7 below explains the new protocol introduced by Umalusi for analysing examination question difficulty.

7. ANALYSING THE LEVEL OF DIFFICULTY OF EXAMINATION QUESTIONS

When analysing the level of difficulty of each examination question, there are six important protocols to note. These are:

1. Question difficulty is **assessed independently** of the type and level **of cognitive demand**.
2. Question difficulty is assessed against **four levels of difficulty**.
3. Question difficulty is determined against the assumed capabilities of the **ideal 'envisaged'** Grade 12 Computer Applications Technology NSC examination **candidate**.
4. Question difficulty is determined using **a common framework** for thinking about question difficulty.
5. Question difficulty entails **distinguishing unintended sources of difficulty** or ease **from intended sources of difficulty** or ease.

6. Question difficulty entails identifying **differences** in levels of difficulty **within a single question**.

Each of the above protocols is individually explained and discussed below.

7.1 Question difficulty is assessed independently of the type and level of cognitive demand

As emphasised earlier in this exemplar book, the revised Umalusi NSC examination evaluation instruments separate the analysis of the type of cognitive demand of a question from the analysis of the level of difficulty of each examination question. Cognitive demand describes the *type of cognitive process* that is required to answer a question, and this does not necessarily equate or align with the *level of difficulty* of other aspects of a question, such as the difficulty of the content knowledge that is being assessed. For example, a recall question can ask a candidate to recall very complex and abstract scientific content. The question would be categorised as Level 1 in terms of the cognitive demand taxonomy but may be rated as 'difficult' (Level 3 Table 8 below).

Note:

Cognitive demand is just one of the features of a question that can influence your comparative judgments of question difficulty. The type and level of cognitive process involved in answering a question does not necessarily determine how difficult the question would be for candidates. Not all evaluation/synthesis /analysis questions are more difficult than questions involving lower-order processes such as comprehension or application.

7.2 Question difficulty is assessed at four levels of difficulty

The revised Umalusi NSC examination evaluation instruments require evaluators to exercise expert judgments about whether each examination question is 'Easy', 'Moderately challenging', 'Difficult' or 'Very difficult' for the envisaged

Grade 12 learner to answer. Descriptions of these categories of difficulty are shown in Table 8.

TABLE 8: LEVELS OF DIFFICULTY OF EXAMINATION QUESTIONS

1	2	3	4
<p>Easy for the envisaged Grade 12 student to answer.</p>	<p>Moderately challenging for the envisaged Grade 12 student to answer.</p>	<p>Difficult for the envisaged Grade 12 student to answer.</p>	<p>Very difficult for the envisaged Grade 12 student to answer.</p> <p>The skills and knowledge required to answer the question allow for the top students (<i>extremely high-achieving/ability students</i>) to be discriminated from other high achieving/ability students).</p>

Note:
The fourth level, 'very difficult' has been included in the levels of difficulty of examination questions to ensure that there are sufficient questions that discriminate well amongst higher ability candidates.

7.3 Question difficulty is determined against the assumed capabilities of the ideal 'envisaged' Grade 12 Computer Applications Technology NSC examination candidate

The revised Umalusi NSC examination evaluation instruments require evaluators to exercise expert judgments about whether each examination question is 'Easy', 'Moderately challenging', 'Difficult' or 'Very difficult' for the '**envisaged**' Grade 12 learner to answer (Table 8). In other words, assessment of question difficulty is linked to a particular target student within the population of NSC candidates, that is, the Grade 12 candidate of average intelligence or ability.

The Grade 12 learners that you may have taught over the course of your career cannot be used as a benchmark of the 'envisaged' candidate as we cannot know whether their abilities fall too high, or too low on the entire spectrum of all Grade 12 Computer Applications Technology candidates in South Africa. The revised Umalusi NSC examination evaluation instruments thus emphasise that, when rating the level of the difficulty of a particular question, your conception of the 'envisaged' candidate needs to be representative of the entire population of candidates for all schools in the country, in other words, of the overall Grade 12 population.

Most importantly, the conception of this 'envisaged' candidate is a learner who has been taught the whole curriculum adequately by a teacher who is qualified to teach the subject, in a functioning school. There are many disparities in the South African education system that can lead to very large differences in the implementation of the curriculum. Thus this 'envisaged' learner is not a typical South African Grade 12 learner – it is an intellectual construct (an imagined person) whom you need to imagine when judging the level of difficulty of a question. This ideal 'envisaged' Grade 12 learner is an aspirational ideal of where we would like all Computer Applications Technology learners in South Africa to be.

Note:

The concept of the **ideal envisaged Grade 12 candidate** is that of an imaginary learner who has the following features:

- a. Is of average intelligence or ability
- b. Has been taught by a competent teacher
- c. Has been exposed to the entire examinable curriculum

This envisaged learner represents an imaginary person who occupies the middle ground of ability and approaches questions *having had all the necessary schooling*.

7.4 Question difficulty is determined using a common framework for thinking about question difficulty

Examiners, moderators and evaluators **in all subjects** are now provided with a common framework for thinking about question difficulty to use when identifying sources of difficulty or ease in each question, and to provide their reasons for the level of difficulty they select for each examination question.

The framework described in detail below provides the main sources of difficulty or 'ease' inherent in questions. The four sources of difficulty, which must be considered when thinking about the level of difficulty of examination questions in this framework, are as follows.

1. '**Content difficulty**' refers to the difficulty inherent in the subject matter and/or concept/s assessed.
2. '**Stimulus difficulty**' refers to the difficulty that candidates confront when they attempt to read and understand the question and its source material. The demands of the reading required to answer a question thus form an important element of 'stimulus difficulty'.
3. '**Task difficulty**' refers to the difficulty that candidates confront when they try to formulate or produce an answer. The level of cognitive demand of a question forms an element of 'Task difficulty', as does the demand of the written text or representations that learners are required to produce for their response.
4. '**Expected response difficulty**' refers to difficulty imposed by examiners in a marking guideline, scoring rubric or memorandum. For example, mark allocations affect the amount and level of answers students are expected to write.

This framework derived from Leong (2006) was chosen because it allows the person making judgments about question difficulty to grapple with nuances and with making connections. The underlying assumption is that judgment of question difficulty is influenced by the interaction and overlap of different aspects of the four main sources of difficulty. Whilst one of the above four sources of difficulty may be more pronounced in a specific question, the other

three sources may also be evident. Furthermore, not all four sources of difficulty need to be present for a question to be rated as difficult.

The four-category conceptual framework is part of the required Umalusi examination evaluation instruments. Each category or source of difficulty in this framework is described and explained in detail below (Table 9). Please read the entire table very carefully.

Table 9: Framework for thinking about question difficulty

CONTENT/CONCEPT DIFFICULTY
<p>Content/concept difficulty indexes the difficulty in the subject matter, topic or conceptual knowledge assessed or required. In this judgment of the item/question, difficulty exists in the academic and conceptual demands that questions make and/or the grade level boundaries of the various 'elements' of domain/subject knowledge (topics, facts, concepts, principles and procedures associated with the subject).</p>
<p>For example:</p>
<p>Questions that assess 'advanced content', that is, subject knowledge that is considered to be in advance of the grade level curriculum, are <i>likely</i> to be difficult or very difficult for most candidates. Questions that assess subject knowledge which forms part of the core curriculum for the grade are <i>likely</i> to be moderately difficult for most candidates. Questions that assess 'basic content' or subject knowledge candidates would have learnt at lower grade levels, and which would be familiar to them are <i>unlikely</i> to pose too much of a challenge to most candidates.</p> <p>Questions that require general everyday knowledge or knowledge of 'real life' experiences are <i>often</i> easier than those that test more specialized school knowledge. Questions involving only concrete objects, phenomena, or processes are <i>usually</i> easier than those that involve more abstract constructs, ideas, processes or modes.</p> <p>Questions which test learners' understanding of theoretical or de-contextualised issues or topics, rather than their knowledge of specific examples or contextualised topics or issues <i>tend</i> to be more difficult. Questions involving familiar, contemporary/current contexts or events are <i>usually</i> easier than those that are more abstract or involve 'imagined' events (e.g. past/future events) or contexts that are distant from learners' experiences.</p> <p>Content difficulty may also be varied by changing the number of knowledge elements or operations assessed. <i>Generally</i>, the difficulty of a question increases</p>

with the number of knowledge elements or operations assessed. Questions that assess learners on two or more knowledge elements or operations are *usually* (but not always) more difficult than those that assess a single knowledge element or operation.

Assessing learners on **a combination of knowledge elements or operations that are seldom combined** *usually* increases the level of difficulty.

EXAMPLES OF INVALID OR UNINTENDED SOURCE OF CONTENT DIFFICULTY

- Testing obscure or unimportant concepts or facts that are not mentioned in the curriculum, or which are unimportant to the curriculum learning objectives.
- Testing very advanced concepts or operation that candidates are extremely unlikely to have had opportunities to learn.

STIMULUS DIFFICULTY

Stimulus difficulty refers to the difficulty of the linguistic **features of the question** (**linguistic** complexity) and the challenge that candidates face when they attempt to read, interpret and understand the words and phrases in the question AND when they attempt to read and understand the **information or 'text' or source material (diagrams, tables and graphs, pictures, cartoons, passages, etc.) that accompanies the question.**

For example:

Questions that contain words and phrases that require only simple and straightforward comprehension are *usually* easier than those that require the candidate to understand **subject specific phraseology and terminology** (e.g. idiomatic or grammatical language not usually encountered in everyday language), or that require more technical comprehension and specialised command of words and language (e.g. everyday words involving different meanings within the context of the subject).

Questions that contain information that is 'tailored' to an expected response, that is, questions that contain no irrelevant or distracting information, are *generally* easier than those that require candidates to select relevant and appropriate information or **unpack a large amount of information** for their response. A question **set in a very rich context** *can* increase question difficulty. For example, learners *may* find it difficult to select the correct operation when, for example, a mathematics or accountancy question is set in a context-rich context.

Although the level of difficulty in examinations is *usually* revealed most clearly through the questions, text complexity or the degree of **challenge or complexity in written or graphic texts** (such as a graph, table, picture, cartoon, etc.) that learners are required to read and interpret in order to respond *can* increase the level of difficulty. Questions that depend on reading and selecting content from a text *can* be more challenging than questions that do not **depend on actually reading the**

accompanying text because they test reading comprehension skills as well as subject knowledge. Questions that require candidates to **read a lot** can be more challenging than those that require limited reading. Questions that tell learners where in the text to look for relevant information are *usually* easier than those where **learners are not told where to look**.

The level of difficulty *may* increase if texts set, and reading passages or other **source material** used are challenging for the grade level, and make **high reading demands** on learners at the grade level. Predictors of textual difficulty include:

- **semantic content** - for example, if vocabulary and words used are typically outside the reading vocabulary of Grade 12 learners, 'texts' (passage, cartoon, diagram, table, etc.) are *usually* more difficult. 'Texts' are *generally* easier if words or images are made accessible by using semantic/context, syntactic/structural or graphophonic/visual cues.
- **syntactic or organisational structure** - for example, sentence structure and length. For example, if learners are likely to be *familiar with the structure* of the 'text' or resource, for example, from reading newspapers or magazines, etc. 'texts' are *usually* easier than when the structure is unfamiliar.
- **literary techniques** - for example, abstractness of ideas and imagery - and **background knowledge required**, for example, to make sense of allusions.
- if the **context** is **unfamiliar** or remote, or if candidates do not have or are **not provided with access to the context** which informs a text (source material, passage, diagram, table, etc.) they are expected to read, and which informs the question they are supposed to answer and the answer they are expected to write, then constructing a response is *likely* to be more difficult than when the context is provided or familiar.

Questions which require learners to **cross-reference different sources** are *usually* more difficult than those which deal with one source at a time.

Another factor in stimulus difficulty is presentation and visual appearance. For example, type face and size, use of headings, and other types of textual organisers etc. can aid '**readability**' and make it easier for learners to interpret the meaning of a question.

EXAMPLES OF INVALID OR UNINTENDED SOURCES OF STIMULUS DIFFICULTY

- Meaning of words unclear or unknown.
- Difficult or impossible to work out what the question is asking.
- Questions which are ambiguous.
- Grammatical errors in the question that could cause misunderstanding.
- Inaccuracy or inconsistency of information or data given.
- Insufficient information provided.
- Unclear resource (badly drawn or printed diagram, inappropriate graph, unconventional table).
- Dense presentation (too many important points packed in a certain part of the stimulus).

TASK DIFFICULTY

Task difficulty refers to the **difficulty that candidates confront when they try to formulate or produce an answer.**

For example:

In most questions, to generate a response, candidates have to work through the steps of a solution. *Generally*, questions that **require more steps in a solution** are more difficult than those that require fewer steps. Questions involving only one or two steps in the solution are *generally* easier than those where several operations required for a solution.

Task difficulty may also be mediated by the **amount of guidance present in the question**. Although question format is not necessarily a factor and difficult questions can have a short or simple format, questions that provide guided steps or cues (e.g. a clear and detailed framework for answering) are *generally* easier than those that are more open ended and require candidates to form or tailor their **own response strategy** or argument, work out the steps **and maintain the strategy for answering** the question by themselves. A high degree of prompting (a high degree of prompted recall, for example) *tends* to reduce difficulty level.

Questions that test specific knowledge are *usually* less difficult than **multi-step, multiple-concept or operation questions**.

A question that requires the candidate to **use a high level of appropriate subject specific, scientific or specialised terminology in their response** *tends* to be more difficult than one which does not.

