GENERAL EDUCATION & TRAINING PHASE (GET)

TECHNOLOGY

SBA EXEMPLAR BOOKLET

GRADES 7-9

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Read to Lead
A Reading Nation is a Leading Nation

2030 NDP

FOREWORD

The Department of Basic Education has pleasure in releasing a subject exemplar booklet for School Based Assessment (SBA) to assist and guide teachers with the setting and development of standardised SBA tasks and assessment tools. The SBA booklets have been written by teams of subject specialists to assist teachers to adapt teaching and learning methods to improve learner performance and the quality and management of SBA.

The primary purpose of this SBA exemplar booklet is to improve the quality of teaching and assessment (both formal and informal) as well as the learner's process of learning and understanding of the subject content. Assessment of and for learning is an ongoing process that develops from the interaction of teaching, learning and assessment. To improve learner performance, assessment needs to support and drive focused, effective teaching.

School Based Assessment forms an integral part of teaching and learning, its value as a yardstick of effective quality learning and teaching is firmly recognised. Through assessment, the needs of the learner are not only diagnosed for remediation, but it also assists to improve the quality of teaching and learning. The information provided through quality assessment is therefore valuable for teacher planning as part of improving learning outcomes.

Assessment tasks should be designed with care to cover the prescribed content and skills of the subject as well as include the correct range of cognitive demand and levels of difficulty. For fair assessment practice, the teacher must ensure that the learner understands the content and has been exposed to extensive informal assessment opportunities before doing a formal assessment activity.

The exemplar tasks contained in this booklet, developed to the best standard in the subject, is aimed to illustrate best practices in terms of setting formal and informal assessment. Teachers are encouraged to use the exemplar tasks as models to set their own formal and informal assessment activities.

MR HM MWELI

DIRECTOR-GENERAL

DATE: 13/09/2017

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SECTION 1

Generic

Legislative Context

The guideline must be read and used in conjunction with the:

- Curriculum and Assessment Policy Statements (CAPS) for Technology;
- National Policy Pertaining to the Programme and Promotion Requirements (NPPPPR) of the National Curriculum Statement Grade R-12;
- National Protocol for Assessment (NPA) in Grades R-12;
- Education White Paper 6 – Building an Inclusive Education and Training System;
- Policy on Screening, Identification, Assessment and Support of 2014 (SIAS)
- CAPS for Specialisations
  White Paper in Education, and
- The Guidelines for responding to learner diversity in the classroom Grades R-12.

1. The Principles of Assessment

The SBA must always demonstrate equal opportunity to learning, consistency and realistic expectations by being validity, realible, fair, siffiecient, etc.

1.1 Valid assessment

The assessment task is valid when it is based on the **content** and **standards** as set out in the CAPS. The **content, skills, values** and **attitudes** included in the assessment task must be based on the work learners have completed as per the Annual Teaching Plan (ATP) in the CAPS.

1.2 Reliable assessment

Reliable assessment also means that when the assessment is **developed**, the **input processes are well organized** and **based on sound theoretical** and **assessment principles**.

An assessment is deemed reliable when the results obtained from formal assessments produce the same results every time it is used to assess learners.

1.3 Fair assessment

The method of assessment should not present any barriers to the learners' achievements. It must be **free of bias** and **sensitive to contextual factors**. The types of questions asked must be **age appropriate**. The questions must be **based on the content, skills, values** and **attitudes** that has been taught to the learner over **a period of time**. In addition, the distribution of the **cognitive levels (low, medium and high order questions) must be aligned** to the requirements as stipulated in Section 4 of the CAPS for Technology.

1.4 Sufficient assessment

Sufficient assessment within the context of the Grades R – 9 means that the spread of content, skills, and values assessed are based on the work done during the **term** or **year/phase** according to the Annual Teaching Plan. Learners should be able to complete the assessment task within the **stipulated time**.

2. School-Based Assessment (SBA) and Common Assessments

Chapter 4 of the CAPS describes assessment as a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment. Therefore, SBA is integral to **teaching, learning** and **assessment** as it provides:

2.1. Learners with **feedback** on how they perform individually, as well as in relation to their peers (teamwork);
2.2. Teachers with **feedback** that enables them to adapt their teaching strategies to effectively and efficiently meet the needs of their learners;
2.3. Parents/guardians with meaningful **feedback** on what their children know and understand;
2.4. Guidance to learners, teachers and parents/guardians on what interventions need to be undertaken if necessary.

SBA comprises both **informal** (enabling) and **formal** assessment. Hence, assessment that takes note of learners' needs is called informal assessment (assessment **for** learning through enabling tasks) and assessment that focuses on the results of learning is called formal assessment (assessment **of** learning).

While the purpose of the guideline is to focus on formal assessment tasks in SBA, it needs to be emphasised that informal assessments must be given the same degree of importance and attention.

The CAPS refer to informal assessment as daily assessment which can be done through observations, discussions, classroom activities, homework, investigation (research), etc. It should not be seen in isolation from formal assessment. Informal assessments are important as they lay the foundation for learners to do formal assessments. Informal assessments are integral to learners achieving the required standards of knowledge and skills needed to achieve successful results in their formal assessment tasks. Therefore, *informal daily assessment activities need to be well planned and developed to meet the required standards to support learners to achieve the desired good results*.

With regards to the formal SBA tasks, *the Protocol for Assessment Grades R-12, Government Gazette No.36042 of December 2012 subparagraph 5(2 and 3) and 6(1)* states:

> *5(2) School-Based Assessment, Practical Assessment Tasks and end-of-year examinations are designed to address the content competencies, skills, values and attitudes of the subject, and to provide learners, parents and teachers with results that are meaningful indications of what learners know, understand and can do at the time of the assessment;*
>
> *5(3) School-Based Assessment and Practical Assessment Tasks allow for learners to be assessed on a regular basis during the school year and also allow for the assessment of skills that cannot be assessed in a written format, e.g. test or examination. School-Based Assessment and Practical Assessment Tasks include a variety of assessment methods as contemplated in Chapter 4 of the Curriculum and Assessment Policy Statements.*
>
> *6(1) School-Based Assessment is a compulsory component for progression and promotion in all the different school phases.*

In SBA, all the tasks that make up a formal programme of assessment for the year are regarded as formal assessments. Teachers mark and record all formal assessment tasks formally for the purposes of progression, promotion and reporting to parents. All formal assessment tasks have to be **moderated** (at school/district/provincially) for the purpose of **quality assurance** and to ensure that appropriate standards are maintained. Technology uses a variety of different methods and/or forms of assessment tasks. These are detailed in Chapter 4 of the CAPS.

The Grade 9 end-of-year examination is a high-stake assessment. As mentioned earlier, in 2010 the Minister delegated the responsibility to develop and administer the Grade 9 external assessments to each Provincial Department of Education through ***Circular 1 of 2010***. Since then some provinces have opted to set common examination papers for selected grades in the Intermediate Phase and the Senior Phase in order to ensure that end-of-year examinations meet the required standards. Teachers should take note and understand that there is no difference in terms of standards between the SBA that are developed internally and those that are developed externally. The table below presents some characteristics of SBA and Common Assessments:

School Based Assessment (SBA)	Common Assessments
Developed at school level by teachers.	Developed at provincial, district, circuit and cluster levels by subject specialists or senior teachers/ teachers and PLC leaders.
May use the SBA guidelines to develop their SBA activities and adapt them to their context.	Follow prescribed SBA guidelines for their development and administration.
Quality control is managed internally.	Quality control is managed externally
Less costly.	Cost implications are high.
Can be developed relatively quickly.	Takes time to develop.
Assessments are set and marked internally.	Assessments are set externally and marked internally.
Scripts are moderated internally.	Scripts are moderated internally and externally.
Item analyses and feedback done internally and easy to implement the intervention	Item analyses and feedback done both internally and externally and may not be easy to implement due to time constraints.

3. Types of Questions that can be used to develop formal assessment tasks

The format of the test/examination paper or formal assessment task can include any of the question types mentioned below. The actual structure and combination will depend on the content definition and the subject specific requirements as per the CAPS Section 4. As a rule, the memorandum and/or rubric are prepared as the assessment tasks are being developed.

3.1. Short Answer Questions

A short answer item is a question used to find out about what the learner knows. It requires the learner to provide an answer, rather than to select an answer. Short answer items use questions that restrict the answer to a short paragraph, sentence, or single words. Short answer questions are more

appropriate for some topics rather than others. They are useful for recall of facts, analysis of data and solving of problems. Examples of short answer items could include lists of items or equipment, brief descriptions of a procedure, sequence of an activity or reasons to explain an event.

Advantages:

- Easy and relatively quick to write.
- Less influenced by guessing than multiple choice or true/false questions.
- Easy to score/mark with a high reliability of marking, especially with model answers or a marking guide.
- Provides more scope for the learner to show their knowledge than with a limited response question.

Disadvantages:

- Where a short answer is required, the learner should be given clear guidance on the target length of the answer.
- When a marking guide is developed, the teacher / test developer should recognise that there are likely to be correct answers discovered later in addition to those expected and that these should be added to the marking guide as they are identified.

Hints

- Ask for specific information.
- Phrase the question precisely and concisely.
- Ensure that there is a single or defined number of correct answers.
- Avoid phrasing a question that offers a clue to the answer.
- Indicate the marks allocated for the question.

3.2. Diagrams/Cartoons/Graphs

This type of question requires the learner to look at a drawing, picture, cartoon or a graph and write the correct information in a blank space, interpret, analyse the information presented and/or develop his/her own diagram, cartoon or graph. Interpretation and drawing of graphs are used more for higher-level questions.

Advantages:

- Useful in measuring the learner's knowledge of tools, supplies or components.
- Useful for higher level questions.
- Assists learners with low literacy skills by the use of pictorial materials.

- Can be used effectively to test many aspects of the subject.
- Can be incorporated with other forms of assessment such as case studies or short questions.

Disadvantages:

- Preparation and presentation of clear diagrams or pictorial material is difficult.
- Grids for graphs must be drawn accurately when preparing the answer sheet.
- Sufficient amount of graph paper needs to be supplied.

Hints:

- Grids for the graphs must be age appropriate.
- ***Only include this type of question if learners have worked with it in their informal activities.***

3.3. Fill the Space/Gap questions

"Fill in the gap" questions are another variation of short answer questions. The question consists of a true statement in which one or two important words have been left out.

Advantages:

- Little scope for the learner to guess the correct answer.
- Useful for assessing recall of information.

Disadvantages:

- Often difficult to write questions that have only one correct answer.
- Sometimes the word(s) omitted make it difficult to understand the meaning of the sentence.

Hints:

- Omit only a relevant key word.
- Use straightforward sentences.
- Check that learners can infer the meaning even without a deleted word.
- Do not use “a” or “an” to provide a clue.
- Give credit for all potential answers that make sense.

3.4. Multiple Choice Questions

A multiple choice is a question or incomplete statement followed by three to five options from which the learner selects the best answer(s). Incorrect options are called distracters. Distracters are used to side-track learners who may not know the correct answer.

Advantages:

- Marking / scoring is uniform, standardised and usually quick.
- Objectivity in marking reduces any teacher variability factors.
- Assesses a learner's knowledge as well as their ability to discriminate amongst several possible alternatives.
- Can test judgment as well as memory.
- Provides a better sample of the topic being assessed than most other formats given the same period of time.
- Can be used to assess low, medium and higher order questions.

Disadvantages:

- Relies on the learner having appropriate reading and comprehension skills.
- Construction of effective questions is often difficult and time consuming.
- The quality of the question often depends on appropriate "distracters" or incorrect options.
- Economies of scale can only be achieved with large numbers of learners.

Hints:

- Allocate approximately one multiple-choice question per minute.
- Questions should be meaningful and represent a specific problem in the stem of the question.
- Questions should be stated in positive rather than negative terms.
- Distribute answers equally in the positions of *a, b, c,* and *d.*
- Avoid the use of grammatical clues at the end of a stem, for example: *a, an, are, is, this, these.*
- Avoid the use of "some/none/all of the above" as an option.
- Try to include at least four possible responses for each question.
- Use between 1 or 2 questions to assess each of the topics completed during the term.
- Use plausible distracters.
- Use a question format.
- Be grammatically correct.
- Avoid giving clues for the correct answer.

3.5. Matching and Alternative Choice Questions

The matching question is a type of multiple-choice question that is helpful for assessing knowledge of related information. It consists of two lists or columns of related information from which the learner is asked to match the appropriate items.

Advantages:

- A lot of content can be covered in one question.
- Easier to write than multiple choice questions.
- Useful variation in questioning.
- Objective and easy to mark/score.

Disadvantages:

- Need a large number of items to match within the question.
- Specific instructions/guidelines should be given for matching items.

Hints:

- Need 7-10 items to match within the question.
- Allow one or two extra options.
- Make sure learners are familiar with this type of questions.

3.6. True/False Questions

The true or false question is basically a statement that has to be identified as correct or incorrect.

Advantages:

- Useful for assessing the basic knowledge of facts.

Disadvantages:

- Can encourage guessing.
- Questions should not require only recall of trivial information.

Hints:

- Ensure that the statement is entirely true or false.
- Include only one idea in each question.
- Use clear language and avoid double negatives.
- Place true and false answers in random order.

- Use false answers so that they represent misconceptions, and true answers for correct ideas.
- Include many questions on a topic to reduce the impact of guessing answers.
- Avoid the terms 'usually', 'always', 'none'.
- Avoid trick questions.

3.7. Case Study Questions

Case Study type questions are probably the most demanding of questions because they assess the learner's ability across all the cognitive levels of all Taxonomies. The structure and style of the Essay-type questions differ from subject to subject.

Advantages:

- Useful for assessing high order cognitive questions.