A question requiring candidates to **create a complex abstract (symbolic or graphic) representation** is *usually* more challenging than a question requiring candidates to create a concrete representation.

A question requiring writing a one-word answer, a phrase, or a simple sentence is *often* easier to write than **responses that require more complex sentences, a paragraph or a full essay or composition**.

Narrative or descriptive writing, for example where the focus is on recounting or ordering a sequence of events chronologically, is *usually* easier than **writing discursively (argumentatively or analytically)** where ideas need to be developed and ordered logically. Some questions reflect task difficulty simply by '**creating the space**' for **A-grade candidates** to demonstrate genuine insight, original thought or good argumentation, and to write succinctly and coherently about their knowledge.

Another element is the **complexity in structure of the required response**. When simple connections between ideas or operations are expected in a response, the question is *generally* easier to answer than a question in which the significance of the relations between the parts and the whole is expected to be discussed in a response. In other words, a question in which an unstructured response is expected is *generally* easier than a question in which **a relational response** is required. A response which involves **combining or linking a number of complex ideas or**

operations is *usually* more difficult than a response where there is no need to combine or link ideas or operations.

On the other hand, questions which require continuous prose or extended writing *may* also be easier to answer correctly or to get marks for than questions that require no writing at all or single letter answer (such as multiple choice), or a brief response of one or two words or short phrase/s because they **test very specific knowledge**.

The **cognitive demand** or **thinking processes** required form an aspect of task difficulty. Some questions test thinking ability, and learners' capacity to deal with ideas, etc. Questions that assess inferential comprehension or application of knowledge, or that require learners to take ideas from one context and use it in another, for example, *tend* to be more difficult than questions that assess recognition or retrieval of basic information. On the other hand, questions requiring recall of knowledge are *usually* more difficult than questions that require simple recognition processes.

When the **resources for answering** the question are included in the examination paper, then the task is *usually* easier than when candidates have to **use and select their own internal resources** (for example, their own knowledge of the subject) or transform information to answer the question.

Questions that require learners to take or **transfer** ideas, **skills or knowledge from one context/subject area and use them in another** *tend* to be more difficult.

EXAMPLES OF INVALID OR UNINTENDED SOURCES OF TASK DIFFICULTY

- Level of detail required in an answer is unclear.
- Context is unrelated to or uncharacteristic of the task than candidates have to do.
- Details of a context distract candidates from recalling or using the right bits of their knowledge.
- Question is unanswerable.
- Illogical order or sequence of parts of the questions.
- Interference from a previous question.
- Insufficient space (or time) allocated for responding.
- Question predictability or task familiarity. If the same question regularly appears in examination papers or has been provided to schools as exemplars, learners are likely to have had prior exposure, and practised and rehearsed answers in class (for example, when the same language set works are prescribed each year).
- Questions which involve potential follow-on errors from answers to previous questions.

EXPECTED RESPONSE DIFFICULTY

Expected response difficulty refers to difficulty imposed by examiners in a **mark scheme and memorandum**. This location of difficulty is more applicable to 'constructed' response questions, as opposed to 'selected' response questions (such as multiple choice, matching/true-false).

For example:

When examiners expect few or no details in a response, the question is *generally* easier than one where the mark scheme implies that **a lot of details are expected**.

A further aspect of expected response difficulty is the clarity of the **allocation of marks**. Questions are *generally* easier when the allocation of marks is explicit, straight-forward or logical (i.e. 3 marks for listing 3 points) than when the **mark allocation is indeterminate or implicit** (e.g. when candidates need all 3 points for one full mark or 20 marks for a discussion of a concept, without any indication of how much, and what to write in a response). This aspect affects difficulty because candidates who are unclear about the mark expectations in a response may not produce sufficient amount of answers in their response that will earn the marks that befit their ability.

Some questions are more difficult/easy to mark accurately than others. Questions that are **harder to mark and score objectively** are *generally* more difficult for candidates than questions that require simple marking or scoring strategies on the part of markers. For example, recognition and recall questions are *usually* easier to test and mark objectively because they usually require the use of matching and/or simple scanning strategies on the part of markers. More complex questions requiring analysis (breaking down a passage or material into its component parts), evaluation (making judgments, for example, about the worth of material or text, or about solutions to a problem), synthesis (bringing together parts or elements to form a whole), and creativity (presenting own ideas or original thoughts) are *generally* harder to mark/score objectively. The best way to test for analysis, evaluation, synthesis and creativity is usually through extended writing. Such extended writing *generally* requires the use of more cognitively demanding *marking* strategies such as interpreting and evaluating the logic of what the candidate has written.

Questions where **a wide range of alternative answers or response/s** is possible or where the correct answer may be arrived at through different strategies *tend* to be more difficult. On the other hand, questions may be so open-ended that learners will get marks even if they engage with the task very superficially.

EXAMPLES OF INVALID OR UNINTENDED SOURCES OF EXPECTED RESPONSE DIFFICULTY

- Mark allocation is unclear or illogical. The weighting of marks is important in questions that comprise more than one component when components vary in levels of difficulty. Learners may be able to get the same marks for answering easy component/s of the item as other learners are awarded for answering the more difficult components.
- Mark scheme and questions are incongruent. For example, there is no clear correlation between the mark indicated on the question paper and the mark allocation of the memorandum.

- Question asked is not the one that examiners want candidates to answer. Memorandum spells out expectation to a slightly different question, not the actual question.
- Impossible for candidate to work out from the question what the answer to the question is (answer is indeterminable).
- Wrong answer provided in memorandum.
- Alternative correct answers from those provided or spelt out in the memorandum are also plausible.
- The question is 'open' but the memo has a closed response. Memo allows no leeway for markers to interpret answers and give credit where due.

The framework described above does not provide you with explicit links between the different sources of difficulty, or show relationships and overlaps between the different categories and concepts in the framework. This is because it is impossible to set prescribed rules or pre-determined combinations of categories and concepts used for making judgments about the source of difficulty in a particular examination question.

The intention behind the framework is to allow you to exercise your sense of judgment as an expert. The complexity of your judgment lies in your ability as an expert to recognise subtle interactions and identify links between different categories of a question's difficulty or ease. For example, a question that tests specific knowledge of your subject can actually be more difficult than a multi-step question because it requires candidates to explain a highly abstract concept, or very complex content. In other words, although questions that test specific knowledge are *usually* less difficult than multiple-concept or operation questions, the level of difficulty of the content knowledge required to answer a question can make the question more difficult than a multi-step or multi-operation question.

Not all one-word response questions can automatically be assumed to be easy. For example, multiple-choice questions are not automatically easy because a choice of responses is provided – some can be difficult. As an expert in your subject, you need to make these types of judgments about each question.

Note:

It is very important that you become extremely familiar with the framework explained in Table 9, and with each category or source of difficulty provided (i.e. content difficulty, task difficulty, stimulus difficulty, and expected response difficulty). You need to understand the examples of questions which illustrate each of the four levels (Table 10 to Table 13). This framework is intended to assist you in discussing and justifying your decisions regarding the difficulty level ratings of questions. You are expected to **refer to all four categories or sources of difficulty** in justifying your decisions.

When considering question difficulty ask:

- How difficult is the **knowledge** (content, concepts or procedures) that is being assessed for the envisaged Grade 12 candidate? (*Content difficulty*)
- How difficult is it for the envisaged Grade 12 candidate to formulate the answer to the question? In considering this source of difficulty, you should **take into account the type of cognitive demand** made by the task. (*Task difficulty*)
- How difficult is it for the envisaged Grade 12 candidate to **understand the question and the source material** that need to be read to answer the particular question? (*Stimulus difficulty*)
- What does the **marking memorandum and mark scheme** show about the difficulty of the question? (*Expected response difficulty*)

7.5 Question difficulty entails distinguishing unintended sources of difficulty or ease from intended sources of difficulty or ease

Close inspection of the framework for thinking about question difficulty (Section 7.4, Table 9) above, shows that, for each general category or source of difficulty, the framework makes a distinction between 'valid' or intended, and 'invalid' or unintended sources of question difficulty or ease. Therefore, defining question difficulty entails identifying whether sources of difficulty or ease in a question were intended or unintended by examiners. Included in Table 9 are examples of unintended sources of difficulty or ease for each of the four categories.

Valid difficulty or 'easiness' in a question has its source in the requirements of the question, and is **intended** by the examiner (Ahmed and Pollit, 1999). Invalid sources of difficulty or 'easiness' refer to those features of question difficulty or 'easiness' that were **not intended** by the examiner. Such unintended 'mistakes' or omissions in questions can prevent the question from assessing what the examiner intended, and are likely to prevent candidates from demonstrating

their true ability or competence, and can result in a question being easier or more difficult than the examiner intended.

For example, grammatical errors in a question that could cause misunderstanding for candidates are unintended sources of question difficulty because the difficulty in answering the question could lie in the faulty formulation of the question, rather than in the intrinsic difficulty of the question itself (for example, because of stimulus difficulty). Candidates “may misunderstand the question and therefore not be able to demonstrate what they know” (Ahmed and Pollit, 1999, p.2). Another example is question predictability (when the same questions regularly appear in examination papers or textbooks) because familiarity can make a question which was intended to be difficult, less challenging for examination candidates.

Detecting unintended sources of difficulty or ease in examinations is largely the task of moderators. Nevertheless, evaluators also need to be vigilant about detecting sources which could influence or alter the intended level of question difficulty that moderators may have overlooked.

Note:

When judging question difficulty, you should distinguish **unintended sources of question difficulty or ease** from those sources that are intended, thus ensuring that examinations have a range of levels of difficulty. The framework for thinking about question difficulty allows you to systematically identify technical and other problems in each question. Examples of problems might be: unclear instructions, poor phrasing of questions, the provision of inaccurate and insufficient information, unclear or confusing visual sources or illustrations, incorrect use of terminology, inaccurate or inadequate answers in the marking memorandum, and question predictability. You should **not** rate a question as difficult/easy if the source of difficulty/ease lies in the ‘faultiness’ of the question or memorandum. Instead, as moderators and evaluators, you need to alert examiners to unintended sources of difficulty/ease so that they can improve questions and remedy errors or sources of confusion before candidates write the examination.

7.6 Question difficulty entails identifying differences in levels of difficulty within a single question

An examination question can incorporate more than one level of difficulty if it has subsections. It is important that the components of such questions are ‘broken down’ into their individual levels of difficulty.

Note:

Each subsection of a question should be analysed separately so that the percentage of marks allocated at each level of difficulty and the weighting for each level of difficulty can be ascertained as accurately as possible for that question.

Note:

As explained previously, each of the example questions is based on a general scenario. Thus, in addition to the example question a brief synopsis of the scenario is provided so as to establish the context of the question.

8. EXAMPLES OF QUESTIONS AT DIFFERENT LEVELS OF DIFFICULTY

This section provides at least **three** examples of questions from previous Accounting NSC examinations (Table 10 to Table 17) categorised at each of the four levels of difficulty described in Section 7 (Table 9) above. These examples were selected to represent the **best and clearest** examples of each level of difficulty that the accounting experts could find. The discussion below each example question tries to explain the reasoning behind the judgments made about the categorisation of the question at that particular level of difficulty.

PAPER 1 - PRACTICAL

Table 10: Examples of PRACTICAL EXAMINATION questions at Difficulty Level 1 – EASY

Example 1:
<p><u>Reference:</u> DBE, November 2012, CAT Paper 1, Question 5.1.2</p> <p><u>Synopsis of scenario on which question is based:</u></p> <p>Weather patterns are changing.</p> <p><u>Data file:</u> 5Weather_Weer</p> <p><u>Question:</u></p> <p>Open the 5Weather_Weer database.</p> <p>Work in the Data table.</p> <p>5.1 The club wishes to maintain databases concerning the weather.</p> <p>5.1.2 Delete the record of L Jackson. (1)</p>
<p><u>Discussion:</u></p> <p>This question is classified as 'easy' for the following reasons:</p> <ul style="list-style-type: none">• <u>Content:</u> Learners need to have a basic understanding of databases, including how to open a database table, find and highlight a record and then delete it. During Grade 11 learners would have learnt how to create a database table, insert data into a record and then delete records. Answering the question thus requires knowledge of simple procedures which should all be very familiar to Grade 12 learners.• <u>Stimulus:</u> The description of the scenario or setting and the question itself are both easy for Grade 12 learners to read and comprehend and they contain no specialised terminology or extraneous or distracting information. The question is self-contained and does not cross reference with other questions, applications or data. In addition, the given database is structured in a way that learners would be very familiar with.• <u>Task:</u> In order to answer the question learners have to open the database table indicated in the question, find and highlight the record containing "L Jackson" and then press the <Delete> button. The number of fields in the table is limited which enables the learner to easily view all the records. If there were a large number of records and the specific record had to be searched for the level of difficulty of the question would have been increased to "moderately difficult". A fair amount of guidance is also given in the question, such as, open the database, work in the table, etc. making answering the question easier.

The cognitive demand of this question would be rated at Level 1 as it comprises routine procedures.

- Expected response: According to the memo, 1 mark is allocated for deleting one record and so the allocation is very explicit. The answer and mark allocation is therefore straightforward and markers will have no difficulty in marking the question as all they need to check is whether “L Jackson's” record is missing from the table.

The question is therefore considered to be 'easy' in terms of content, stimulus, task and expected response demands.

Memorandum/Marking guidelines

L Jackson record does not appear ✓

(Note to marker: the whole record must be deleted and not just the data in that row)

Example 2:

Reference: DBE, November 2012, CAT Paper 1, Question 2.5

Synopsis of scenario on which question is based:

Weather patterns are changing.

Data file: 2Wind_Wind

Question:

Open the **2Wind_Wind** document.

2.5 Locate the subheading 'Tornado versus hurricane' together with its contents ending '... 320 km/h.'

Place a dashed shadow paragraph border around the subheading and its contents. (3)

Discussion:

This question is rated as 'easy' for the following reasons:

- Content: To answer the question learners need to know the basic procedures involved in changing the properties of a paragraph using a word processor. As part of the “formatting and editing” topic in word processing in Grade 10 learners should have had a great deal of exposure to this type of activity. They should have carried out these actions on numerous occasions both in class and in tests so they should be very familiar with what is required by the question.
- Stimulus: The scenario and question are very easy for Grade 12 learners to read and comprehend and contain no specialised terminology or extraneous or distracting information. The instructions are very explicit, for example, the necessary steps are highly specified and learners are told exactly which subheading to locate. In addition, the sub-heading is colour-coded for easy identification. The question is self-contained and does not

cross reference with other questions, applications or data. The data file that is used is a standard Word document that holds no surprises.

- **Task:** The task involves locating the relevant subheading (which is colour-coded) in the given document, selecting the required text and then clicking on the “Borders and Shading” option in the drop-down menu used for creating borders around a paragraph. A fair amount of guidance is given as to exactly what needs to be done and to what. The task itself is easy as all it requires is a few clicks of the mouse button.
- The cognitive demand of this question would be rated at Level 1 as it comprises routine procedures.
- **Expected response:** In general, in the practical examination 1 mark is allocated for each ‘step’. A ‘step’ can include a simple action such as changing the margin size of a document. So, under normal circumstances a 3-mark question indicates that 3 steps or actions are required to obtain the answer. Learners should be aware of this mark allocation – in any event this information forms part of the general instructions in the examination paper.

According to the memo, 3 marks are allocated to the question, one each for the correct paragraph, the dotted line and the shading of the box – the latter two only requiring a selection to be made.

The answer and mark allocation is therefore straightforward and markers should have no difficulty in marking the question as all they need to check for is that the indicated paragraph is surrounded by a dashed shadowed border.

The question is therefore considered to be ‘easy’ in terms of content, stimulus, task and expected response demands.

Memorandum/Marking guidelines

- Paragraph border appears around 'Tornado versus hurricane' and its content ending '... 320 km/hr.' ✓
(Note to marker: Do not accept a text box or shape)
- Border is dashed ✓
(Note to marker: Accept a dotted border)
- Border is shadowed ✓
(Note to marker: The shadowed border may appear as a solid line on 2 sides of the paragraph)

Example 3:

Reference: DBE, November 2010, CAT Paper 1, Question 7.4

Synopsis of scenario on which question is based:

A few CAT learners got involved in a community project and offered their computer skills to the local health clinic. The clinic assists people on a daily basis and also has a facility where patients can stay overnight.

Data file: 7Cap

Question:

Open spreadsheet **7Cap**. Edit this spreadsheet so that the only items that remain meet the 'criteria' listed below. All other items must be deleted from the spreadsheet (the headings in row 3 may be kept).

- The items must be schedule 1 ('S1').
- The items must be in capsule format ('CAP').
- The date for the items must be any date in 2010.

(4)

Discussion:

This question is rated as 'easy' for the following reasons

- Content: In order to answer the question learners need to know how to work with simple spreadsheets and how to turn on the "Filter" function in Excel, something they should have done a number of times in class, class tests and internal examinations. In respect of the concepts involved and the skills required this question would be classified as being easy.
- Stimulus: The scenario and question contain words such as 'facility' and 'criteria'; and technical terms used in the pharmacy industry such as 'schedule 1' (S1) and 'capsule format' (CAP). However, in order to answer the question, learners do not need to understand the meaning of these terms. All they need to know is how to read and recognise these terms in the spreadsheet so that they can select the correct criteria according to the question. The instructions on what needs to be done are clear and concise. The question itself is self-contained and does not cross reference with other questions, applications, data or other worksheets in the spreadsheet. The spreadsheet data file provided is a standard spreadsheet file that all Grade 12 learners should be very familiar with.
- Task: The most efficient way of carrying out this task is to use the filtering capabilities of the spreadsheet application. Once the filters are in place then it is simply a matter of individually selecting those items that do not meet the given criteria by clicking on the appropriate property. The rows/items that do not meet each of the criteria can then be deleted. After having gone through this process the rows/items that remain are those that satisfy all three of the given criteria.

A more arduous but still easy way to achieve the same result is to have a good look at each row/item of the spreadsheet to see which row/item meets the three given criteria. If the row/item does not meet all three of the criteria then one can simply delete the row. What will remain after this lengthier process will be those rows/items satisfying the criteria. If the spreadsheet is very large and contains hundreds of rows, as this one does, then this second method is very inefficient.

So, although a number of fairly routine steps are required in order to obtain the answer in effect it is the same routine just repeated a number of times on different columns. The cognitive demand of this question would therefore be rated at Level 1 as it comprises routine procedures.

- Expected response: The marking guideline indicates that 4 marks are allocated to the question. The marking guideline awards part marks in that part marks are awarded for a result that satisfies each of the three given

criteria and a 4th mark for deleting those records/rows that do not satisfy all of the criteria. If a given criteria is not satisfied or the rows/records that do not meet the criteria are not deleted the learner loses the mark allocated to that specific part of the answer. The expected answer will be a smaller spreadsheet containing only 2 rows. Markers should have no difficulty in checking whether the question has been correctly answered.

The question is considered to be 'easy' in terms of the content, stimulus, task and expected response demands.

Memorandum/Marking guidelines

Only items remaining have:

- a schedule of S1 ✓
- a capsule format ('CAP') ✓
- a date in 2010 ✓
- All other data deleted ✓

Code_Kode	Schedule_Skedule	Format_Formaat	Date_Datum
821055003	S1	CAP	2010/03/08
822434008	S1	CAP	2010/02/07

Table 11: Examples of PRACTICAL EXAMINATION questions at Difficulty Level 2 – MODERATELY DIFFICULT

Example 1:

Reference: DBE, November 2011, CAT Paper 1, Question 2.9

Synopsis of scenario on which question is based:

Your school has a media exchange centre which allows learners to borrow books, CDs and DVDs. The CAT learners have been requested to assist the media exchange centre. Part of your responsibility will be to request donations to purchase more media resources.

Data file: 2MediaW

Question:

Open the document called **2MediaW**.

...

2.9 Apply a two-column format to the highlighted text on page 4 of the document.

Refer to the example below and note the following:

- A 1 cm/0.39 inches space must appear between the columns.
- A border appears around each of the columns.
- Ensure that paragraph 'c) Example Ground Rules:' will always start at the beginning of the second column. (6)

<p>a) Regular meeting times Set a regular meeting time - An ideal size for a book club is 8 - 11 people. As you can imagine, it is often difficult to coordinate that many schedules. Go ahead and set a regular meeting time and date for your book club with your core group. By setting the time before advertising the book club, you avoid playing favourites when working around schedules and are up front about what commitment is required.</p> <p>b) Establish ground rules Get together with your potential book club members and set the group's ground rules. If you did not set the meeting time with your core group, do that now.</p>	<p>c) Example Ground Rules: My book club decided that a different person would host each month. The hostess is responsible for picking the book, leading the discussion and providing the meal. If we meet at a restaurant, the hostess buys appetizers and wine. We place no restrictions on what books the hostess chooses--fiction, non-fiction, self-help--everything's fair game. We always take December off from reading and plan a fun event out.</p> <p>d) Hosting Ideas: Food is not required, but it helps the discussion roll and makes the book club meetings more fun. Some book clubs meet at a different restaurant each month. Sometimes meetings are held in people's homes. Be sure to check out our ready to go discussion questions on best sellers. Just print out the questions and you're ready to lead.</p>
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Discussion:

This question is classified as 'moderately difficult' for the following reasons:

- **Content:** To answer this question learners must know about, and be able to demonstrate a number of skills such as opening a standard Word document, navigating through the document to find the required text (which in this case is colour-coded), converting standard text into columns with given specifications (e.g. changing the space between columns), inserting column breaks and placing a border around selected paragraphs. Much of this knowledge should have been learnt in Grade 10 as part of getting to know how to use the word processing program. All of these skills should have been studied in class and practiced on numerous occasions and so should not present any problems to Grade 12 learners.
- **Stimulus:** The data file provided is a standard Word document that contains highlighted sections or words in order to ensure that those sections on which operations have to be carried out are easily visible. Learners are not required to read the contents of the document but must only concentrate on those sections specifically mentioned in the question and so the reading demands of the contents of the data file are irrelevant. The instructions contained in the question itself should be easily understood by all Grade 12 learners as they should have faced similar questions in class.
- **Task:** This task involves multiple procedures. What might be unfamiliar to learners and the reason this question is rated moderately difficult is that in class they would probably have had to perform the tasks separately in isolation of the other tasks. For example, they would have placed a border

around a simple paragraph but might not have had occasion to place a border around a paragraph that appears in columns. This task itself is identical regardless of whether the paragraph is in a column or not in a column. Outside of this specific task, all the other procedures that need to be carried out should be familiar to all Grade 12 learners.

The cognitive demand of this question is rated as Level 2 as it comprises multiple different steps.

- Expected response: According to the marking guideline, 6 marks are allocated to this question. A mark is allocated to each of the requirements indicated in the question, i.e. identifying the text, placing the identified text into columns, changing the spacing property, placing a border around each of the columns; and ensuring that the paragraph beginning with (c) appears at the top of the right-hand column. If learners carefully follow the instructions there should be no problems in responding.

The answer and mark allocation is straightforward and markers should have no difficulty in marking the answer.

The question is considered to be 'moderately difficult' because of the task demands.

Memorandum/Marking guidelines

- Correct text appears in two columns ✓
- With 1 cm/ 0.39 inches spacing applied ✓
- Borders appear around both columns ✓
- Paragraph borders are 'rectangular' (not cut off) ✓
- Paragraph c) starts at top of the 2nd column ✓
- Column break is inserted ✓

(Note to marker: No marks are awarded for the last two bullets if use of the 'Enter key' has been made to effect the 'break'.)

Example 2:

Reference: DBE, November 2012, CAT Paper 1, Question 4.3

Synopsis of scenario on which question is based:

Weather patterns are changing.

Data file: 4Daily_Daaglik

Question:

Weather data for several South African towns and cities has been collected for 7 December 2011.

Open the spreadsheet **4Daily_Daaglik**.

Work in the worksheet **DayRecord_DagVerslag**.

...

- 4.3 The daily temperatures for Bisho for one week are recorded in **cells B4:H4** in the **Temperature_Temperatuur** worksheet.

Add a function in **cell F5** on the **DayRecord_DagVerslag** worksheet to display the average temperature for Bisho for ONE week.

Round the answer off to TWO decimal places. (4)

Discussion:

This question is classified as 'moderately difficult' for the following reasons:

- **Content:** To answer this question, learners need to know how to calculate the average of the values in a group of cells in a spreadsheet; how to round off an answer to a specified number of decimal places; and how to combine these two actions into a single Excel statement. In other words, learners need to know and be able to work with the AVERAGE and ROUND functions that form part of Excel. They also have to note that the spreadsheet comprises 3 worksheets and know how to navigate between the various worksheets. All learners should have worked with these functions on numerous occasions and also moved from one worksheet to another in a spreadsheet. Thus, the content is considered to be easy.
- **Stimulus:** The data file would already have been opened at the beginning of the question in order to answer Question 4.1 and so learners would be familiar with the contents. The question is easy to read and understand and not only clearly refers to the fact that learners will need to work with data in two of the three worksheets, viz. **DayRecord_DagVerslag** and **Temperature_Temperatuur**, but also to the functions that they will need to use in order to answer the question. In addition, the cell into which the desired response is to be placed has been colour-coded for ease of recognition.

The matter of working across two different worksheets raises the level of difficulty to being 'moderately difficult'.

- **Task:** Most of the operations involved in getting the required answer to this multi-step question such as use of the AVERAGE and ROUND functions and combining them into a single Excel statement are reasonably straightforward. What makes the *task* of answering this question moderately difficult is that learners are required to work across two worksheets in the same spreadsheet and also to combine two single functions into a single statement.

The cognitive demand of the question is rated as Level 2 because learners are required to apply skills that they have learned in a different context.

- **Expected response:** According to the marking guideline, 4 marks are allocated to the question. Marks are allocated for the correct use of each of the AVERAGE and ROUND functions, ensuring that the correct range is used in the calculation of the average and that the final answer is correct to 2

decimal places. The answer and mark allocation is therefore straightforward and markers should have no difficulty in marking the answer.

The question is considered to be 'moderately difficult' because of the task demands.

Memorandum/Marking guidelines

Cell F5: =ROUND(AVERAGE(Temperature_Temperatuur!B4:H4),2)

- Formula = ROUND ✓
- Formula AVERAGE ✓
- Correct worksheet and range ✓
- 2 decimal places ✓

Example 3:

Reference: DBE, November 2008, CAT Paper 1, Question 6.2.3

Synopsis of scenario on which question is based:

Your friend's mother owns a franchise for a small cell phone company called 'EasyCell'. Your friend has arranged a part-time job for you at the cell phone company. His mother, Chloé Perez, has been running this company since January 2007. One of the new conditions of the franchise is that all data and information relevant to the company must be computerised.

Data file: q6Easycell

Question:

6.2 Ms Perez keeps details of her employees and her clients in a database. Open the database **q6Easycell** and the table **q6Clients**.