Disadvantages:

- Essay questions must be formulated very carefully.
- It is easy for learners to misinterpret questions.
- Memoranda are open-ended, depending on the structure of the question, and therefore must be detailed with clear allocation of marks for the responses required.
- Marker needs to have in-depth knowledge of the topic.

Hints:

- Formulate the question clearly.
- Identify probable causes that might lead the learner to misinterpret the question.
- Make sure learners are familiar with the structure and style of Essay-type questions.

When preparing the memorandum:

- select or generate the most appropriate solution/s;
- list all the facts/answers required for the essay and the mark allocation for each fact/answer; and
- list all possible alternative solutions if any.

4. Taxonomies helping to strike the balance

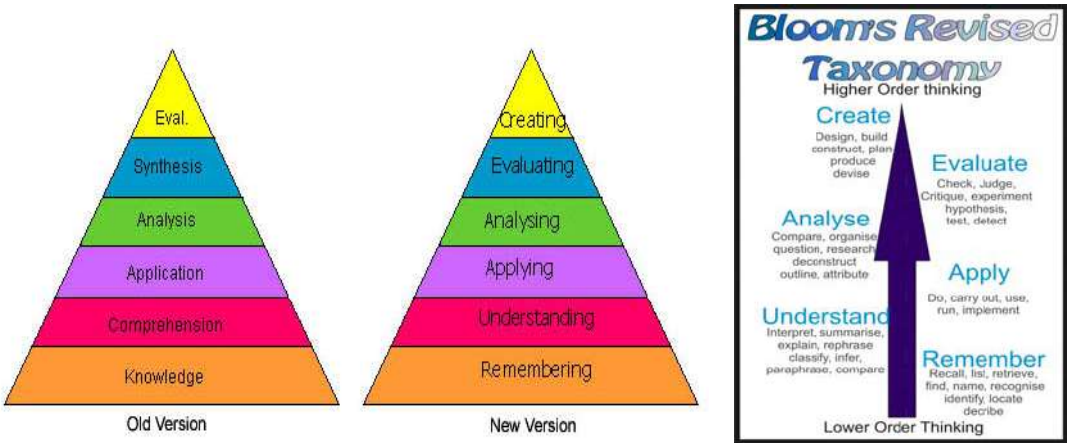
When preparing to develop a formal assessment task, it is important to make sure that the “cognitive levels” are well balanced. Every learner has to be given a fair and just chance in achieving the desired result according to her/his cognitive ability. This leads to the basic question facing teachers the world over, “How do we strike that balance?” Various theories exist on how to “strike the balance” by classifying the types of questions asked into cognitive low order, medium order, and high order levels.

Section 4 in the CAPS indicates the cognitive levels and the percentage distribution of the three different cognitive levels for all subjects. For the purpose of this guideline *Bloom’s Taxonomy* (page 77 of CAPS) and *the Problem-Solving Taxonomy* will be discussed. Bloom’s Taxonomy is used in most subjects and the Problem-Solving Taxonomy is used in Technology. Simply put, “Taxonomy” means to arrange something in a particular order. For our purpose, it means arranging both formal and informal assessment questions into high, medium or low order levels by using an appropriate verb.

4.1. Bloom’s Taxonomy

Bloom's Taxonomy is most commonly used and has stood the test of time. It is a multi-tiered model of classifying thinking according to six cognitive levels of complexity. Throughout the years, the levels have often been depicted as a stairway, leading many teachers to encourage their students to "climb to a higher (level of) thought." The lowest three levels are: knowledge, comprehension, and application. The highest three levels are: analysis, synthesis, and evaluation. "The taxonomy is hierarchical; [in that] each level is subsumed by the higher levels. In other words, a student functioning at the 'application' level has also mastered the material at the 'knowledge' and 'comprehension' levels." (UW Teaching Academy, 2003). One can easily see how this arrangement led to the natural divisions of lower, middle and higher-level thinking.

In 2001 Bloom’s Taxonomy was revised. Basically, Bloom’s six major categories were changed from noun to verb forms. Additionally, the lowest level of the original, knowledge was renamed and became remembering. Finally, comprehension and synthesis were re-titled to understanding and creating. The changes are explained in the diagram on the next page:



Caption: Terminology changes.
The graphic is a representation of the NEW verbiage associated with the long familiar Bloom's Taxonomy. Note the change from Nouns to Verbs [e.g., Application to Applying] to describe the different levels of the taxonomy. Note that the top two levels are essentially exchanged from the old to the new version." (Schultz, 2005) (Evaluation moved from the top to Evaluating in the second from the top, Synthesis moved from second on top to the top as 'Creating'.
Source: http://www.odu.edu/educ/llschult/blooms_taxonomy.htm

The new terms are defined as:

Remembering: Retrieving, recognizing, and recalling relevant knowledge from long-term memory.

Understanding: Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.

Applying: Carrying out or using a procedure through executing or implementing.

Analysing: Breaking material into constituent parts. Determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.

Evaluating: Making judgments based on criteria and standards through checking and critiquing.

Creating: Putting elements together to form a coherent or functional whole. Reorganizing elements in a new pattern or structure through generating, planning and/or producing.

The table on the next page can be used to assist in formulating the assessment questions so that the balancing of the cognitive levels can be addressed.

The table lists each of the categories and the key verbs associated with it.

Categories	Remembering	Understanding	Applying	Analysing	Evaluating	Creating
Associated verbs	Recognise List Describe Identify Retrieve Name Locate Find Label Give example	Interpret Summarise Infer Paraphrase Classify Compare Explain Exemplify	Sequence Implement Calculate Execute Manipulate Solve Adapt	Investigate Examine Organise Deconstruct Categorise Probe Integrate Structure Distinguish	Validate Check Hypothesise Critique Experiment Judge Test Detect Monitor	Develop Design Construct Plan Produce Invent Devise Make Formulate

4.2 Problem Solving Taxonomy: Plants Approach

The Problem-Solving Taxonomy is used in the subject Technology in the Senior Phase. Technology focuses more on Practical activities referred to as Capability Tasks or PAT. The Plants approach acknowledges the cognitive and skills levels the learners' come up with. This approach fits well with the skills and the cognitive development in technology where learners are expected to develop progressively.

Problem Solving Taxonomy: Plants approach is applied to the subject Technology as follows:

Creative Level:

Tasks require learners to develop a solution which was not previously known or combine a few procedures in a new way

Interpretation level:

Learners are required to stimulate real life problems and solve it.

Strategic level:

Learners are presented with problems which require them to select the most suitable solution out of a number of possible options.

Diagnostic level:

Learners are given tasks which require them to choose the correct routine out of a few known possibilities.

Routine Level:

Problems are presented to learners which require them to follow familiar routine processes.

5. Steps in developing formal assessment tasks

All formal assessment tasks must be planned and developed according to the CAPS. The requirements and the importance of the assessment must be communicated in advance to learners and parents. The following steps are suggested as a guideline:

5.1. The planning processes:

Planning for the development of the formal assessment tasks must be done according to the Programme of Assessment in Chapter 4 of the CAPS. Section 4.4 of the CAPS (page 45 to 47), stipulates the number of formal assessments that need to be completed per term and per year for each subject.

5.2. Identifying the content:

The Annual Teaching Plan: Chapter 3 of the CAPS should be used to identify the content which will be used to develop the formal assessment tasks stated in the Programme of Assessment.

The NCS: CAPS for Technology is silent on the mid-year examinations however, we recommend that the mid-year examination should cover work done in terms 1 and 2. The end-of-year examination should cover the work done in term 3 and 4.

Remember learners can only be tested on content that they have been taught.
We noted that the directive to erase 20 marks outlined in Cir S1 and its guidelines has been added in SA-SAMS. We recommend that the end of the year examinations be weighted at 60% in line with the NPA prescripts.

5.3. Forms of assessment

Chapter 4 of the CAPS document details the different forms of assessment applicable to each subject. Exemplars of the forms of

assessment are explained in greater detail in Section 2 of this handbook. It is important to note that the cognitive levels of low order, middle order and high order are applicable to all the forms of assessment. The marks allocated for the formal assessments are stipulated in the CAPS and should be adhered to.

5.4. Types of questions to be included in the formal assessment task

The types of questions that will be used in a particular form of assessment will depend on the form of assessment being developed.

5.5. Format of the formal assessment task

The format and the structure of the assessment task will depend on the form of assessment being developed. With regards to the examinations, it is recommended that the format, particularly for the Senior Phase, be similar to the FET examination papers (find attached annexure for GET examinations). The rationale behind this is to familiarise our learners to the type of assessment papers they will write in the FET examinations and to develop their skills in writing external assessments.

5.6. Instructions for the learner

Instructions to the learner should be clear and simple. Instructions should include what is expected, the time, the process involved and any other relevant information that will help the learner to complete the task successfully.

5.7. Possible answers: memorandum / rubric

As a rule, the memorandum / possible answers are prepared as the assessment is being developed. This allows the developer to evaluate the questions and make the necessary amendments should the need arise.

5.8. The moderation process of formal assessment tasks

With regards to the moderation of SBA tasks, *the Protocol for Assessment Grades R-12, Government Gazette No.36042 of December 2012 subparagraph 6(2) and 7(4)* state that moderation of the SBA tasks must be done in order to ensure that the quality and standards are met.

According to Chapter 4 of the CAPS, all formal assessments from Grades 4 - 9 is moderated internally. Furthermore, district subject advisors will

moderate samples of the task during school visits to verify the standard of internal moderation.

With regards to Grade 9, formal assessment tasks will be set and managed by the provincial Departments of Education according to Circular S1 of 2010 and moderated as per the requirements of the Protocol for Assessment Grades R-12.

Moderation is conducted at school, district, provincial and national levels to:

- Confirm the validity, fairness and practicability of the assessment instrument;
- Establish whether assessment was conducted in a fair and consistent manner;
- Establish the reliability and fairness of the assessment scores; and
- Provide feedback on the moderation findings with a view to improving the quality of SBA.

7.3. GUIDELINES FOR SETTING A MEMORANDUM:

- The memorandum should be drawn up at the same time as the question paper is being set.
- The memorandum must correspond with questions set in the question paper.
- A memorandum gives allowance for alternative responses.
- The marking memorandum should be complete with the mark allocation.
- The marking memorandum should be laid out clearly and neatly typed.

Moderation of the SBA at the **school level** means that:

- The school will take full responsibility for the moderation and monitoring of SBA.
- The principal will appoint the head of department or a senior teacher to take responsibility for the moderation of SBA in Technology, in each grade.
- The principal will ensure that all teachers will adhere to the requirements of the NCS with regards to SBA

- The principal in collaboration with the School Management Team (SMT) will monitor on a quarterly basis, the setting, marking and moderation of SBA.
- Three to ten percent (3% - 10%) of learners' evidence in Technology depending on the total number of learners in the grade will be moderated to ensure that the marking memorandum/possible answers were consistently applied. The principal will ensure that all **irregularities discovered** during moderation will be addressed.

A **moderation checklist** must be used by the school for the moderation of the SBA. The moderation checklist should be used to check that the:

- Assessment tasks are aligned to CAPS;
- Assessments tasks are valid, reliable, fair, sufficient, etc
- Instructions relating to the assessment tasks are clearly stated;
- Content is based on the Annual Teaching Plan as stipulated in the CAPS;
- Learners have been taught the content and skills that they are being assessed on;
- Assessment task is free of any bias;
- Language used in assessment task caters for the learners at the level of English FAL;
- Cognitive levels at which the assessment tasks are pitched are compliant to CAPS and differentiation; and
- Time allocated to complete the assessment task is weighted according to learners' cognitive levels and grade specific.

Analysis of results:

It is important for teachers to analyse the results of learning to further support learners that are struggling with content or learners experiencing barriers to learning. This is normally done at the end of every term (could be done after every assessment activity as well)

1 Not Achieved	**2** Elementary Achievement	**3** Moderate achievement	**4** Adequate achievement	**5** Substantial achievement	**6** Meritorious achievement	**7** Outstanding achievement	**TOTAL NO. OF LEARNERS**

Analysis of results in the subject is designed to inform the following progresses i.e. the NSLA (District/ Provincial/ National, Item analyses (School/District) and Subject Improvement Plans (School/District/Province)

Concluding Remarks

SBA is an essential component of teaching, learning and assessment in the classroom and comprises both informal and formal assessment on an on-going basis. As indicated above, informal assessment lays the foundation for learners to achieve good results in their formal assessment tasks.

Section 1 of this guideline outlines briefly all the aspects needed to develop educationally sound formal assessment tasks up to the point of pre and post assessment moderation. However, it is important to note that post assessment activities of the formal assessment tasks such as: the administration of the task in the classroom, the effective and efficient marking of the task, the moderation of the marking, the analysis of the learners' responses to the assessment tasks and providing prompt feedback to the learners and parents are sound practices that are critical to the achievements of our learners.

Section 2 provides selected exemplars of formal assessment tasks as prescribed in the CAPS for Grades 7-9 for Technology. It is envisaged that these exemplars will provide teachers with the necessary tools they need to develop their own formal assessment tasks.

SECTION 2

Assessment in Technology

2.1. What is Assessment?

Assessment is a continuous planned process of gathering information about the performance of learners in order to improve both the processes of teaching, learning and assessment.

2.2. Importance of Assessment:

- To track the learners progress;
- To assess if learners have understood the concepts taught and their application;
- To identify weaknesses and strengths in the teaching and learning process;
- To give feedback to all relevant stakeholders;
- To ensure that the principles of assessment are discussed - they must be valid, reliable, appropriate, etc.

Teachers assess in order to:

- Learn how to teach your class;
- Understand how your learners learn;
- Learn how to keep improving learning and teaching.

What should teachers do to achieve this?