...

6.2.3 Mrs Perez wants to have basic statistics about her clients for her marketing campaign.

- Create a report based on the **q6Clients** table that will give the alphabetical list of the surnames, together with cell numbers, age and contract type.
- The records must be grouped by contract type.
- The following statistics must appear:
 - The total number of clients per contract type
 - The average age of all her clients, showing no decimals at the end of the report

Show clear labels for all the statistics in the report.

Save the report as **q6ClientsReport**. (13)

Discussion:

This question is classified as 'moderately difficult' for the following reasons:

- Content: To answer the question learners need to know the basics of working with a database, including how to generate a report based on a specific table in the database; how to calculate an average using the built-in functions; and then how to adapt the report to meet given specifications such as where the statistical values have to appear (i.e. either in the group header/footer or the report header/footer). Much of this work is studied in Grade 11 and the early part of Grade 12.

In general learners find working with a database more challenging than working with say a spreadsheet or word processor thereby making the concepts involved moderately difficult to grasp.

- Stimulus: The scenario is easy to read and comprehend and contains no irrelevant or distracting information. The instructions themselves are clear and concise and easily understood which suggests that all Grade 12 learners should be able to easily understand what is required of them in answering the question.

There are some instances of the use of terms that might be unfamiliar to some Grade 12 learners, for example terms such as “contract”, but this unfamiliarity should not prove to be insurmountable as learners do not need to understand what is involved in entering into a contract with another party in order to answer the question.

The data file comprises two unrelated tables containing a number of records, each record comprising a number of fields with a clear description of what each field contains.

- Task: Although the task of answering this question correctly requires some problem solving, much of the task of developing the report entails using a report wizard in the database application. Answering the question requires grouping the records, which is not difficult to achieve, either using the Report Wizard or the functionality built into the report writer; and then calculating the required statistics. However, Grade 12 learners usually have some difficulty in grouping records and in understanding exactly where the statistical values have to appear, i.e. either in the group header/footer or the report header/footer. Thus, this question is rated as being ‘moderately difficult’ because of the difficulty experienced by the envisaged Grade 12 learner in grouping records and generating the required statistics.
- Expected response: In general, in the practical examination 1 mark is allocated to a ‘step’. A ‘step’ could include an action or the use of a function. So, under normal circumstances a 13-mark question such as this one indicates that 13 steps/actions are required to obtain the answer. Learners should be aware of this allocation – in any event this forms part of the general instructions in the examination paper. The marking guideline indicates that 13 marks are allocated to this question. Although not specified in the question itself the marks will be allocated in accordance with the requirements of the question, i.e. 5 marks for what is required in bullet 1, 2 marks for what is required in bullet 2, 5 marks for generating the statistics; and the final mark

for ensuring that the labels are clearly shown. So, although not explicitly stated in the question the mark allocation per requirement should be easily determined and markers will easily be able to follow the marking guideline.

The question is therefore considered to be 'moderately difficult' because of the content and the task demands.

Memorandum/Marking guidelines

Correct table used ✓ (q6clients)

Fields, Surname, Cell number, Age, Contract type ✓

Sorted alphabetically according to surname ✓

Grouped by ✓ contract Type ✓

In group footer/header - Number of clients: ✓

=count ✓ ([Names]) ✓ (or any other field) OR count(*)

Average age formula in Report footer: ✓

Calculation of average age =avg ✓ ([age]) ✓

No decimals displayed (Property settings set to fixed or standard with 0 decimals) ✓

Both labels ✓ (No of clients and Average age)

Example 4:

Reference: DBE, November 2014, CAT Paper 1, Question 6.7

Synopsis of scenario on which question is based:

The African continent offers many beautiful places to visit. Your school is planning a tour on the African continent for the Grade 12 learners. The school has appointed Ace Travel to assist with the tour. The company has stored a list of their clients in a spreadsheet.

Data file: 6Serengeti.html

Question:

You need to assist Ace Travel to complete their web page.

...

6.7 Edit the table as follows:

- Change the table to consist of two rows and two columns.
- Place the headings in the first column.
- Place the data/information in the second column.
- Change the thickness of the border to 2.

NOTE: Use the example on the previous page to guide you with this question.
(4)

Discussion:

This question is classified as 'moderately difficult' for the following reasons:

- Content: To answer the question learners need to know how to read and interpret HTML code; and how to adapt the code so that it meets new requirements. The HTML code for generating tables is studied in Grade 12. This topic is still relatively new in the curriculum having only been examined for the first time at Grade 12 level in 2014. Teachers and learners are currently still getting to grips with the concepts and the style of questions that could be asked. As such the content could be considered as being 'moderately difficult'.
- Stimulus: The scenario is easy to read and comprehend suggesting that all Grade 12 learners should be able to understand the question. The terminology used should be well-known. The instructions themselves are clear and concise and easily understood.

The data file provides all the HTML code required to answer the question with the code segment that needs to be adapted clearly indicated. In addition, learners are provided with an HTML tag sheet that provides the basic syntax for each HTML statement.

- Task: Answering this question requires learners to study the code segment that produces the table and then to decide how best to change the code so that it meets the new specifications as indicated in the question. The level of cognitive demand of the task is pitched at Level 2 (understanding/applying).
- Expected response: In general, in the practical examination 1 mark is allocated to a 'step'. In the case of HTML, the 'steps' would be more like writing lines of code than specific actions as in a spreadsheet. So, under normal circumstances a 4-mark question indicates that 4 lines of code or 4 changes to existing lines of code are required in order to obtain the answer. Learners should be aware of this allocation which in any event forms part of the general instructions in the examination paper.

The marking guideline indicates that 4 marks are allocated to this question. Although not specified in the question itself the marks will be allocated in accordance with the requirements of the question, i.e. 1 mark for ensuring that the tables is a 2x2 table; 1 mark for ensuring that the headings are in the first column and 1 mark for ensuring that the data is in the second column; with the final mark being awarded for changing the line thickness.

The marking guideline gives all the necessary code as well as clearly identifying exactly where the marks should be allocated and should be easy for markers to follow.

The question is considered to be 'moderately difficult' because of the content and the task demands.

Memorandum/Marking guidelines

```
<table border="2" width="500">
  <tr>
    <td>
      <h2>Serengeti Facts</h2>
    </td>
    <td>
      Country Tanzania</br>
      Coordinates 17.9233S, 25.856E</br>
      Plain 5 km</br>
      Water Course Olduvai</br>
      UNESCO World Heritage Site1989</br>
    </td>
  </tr>
  <tr>
    <td>
      <h2><a name="Contact">Contact Details</a></h2>
    </td>
    <td>
      Tel: 997 521 8547</br>
      Fax: 998 521 8547</br>
      Email: serengeti@africa.com</br>
    </td>
  </tr>
</table>
```

- The table consists of two rows and two columns ✓
- Only headings appear in column 1 ✓
- Data/information appears in column 2 ✓
- Border thickness set to 2 ✓

(Note to marker: Mark this question from HTML code.)

**Table 12: Examples of PRACTICAL EXAMINATION questions at Difficulty Level
3 – DIFFICULT**

Example 1:
<p><u>Reference:</u> DBE, November 2012, CAT Paper 1, Question 6.7</p> <p><u>Synopsis of scenario on which question is based:</u></p> <p>Weather patterns are changing.</p> <p><u>Data file:</u> 6Record_Opname</p> <p><u>Question:</u></p> <p>Learners need to present the data from the weather station to the authorities.</p> <p>Open the 6Record_Opname document.</p> <p>...</p> <p>6.7 Weather data has been entered into a spreadsheet called 6Day_Dag.</p> <p>Paste the contents of cells B2:G9 as a linked table at the end of the document 6Record_Opname. (2)</p>
<p><u>Discussion:</u></p> <p>This question is classified as 'difficult' for the following reasons:</p> <ul style="list-style-type: none"> • <u>Content:</u> In order to answer this question learners need to know how to work with both a Word document and an Excel spreadsheet and how to link the two together so that if the data in the spreadsheet changes the data in the Word document will also change – this work would have been introduced in Grade 10 and studied in some detail in Grade 12. Working within and between applications is difficult as one needs to always be aware of exactly what needs to be done and which properties need to be changed in order to achieve the desired result. So, one element of difficulty lies in getting to grips with the content and the concepts involved. • <u>Stimulus:</u> The scenario and question are easy to read and comprehend and contain no specialised terminology or extraneous or distracting information making for an easy to understand question. The instructions are very explicit, for example, the necessary steps are highly specified and learners are told which section of the spreadsheet needs to be pasted into the Word document and exactly where the spreadsheet segment needs to be pasted. The data files themselves are standard files containing no hidden surprises. Learners also do not need to understand or interpret the data contained in either of the data files. • <u>Task:</u> This task requires learners to perform multiple operations. They have to copy the contents of a range of cells in a spreadsheet and paste the copied cells to a word-processed document. The cells must not only be pasted but must be linked to the original cells in the spreadsheet so that, if the values in

the spreadsheet cells change, then the values in the table in the word-processed document will change automatically. The task difficulty lies in creating a table in a document that is linked to a range of cells in a spreadsheet.

Learners have to work across two different applications. In addition, in the copying process learners are required to create a live link between the two applications so that the cell values are automatically updated.

The cognitive demand of this question would be rated at Level 2.

- Expected response: In general, in the practical examination 1 mark is allocated to a step. A step could include an action or the use of a function. So, under normal circumstances a 2-mark question indicates that 2 steps are required to obtain the answer. Learners should be aware of this allocation – in any event this forms part of the general instructions in the examination paper. In this question, a mark is allocated to the correct cells being copied and the second mark to creating the link. The answer and mark allocation is therefore straightforward and markers should have no difficulty in marking the answer.

The question is considered to be difficult because of the content and the task demands.

Memorandum/Marking guidelines

- Correct data from cells B2:G9 pasted from spreadsheet ✓
- Pasted as a linked table/object ✓

Example 2:

Reference: DBE, February/March 2012, CAT Paper 1, Question 4.8

Synopsis of scenario on which question is based:

Some of the CAT learners are part of the School Publications Committee. All the data and information are computerised and these CAT learners will assist with a range of tasks.

Data file: 4Learner_Leerder

Question:

The Grade 12 learners were asked to sell magazines to the community.

Open the spreadsheet **4Learner_Leerder**.

Work in the **Data** worksheet.

...

4.8 The following discounts are given:

- 10% discount for selling more than 20 magazines
- 7,5% discount for selling more than 15 magazines

- 5% discount for selling more than 10 magazines

Use nested IF statements in cells D9 to D12 to determine the percentage discount that each person will receive. **NOTE:** No discount is given if 10 or fewer magazines are sold. (5)

Discussion:

This question is classified as 'difficult' for the following reasons:

- Content: In order to answer this question learners need to know how to work with a spreadsheet, in particular how to work with a complex nested-IF statement. This topic is studied in some detail at the beginning of the Grade 12 year. The envisaged Grade 12 learner is likely to have some difficulty with the concept, particularly the logic and the syntax/construction of the required IF statement.
- Stimulus: The scenario and question are easy to read and comprehend and contain no specialised terminology or extraneous or distracting information. The only term that might be unfamiliar is the concept of 'discount' but the majority of the learners writing the paper should be familiar with this term as they are required to study either Mathematics or Mathematical Literacy.

The instructions are very explicit, for example, open the spreadsheet; use a nested-IF statement; in which cells this statement needs to be placed; and the criteria that will be used in determining the applicable discount. Although some learners might find the logic/criteria difficult to understand, the envisaged learner should not have any difficulties in understanding what is required by the question.

The data file provided is a standard spreadsheet file with the fields (columns) required to answer the question clearly stated.

- Task: What makes the task of answering this question difficult is the logic involved in working out how to ensure that the correct discount is applied. Nested-IF statements create difficulties for the envisaged Grade 12 learner. In this particular case, there are four different groups that need to be accounted for, making the nested-IF a complex nested-IF statement.

The cognitive demand of this question would be rated as Level 2.

- Expected response: In general, in the practical examination 1 mark is allocated to a step. A step could include an action or the use of a function. So, under normal circumstances a 5-mark question indicates that 5 steps or actions are required to obtain the answer. Learners should be aware of this allocation – in any event this forms part of the general instructions in the examination paper. In this case learners will know that there are 4 conditions, viz. ">20", ">15", ">10" and "<=10" and so would expect there to be a mark per condition with the final mark being allocated to copying the IF statement in each of the designated cells. The answer and mark allocation is straightforward and markers should have no difficulty in marking the answer.

The question is considered to be difficult because of the content, stimulus and task demands.

Memorandum/Marking guidelines

Cell D9: = IF(C9>20,"10", IF(C9>15,"7.5", IF(C9>10,"5",0)))

OR

= IF(C9>20,10, IF(C9>15,7.5, IF(C9>10,5, IF(C9<=10,0))))

- Condition for more than 20 set to 10 ✓
- Condition for more than 15 set to 7.5 ✓
- Condition for more than 10 set to 5 ✓
- Condition for less than 10 set to 0 ✓
- Cells D9 to D12 filled ✓

(Note to marker: Accept formula with or without quotes/percentage symbol)

Example 3:

Reference: DBE, November 2010, CAT Paper 1, Question 6.2.2

Synopsis of scenario on which question is based:

A few CAT learners got involved in a community project and offered their computer skills to the local health clinic. The clinic assists people on a daily basis and also has a facility where patients can stay over.

Data file: 6Clinic_Kliniek

Question:

Open the database called **6Clinic_Kliniek**.

6.2 Open the form called **frmData** which is based on the **Stock_Voorraad** table and make the following changes to the form:

...

6.2.2 The **Schedule_Skedule** field does not appear on the form currently. Add a list box control on the form to allow the user to choose from the values S1, S2, S3, S4 and S5 for the **Schedule_Skedule** field. A suitable label must be added to the list box.

Format the label to match the other labels on the form. (5)

Discussion:

This question is classified as 'difficult' for the following reasons:

- Content: In order to answer this question learners have to have a thorough knowledge of working with a database, in particular, how to adapt database forms to satisfy new requirements; the inclusion of list control boxes in a form; and the linkage of this control to a specific field in the database.

This process is relatively complicated that the envisaged learner normally finds difficult.

- Stimulus: The scenario and question are easy to read and comprehend and contain no specialised terminology or extraneous or distracting information suggesting that all Grade 12 learners should be able to easily understand the question. The instructions are very explicit, for example, the necessary steps are highly specified and learners are told exactly which subheading to locate.
- Task: This problem-solving (Level 3 cognitive demand) task presents a number of challenges mainly related to the technical difficulty of what needs to be done. Working with databases is challenging for the envisaged Grade 12 learner and, when additional levels of complexity are added, such as the inclusion of form controls, the level of difficulty is increased. Learners need to work with a given form that already contains some information. Answering this question requires that they add additional functionality to the form to aid in the correct capturing of data.
- Expected response: In general, in the practical examination 1 mark is allocated to a step. A step could include the use of a function. If a function has parameters then a mark would also be allocated for the correct use of the parameters. So, under normal circumstances a 5-mark question indicates that 5 steps are required to obtain the answer. Learners should be aware of this approach – in any event this forms part of the general instructions in the examination paper. The answer and mark allocation is therefore straightforward and markers should have no difficulty in marking the answer.

The question is considered to be difficult because of the content and the task demands.

Memorandum/Marking guidelines

- List box control added to the form ✓
- Values (S1, S2, S3, S4 and S5) (two or more values) added to the control box ✓
- List box control links to Schedule_Schedule field ✓
- Suitable label linked to Name/Description of the field ✓
- Label formatted to resemble existing labels ✓

(Note to marker: If candidates used a combo box instead of a list box they will lose 1 mark)

**Table 13: Examples of PRACTICAL EXAMINATION questions at Difficulty Level
4 – VERY DIFFICULT**

Note:

During the development of the exemplar book some subject specialist argued that there is a fine line between a difficult and a very difficult question. It was also evident that in some subjects question papers did not have questions that could be categorised as very difficult. In order to cater for this category, subject specialists were requested to adapt existing questions and make them very difficult or create their own examples of very difficult question. However, it was noted that in some instances attempts to create very difficult questions introduced invalid sources of difficulty which in turn rendered the questions invalid. Hence Umalusi acknowledges that the very difficult category may be problematic and therefore requires especially careful scrutiny.

Example 1:

Reference: DBE, November 2014, CAT Paper 1, Question 4.3

Synopsis of scenario on which question is based:

The African continent offers many beautiful places to visit. Your school is planning a tour of the African continent for the Grade 12 learners. The travel agency, Ace Travel, used by the school wants to promote their business in the South African market.

Data file: 4Book_Bespreek

Question:

A list of all Ace Travel's bookings is stored in a spreadsheet.

Open the **4Book_Bespreek** spreadsheet and work in the **Bookings_Besprekings** worksheet.

...

4.3 Clients have to pay an additional compulsory tourism levy.

The levy to be paid by clients for a particular hotel or lodge depends on whether it is Peak Season or Off-peak Season.

Column M displays a 1 for Peak Season and a 2 for Off-peak Season. The table below indicates the codes for the seasons.

Season code	Season
1	Peak
2	Off-peak

Use a VLOOKUP function in cell H6 to display the tourism levy that will be paid by the particular client for that hotel or lodge.

Use the Hotel/Lodge data in **cell J6**, the Peak Season data in **cell M6** and the data provided in the **Levy_Heffing** worksheet.

Ensure that the function will work correctly if it is copied to the rest of the cells in **column H**.

HINT: You may use the VLOOKUP function in combination with another function to determine the answer. (4)

Discussion:

This question is classified as being 'very difficult' for the following reasons:

- **Content:** In order to successfully answer this question, the learner needs to know how to work with multiple worksheets in a spreadsheet; know the structure of and how to use a VLOOKUP statement; and depending on the method used to solve the problem know how to construct a nested-IF statement. These individual components would all have been studied during their course (Grade 11 and Grade 12) and learners should also have practiced them in the classroom. What makes this question significantly more difficult is the combination of a nested-IF and a VLOOKUP and the complexity of the nested-IF as it contains two VLOOKUP statements if that particular option is chosen. The concepts and logic involved make this a very difficult question.
- **Stimulus:** The scenario on which the question is based should be within the grasp of all learners and is considered to be straightforward. However, because of the phrasing of the question some learners might have difficulty in reading and comprehending the requirements of the question itself. The question, however, contains no irrelevant or distracting information but does need to be very carefully read and considered before being answered, as it contains logic that many learners might find difficult.

The data file used is a standard spreadsheet containing multiple worksheets which may increase the level of difficulty for the less able learner.

- **Task:** The ability to answer this question lies in a learner's ability to interpret the logic that needs to be used. There are at least three methods that could be used in solving the problem – two of these methods use complex VLOOKUP statements while the third method uses a very complex nested-IF containing two VLOOKUP statements. The task is thus considered as being very difficult and the cognitive demand of the question is rated as Level 3.
- **Expected response:** The marking guideline indicates that 4 marks are allocated to the question. The mark distribution within each of the possible solutions to the problem is clearly shown and facilitates the marking. However, marking this type of question needs to be done by highly competent markers because of the possibility that learners could produce solutions other than those given in the marking guideline which could also be correct.

The question is considered to be 'very difficult' because of the demands of the content, stimulus, task and expected response.

Memorandum/Marking guidelines

Cell H6: =VLOOKUP(J6,'Levy_Heffing'!\$A\$2:\$C\$28,M6+1)

- LOOKUP Value: J6 ✓
- Table array: 'Levy_Heffing'!\$A\$2:\$C\$28 ✓ OR
Table array: 'Levy_Heffing'!\$A\$1:\$C\$28)
- Absolute cell reference ✓
- Column index number: M6 +1 ✓

OR

Cell H6: =IF(M6=1,(VLOOKUP(J6,Levy_Heffing!\$A\$2:\$C\$28,2)),
(VLOOKUP(J6,Levy_Heffing!\$A\$2:\$C\$28,3)))

- IF (M6=1 ✓,
- (VLOOKUP(J6 ✓,Levy_Heffing!\$A\$2:\$C\$28,2)),
- (VLOOKUP(J6,Levy_Heffing!\$A\$2:\$C\$28,3) ✓))
- Absolute cell reference ✓

OR

Cell H6: =VLOOKUP(J6,Levy_heffing!\$A\$2:\$C\$28,IF(M6=1,2,3))

(Note to marker: Absolute cell referencing must be used.)

Example 2:

Reference: Question specially developed for this exemplar book.

Synopsis of scenario on which question is based:

Your local computer store is having a special on 64 GB memory sticks. The price is so attractive that people from all over the city are flocking to the store to buy these memory sticks. This has meant that the store has to order stock every day to supplement the initial number they had in stock before the special promotion began.

Data file: data provided in question

Question:

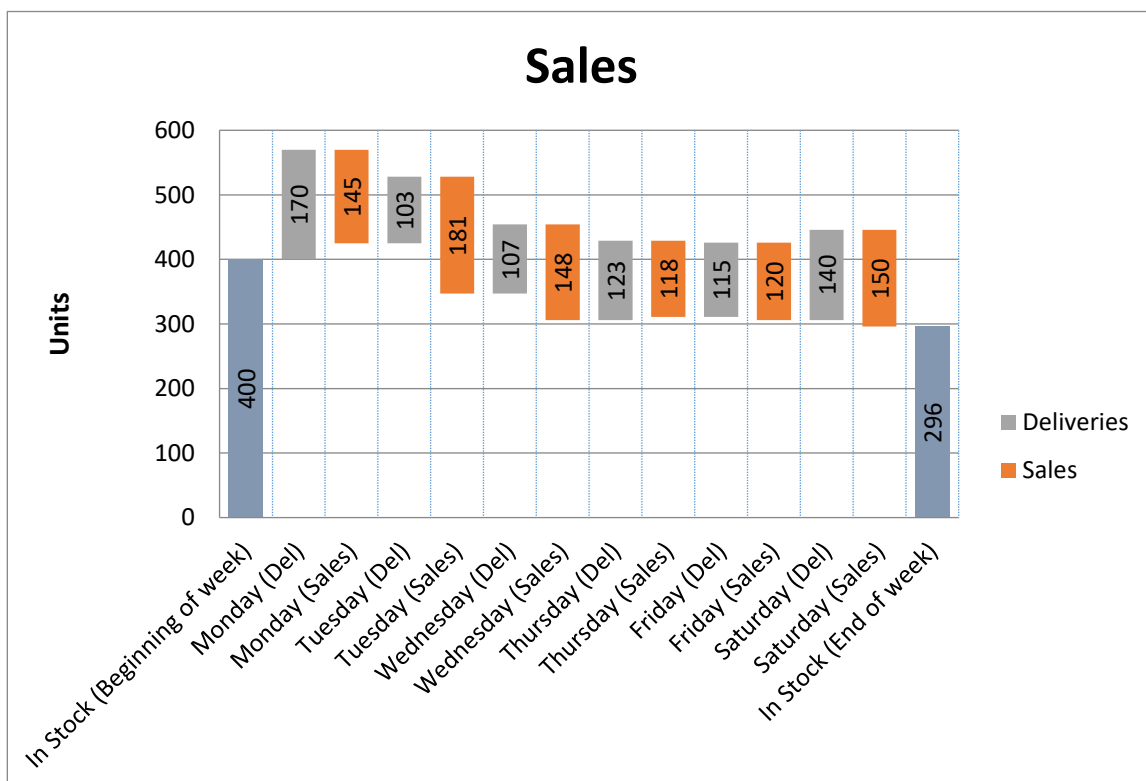
The table below shows the initial number of the 64 GB memory sticks they had in stock at the beginning of the week, the number delivered each day, the number sold each day and the final number they had in stock at the end of the week. The table shows that the store started with 400 in stock, then on Monday they took delivery of a further 170 memory sticks and sold 145 memory sticks. By the end of the week they had 296 in stock.

	Sales Flow
In Stock (Beginning of week)	400
Monday (Del)	170
Monday (Sales)	-145
Tuesday (Del)	103
Tuesday (Sales)	-181
Wednesday (Del)	107
Wednesday (Sales)	-148
Thursday (Del)	123
Thursday (Sales)	-118
Friday (Del)	115
Friday (Sales)	-120
Saturday (Del)	140
Saturday (Sales)	-150
In Stock (End of week)	296

As the sales assistant responsible for managing this particular promotion you have been asked to display the data above in a chart that can be used during a presentation to management.

Reproduce the chart shown below.

(8)



Discussion:

This question is classified as being 'very difficult' for the following reasons:

- **Content:** Conceptually this is a very difficult question as it draws on a number of different aspects in Excel. In order to answer the question learners need to not only have a working knowledge of how formulas and functions are used in Excel but also have a thorough knowledge of working with charts using given data. In this case many properties of the chart have to be manipulated in order to get what is commonly called a "Waterfall Chart". This chart is not one of the common charts that learners would have seen during the CAT course. Despite this the question is one that can be answered using a combination of the skills that learners have learnt. The chart is essentially a "Stacked Column" chart with part of each stack made invisible by changing the properties of that part.
- **Stimulus:** The scenario itself should be something with which learners are familiar, that of a store selling goods of some sort. The technical terms used in the scenario and question form part of the vocabulary of the subject and so should be familiar to all learners. What many learners will find difficult, and what will probably cause them to leave the question until the very end of a question paper, is the complexity of the chart that they are required to create, something which most learners will not have seen before. The manner in which the question is phrased might mean that some learners will have difficulty in comprehending what is being asked.
- **Task:** The question provides no scaffolding or guidance in order to get to the final chart making this a problem-solving (Level 3 cognitive demand) type of question. Learners have to work through a series of different sub-tasks in order to arrive at the final answer. These sub-tasks, although simple in themselves, when combined together make this task very difficult. The sub-tasks include re-arranging the data by inserting columns; including data created by using IF statements in the cells created by the column insertions; creating a standard Stacked Column chart using the data obtained from the IF statements; formatting the resultant chart by changing colours, adding data labels, adding headings and axes labels, etc.
- **Expected response:** The marking guideline for this question proposes a mark of 8 (approximately 4% of the total mark for the paper). From the learner's perspective, the mark allocation is not explicit which is what makes the expected response difficult although the general instructions for the examination indicates that roughly 1 mark is allocated per step. Learners should expect that there would be roughly 8 steps to solving the problem. The marking guideline itself is quite specific and indicates to markers where to allocate the marks.

The question is considered to be 'very difficult' because of the content, stimulus, task and expected response demands.

Memorandum/Marking guidelines

- Additional columns + calculations. ✓✓
- Drawing initial chart. ✓

- Labelling axes + heading. ✓
- Eliminating non-essential part of each bar. ✓✓
- Placing label + orientation. ✓
- Eliminating spurious labels. ✓

Example 3:

Reference: Question specially developed for this exemplar book

Synopsis of scenario on which question is based:

You and a couple of your friends visit the local restaurant to celebrate the end of your school careers.