- plan what to teach in order to plan what to assess.
- identify areas where learners require support and where learners are excelling.
- plan to address the challenges of learners and acknowledge how well they perform in the areas where they have done well
- keep records of all plans and of the learner's performance,
- analyse the information and re-plan how to teach better in order for the children to learn better.
- communicate findings to parents and to the education authorities (stakeholders).
- During parents'/guardians' meetings, we share ideas on how children learn - both from the home-based observation of parents and the school-based observation of teachers.

- Regular feedback should be given to learners and parents in order to track the learner's progress.

3. Difference between Formal and Informal Assessment

3.1. Informal Assessment (Assessment for learning):

- Assessment for learning - collecting information on learner achievement to improve learning (CAPS: Section 4; NPA: p 3)
- Daily monitoring and observation of learner progress
- Used to give feedback to learners
- The information obtained is used to plan future lessons
- Results of informal daily assessment are **NOT** formally recorded unless the teacher wishes to do so
- The results of daily assessment tasks are not taken into account for promotion and certification purposes
- Informal assessment builds skills for learners to cope with formal assessment.
- Examples of informal assessment: class activities, homework, spelling vocabulary test.

3.2. Formal Assessment (Assessment of learning):

- It includes all tasks that make up the formal (PAT, Test and Examination) programme of assessment.
- Teachers must ensure that assessment criteria are very clear to learners before assessment.
- Such tasks are marked and formally recorded for the progression in the learning process.
- Formal tasks are subjected to moderation for quality assurance and standard setting.
- *Examples*: IDMEC; tests, examinations, assignments, projects, case studies, data responses, posters, oral presentations.

4. The importance of formal and informal assessment

Informal Assessment: It builds up the knowledge, skills and values of learners to cope with Formal Assessment. It allows learners to learn from and reflect on their own performance.

Formal Assessment: It provides teachers with a systematic way of evaluating how well learners are progressing in a specific grade in Technology.

5. Programme of Assessment per Grade.

Grade 7 (CAPS: pg45)

	Term 1		Term 2	Term 3		Term 4
Forms of Assessment	PAT	Controlled Test	Mid-Year Exam	PAT	Controlled Test	Final Exam.
Total Marks	70	60	60	70	60	60
Time Allocation	-	60 min	60 min	-	60 min	60 min

Grade 8 (CAPS: pg45)

	Term 1		Term 2	Term 3		Term 4
Forms of Assessment	PAT	Controlled Test	Mid-Year Exam	PAT	Controlled Test	Final Exam.
Total Marks	70	60	100	70	60	100
Time Allocation	-	60 min	60 min	-	60 min	90 min

Grade 9 (CAPS: pg45)

	Term 1		Term 2	Term 3		Term 4
Forms of Assessment	PAT	Controlled Test	Mid-Year Exam	PAT	Controlled Test	Final Exam.
Total Marks	70	60	120	70	60	120
Time Allocation	-	60 min	120 min	-	60 min	120 min

6. Codes and Percentages for recording and reporting

Rating Codes	Description of competence	Percentage
7	Outstanding achievement	80 – 100
6	Meritorious achievement	70 – 70
5	Substantial achievement	60 – 69
4	Adequate achievement	50 – 59
3	Moderate achievement	40 – 49
2	Elementary Achievement	30 – 39
1	Not Achieved	0 – 29

7. TESTS AND EXAMINATIONS GUIDELINES

SETTING A QUALITY QUESTION PAPER FOR GRADES 7 TO 9

7.1. INTRODUCTION:

This document serves to provide guidance on the setting of a good quality question paper.

The Curriculum and Assessment Policy Statement (CAPS) for the Senior Phase (Grades 7 to 9) has indicated the following for Technology in the GET Band:

- The content for term 1 and 2 must be addresses in the mid-year examination.
- The content for term 3 and 4 must be addressed in the end of year examination.
- The mid-year and end of year examination for Grade 7 is 60 minutes and counts 60 marks, Grade 8 is 90 minutes and counts 100 marks and Grade 9 is 120 and counts 120 marks.
- The weighting of the end of year examination for Technology is 60%.
- In Grade 8 and 9 prior knowledge from Grade 7 and 8 may be necessary to interpret and answer some questions.

This guideline document serves to support teachers in setting question papers of high quality which will ensure the integrity of the assessment process for all stakeholders.

7.2 STEPS IN SETTING A GOOD QUALITY QUESTION PAPER

Step 1	Determine the *knowledge, skills and values* applicable to the paper
Step 2	Select *appropriate marks allocated* to each question.
Step 3	Brainstorm the *nature or type of each question and sub-questions* e.g. factual, data-response, critical evaluation, problem-solving, verbal, numerical, visual, closed or open-ended.
Step 4	Decide on the *cognitive levels* to be addressed in each question.
Step 5	Decide on *how each question should be structured*, for example 'scaffolding'.
Step 6	Set the question paper and the marking memorandum *simultaneously*.
Step 7	Apply suggested *time allocations* for each question.
Step 8	Develop the *cover page, including time allocation*.
Step 9	Ensure that the paper is *moderated and all quality control checks (annexures accompanying specific formal assessment activities)* that have been completed.

(Extract from Trevor Hall's *Implementation of the National Curriculum in Grades 10 – 12)*

7.3 MODERATION OF QUESTION PAPERS

Moderation of question papers is important to ensure the validity, reliability and fairness of the assessment. It also serves as a quality assurance mechanism to ensure that all schools use high quality assessments. Schools may use the moderation provided to assist in the moderation process for the Grade 7 - 9 internal examination:

7.4 OVERAGE OF SPECIFIC AIMS ACROSS THE QUESTION PAPERS

Controlled Tests only

SPECIFIC AIMS			Grade 7	Grade 8	Grade 9
		% Weighting	Marks	Marks	Marks
SA 1	Design skills to solve technological problems.	50%	30	30	30
SA 2	Concepts and knowledge used in Technology	30%	18	18	18
SA 3	Values, attitudes, technology, society and the environment	20%	12	12	12
		Total Marks	60	60	60

Notes:

- Content and skills must cover a Grade focus across a broad range of topics, concepts and skills
- Although the question paper is divided largely into Content Sections, Specific Aims1 and 3 are integrated across and or within the questions.

Examinations Only

SPECIFIC AIMS			Grade 7	Grade 8	Grade 9
		% Weighting	Marks	Marks	Marks
SA 1	Design skills to solve technological problems.	50%	30	50	60
SA 2	Concepts and knowledge used in Technology	30%	18	30	36
SA 3	Values, attitudes, technology, society and the environment	20%	12	20	24
		Total Marks	60	100	120

Notes:

- Content and skills must cover a Grade focus across a broad range of topics, concepts and skills
- Although the question paper is divided largely into Content Sections, Specific Aims1 and 3 are integrated across and or within the questions.

7.5 COVERAGE OF COGNITIVE LEVELS ACROSS THE QUESTION PAPERS

Controlled Tests Only					
COGNITIVE LEVELS			Grade 7	Grade 8	Grade 9
LEVELS		% Weighting	Marks	Marks	Marks
Low		30%	18	18	18
Middle		40%	24	24	24
High		30%	18	18	18
		Total Marks	60	60	60

Notes:

- When setting questions within a Section, consideration must be given to the increasing cognitive complexity of the questions across the full question paper and within each question where possible.
- Progress questions from low to high order where possible.

Examinations Only					
COGNITIVE LEVELS					
			Grade 7	Grade 8	Grade 9
LEVELS		% Weighting	Marks	Marks	Marks
Low		30%	18	30	36
Middle		40%	24	40	48
High		30%	18	30	36
		Total Marks	60	100	120

Notes:

- When setting questions within a Section, consideration must be given to the increasing cognitive complexity of the questions across the full question paper and within each question where possible.
- Progress questions from low to high order where possible.

4. OVERALL STRUCTURE OF THE QUESTION PAPERS

The format of the question paper should be followed as prescribed in the table below for every question paper set. Questions may be divided into sub-questions to differentiate between topics, subject to maintaining the total marks allocated for specific aims. Table below illustrates the structure of question papers above.

STRUCTURE OF GRADE 7-9 TESTS (TERM 1 AND 3)													
Grade					7			8			9		
Section	Content Weighting	Cognitive levels: Low (30%), Middle (40%), High (30%)	Questions	Comments	60			60			60		
Section A	SKILLS - IDMEC (Design Process) 50%	**Low**: Recognise, List Describe, Identify, Retrieve Name, Locate, Find, Label, give example, Interpret Summarise, Infer, Paraphrase, Classify, Compare, Explain Exemplify	Question X Question X …..	• Will address Design skills within a content field (this may include sketching of design ideas / possible design solutions	SA1	SA2	SA3	SA1	SA2	SA3	SA1	SA2	SA3
					30	*	*	30	*	*	30	*	*
Section B	KNOWLEDGE (Content) 30%	**Middle**: Sequence, Implement, Calculate, Execute, Manipulate, Solve Adapt, Investigate, Examine, Organise, Deconstruct, Categorise, Probe, Integrate, Structure, Distinguish	Question X Question X …..	• Covers a range of different type of questions: True / false; complete statement, respond to text, matching columns	*	18	*	*	18		*	18	*
Section C	VALUES AND ATTITUDES, SOCIETY AND ENVIRONMENT (Values/ Attitude) 20%	**High**: Validate, Check Hypothesise, Critique Experiment, Judge, Test Detect, Monitor, Develop Design, Construct, Plan Produce, Invent, Devise Make, Formulate	Question X Question X …..	• Will address Society and Environment within a content field.	*	*	12	*	*	12	*	*	12
Total value of Specific Aims covered i.e. integrate SA 1 and 3 within content of SA 2.					30	18	12	30	18	12	30	18	12

Notes:

- Questions set within a technology context to assess Technical understanding
- Questions follow number sequence across the paper. Each Section may have more than two questions.
- Not all Sections must show integration of SA 1 and 3.
- No question paper will always match the % weighting for Specific Aims or Cognitive levels. A deviation of 5% could be considered acceptable
- Ref: * = Marks allocated must show coverage of all content areas. Values may change across content areas.

STRUCTURE OF GRADE 7-9 EXAMINATIONS (TERM 2 AND 4)													
Grade					7			8			9		
Section	Content Weighting	Cognitive levels	Question 1	Comments	60			100			120		
					SA1	SA2	SA3	SA1	SA2	SA3	SA1	SA2	SA3
Section A	SKILLS - IDMEC (Design Process) 50%	**Level 1:** Recognise, List Describe, Identify, Retrieve Name, Locate, Find, Label, give example, Interpret Summarise, Infer, Paraphrase, Classify, Compare, Explain Exemplify	Question X Question X …..	• Will address Design skills within a content field (this may include sketching of design ideas / possible design solutions	30	*	*	50	*	*	60	*	*
Section B	KNOWLEDGE (Content) 30%	**Level 2:** Sequence, Implement, Calculate, Execute, Manipulate, Solve Adapt, Investigate, Examine, Organise, Deconstruct, Categorise, Probe, Integrate, Structure, Distinguish	Question X Question X …..	• Covers a range of different type of questions: True / false; complete statement, respond to text, matching columns	*	18	*	*	30		*	36	*
Section C	VALUES AND ATTITUDES, SOCIETY AND ENVIRONMENT (Values/ Attitude) 20%	**Level 3:** Validate, Check Hypothesise, Critique Experiment, Judge, Test Detect, Monitor, Develop Design, Construct, Plan Produce, Invent, Devise Make, Formulate	Question X Question X …..	• Will address Society and Environment within a content field.	*	*	12	*	*	20	*	*	24
Total value of Specific Aims covered i.e. integrate SA 1 and 3 within content of SA 2.					30	18	12	50	30	20	60	36	24

Notes:

- Questions set within a technology context to assess Technical understanding
- Questions follow number sequence across the paper. Each Section may have more than two questions.
- Not all Sections must show integration of SA 1 and 3.
- No question paper will always match the % weighting for Specific Aims or Cognitive levels. A deviation of 5% could be considered acceptable
- Ref: * = Marks allocated must show coverage of all content areas. Values may change across content areas.

8. GUIDELINES FOR QUALITY PRACTICAL ASSESSMENT TASK (PAT)

8.1. **Practical Assessment Task (PAT)**

Definition:

A set of short practical assessment tasks which make up the main formal assessment of a learner's skills, knowledge and values and their application of them during a particular term i.e. term 1 and 3 of each grade. It may be an assignment covering aspects of the design process, or it may be a full capability task covering all aspects of the design process (IDMEC). It is composed of a variety of forms of assessment suited to the range of activities that make up a PAT in line with the Annual Teaching Plan (ATP) of the grade.

Purpose:

A PAT is intended to formalise the **practical** component of Technology contextualised within acknowledge focus. **Practical activities should make up at least 57% of a PAT's mark allocation.**

- The Practical Assessment Task is designed to give learners the opportunity to develop and demonstrate their levels of ability (i.e. capability) as they progress through the task's activities.
- Each PAT focuses primarily on one of the knowledge foci of Technology (viz. structures, mechanical systems and control, electrical/electronic systems and control and processing), but may be integrated and may target more than one knowledge focus.
- These tasks are structured according to the design process:

  Investigate – Design – Make – Evaluate – Communicate.

  NB: This is NOT a LINEAR process happening in a fixed sequence.

- Assessment in a PAT need not cover all aspects of the design process each term.
- A PAT is an extended formal assessment task and must be planned with other school activities.

A learner must present the full design process once as a Practical Assessment Task in term 3 of each grade. This meets the requirement of one project per subject per annum.

- The preferred tool to be used to assess learner performance in a Practical Assessment Task is an analytical rubric (amended) (Refer to page 44).