Data file: FishermansGrill

Question:

At the end of the meal you will be presented with a bill for what you have had to eat and drink. More often than not the bill will look something like the sample shown below. Carefully study the sample bill to ensure that you are aware of the information contained on the bill. Some of the information is static (i.e. does not change) while other information is dynamic (i.e. it varies depending on say the date, the table number and what has been ordered, etc.).

Fisherman's Grill
V&A Waterfront
Cape Town
Tel: 021-555-1234

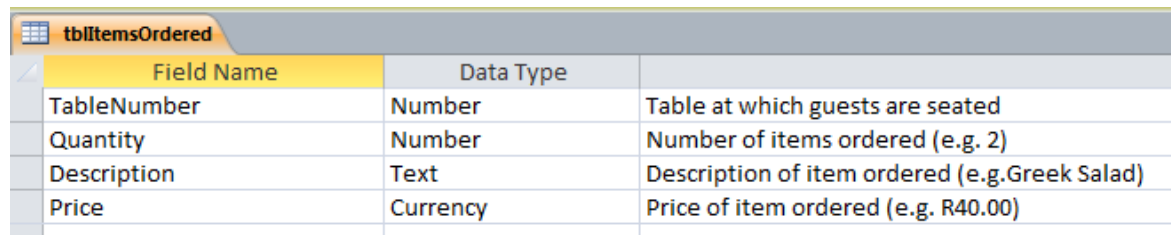
Table 1

10 May 2015

1	Greek Salad @ R67.50	R67.50
1	Smoked Salmon @ R95.00	R95.00
2	Catch of the Day @ R150.00	R300.00
1	Brandy Tart @ R40.00	R40.00
1	Cheese Cake @ R45.00	R45.00
1	Cappuccino Coffee @ R35.00	R35.00
TOTAL (incl. VAT)		R582.50

A waiter (waitron) uses a handheld device to capture the order while standing at the table. The captured data is immediately transmitted to a database via a Wi-Fi link in the restaurant.

The structure of the database table that stores the data is shown in the image below:



The image shows a screenshot of a database table structure for 'tblItemsOrdered'. The table has four columns: Field Name, Data Type, and a descriptive note. The rows are: TableNumber (Number, Table at which guests are seated), Quantity (Number, Number of items ordered (e.g. 2)), Description (Text, Description of item ordered (e.g. Greek Salad)), and Price (Currency, Price of item ordered (e.g. R40.00)).

Field Name	Data Type	
TableNumber	Number	Table at which guests are seated
Quantity	Number	Number of items ordered (e.g. 2)
Description	Text	Description of item ordered (e.g. Greek Salad)
Price	Currency	Price of item ordered (e.g. R40.00)

The **FishermansGrill** database in your exam folder contains the table described above. The orders for Table 1, Table 2 and Table 3 have already been captured.

Use whatever database functionality is required (e.g. queries, reports, etc.) to create the printout of the bill for Table 2 in a format similar to that shown above.

(8)

Discussion:

This question is classified as being 'very difficult' for the following reasons:

- Content: The question requires a thorough understanding of working with a given database. Use of a database application forms part of the Grade 11 and 12 CAT curriculums and so should not be unfamiliar to learners. In order to answer this question, learners need to know how to create queries based on specific criteria; how to include calculated fields in a query; how to create reports based on a query; and how to change the format of a report so as to meet specific requirements. All of these aspects would have been studied in class but it is likely that not all elements would have been done at the same time.
- Stimulus: The scenario of eating out at a restaurant or someplace similar should be familiar to all Grade 12 learners. The terminology used in the question should also be very familiar to all learners as they would have studied this during the CAT course. The image of the structure of the database table is something that learners would have seen in class as this is a standard table structure. The scenario and question contains no irrelevant or distracting information but the phrasing of the question might be such that some learners would have difficulty in understanding the requirements of the question.

The question also contains no hints (scaffolding) on how to approach the problem so the learner is essentially left to decide for themselves how they will solve the problem.

- Task: Answering the question requires the learner to carry out a number of different sub-tasks (multi-step) that include creating a query based on the given table; including a calculated field in the query; using the query to create a report; and changing the report format so as to produce a printout similar to that shown in the question. No guidance or scaffolding is provided in the

question so the learner is effectively left on his/her own to solve the problem making the task a lot more difficult than it would have been had guidance to have been provided.

The cognitive demand of the question is rated as Level 3 – problem solving.

- Expected response: The marking guideline for this question proposes a mark of 8 (approximately 4% of the total mark for the paper). From the learner’s perspective, the mark allocation is not explicit leaving the learner a little in the dark as to whether part marks will be awarded. However, the general instructions for the examination indicate that roughly 1 mark is allocated per step. So, learners should expect that there would be roughly 8 steps to solving the problem. The marking guideline itself is quite specific and indicates to markers where to allocate the marks.

The question is considered to be ‘very difficult’ because of the content, stimulus and task demands.

Memorandum/Marking guidelines

- Select query with calculated field:
 - Correct query. ✓
 - Correct tables selected. ✓
 - Calculated field included. ✓

Field:	TableNumber	Quantity	Description	Price	Expr1: [tblItemsOrdered]![Quantity]*[tblItemsOrdered]![Pric
Table:	tblItemsOrdered	tblItemsOrdered	tblItemsOrdered	tblItemsOrdered	
Sort:					
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:	2				
or:					

- Report based on query:
 - Report correctly formatted. ✓
 - Currency values correctly formatted. ✓
 - Total for all items eaten included. ✓
 - Automatic date field included. ✓
 - All items included on invoice. ✓

PAPER 2 - THEORY

Table 14: Examples of THEORY EXAMINATION questions at Difficulty Level 1 – EASY

Example 1:
<p><u>Reference:</u> DBE, November 2011, CAT Paper 2, Question 3.5</p> <p><u>Synopsis of scenario on which question is based:</u></p> <p>A team of CAT learners have decided to work at a cyber café to raise funds for their school. They will be required to answer computer-related questions for the owner, Mr Wu.</p> <p><u>Question:</u></p> <p>The first task is to replace the old administration computer.</p> <p>...</p> <p>3.5 Many of the devices that can be connected to the laptop connect via USB ports and are therefore plug-and-play.</p> <p>What do we mean when we say a device is plug-and-play? (2)</p>
<p><u>Discussion:</u></p> <p>This question is classified as 'easy' for the following reasons:</p> <ul style="list-style-type: none">• <u>Content:</u> The envisaged Grade 12 learner should be very familiar with the concepts embodied in the phrase 'plug-and-play' and with the notion of USB ports. This content is studied in Grade 10. Most learners would also be familiar with the concept of "memory sticks" and "USB modems" and with connecting a smartphone to a computer in order to download music or pictures. All of these are everyday occurrences of 'plug-and-play' technologies.• <u>Stimulus:</u> The description of the scenario or setting and the question itself are both easy to read and comprehend and contain no unfamiliar terminology or extraneous or distracting information. Terms such as USB ports and 'plug-and-play' should be familiar to Grade 12 learners. All learners should also have used some sort of 'plug-and-play device' either at home or in the computer lab at school. Such devices include memory sticks/flash drives, external hard drives, digital cameras, etc.• <u>Task:</u> Answering this question which tests specific knowledge involves recall of basic information that should have been learnt in class and through the use of textbooks (Level 1 cognitive demand). All learners have to do is write a single sentence explaining what plug-and-play means in the context of a USB device.

- Expected response: According to the memo, 2 marks are allocated for writing one short sentence. The answer and mark allocation is explicit and straightforward.

The question is therefore considered to be 'easy' in terms of stimulus, content, task and expected response demands.

Memorandum/Marking guidelines

The device can be plugged in and used automatically/immediately ✓ without the user having to configure or install anything themselves (such as the driver) ✓

Example 2:

Reference: DBE, February/March 2011, CAT Paper 2, Question 3.6.3

Synopsis of scenario on which question is based:

A group of CAT learners (Ben, Xolani, Tersia, Tasneem and Keshnee) set up a computer club with some new and old computers in a room at their school. Members of the club allow other learners to access the Internet and play games, and also answer any computer-related queries for a small fee.

Question:

3.6 The team needs to look at purchasing a new printer.

...

3.6.3 Name THREE factors or specifications to look at when purchasing a printer, besides the cost of buying the printer.

(Assume that you have already chosen the type of printer best suited to your specific needs.) (3)

Discussion:

This question is classified as 'Easy' for the following reasons:

- Content: Answering this question requires knowledge and understanding of printer specifications. Grade 12 learners should be very familiar with the content as they should have been taken through the various specifications of a range of computer peripherals as well as the process of how to select various peripherals (such as printers) for a specific purpose in class. The concepts involved (namely speed, paper type, quality/ resolution, networkability, compatibility with operating system, warranty/guarantee, etc.) are easily understood.
- Stimulus: The scenario is very easy to read and comprehend and contain no unfamiliar or specialised terminology or extraneous or distracting information. However, the phrasing of the question might be such that some learners might have difficulty understanding the requirements of the question. The instructions and action verb used are, however, very clear and highly specified.

- Task: The task of answering this question involves application of knowledge of printer specifications. All learners need to do to answer the question is to list THREE factors or specifications that should be considered besides cost when one considers buying a printer. There are at least 6 factors that could have been listed making the selection relatively easy. Had there been fewer factors to select the question would be slightly more difficult.
- Expected response: Learners need to write down three words or phrases. One mark is allocated for each of the three appropriate factors. The marking guideline makes provision for 6 possible answers. The expected response is thus straightforward and easy to mark.

The question is considered to be 'easy' in terms of the stimulus, content, task and expected response demands.

Memorandum/Marking guidelines

- Speed;
- Quality/resolution of printer;
- Paper sizes/media that can be used;
- Whether the printer can be connected to a network;
- Compatibility with operating system; or
- Warranty/guarantees, etc.

(Note to marker: Do not accept answers relating to purchase cost.)

(Any 3) ✓✓✓

Example 3:

Reference: IEB, November 2014, CAT Paper 1, Question 8.4

Synopsis of scenario on which question is based:

Lebo Umpheki, is a young entrepreneur who wants to start up a catering company called, Food Visions Catering. She not only needs to purchase all the necessary kitchen equipment for her company but also wants to set up an online presence.

Question:

Lebo has now set up her catering kitchen. However, her selection of dishes is limited to South African cuisine. She realises that she needs to expand her culinary range and finds many recipes to use in 'Nigella's Kitchen Cookbook'. To make more money, Lebo compiles Nigella's and her own recipes into a book call 'Food Visions Cookbook'.

Is it legal for Lebo to sell her compiled recipe book? Give ONE comment to support your answer. (2)

Discussion:

This question is classified as 'Easy' for the following reasons:

- **Content:** This question revolves around the social and ethical implications of using computers. Issues such as plagiarism would have been discussed in class. This issue would have been reinforced in the Practical Assessment Task (PAT) that forms a component of the assessment in each grade. One of the issues specifically discussed in the PAT is that of ensuring that the work submitted is the learner's own work and that where information has been obtained from another source that the source needs to be acknowledged.
- **Stimulus:** The scenario and question are straightforward and contain no irrelevant or distracting information, and so should be easily understood by all Grade 12 learners.
- **Task:** The learner effectively needs to recall/remember what they learnt in the classroom and what was reinforced during the work they did on the PAT. This is classified as Level 1 in terms of cognitive demand.
- **Expected response:** The learner is expected to answer Yes or No and then to briefly motivate in their own words why they have answered Yes or No. The marking guideline provides

The question is considered to be 'easy' in terms of stimulus, content, task and expected response.

Memorandum/Marking guidelines

No. Nigella owns the original recipes/Lebo cannot copy them without permission from Nigella. ✓✓

OR

Yes. If Lebo has permission from Nigella. ✓✓

Table 15: Examples of THEORY EXAMINATION questions at Difficulty Level 2 – MODERATELY DIFFICULT

Example 1:
<p><u>Reference:</u> DBE, November 2013, CAT Paper 2, Question 6.6.2</p> <p><u>Synopsis of scenario on which question is based</u></p> <p>The CAT teacher at Prestige High School, Ms Cloete, has decided to use a questionnaire to ensure that all the learners at the school have a working knowledge of ICT devices, programs and the impact that ICT has on their lives. As a CAT learner, you are required to assist Ms Cloete by providing answers that will be used as a guide to mark the responses to the questionnaire.</p> <p><u>Question:</u></p>

6.6 Billions of computers are used around the world every day, making many demands on the environment.

...

6.6.2 Suggest TWO ways in which you can help to reduce the negative effect that the use of computers has on the environment.

Explain how you would achieve this for each of your two suggestions.

(4)

Discussion:

This question is classified as 'moderately difficult' for the following reasons:

- Content: This question revolves around the softer issues in the subject content such as the social and ethical implications of using computer technology as well as “green” issues. Not only do many Grade 12 learners grapple with these issues but, because of their relatively poor language abilities, they have some difficulty in explaining the concepts and motivating a particular position. Although issues, such as those required to answer the question, may have been discussed in the classroom the context here is different and not within the experience of all learners.
- Stimulus: The scenario and question are straightforward and contain no irrelevant or distracting information, and so should be easily understood by all Grade 12 learners.
- Task: Answering the question involves basic recall of curriculum content (Level 1) that all Grade 12 learners should have learnt. However, what many learners will find difficult is phrasing an answer that is within the given context. Thus, although learners may be able to provide an answer, they may omit to relate their answer to the given scenario and thus lose marks. They have to use their own words to write extended text and must write sustained explanations/motivations for each of their suggestions.
- Expected response: One (1) mark is given for each suggestion and 1 mark for each explanation. Provision is made in the memo for a number of different suggestions with corresponding motivations. Provision is also made for suggestions outside of those given in the memo as long as they are suitably motivated. Responses therefore will differ and markers will have to carefully evaluate the explanation given by the learner making marking this question more demanding.

The question is considered to be 'moderately difficult' in terms of content, task and expected response demands.

Memorandum/Marking guidelines

- Save energy/electricity - by using Energy Star compliant/energy efficient hardware/switching off unused equipment/making use of suitable power schemes/hibernation, etc;

- Save paper - do not make unnecessary printouts/Proofread on screen or online/make increased use of e-communications;
- Use environmentally friendly recycling methods to avoid/reduce;
- e-waste/toxic waste;
- Donate old equipment to schools/Upgrade computers where possible as opposed to discarding and replacing to reduce e-waste; or
- Re-use ink cartridges - Reducing e-waste/toxic effects by using recycled/refillable cartridges/upgrading/reusing older hardware instead of dumping it, etc.

(Any two suggestions ✓✓ with a suitable motivation for each ✓✓)

Example 2:

Reference: DBE, November 2011, CAT Paper 2, Question 3.4

Synopsis of scenario on which question is based:

A team of CAT learners have decided to work at a cyber café to raise funds for their school. They will be required to answer computer-related questions for the owner, Mr Wu.

Question:

The first task is to replace the old administration computer. Mr Wu saw the following advertisement for a laptop:

ABC 21" LAPTOP	
Processor:	Intel Celeron 1.8 Hz
RAM:	4 GB
Hard drive:	150 GB
Connectivity:	WLAN/LAN
Dual-layer DVD writer	
Integrated webcam	
Windows 7 Professional	
Multidata card reader	
12 month on-site warranty	

3.4 Mr Wu wants to experiment with video editing using the laptop.

Name TWO hardware components from the advertisement where the specifications are not suitable for video editing. Briefly motivate the use of each hardware component in the context of video editing.

(4)

Discussion:

This question is classified as 'moderately difficult' for the following reasons:

- **Content:** In order to answer this question the learner needs to have a reasonably thorough understanding of the more technical aspects of a computer, aspects such as processor type, memory, hard drive sizes, types of connectivity, etc. In addition, various programs have additional hardware requirements in order for them to operate efficiently, so video editing would probably require higher screen resolution, more powerful CPU, more RAM, etc. Although these aspects should have been studied during the CAT courses and should not be totally unfamiliar to Grade 12 learners, the technical knowledge required to answer this question make for a moderately difficult question.
- **Stimulus:** The scenario and requirements of the question are reasonably straightforward. However, the specifications of the computer add a level of difficulty as, before answering the question, learners need to read and evaluate each specification individually. The specifications themselves should not prove difficult as learners would have studied the components that go into making up a computer.
- **Task:** In answering the question learners have to recall the technical requirements for the editing of videos. Having identified these specifications, learners then have to review the specifications of the computer in the advertisement noting which of the items specified would impact on the process of video editing. They then need to compare the requirements to the specifications of the advertised notebook to determine which of the items would not be suitable. Armed with this information learner are then able to name the hardware components and provide a motivation, in their own words, as to why they were not suitable. The task is therefore not straightforward and quite demanding.

This question would be rated as Level 3 in terms of cognitive demand.

- **Expected response:** The memo indicates that 4 marks are allocated to the question, 1 mark for naming the hardware component that is not suited to video editing and 1 mark for motivating why it needs to be upgraded. The memo provides 3 possible hardware components but is open ended in that the learner might come up with another component and provide adequate motivation for the component named. Responses therefore will differ and markers have to carefully evaluate the motivation given by the learner making marking this question moderately difficult.

The question is considered to be 'moderately difficult' in terms of the content, task, stimulus and expected response demands.

Memorandum/Marking guidelines

- Processor type/speed.
- Video editing requires lots of calculations and processing.

AND/OR

- Hard drive size.
- Video files are large, requiring lots of hard drive space.

AND/OR

- Accept RAM.
- Video editing requires a lot of memory.

2 x Hardware component ✓✓

2 x Corresponding motivation ✓✓

Example 3:

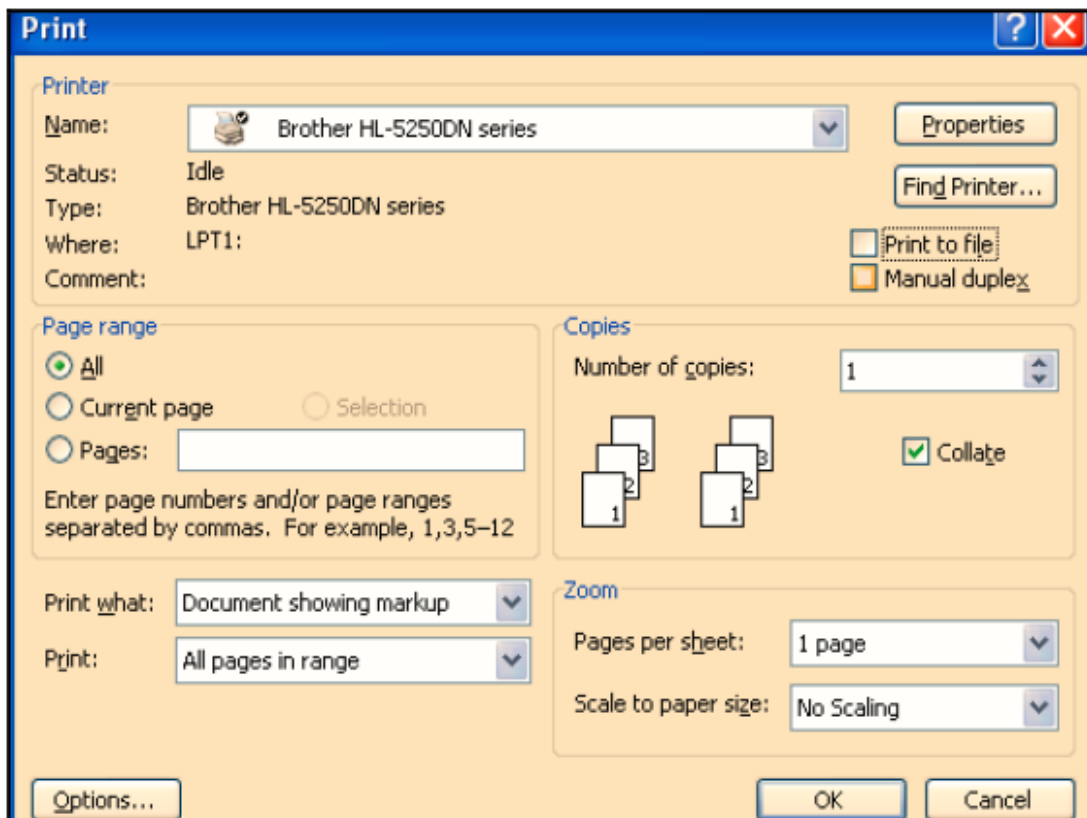
Reference: DBE, November 2009, CAT Paper 2, Question 5.6

Synopsis of scenario on which question is based:

Many people share interests and ideas and form friendships using social networking applications such as FaceBook, MySpace, Mxit and YouTube. A team of CAT learners has been asked to develop a brochure that provides information about the advantages, disadvantages and requirements of these applications.

Question:

When the team printed the brochure, they found that all the comments and changes made by them were printed in the final copy. Study the 'Print' dialog box below and give the reason why this happened. (1)



Discussion:

This question is classified as 'moderately difficult' for the following reasons:

- Content: Troubleshooting forms part of the Systems Technologies topic in Grade 12 of the CAT curriculum. In order to answer the question learners will have to have knowledge and understanding of troubleshooting and what to look out for when troubleshooting. This nearly always has a technical aspect

which the less technical learner will have difficulty in understanding, making the content moderately difficult for the envisaged Grade 12 learner.

- Stimulus: The scenario and requirements of the question are relatively straightforward and should be easily understood by all Grade 12 learners. However, the phrasing of the question is such that many learners might have difficulty in clearly understanding the requirements of the question. What raises the difficulty level of this question is the screenshot and the need for learners to read and interpret all aspects of the screenshot before answering the question.
- Task: Grade 12 learners will have been taken through a range of different processes as part of the process of troubleshooting or interpreting error messages that appear when using computers. These processes include reading what the error message says, interpreting what the error is and then checking various aspects to resolve the error. In this particular case learners are told what the actual error is and so they should know to look for something in the dialog box that relates to the nature of the actual output. In a sense, this factor limits what they need to look for and makes the task moderately difficult as opposed to being difficult.
- Expected response: The memo indicates that a single mark is allocated for identifying and writing down the only reason why the printout is incorrect. The answer and mark allocation is therefore straightforward and markers should have no difficulty in marking the question.

The question is considered to be 'moderately difficult' because of stimulus and task demands.

Memorandum/Marking guidelines

Printing the document showing markup. ✓

Table 16: Examples of THEORY EXAMINATION questions at Difficulty Level 3 – DIFFICULT

Example 1:
<u>Reference</u> : DBE, November 2014, CAT Paper 2, Question 4.5.2
<u>Synopsis of scenario on which question is based</u> : The opening of programs on a computer sometimes becomes slower over a period of time.
<u>Question</u> :

- 4.5.1 A support technician suggests that the hard drive might be fragmented. He recommends defragmenting the hard drive.
- 4.5.2 Identify TWO other software-related problems that could reduce the speed of a computer, besides fragmentation. Write down a potential solution for EACH of the problems you identify. (4)

Discussion:

This question is classified as 'difficult' for the following reasons:

- **Content:** There are a number of factors that could lead to a computer "slowing down". These could be broadly classified into hardware-related issues (such as defragmentation) and software-related issues (such as malware). In order to answer the question, the learner has to clearly understand what the probable causes of a computer slowing down are and how these are classified into hardware-related and software-related. The question is made more difficult by taking the hardware-related issues out of play and only specifying that software-related issues must be considered, thereby narrowing the possible options.
- **Stimulus:** Grade 12 learners should be familiar with the specific terminology used in this question (such as fragmented). However, the phrasing of the scenario and question are such that some learners might have difficulty in reading and understanding the question and determining exactly what is required of them.
- **Task:** Answering the question requires learners to list probable reasons for why a computer would slow down. In this process, they should discard those reasons that are hardware-related as they fall outside the scope of the question. The reasons that remain are therefore software-related. Once the reasons have been identified, the learner needs to provide a solution that would resolve the problem identified. These factors make the task difficult.
- **Expected response:** The memo indicates that this question carries 4 marks, 1 mark for each of the two problems identified and 1 mark for the resolution to the problem. The memo provides 5 possible reasons, each with a solution.

Learners have to use their own words to write extended text and must write sustained explanations/motivations for each of their solutions to the problems identified.

The answer and the mark allocation is therefore straightforward and markers should not have any problems in allocating marks.

The question is considered to be 'difficult' in terms of content, stimulus and the task demands.

Memorandum/Marking guidelines

Problem: Malware/Virus infection. ✓

Solution: Remove the infection with an antivirus program/removal tool. ✓

AND/OR

Problem: Too many programs open at the same time for the amount of RAM available/memory full/Programs running in the background. ✓

Solution: Close unused programs/Find and close any unnecessary programs running in the background. ✓

AND/OR

Problem: Software updates being automatically downloaded.

Solution: Switch off automatic updates.

AND/OR

Problem: Defective application/bug.

Solution: Update/Replace defective applications.

AND/OR

Problem: Too many unnecessary files/temporary files on the hard drive.

Solution: Use Disk Cleanup/Remove unnecessary files or programs.

(Note to marker: Do not accept any reference to defragmentation or upgrade issues.)

Example 2:

Reference: DBE, November 2012, CAT Paper 2, Question 7.7.3

Synopsis of scenario on which question is based:

The CAT learners have been asked to work with Mr Joe, the teacher, to set up a new computer centre at the school. As a CAT learner, you need to assist with any computer-related problems.

Question:

7.7 Mr Joe has to solve several problems regarding computers and the work learners are doing in the computer centre.

Mr Joe has asked some learners to help him in the computer centre in the afternoons.

He has created a spreadsheet to calculate the times worked by each learner.

Study the extract from the spreadsheet below and answer the questions that follow.

	A	B	C	D	E	F
1	Computer Centre Helpers					
2	Surname	Name	Class	Time In	Time Out	Hours worked
3	PODILE	Mpho	12C	12:30	16:00	03:30
4	MARX	Liena	11B	14:15	18:00	03:45
5	SERUMULA	Mohamed	11B	15:30	17:30	02:00
6	PUDIKABEKOA	Dzuni	11C	14:15	17:30	03:15
7	WIESEMAN	Owen	11A	15:15	18:00	02:45
8	MANTSINA	Jannie	12C	15:30	17:30	02:00
9	ESTERHUIZEN	Jan	12A	14:15	16:00	01:45
10	MSIMEKI	Linda	11B	12:30	16:00	03:30

...

7.7.3 Mr Joe wishes to know how many hours each learner worked.

He used the formula =E3-D3 (Time Out minus Time In) but found that the number of hours displayed as a time, for example 03:30, instead of 3.5.