Comparison: Holistic rubric versus Analytic rubric
HOLISTIC RUBRIC (70)

LEVEL	DESCRIPTION	MARKS
1 0-19 %	Learner did not complete or did not submit all or some of the required Design Processes Stages e.g. Investigation not complete or done/ drawings not submitted/ not according to the required technique/the model incomplete or not submitted/ overall workmanship poor/ presentation by a learner not aligned to the team/ learner did not co-operate with other members of the team in completing the required task/etc.	1-11
2 20-49%	Learner completed some or did not submit some of the required Design Processes Stages e.g. Investigation not complete or done/ drawings not submitted/ not according to the required technique/the model incomplete or not submitted/ overall workmanship poor/ presentation by a learner not aligned to the team/ learner did not co-operate with other members of the team in completing the required task/etc. The Design processes required is fairly present.	12-29
3 50-79%	Learner completed most of the required Design Processes Stages e.g. Investigation mostly complete or done/ drawings mostly submitted/ according to the required technique but not complete/the model mostly completed/ overall workmanship good although can be improved on/ presentation by a learner mostly aligned to the team/ learner mostly co-operate with other members of the team in completing the required task/etc. The Design processes required is creative and there is evidence of developed skills working with hands / model is fitted well and rounding off.	30-47
4 80-100%	Learner completed all of the required Design Processes Stages e.g. Investigation completed / drawings submitted/ and according to the required technique /the model mostly completed/ overall workmanship very good / presentation by a learner aligned to the team/ learner co-operate with other members of the team in completing the required task/etc. The Design processes required is very creative and very good skills working with hands was displayed/ the model is neat and according to the design brief, specifications and constraints.	48-70

ANALYTIC RUBRIC (70)

LEVEL and %	1 - 2 (0-19)	3 - 4 (20-49)	5 - 6 (50-79)	7 (80-100)	MARK ACHIEVED
Investigation	Investigation (research/ case study/etc.) not done and no evidence of submission. In some cases, an investigation has been submitted a lot of plagiarism has been observed and references (0) not credited.	Some aspects of the investigation (research/ case study/etc.) done. Investigation not completed. Some (1-4) references have been credited in the investigation.	Most of the aspects in the investigation (research/case study/etc.) completed although the investigation is not completed. Most (5-7) references have been credited in the investigation.	All aspects of the investigation (research/case study/etc.) completed. Investigation done but not completed. At least 8-10 references have been credited in the investigation.	
Design					
• Design Brief, Specifications and Constraints	Design brief, specification and constraints not written and no evidence of submission. A few of the aspects of the Design brief have been highlighted but the specification and constraints not done.	Some of the required aspects of the design brief, specification and constraints have been outlined. Some of the specifications and constraints are aligned to the problem statement/ scenario/ context.	Most of the required aspects of the design brief, specification and constraints have been outlined. These are mostly aligned to the problem statement/ scenario/ context.	All required aspects of the design brief, specification and constraints have been written. These are aligned to the problem statement/scenario/ context.	
• Sketching/Initial ideas and selection of final idea	Initial ideas (0) have not been developed. In some cases, they have been attempted although not completed, and/or an incorrect sketching technique has been applied. No list of advantages and disadvantages for the selected idea.	An initial idea (1) has been developed. Although completed, some correct sketching technique have been attempted. Some of the advantages and disadvantages are listed (2 of each) although limited to only one idea.	Initial ideas (2) have been developed. Although completed, most correct sketching technique have been attempted. Most of advantages at disadvantages compares the two initial ideas (at least 3 each).	Initial ideas (2) have been developed. They are complete and the correct sketching technique has been applied. All advantages at disadvantages compares the two initial ideas (at least 4 each).	
Making					
• Formal Working Drawings	Formal working drawing not done nor submitted. The correct drawing technique attempted but drawing not completed. Conventions not followed e.g. line types, dimensions, etc.	Formal working drawing and required drawing technique attempted. Some of the conventions (line types, scale, dimensions, etc.) attempted and the working drawing is almost complete.	Formal working drawing and required drawing technique achieved. Most of the conventions (line types, scale, dimensions, etc.) achieved and the working drawing is complete.	Formal working drawing and required drawing technique achieved outstandingly. All the conventions (line types, scale, dimensions, etc.) achieved and the working drawing is complete.	
• Model	A proto-type model has not been submitted or is incomplete. Safe	A proto-type model has been completed. The model is not	A proto-type model has been completed. The model is working	A proto-type model has been completed. The model is working	

	working practices and care for tools not observed during the making process.	working as envisaged. Some safe working practices and care for tools were observed during the making process.	as envisaged. Most safe working practices and care for tools were observed during the making process.	beyond the set expectations with innovative ideas developed. All safe working practices and care for tools were observed during the making process.	
Evaluation					
• Processes	There is no evidence of evaluation of the processes of Design during developmental stage or evidence of some evaluation of processes available.	There is some evidence of evaluation of processes of Design during developmental stage	There is a lot of evidence of the evaluation of processes been undertaken during developmental stage of the Design process.	There is a lot of evidence of the critical and creative evaluation of processes conducted during developmental stage of the Design process.	
• Improvements	There is no evidence of suggested improvements after evaluation of the process has taken place and/or no evidence of suggested improvements.	Some evidence exists that suggested improvements after evaluation of the process has taken place and evidence of some suggested improvements.	Most of the evidence exists that suggested constructive improvements after evaluation of the process has taken place and evidence of most some suggested improvements.	Evidence exists that innovative improvements after evaluation of the process has taken place and evidence of innovative suggested improvements.	
Communication					
• Presentation	Not all team members participated during presentation of their suggested solution. Team members were not prepared for the presentation. The team did not use ICT resources in their presentation, no display charts, etc.	Some of the team members participated during the team's presentation of their suggested solution. Some of them were well prepared. Although the team used ICT resources in their presentation and display charts, etc technicalities affected their presentation and did not achieve their desired effect.	Most team members participated as a member of a team during the presentation of their suggested solution. Most of them were well prepared. The team used ICT resources effectively and their visual displays e.g. charts, etc resulted in the desired effect.	All team members participated optimally during the presentation of their suggested solution. All the members were well prepared. The team effectively used ICT resources effectively and their visual displays e.g. charts, etc resulted in them achieving their desired result.	
• Portfolio of Evidence – PoE (PAT + Model)	Learner did not submit or submitted some parts of the "Portfolio of Evidence" i.e. uncompleted PAT or model which is not working.	The learner submitted some of the parts of the Portfolio of Evidences i.e. completed PAT or model that is partially working.	The learner submitted most of the parts of the Portfolio of Evidences i.e. completed PAT and/or model that is partially working.	The learner submitted all the parts of the Portfolio of Evidences i.e. completed PAT and the model that working.	
				TOTAL	

- Teachers will assess knowledge, skills and values using analytical rubrics which should have clear descriptors for each level. This means that a descriptor should say why an achievement is deemed to be, say, 'meritorious' or 'elementary'.
- Schools must take responsibility for providing resources (both tools and materials) needed during the PAT. These resources may be procured from the schools' RTT Allocation, with reference to LTSM.
- Learners must complete the PATs for formal assessment under teacher supervision.
- Teachers will assess the PATs formally.

The formal assessment requirements for Technology are as follows:

- Formal assessment for Technology will consist of the Practical Assessment Tasks and pen and paper tests and examinations.
- At least **40 marks** out of the **70 PAT marks** per term must be attributed to Practical Work.
- Tasks done by learners for formal assessment purposes should be monitored by teachers at all times.
- Work done "off-campus" outside the direct control of the teacher should normally not form part of the formal assessment record.

The end of year promotion mark will comprise 40% CASS and 60% (examination 60%) end of year examination:

NOTE:

Problem Solving Taxonomy by Plant, et al. is more applicable as a guide to assessing capability in Technology education. In Plant's approach, the cognitive level is determined by previous experience of learners. This fits well with the skills development in Technology where learners are expected to get progressively better through the year.

Formal Assessment in Technology – Grade 7-9				
	INFORMAL DAILY ASSESSMENTS	FORMAL ASSESSMENT: TERM MARKS		
		Practical Task and Theory Test / Examination		
	Enabling Tasks	Practical Assessment Task	Term Test/Examination (June and end of year)	Term Mark
Term 1	0%	70%	30%	100%
Term 2		0%	100%	100%
Term 3		70%	30%	100%
		CASS Components: 40%		
Term 4		0%	100%	100%
		End of the year Examination Component: 60%		
Promotion Mark: CASS 40% + End of the Year Exam 60% =				100%

GRADE 7

TERM 1

MECHANICAL SYSTEMS AND CONTROL

JAWS-OF- LIFE

(RESCUE SYSTEM)

PAT

(PRACTICAL ASSESSMENT TASK)

Name and Surname: _____

Class: _____

PROBLEM STATEMENT / SCENARIO/ CONTEXT

Emergency workers use Jaws-of-life systems to rescue trapped accident victims. The Jaws –of –life is a set of very powerful machines that are used to rescue trapped accident victims. The most well-known are the ***cutter*** *and* ***spreader.***

ACTIVITY 1 (IMPACT OF TECHNOLOGY/MECHANICAL SYSTEMS AND CONTROL)

Pneumatics and Hydraulics

Use pneumatics and hydraulics to obtain a mechanical advantage.

Pneumatic and hydraulic systems are used to transmit force from one another. These systems are used to obtain to mechanical advantage in a variety of machines.

This is **hydraulic system**. The force is transferred from the mastyer cylider to the slave cylinder.The master cylider is the the one you press and the slave cylider is the one that responds.

Pneumatic machines

Air transfers force in **pneumatic system**.

Hydraulic machines.

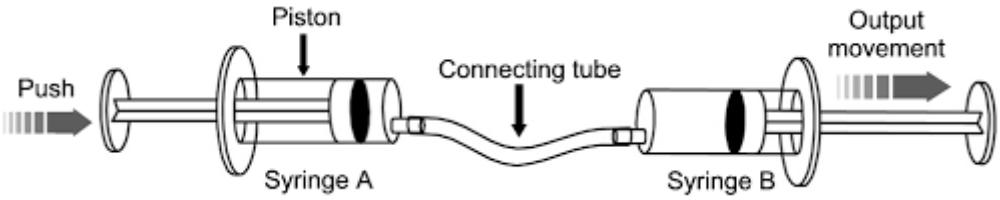
Force is transferred from one point to another through a liquid in hydraulic systems.

1.1. PRACTICAL INVESTIGATION

1.1.1 Force transfer between two equal syringes with 1. Air & 2. Water

A) Two equal syringes filled with air.

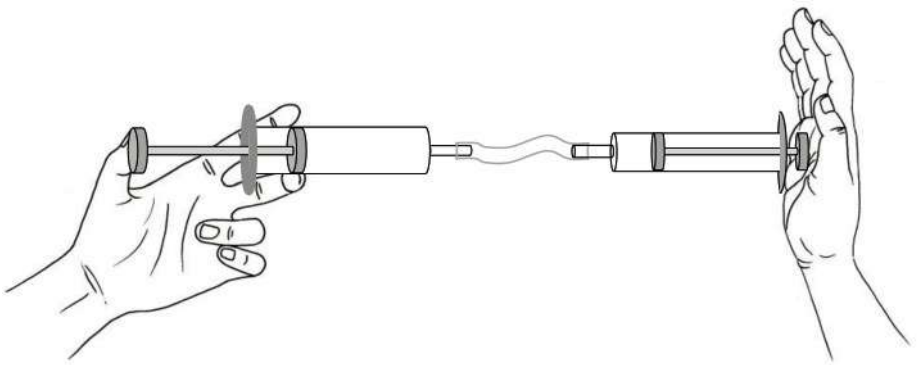
1. Connect two syringes of the same size.
2. Do not add water.
3. Pull the plunger to fill syringe with air from the second one syringe.



B) Two equal syringes filled with water

1. Use a bowl or bucket of water
2. Hold one syringe under water.
3. Pull the plunger to fill the syringe.
4. Connect the tubing.
5. Press and pull the plunger until the tube and syringe are full.

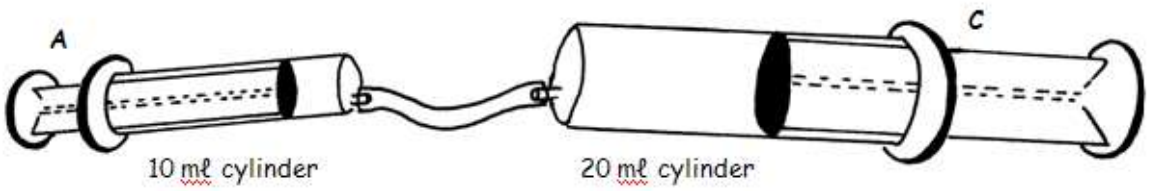
   (Try not to get air into the system)
6. Connect the second syringe (With plunger pushed in)
7. Push the first plunger.



1.1.2 Force transfer between two unequal syringes with 1.Air & 2.Water

In **pneumatic systems force** is transferred through **air.**

In **hydraulic systems** force is transferred through a **liquid,** for example, water or oil.



Work in groups and carry out the following instructions.

1. Press the master cylinder and observe what happens to the slave cylinder.
2. The slave plunger moves out when the master is pushed in.
3. Now add some pressure on the slave cylinder.

Look at the table below; complete the right –hand column by choosing the correct words.

EQUAL SYRINGES	FORCE TRANSFER FROM MASTER TO SALVE
1.Air : 5ml master to 5ml slave	MORE/LESS/REMAIN THE SAME
2.Water: 5ml master to 5ml slave	MORE/LESS/REMAIN THE SAME
UNEQUAL SYRINGES	**FORCE TRANSFER FROM MASTER TO SLAVE**
1.Air: 10ml master to 20ml slave	MORE/LESS/REMAIN THE SAME
2.Water:10ml master to 20 ml slave	MORE/LESS/REMAIN THE SAME

(20)

ACTIVITY 2

DESIGN SKILLS

2.1 Learners develop a working model of hydraulic-syringe powered, linked -lever rescue device using simple materials.

2.1.1. Write the design brief:

2.1.2. List 4 specifications:

_____
_____
_____
_____

2.1.3. List 2 constraints.

_____
_____
_____
_____
_____

(7)

RUBRIC: Writing the Design Brief Teacher Assessment MODE: Team

CODE	Level Descriptor: The team …	Marks
7	The design brief is complete and has all specifications and all constraints	
6	The design brief is complete and has all specifications and some constraints	
5	The design brief is complete and has most specifications and some constraints	
4	The design brief is complete and has some specifications and some constraints	
3	The design brief is incomplete and has some specifications but lacks constraints	
2	The design brief is complete but has no specifications nor constraints	
1	The design brief is incomplete and has no specifications nor constraints	

2.2. Sketching:

2.2.1. use the space bellow to Draw a 3d drawing of the idea in oblique projection using dark and feint lines. **(10)**

RUBRIC FOR ANOTHER SKETCH

Code	Descriptors	Marks
7	Sketch very well drawn, clearly shows all working parts, and has explanatory labels	
5 – 6	Sketch well drawn, clearly shows the working of both the levers and hydraulics	
3 – 4	Sketch gives some idea of the device and how the levers OR the hydraulics work	
1 – 2	No sketch or sketch very poor; cannot determine what the learner has in mind	

2.2.2 Sketch: use the space bellow to Draw working in 2D showing one view with dimensions to scale. **(10)**

ACTIVITY 3

MAKING SKILLS: Learners make a simple working model.

At a minimum, the "jaws –of life "model may be a simple device representing any one machine in the "Jaws –of life" system will work using plastic tubing, syringe(s)and cardboard.
(23)

RUBRIC FOR A PRODUCT

Teacher Assessment **Team Work**

CODE	Level descriptor	Marks
7	The device is **fit-for-purpose, well-designed and well made, works well and is effective. It** has required **safety** considerations**:** it can be switched on and switches off automatically. It has a master/main switch to override the power if anything goes wrong	
5 - 6	The device **works, is fairly well-designed and made,** It has **some** of the required **safety** considerations mentioned above but not all:	
3 - 4	The device does not **work, although it is fairly well-designed and made,** It has a **few** of the required **safety** considerations mentioned above but not all:	
1 - 2	The device is **far from complete** and untidy, the **design will not work**.	

OR

RUBRIC FOR A MODEL

Rating	Descriptors	Marks
7	The model is strong and well-constructed. It is stable and safe. The device does give a mechanical advantage because the master and slave cylinders are the correct sizes AND because the levers are correctly linked.	
5 – 6	The model is strong and well-constructed. It is stable and safe. The device does give a mechanical advantage because the master and slave cylinders are the correct sizes OR because the levers are correctly linked.	
3 – 4	The model is strong but poorly constructed. It is not very stable and might be dangerous if used. The device does give a mechanical advantage because the master and slave cylinders are the correct sizes OR because the levers are correctly linked.	
1 – 2	The model is flimsy and poorly constructed. It is very unstable and would be dangerous if used. The device does not give a mechanical advantage either because the master and slave cylinders are the incorrect sizes, or because the levers are incorrectly linked.	

EXEMPLAR 2: Formal Assessment Task Grade 7 Term 1–Controlled Test

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

COMMON ASSESSMENT

QUESTION PAPER

GRADE 7

MARKS : _____ / 60

TIME : 1 hour

This question paper consists of 10 pages.

NAME OF DISTRICT :_____

NAME OF CIRCUIT :_____

NAME OF CLUSTER :_____

NAME AND SURNAME :_____

NAME OF SCHOOL :_____

GRADE :_____

NAME OF TEACHER :_____

LEARNER SIGNATURE: _____ DATE: _____

QUESTIONS	POSSIBLE MARKS	MARKS OBTAINED	MODERATED MARK
1	14		
2	10		
3	15		
4	4		
5	6		
6	4		
7	7		
TOTAL	60		

SIGNATURE OF TEACHER: _____ DATE: _____

SIGNATURE OF HOD :_____(MODERATED) DATE: _____

INSTRUCTIONS:

1. Make sure you have all *13* pages clearly printed.
2. Write your name, class and initial of your teacher on each answer sheet
3. All answers must be completed on the question paper.
4. 15 minutes reading time is allowed.
5. The invigilator will tell you when you may start to write.
6. Only use a blue pen when answering the questions.
7. All sketches or drawing must be done in pencil.
8. Write neatly and legibly.
9. Read the instructions for EACH question carefully.
10. Consult the rubrics and marks allocated to guide you when answering the questions.

SPECIFIC AIMS ASSESSED

TECHNOLOGICAL PROCESSES AND SKILLS	50%	30 Marks
TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING	30%	18 Marks
TECHNOLOGY, SOCIETY AND THE ENVIRONMENT	20%	12 Marks

QUESTION 1 (IMPACT OF TECHNOLOGY)

Read the article below then answer the questions that follow: [14]

Every day in the United States, fires cause damage to an average of 1,700 homes, 300 apartment buildings, 61 schools, 69 restaurants and 135 industrial plants.

On an annual basis, fires will:
Claim over 12,000 lives in USA
Injure over 300,000 people of which 50,000 will be confined to hospital for 6 weeks to 2 years
Destroy 12 billion dollars' worth of property

There is no such thing as fireproofing. Cement, steel, bricks and even stone will distort, glassify or break up when the temperature is high enough. The object of flame-resistant material is to reduce the flames spreading rapidly and causing a ***conflagration.***

Cooking containers such as paraffin stoves or candles often overturn and set hundreds of shacks alight. Flammable liquids, gas and electrical appliances, if left unattended, can cause enormous damage.

All flame-retard products on the market today are intended to retard flames in fabrics, carpets, wood etc. The coatings and chemicals provide a protective barrier by producing a non-combustible gas that prevents the ignition and spread of fire. These are intended to set up a thermal barrier to reduce the flame spread and to allow humans to escape from the building. Some products can be effective at retarding flame spread and reducing toxic fumes and smoke inhalation by 90%. Smoke inhalation is more frequently the cause of death than burns.

http://www.firetech.com/information.htm

1.1. What is the difference between fire-proof and flame-resistant? (2)

1.2. If a term is on average NINE weeks long, how many schools are likely to burn down in the States in a term? (2)

1.3. Give TWO examples of flammable liquids. (2)

1.4. Explain what you understand by the terms:

1.4.1. Thermal barrier (2)

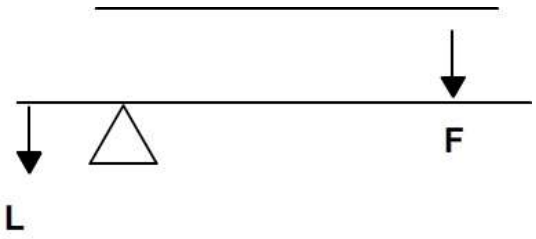
1.4.2. Toxic fumes (2)

1.4.1. What TWO substances can provide a protective barrier to prevent flames spreading? (2)

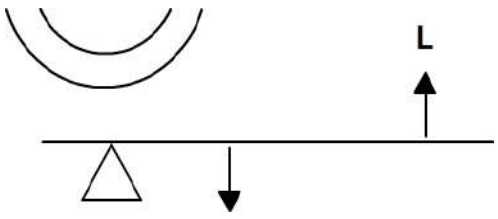
QUESTION 2 (LEVER AND LINKAGES)

In each of the cases below, state which classes each lever belongs to [4]

2.1.

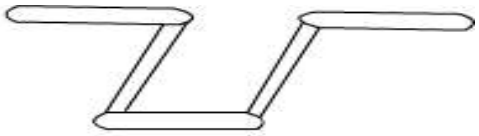


2.2.

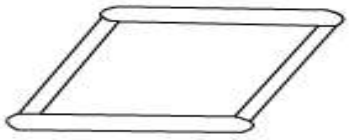


Fill in the fixed and moving pivots. Insert arrows to show the direction of movement of the linkage systems. [6]

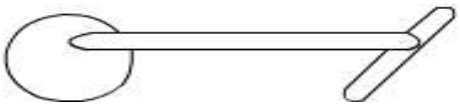
2.3.



2.4.



2.5.



QUESTION 3 (MECHANICAL SYSTEMS)

Answer the following questions [15]

3.1. What is a hydraulic system? (2)

3.2 How is a hydraulic system different from a pneumatic system? (2)

3.3. Draw simple diagrams to show the effort, load, and fulcrum of the following levers.

(6)

LEVER	DIAGRAM
3.3.1. Stapler	
3.3.2. Bottle opener	
3.3.3. Hammer removing a nail	

3.4. State which class (first, second or third) of levers each of the levers belongs to.

3.4.1 Stapler (1)

3.4.2 Bottle opener (1)

3.4.3 Hammer removing a nail (1)

3.5. Explain what Mechanical Advantage is. (2)

QUESTION 4 (DESIGN CONSIDERATION)

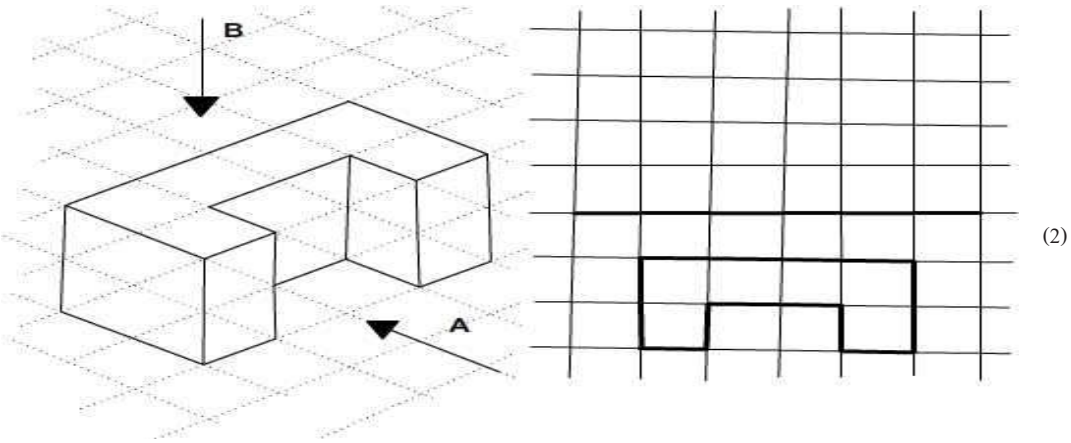
During the investigation stage, we have to examine existing products. While we are doing so, we have to keep in mind such aspects as people, purpose, appearance, environment, safety and cost.

Match the explanations in **Column B** with the correct aspect in **Column A**. [4]

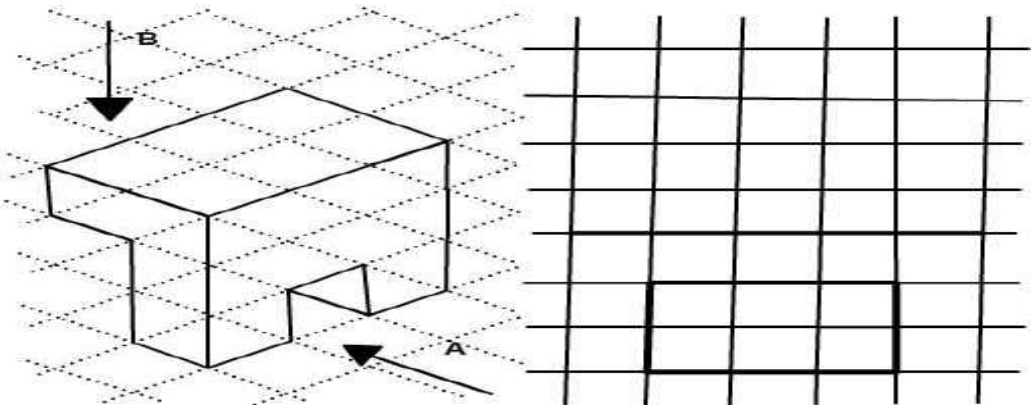
	Column A		Column B	Answer
1	People	A	What impact does the product have on the environment; where and under what conditions is it used?	
2	Purpose	B	Who is the product for: the age/gender of the people, their culture/religion?	
3	Appearance	D	What need/want/problem is the product addressing?	
4	Environment	C	What does the product look like, why does it look like this, what type of material is used, what are the reasons for using this material?	