State TWO changes Mr Joe should make to display the number of hours correctly. (2)

Discussion:

This question is classified as 'difficult' for the following reasons:

- Content: In order to answer the question learners are required to have an understanding of spreadsheets, in particular how calculations involving time are dealt with in the spreadsheet application. The envisaged Grade 12 learner has difficulty in working with date and time values as they are not as straightforward as working with integer or real number values although the subtraction problem that is required is in itself easy. The solution requires specific knowledge about calculations involving dates and time.
- Stimulus: The scenario and question are easy to read and understand. However, the envisaged Grade 12 learner would find this question difficult to answer because the question posed could be answered more easily if they were given the actual data file with the stimulus material. If they were provided with the data file, they could then investigate how the various cells are formatted and this information could 'lead' them to an answer. Without access to the actual data file, learners have to surmise how the cells have been formatted which raises the level of difficulty of the question.
- Task: This task makes high levels of cognitive demand. To complete the task learners must first analyse what the error is and how it would be produced before proposing a solution to resolve the error. They need to note that the answer to the subtraction should be a decimal value but that it is given as a time. They need to convert the time into a decimal value and also format the cell as a number.
- Expected response: The memo indicates that 2 marks are allocated to this question, showing that two facts are required. Once two facts have been

identified, the learner merely has to list them in short sentences. The answers and mark allocation are therefore straightforward and should mark easily.

The question is considered to be 'difficult' in terms of content, stimulus and task demands.

Memorandum/Marking guidelines

- Multiply the answer by 24. ✓
(Note to marker: Accept correct conversion)
- Format the cells/field to Number. ✓

Example 3:

Reference: DBE, November 2012, CAT Paper 2, Question 6.5.1 (ADAPTED)

Synopsis of scenario on which question is based:

The CAT learners have been asked to work with Mr Joe, the teacher, to set up a new computer centre at the school. As a CAT learner, you need to assist with any computer-related problems.

Question:

- 6.5 Mr Joe uses e-mail as the main method of communicating with other schools.
- 6.5.1 Although the area he lives in often experiences power failures, he still will receive all his e-mail.
- Explain why Mr Joe's e-mail is not lost during a power failure. Refer to the process whereby e-mail is sent and received. (2)

Discussion:

This question is classified as 'difficult' for the following reasons:

- Content: The difficulty in this question lies in the fact that most people, including Grade 12 learners, who use e-mail, have no clear understanding of exactly how an e-mail system works. There is a perception that for a brief moment in time the two computers are linked together over the Internet and that the message is transferred between the two during this time. Grade 12 learners will have some difficulty in explaining the "store-and-forward" concept that is used in the majority of e-mail systems. In addition to understanding the "store-and-forward" concept there are technical issues relating to where and how the messages are stored by the ISP. Because of the technical level of detail required in the answer, the envisaged Grade 12 learner will find answering the question difficult.
- Stimulus: The scenario and question are straightforward and all learners should find the requirements of the question fairly easy to comprehend.
- Task: To answer this question, learners need to recall the basics of how e-mail systems work, in particular the concept of "store-and-forward". They need to

apply their knowledge of how e-mail systems work to the particular scenario involving power failures and then provide a reasoned fairly technical explanation. The added complication of a power failure increases the difficulty of the task.

- Expected response: This question is allocated 2 marks, and, according to the memo, in their explanation learners need to provide at least two facts. Learners have to use their own words to write extended text and must write sustained explanations/motivations.

The mark allocation and marking are therefore straightforward.

The question is considered to be 'difficult' in terms of content and task demands.

Memorandum/Marking guidelines

- The e-mail service provider will keep the message in the mailbox. ✓
- until it can be transferred to Mr Joe's computer ✓

Table 17: Examples of THEORY EXAMINATION questions at Difficulty Level 4 – VERY DIFFICULT

Note:

During the development of the exemplar book some subject specialist argued that there is a fine line between a difficult and a very difficult question. It was also evident that in some subjects question papers did not have questions that could be categorised as very difficult. In order to cater for this category, subject specialists were requested to adapt existing questions and make them very difficult or create their own examples of very difficult question. However, it was noted that in some instances attempts to create very difficult questions introduced invalid sources of difficulty which in turn rendered the questions invalid. Hence Umalusi acknowledges that the very difficult category may be problematic and therefore requires especially careful scrutiny,

Example 1:

Reference: Question developed specially for this exemplar book

Synopsis of scenario on which question is based:

Many schools in South Africa have well equipped, networked IT facilities, including Internet access and a school intranet.

Question:

The school at which your mother teaches has not yet introduced technology into its teaching and learning practices. With the recent appointment of a young and

dynamic new principle the school has started to explore the possibilities but is only willing to implement a strategy if it will be to the benefit of the learners.

As a CAT learner you have been studying a variety of different aspects of the use of computing technologies. Your mother has, therefore, wisely approached you for some advice. Discuss some of the issues that your mother needs to take into account.

In your discussion, you must concentrate on the following major issues and ensure that you include aspects of ALL of the following:

- (a) Systems technologies (i.e. hardware and software)
- (b) Network technologies
- (c) Internet technologies
- (d) Social implications (9)
- (e)

Discussion:

This question is classified as 'very difficult' for the following reasons:

- Content: The CAT curriculum is built on a number of pillars that include systems technologies, network technologies, Internet technologies, social implications, information management and solution development. In order to successfully answer this question learners need to have a reasonably in-depth knowledge of four of the six pillars. The question contains a combination of a broad number of diverging knowledge elements thereby making answering it very difficult.
- Stimulus: The scenario and requirements of the question are easy to read and understand and contain no unfamiliar terminology or distracting information. Grade 12 CAT learners are in all likelihood at a school that uses computer equipment in a networked situation and should have been exposed to most of the terms used in the question, even if only by way of classroom discussion.
- Task: Firstly, learners need to consider the specifics of the given scenario. Secondly, they have to reflect on their own experiences in the school at which they have been studying CAT. They then have to take into account much of what they have studied over the 3 years in which they have studied CAT. Having done all of these things, they then have to decide which aspects are most important, list these aspects, and then provide a motivation for why they are important. For the majority of learners taking the subject, this task will be very difficult.
- Expected response: The answers to this question are wide-ranging. The marking guideline for the question is based on a rubric rather than a detailed marking guideline. In addition, the quality of the written communication in the answer has to be assessed. The more competently a learner supports the advice given, the higher the mark that will be awarded. Use of a rubric always places an extra burden on the marker and so competent markers with a wealth of experience in this particular aspect of

computing are needed to mark the answers to this question. The mark allocation of 9 (6% of the paper) is indeterminate, i.e. there is no indication to learners of how much to write in relation to each of the four aspects that need to be covered. Because of this fact and the subjectivity of the answers, learners could experience difficulty in deciding what they need to write and how their answer should be phrased or structured.

The question is considered to be 'very difficult' in terms of the demands of the content, task and expected response.

Memorandum/Marking guidelines

Candidates are expected to provide at least 8 well motivated points that need to be considered and that cover the following aspects:

- (a) Systems technologies (i.e. hardware and software)
For example: desktop vs notebook vs tablet; BYOD; proprietary vs open-source operating system; use of cloud services; etc.
- (b) Network technologies
For example: wired network vs wireless network; network peripherals such as printers, copiers, etc;
- (c) Internet technologies
For example: general access to the Internet; web access for parents, community members, etc; and
- (d) Social implications
For example: policies regarding use of social networks; availability of learning resources; use of facilities by community members; etc.

(8 x ✓)

(✓ ALL of the above aspects covered)

Example 2:

Reference: Question developed specially for this exemplar book

Synopsis of scenario on which question is based:

ABC Bank is a major South African bank with its head office in Johannesburg. The bank has branch offices in all of the major towns and cities in the country. In addition, it has a large number of ATMs situated in shopping malls, at service stations and in convenience stores across the country. All the sites are connected in a WAN.

Question:

The rolling electricity blackouts ("load-shedding") across the country are playing havoc with the commercial sector. The head office and major branches are able to continue operating during these blackouts as diesel generators automatically kick in when a power outage is detected. However, the same does not apply to the smaller branches and ATMs. Discuss, in your own words, the impact that load-shedding would have on the smaller branches and ATMs and what precautions the bank needs to take in order to minimize damage to equipment, to ensure that their operations are not endangered and that clients' data is not compromised. (5)

Discussion:

This question is classified as 'very difficult' for the following reasons:

- **Content:** In order to answer the question Grade 12 learners need to know the basics of various types of computer networks (specifically Wide Area Networks), aspects of trouble-shooting (specifically related to power outages and what happens to computer equipment when the power is interrupted), issues around backing up data; the use of uninterruptible power supplies (UPS), security of data, etc. This content is taught during the CAT course in areas such as systems technologies and social implications. However, the knowledge required is wide-ranging and not specific to a particular topic making the content very difficult.
- **Stimulus:** The scenario and requirements of the question are easy to read and understand and contain no distracting information or unfamiliar terms. The majority of learners taking the subject will also be very familiar with rolling blackouts (the scenario). As CAT learners they will in all likelihood be at a school that uses computer equipment in a networked situation and be familiar with what happens to a Local Area Network (LAN) when the power is interrupted.
- **Task:** Learners are required to consider the implications of a power interruption on a Wide Area Network (WAN) and the precautions that need to be put in place to minimize any damage to equipment and corruption of data. In addition, they would need to consider what would happen at a branch office when the power suddenly goes off and the branch is left in the dark. The question would be rated as a Level 3 (problem solving) question.
- **Expected response:** The question counts for 5 marks and learners are therefore expected to make at least 5 points (1 mark per point as per the general instructions for the examination). As this is an open-ended question where the mark allocation is indeterminate, the allocation of marks is reliant on the competence of the marker who needs to carefully study the answer and then decide whether the point being made is appropriate.

The question is considered to be 'very difficult' in terms of the content, task and expected response demands.

Memorandum/Marking guidelines

Marks should be awarded for well-motivated arguments that show an understanding of the issues faced by the smaller branches. Award ONE mark per argument to a maximum of 5 marks.

The following issues are amongst those that could be discussed:

- Policies regarding how to manage the smaller branches when power is off
- Need to do an orderly shut-down of the branch and ATM equipment using UPS, etc.
- Security issues that arise when the power suddenly goes off; emergency lighting using batteries.
- Any other relevant issue.

(5 x ✓)

Example 3:

Reference: Question developed specially for this exemplar book

Synopsis of scenario on which question is based:

The use of Free and Open Source Software (FOSS) has taken off in a number of countries around the world. Many South African banks use FOSS to run their back-office systems (databases, networks, etc.) and the workstations in the banks themselves. Some years ago, the South African Government implemented a FOSS policy that required government departments to migrate to FOSS and to move away from using proprietary software unless they could motivate the retention of their existing proprietary systems.

Question:

Since 2004 the majority of state schools in the country that have fully computerised administration systems, computer laboratories for teaching and learning, and tablet technologies have standardised on Microsoft products. Their networks will use the Microsoft server products while the network workstations will use versions of Windows and Microsoft Office, and the tablets might use Windows 10 along with other educational software and games.

Discuss, in your own words, what the impact would be if the government required all state schools in the country to migrate to free and open source software. (6)

Discussion:

This question is classified as 'very difficult' for the following reasons:

- Content: Grade 12 learners need to know the difference between proprietary software and free and open-source software (FOSS) and be able to apply this knowledge to a situation that they may not have encountered before. While the question seems to concentrate on a relatively simple issue – the difference between proprietary software and free and open-source software – issues around hardware (types of network) and application software (office suite and educational software) are included in the discussion. These aspects make the content very difficult.
- Stimulus: The scenario and requirements of the question are easy to read and understand and contain no distracting information or unfamiliar terms. The scenario itself while not being too difficult to understand does contain issues that require considerable thought as learners have to consider various implications that impact on the use of technology in schools thus making this a very difficult question.
- Task: The task requires learners to consider all aspects of the computerisation of schools and to evaluate what the impact would be if all Microsoft software had to be replaced by free and open-source software. The task is cognitively very demanding (Level 3) and there are a number of different issues to consider making the task multi-faceted and very difficult for the envisaged Grade 12 learner.
- Expected response: The question counts for 6 marks and learners are therefore expected to make at least 6 points (1 mark per point as per the general instructions for the examination). They have to write a sustained explanation

giving their own opinion. Their responses will differ depending on their arguments thus a wide range of alternative answers is possible. The mark allocation is also indeterminate and the allocation of marks is reliant on the competence of the marker who needs to carefully study the answer and then decide whether the point being made is appropriate.

The question is considered to be 'very difficult' in terms of content, stimulus, task and expected response demands.

Memorandum/Marking guidelines (ADAPTED)

Marks should be awarded for well-motivated arguments that show an understanding of the issues faced by the smaller branches. Award ONE mark per argument to a maximum of 6 marks.

The following issues are amongst those that could be discussed:

- Operating systems on all devices would need to be changed;
- Application software used in admin offices and classrooms, such as word processing and spreadsheet software, would need to be installed;
- Standalone school administration systems would need to be re-developed for FOSS;
- Applications that support teaching and learning, such as Maths software, software used on interactive whiteboards, etc. might need to be re-written so as to work in a FOSS environment;
- Documents would need to be saved in a format that would enable them to be sent to contributors who might still be using Microsoft applications;
- Device drivers for non-standard peripheral equipment might need to be obtained or the equipment could stop working; and
- Consideration would need to be given to the implications of learners using FOSS at school and Microsoft applications at home.

(6 x ✓)

9. CONCLUDING REMARKS

This exemplar book is intended to be used as a training tool to ensure that all role players in the Computer Applications Technology (CAT) Examination are working from a common set of principles, concepts, tools and frameworks for assessing cognitive challenge when examinations are set, moderated and evaluated. We hope that the discussion provided and the examples of questions shown by level and type of cognitive demand and later by level of difficulty assist users of the exemplar book to achieve this goal.

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