QUESTION 5 (TWO –DIMENSIONAL VIEWS)

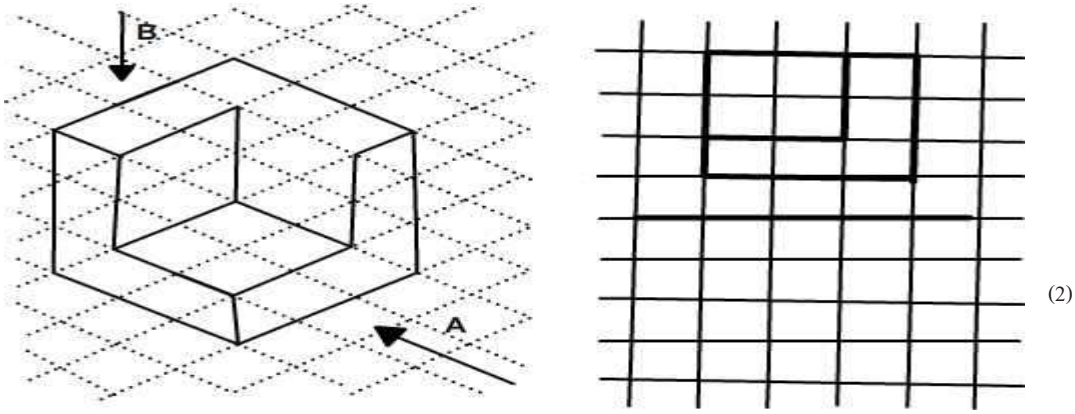
5.1. Study the drawings below. For each of the drawings, fill in the missing view. [6]



(2)



(2)



(2)

5.2 In the above drawings, which view is represented by A and B respectively? (2)

5.3 In 2-D drawings, a horizontal line separates the two views of the object. Which view is drawn?

5.3.1 above the horizontal line (1)

5.3.2 below the horizontal line? (1)

QUESTION 6 (DESIGN AND MECHANICAL SYSTEMS)

MULTIPLE CHOICES

Read each question and **write** the letter that represents the correct answer. [4]

6.1. Which of the following is an example of a constraint that will be included in a design brief?

A. You have three hours to complete the task
B. Work with a partner
C. Take care when working with scissors

D. The mechanism must make 180° turn.

6.2. A third class lever ……..
A. Has the load between the fulcrum and the effort
B. Makes the task easier
C. Always provide mechanical advantage
D. Is a lever in which the load moves in the same direction as the force you apply

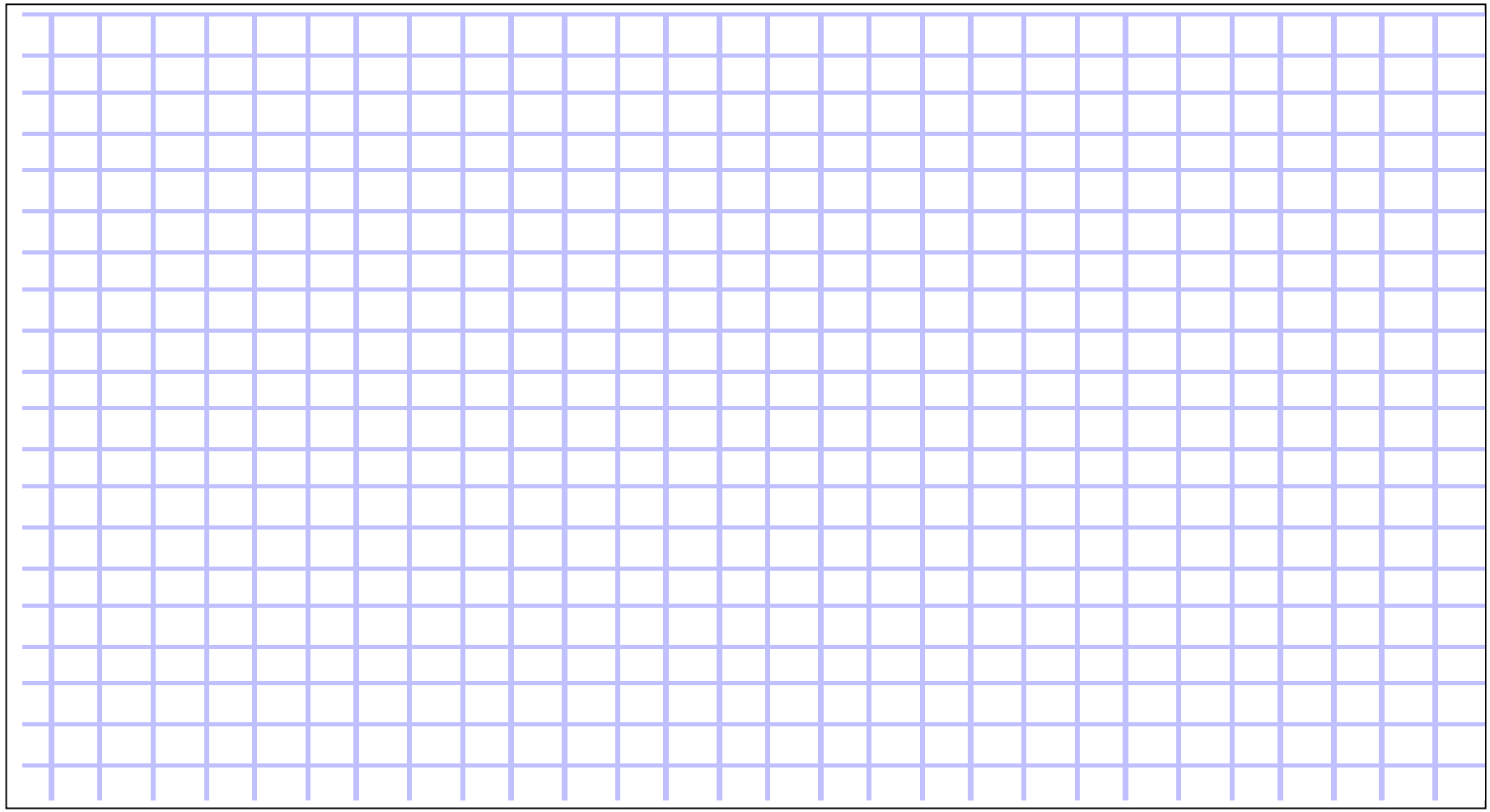
6.3. An example of a third class lever is…..
A. A tennis player hitting the ball
B. A wheel barrow
C. The lid of a suitcase
D. A pair of scissors

6.4. An example of a machine that works using pneumatic is ….
A. A jack used to lift a car to change tyre
B. A front - end loader
C. The breaking system of a motor vehicle
D. A dentist's drill

QUESTION 7 (OBLIQUE DRAWING) [7]

Draw a full scale (1:1) 3 D drawing of the match box below with the length of 40mm, height of 10 mm and depth of 10mm.Do not erase your construction lines. Use the squared grid provided below.

Assessment criteria	(√) mark
Title	(1)
Scale (1:1) indicated	(1)
Construction lines are included and they are feint lines	(1)
The corners have been projected at 45°	(1)
Correct dimensions used	(1)
Outlines are dark	(1)



NAME AND SURNAME:_____SCALE:_____ TITLE:_____

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

COMMON ASSESSMENT

MARKING MEMORANDUM
GRADE 7

MARKS : _____ / 60

TIME : 1 hour

This marking memorandum consists of 8 pages.

QUESTION 1 **[14]**

1.1. Fire-proof means it will never burn.√

Flame-resistant – reduces flames spreading.√ (2)

1.2. 3843√√ (61 X 9 weeks X 7 days) (2)

1.3. Petrol, benzene, paraffin, etc.√√ (ANY OF THE TWO) (2)

1.4.

1.4.1. Thermal barrier – heat cannot pass through √√ (2)

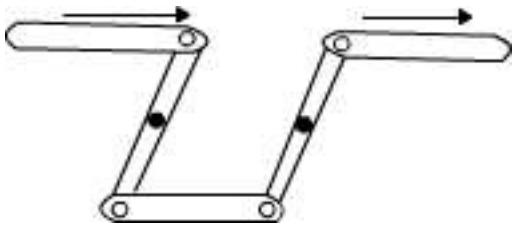
1.4.2. Toxic fumes – poisonous fumes√√ (2)

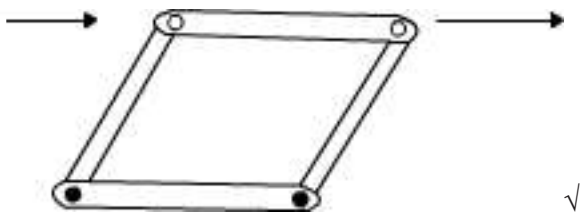
1.5. Coatings and chemicals√√ (2)

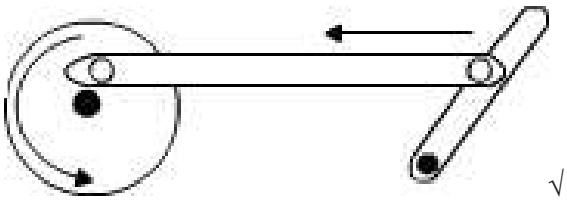
QUESTION 2 **[10]**

2.1. First class√√

2.2. Second class√√

2.3  √√

2.4.  √√

2.5  √√

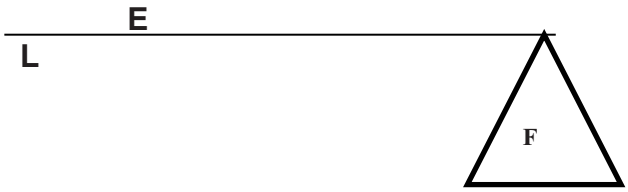
QUESTION 3 **[13]**

3.1. A hydraulic system is a liquid (water or oil) in an enclosed system which makes movements smoother and stronger. √√ (2)

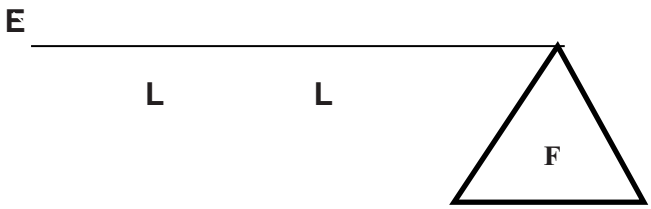
3.2 Hydraulic system uses a liquid and a pneumatic system uses air.√√ (2)

3.3.

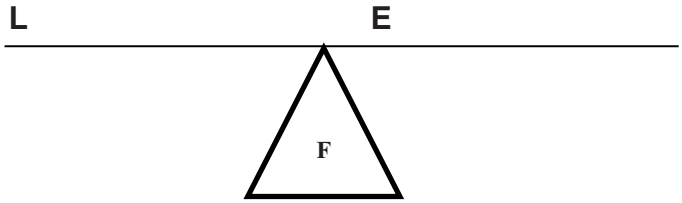
3.3.1. Stapler – the effort is somewhere between the fulcrum and the load.√√ (2)



3.3.2. Bottle opener – the effort is somewhere between the fulcrum and the load.√√ (2)



C) Hammer – the fulcrum is somewhere between the effort and the load.√√ (2)



3.4. Third class lever√ (1)

.

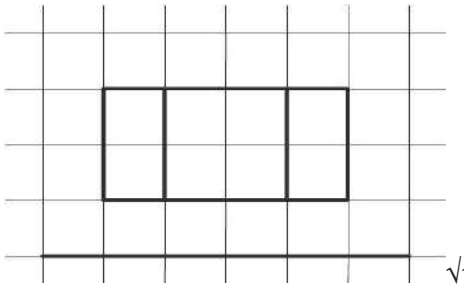
3.5. Mechanical Advantage is how much faster and easier a machine can make your work. √√ (2)

QUESTION 4 **[4]**

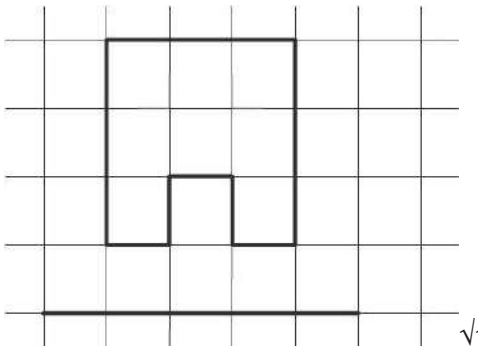
Column A	Column B
1 – People	B√ – Who is the product for: the age/gender of the people, their culture/religion?
2 – Purpose	D√ – What need/want/problem is the product addressing?
3 – Appearance	C√ – What does the product look like, why does it look like this, what type of material is used, what are the reasons for using this material?
4 – Environment	A√ – What impact does the product have on the environment; where and under what conditions is it used?

QUESTION 5

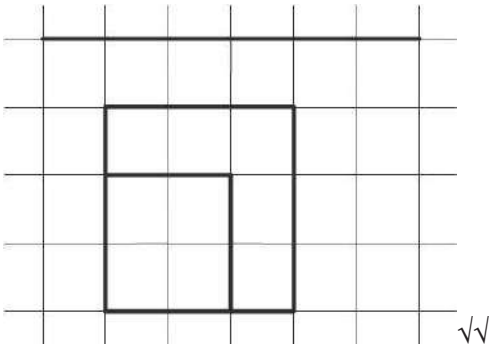
5.1.



√√



√√



√√

5.2 A – Front view √ and B – Top view√ (2)

5.3

5.3.1 Front view√ (1)

5.3.2 Top view√ (1)

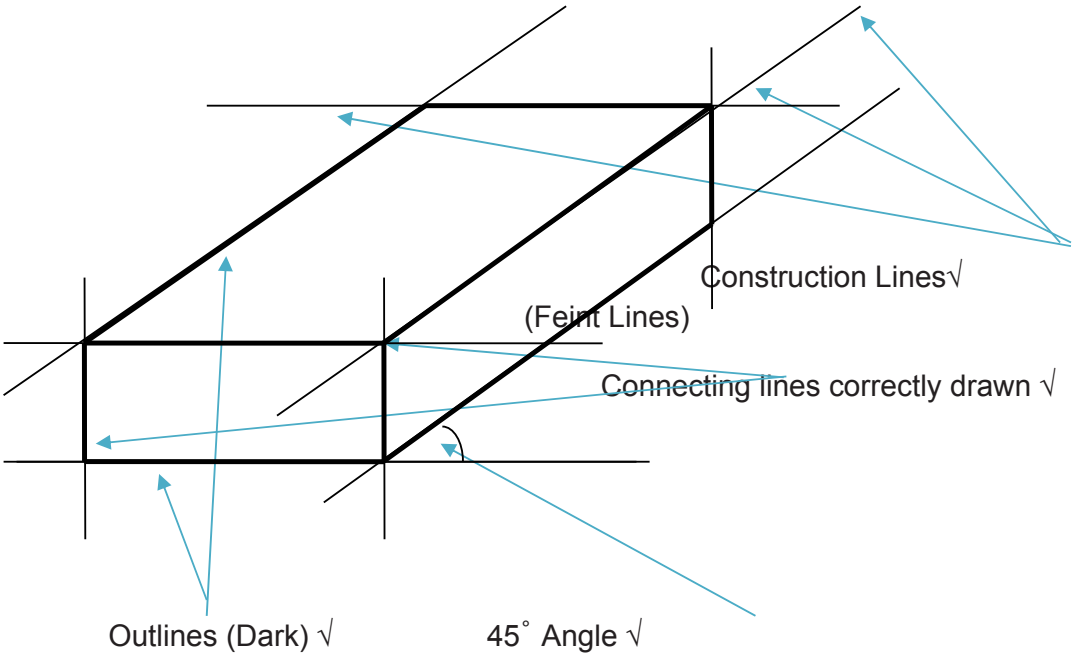
QUESTION 6 [4]

6.1. A √
6.2. D √
6.3. A √
6.4. D √

QUESTION 7 [6]

Assessment criteria	(√) mark
Title	(1)
Scale (1:1) indicated	(1)
Construction lines are included and they are feint lines	(1)
The corners have been projected at 45°	(1)
Correct dimensions used	(1)
Outlines are dark	(1)

N.B.DIMENSSIONS NOT ISSUED CREDIT ALL LEARNERS WITH ONE (1) MARK



NAME AND SURNAME: BENEDICT MOENG **SCALE:** 1:1 **TITLE:** OBLIQUE DRAWING

TOTAL: 60

END OF THE MARKING MEMORANDUM

Exemplar 3: Mid – Year Examination

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

GRADE 7

JUNE MID – YEAR EXAMINATION 2017

QUESTION AND ANSWER SHEET

MARKS : 60 **TIME : 1 hour**

NAME AND SURNAME :_____

NAAM OF SCHOOL :_____

NAME OF TEACHER :_____

LEARNER SIGNATURE: _____ **DATE:** _____

QUESTION	POSSIBLE MARKS	MARKS OBTAINED AND MODERATED
1	30	
2	18	
3	12	
TOTAL	60	

TEACHER SIGNATURE: _____ DATE: _____

HOD SIGNATURE:_____DATE:_____

SPECIFIC AIMS ASSESSED

TECHNOLOGICAL PROCESSES AND SKILLS	50%	30 Marks
TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING	30%	18 Marks
TECHNOLOGY, SOCIETY AND THE ENVIRONMENT	20%	12 Marks

INSTRUCTIONS:

1. Write your name, class and initial of your teacher on the top part of page 1.
2. This paper consists of 9 pages
3. 15 minutes reading time is allowed.
4. The invigilator will tell you when you may start to write.
5. Only use a blue pen when answering the questions.
6. All sketches or drawing must be done in pencil.
7. Write neatly and legibly.
8. Read the instructions for EACH question carefully.
9. Consult the rubrics and marks allocated to guide you when answering the questions.

SECTION A

QUESTION 1 (TECHNOLOGICAL PROCESSES AND SKILLS)

READ THE FOLLOWING CASE STUDY:

CASE STUDY/PROBLEM

Cell phone towers are common all over South-Africa. The reason for that is because most people use cell phones in their daily lives to communicate with each other. Landlines are still being used but people prefer to carry around a phone in their pocket so they can be contacted at any time and do the same with other people.

The weather patterns have changed in SA over the last couple of years and because of storms with strong winds are more common. Because the cell phone towers weren't designed to sustain these conditions they have started to fall over.

A cell phone company has asked your team to manage the project and solve this problem. They have a few requirements the towers must contain. The material to build the structure must be light, strong and have the characteristics of aluminum. Triangulation must be use and the type of structure must be a frame. The towers height must be 30m and the base dimensions must be 6m x 6m. Anker cables must be used to ensure that the tower won't fall over when it is exposed to strong winds.

The company said that they would prefer that the tower is not made in different parts and put together on site because this could influence the strength of the structure although it would be easier to transport. The budget for the project is R30 000 per tower. The tower may not be welded together.

1.1.1) Write a design brief of **two to three** sentences to describe what the problem is and what must be done to solve it. (3)

_____

_____

_____

_____

_____

1.1.2) Write down THREE specifications the tower must consist of? (3)

_____

_____

_____

_____

1.1.3) Write down TWO constraints regarding the project. (2)

_____

_____

_____

_____

1.2) The design process is made out of different stages that needs to be completed.

Problem Statement, Investigate, Design, Make, Evaluate and Communicate.

Indicate what stage of the design process can be used in the following statements:

1.2.1) Investigate different types of materials that can be used to construct the tower. (1)

_____

_____

1.2.2) Identify the real problem that needs to be solved. (1)

_____

1.2.3) Draw TWO freehand drawings to illustrate different designs. (6)

Sketch 1		Sketch 2	
Advantages	Disadvantages	Advantages	Disadvantages

1.2.4) Compile the sequence of steps to manufacture a project. (1)

1.2.5) Construct a statement to ensure the model is complying with all specifications (1)

1.3) Use **ANNEXURE A** design and draw a cell phone tower and include all the specifications and constraints to solve the problem. Make use of different drawing techniques **(Perspective Drawings: Single or Double Point Perspective)** by using different types of lines and make use of captions. Complete the title block and use the rubric to complete your design. (15)

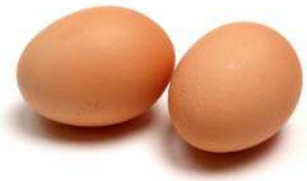
[30]

SECTION B

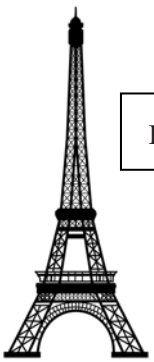
QUESTION 2 (TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING)

Study the following illustrations of structures and answer the questions that follow:

A



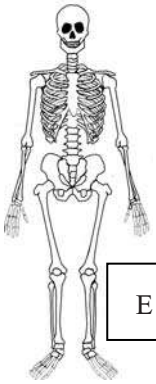
B



C

D

E



F

Answer the following questions by writing down the correct letters.

2.1) Indicate which of the illustrations are man-made structures? (3)

_____

_____

2.2) Indicate which of the illustrations are natural structures? (3)

_____

_____

2.3) Which of the illustrations are frame structures? (2)

_____

_____

2.4) Which of the illustrations are shell structures? (2)

_____

_____

2.5) Which of the illustrations are solid structures (2)

_____

_____

Indicate if the following statements are true or false:

2.6) Shell structures are made out of different part being added together. (1)

_____

2.7) Frame structures are solid (1)

_____

2.8) Shell structures are strong because of it shape (1)

_____

2.9) Triangulations is the use of circles to reinforce a structure (1)

_____

2.10) Structures are being designed to keep things covered or to protect it. (1)

_____

2.11) Structures are being designed to support things and keep them up (1)

_____

[18]

SECTION C

QUESTION 3 (TECHNOLOGY, SOCIETY AND THE ENVIRONMENT)

There are different reasons why cell phone towers can influence the society and environment in a negative manner one of the reasons are that it doesn't fit into the environment and is making visual pollution. Cell phone towers can fall over and injure people, children can climb onto the structure and people can get hurt by electrical shock due to the different components that needs to be installed.

3.1) Answer the following questions:

3.1.1) Name TWO ways a cell phone tower can be camouflaged to fit into the environment? (2)

_____

_____

3.1.2) Describe what is installed on the top of the cell phone tower to prevent airplanes of crashing into them? (3)

_____

_____

3.1.3) Describe three ways people can get hurt by cell phone towers? (3)

_____

_____

3.1.4) Describe what cell phone companies must build around the tower to prevent people of coming near them? (3)

_____

_____

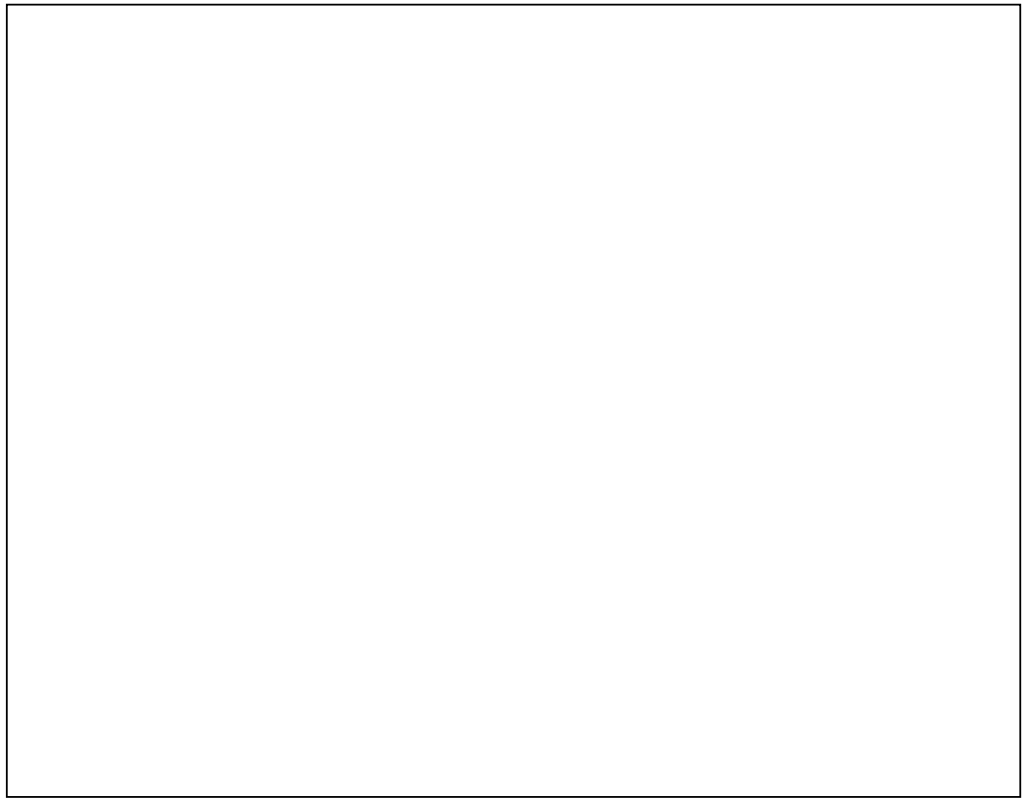
3.1.5) Name ONE ways of how cell phone towers can be strengthened to keep them from falling over? (1)

_____

_____

[12]

ANNEXTURE A (Refer to question 1.3)



Descriptions	Possible marks	Marks obtained
Complete the title block: name, class, title and date	**2**	
Use different drawing techniques: Outlines, Constructions and hidden detail	**3**	
Captions	**2**	
Triangulations	**2**	
Frame structure	**2**	
Anker cables	**2**	
Good design	**2**	

TOTAL 15/_____

NAME AND SURNAME: CLASS: TITLE: DATE:

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

GRADE 7

COMMON ASSESMENT

JUNE 2017

MEMORANDUM

MARKS : 60

TIME : 1 hour

QUESTION 1 (TECHNOLOGICAL PROCESSES AND SKILLS) [30 MARKS]

1.1.1) The weather patterns have changed in SA over the last couple of years and because of storms with strong winds are more common. Because the cell phone towers weren't designed to sustain these conditions they have started to fall over. A new tower needs to be designed to withstand these conditions. (3)

1.1.2) **Any of the following THREE**.

- Light weight material must be such as aluminium
- Triangulation must be used to strengthen the structure
- It must be a frame structure
- The structure must be 30m high and the base 6m x 6m.
- Anker cables must be used to strengthen the structure (3)

1.1.3) **Any of the following TWO**

- The structure must not be made in different parts
- The budget is R30 000
- The structure may not be welded together (2)

1.2)

1.2.1) **investigate** (1)

2.2.2) **problem** (1)

2.2.3) **design** (2)

2.2.4) **make** (1)

2.2.5) **evaluate** (1)

TOTAL 30/

QUESTION 2 (TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING) [18 MARKS]

2.1) B, C, D (3)

2.2) A, E, F (3)

2.3) B, E (2)

2.4) A, E (2)

2.5) D, F (2)

Indicate if the following statements are true or false:

2.6) false (1)

2.7) false (1)

2.8) true (1)

2.9) false (1)

2.10) true (1)

2.11) true (1)

TOTAL 18/

QUESTION 3 (TECHNOLOGY, SOCIETY AND THE ENVIRONMENT) [12 MARKS]

3)

3.1)

Assessment	Possible marks	Marks obtained
Complete the title block: name, class, title en date	**2**	
Use different drawing techniques: Outlines, Constructions an hidden detail	**3**	
Captions	**2**	
Triangulations	**2**	
Frame structure	**2**	
Anker cables	**2**	
Good design	**2**	

(15)

3.1.1) Water tower, tree AND church tower (2)

3.1.2) A red blinking light (3)

3.1.3) electrical shock, falling of the tower and tower can fall over (3)

3.1.4) A high fence with a gate so only certain people can access it. (3)

3.1.5) Triangulation and Anker cables (1)

TOTAL 12

End of the marking memorandum

GRADE 7

TERM 3

STRUCTURES AND ELECTRICITY/CRANKS/PULLEYS

DESIGN A MODEL CRANE

PAT

(PRACTICAL ASSESSMENT TASK)

Name and Surname: _____

Class: _____ **Mark:** _____ **/70**

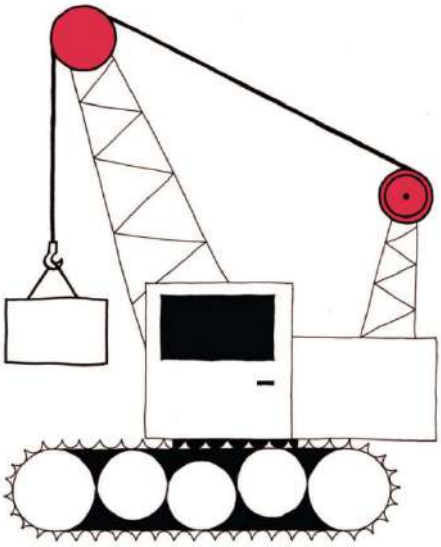
Assessment

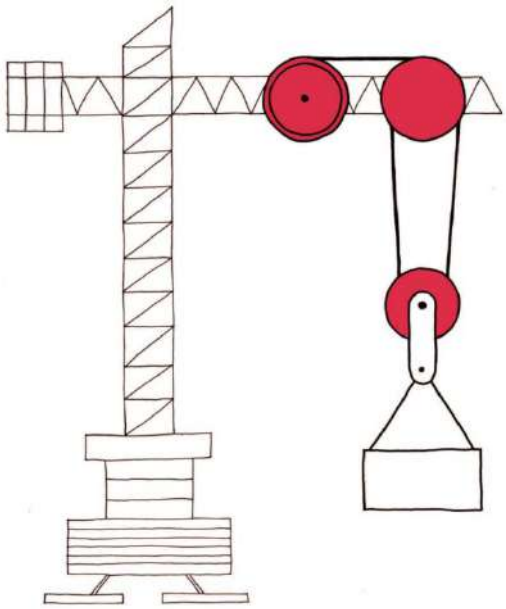
Description of Assessment Activity	Possible Mark	Achieved Mark
Investigate: Identify cranks and pulleys	**5**	
Design: Write a design brief with specifications and constraints	**15**	
Make: Sketch your ideas Draw a flow chart Draw a circuit diagram Model crane with electromagnet	 **10** **5** **8** **17**	
Evaluate: Develop an evaluation sheet	**5**	

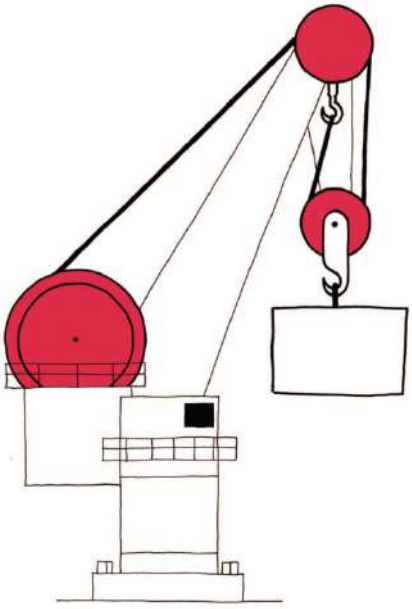
Investigate

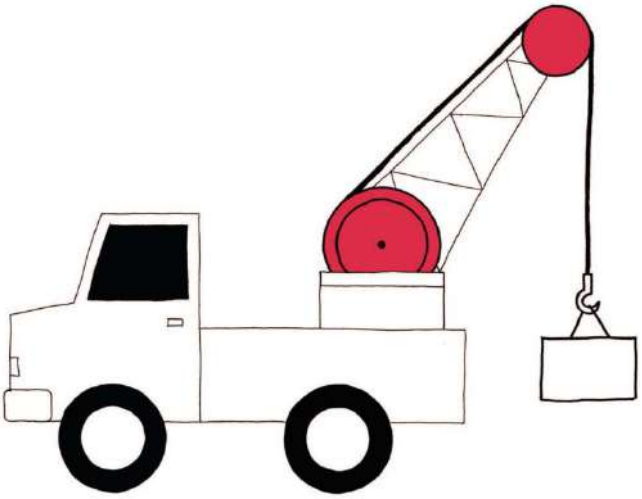
Study all four images of the cranes.

Look at where the cranks are placed and mark each crank with the letter C. Mark each pulley with the letter P.









Design

A scrap metal dealer sorts magnetic and non-magnetic metals into separate piles for recycling. They use a crane with a magnet, but find it difficult to remove the metal pieces from the magnet. They need a magnet that can be switched on and off to help with this.

The company wants you to design and build a model crane that:

- Should be a simple frame structure,
- Should be made strong, stiff and reinforced through triangulation,
- Should work with a pulley and a crank mechanism,
- Should pivot, or it should raise and lower its arm, and
- Is made from any materials. Some can be bought, while others can be simple materials, such as paper dowels or elephant grass.

The crane should have an electromagnet attached to its arm. The electromagnet:

- Should have a soft iron core made from a bundle of short lengths of iron wire,
- Must have a switch so that it can be switched on and off,
- Must be strong enough to pick up several steel paperclips, nails or coins

<u>Design brief with specifications and constraints</u>

1. Now write the design brief. Use the answers of the questions you have just answered to help you.
2. Identify the specifications.
    - List the specifications for the model crane.

    ……
    ……
    ……
    ……
    ……
    ……..

    - List specifications for the electromagnet.

    ……
    ……
    ……
    ……..

3. Identify constrains, if there are any.

    ……
    ……
    ……

Total [15]

Sketching your ideas

Use this **checklist** to make sure that you have included everything.

Things to look at	Sketch 1(Tick)	Sketch 2 (Tick)
Does your Sketch (drawing) have a heading?		
Did you label the different parts?		
Did you indicate the materials you will use?		

Sketch 1.

Advantages	Disadvantages

Sketch 2.

Advantages	**Disadvantages**

Total [10]

Briefly explain your final Design (Sketch) choice:

_____
_____
_____
_____
_____
_____
_____

Plan to make the crane.

You will build the model together as a team.

1. Look at all the designs. Each member will have two designs to offer. Discuss all the designs. Decide which design the team will build.

2. Make a list of all the materials you plan to use to build your model.
   ……
   ……
   ……
   ……
3. Make a list of all the tools you will use to build the model, for example the tools that you will use to measure and cut with.
   ……
   ……
   ……
   ……
   ……
4. Think about your own safety when you use tools. Some tools can be dangerous if used incorrectly. Write down one safety rule for one of the tools you will use.
   ……
   ……
   ……
   .....

Plan to make an electromagnet

1. List the materials you will use for the electromagnet.
   ……
   ……
   ……
2. List the equipment you will use to build the electromagnet and its circuit. Make sure you use the correct tools. Don`t cut wire with scissors.
   ……
   ……
   ……
   ……
3. Write at least one safety rule to follow while making the electromagnet
   ……
   ……
   ……
   ……

Draw a flowchart of the method you will follow to build the electromagnet and its circuit. This task will be assessed.

Total [5]

Draw a circuit diagram

Indicate on your circuit diagram:

1. The heading. That will be what the diagram is for.
2. The positive and negative poles on the battery.
3. The direction of the flow of current. Use an arrow to show the direction the current will flow in.
4. The correct symbols for the different components.

Build the crane and electromagnet

- Make sure that the joints are well made and strong
- Measure the structural members accurately. This will contribute to a stable crane that balances properly.
- Make the crank and insert it in its mounting.
- Make the pulley
- Make sure that the frame is strong and firm enough where the pulley will be attached to the frame. Attach the pulley to the crane.

Electromagnet

- Attach the pulley to the crane.
- Complete the electromagnet
- Assemble the electrical circuit for the electromagnet.
- Attach the circuit to the crane
- Add the counterweight materials to the crane so that it will balance and not fall over.
- Evaluate and make any changes you think are necessary. Total [17]

Develop an evaluation sheet

Work on your own. Make a list of the feature the crane model must have. Use your list of specifications to help you.

Here is an example:

The crane needs to work properly		
The crane needs to lift metal objects		

This evaluation sheet will be used to evaluate your own model and the models that the other groups have built. Total [5]

Communication - (Oral presentations)

Each person`s oral presentation will be assessed separately. Your teacher will use an evaluation sheet like the one below to assess you. Total [5]

Criteria	
The learner speaks clearly so that everyone can hear	
The learner speaks confidently. Knows the work and what he/she wants to say	
The learner makes eye contact with learners sitting in front and back of the class	
The learner explains his /her own role in the project	
The learner shows and demonstrates the model/drawing/diagram	

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

GRADE 7

COMMON ASSESSMENT

NOVEMBER 2016

MARKS : 60

TIME : 1 hour

QUESTION AND ANSWER SHEET

This question paper consists of 12 pages.

NAME OF PROVINCE :_____
NAME OF DISTRICT :_____
NAME AND SURNAME :_____
NAME OF SCHOOL :_____
GRADE :_____
NAME OF TEACHER :_____
LEARNER SIGNATURE: _____ DATE: _____

QUESTIONS	POSSIBLE MARKS	MARKS OBTAINED
1.1.	3	
1.2.	3	
1.3.	1	
2.1.	6	
3.1	17	
4.1.	8	
5.1.	3	
6.1.	4	
7.1.	3	
8.1.1.	2	
8.1.2.	10	
TOTAL	60	

SIGNATURE OF TEACHER: _____ DATE: _____

INSTRUCTIONS:

11. Complete page 2 of the top section of the question and answer sheet.
12. Make sure you have all **10** pages clearly printed.
13. 15 minutes extra reading time.
14. The invigilator will tell you when you may start to write.
15. Only use a black or a blue pen when answering the questions.
16. All sketches or drawing must be done in pencil with labels in pen.
17. Write neatly and legibly.
18. Read the instructions for EACH question carefully.
19. Consult the rubrics and marks allocated to guide you when answering the questions.

SPECIFIC AIMS ASSESSED

TECHNOLOGICAL PROCESSES AND SKILLS	50%	30 Marks
TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING	30%	18 Marks
TECHNOLOGY, SOCIETY AND THE ENVIRONMENT	20%	12 Marks

TECHNOLOGICAL DESIGN PROCESS AND SKILLS [30 marks]

QUESTION 1: DESIGN AND IMPACT OF TECHNOLOGY

READ THE FOLLOWING SCENARIO CAREFULLY:

SCENARIO/PROBLEM STATEMENT

A Grade R class in your school needs toys for children aged 2 to 6 years. They ask your Grade 7 Technology class to help them by making these toys. The School Governing Body does not have money to spend on ~~these~~ toys.

Design and make a toy of your choice.

Question 1 (DESIGN – DESIGN BRIEF, SPECIFICATIONS AND CONSTRAINTS)

Answer the following Questions:

1.1. Write a Design Brief in ONE or TWO sentences indicating clearly what is it you are going to design and make to solve the problem (3)

_____

_____

_____

_____

_____

1.2. List 3 design Specifications from the given scenario. (3)

_____

_____

_____

_____

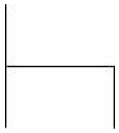
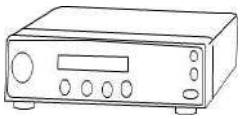
1.3. Write ONE Constraint that is limiting the developmental process of solving the given problem. (1)

_____

_____

QUESTION 2 (DESIGN – 2D AND 3D DRAWINGS)

2.1. Evaluate the drawings of structures below and **decide** which are 2D and which are 3D drawings. (6)

A. _____ 	B. _____ 
C. _____	D. _____ 
E. _____ 	F. _____ 

QUESTION 3 (DESIGN – PERSPECTIVE DRAWING)

3.1. Draw an open matchbox of the illustration below using single point perspective technique in ***Annexure A*** grid attached. Add texture rendering by means of a pencil or by adding colour to make the product to look real. (17)

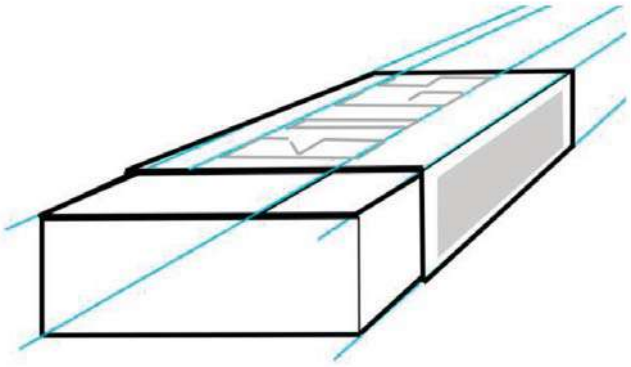
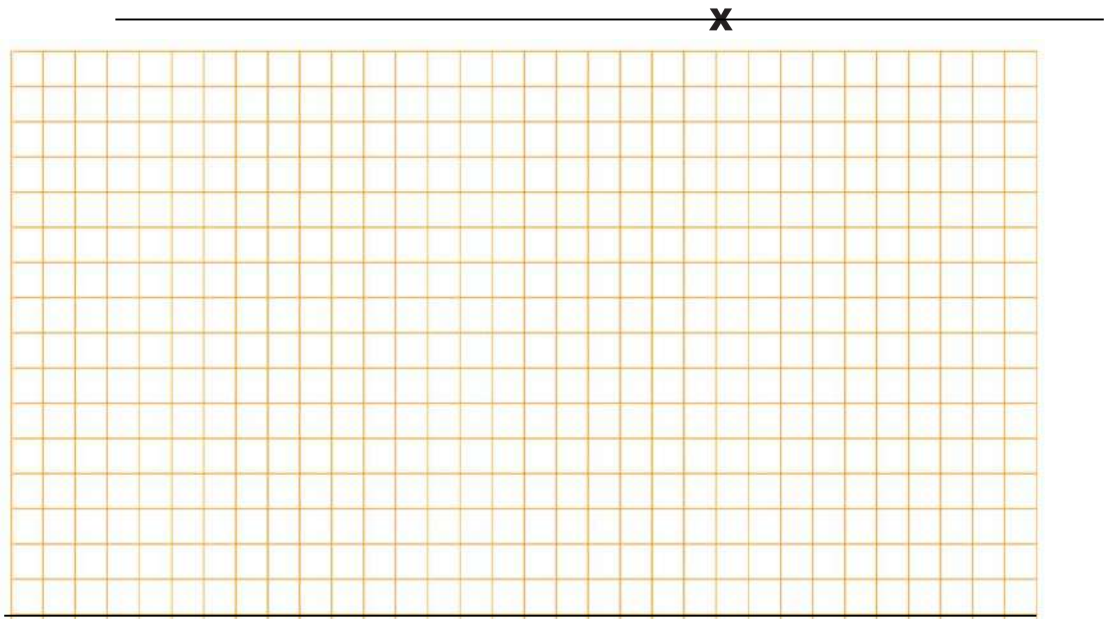


Figure 1

ANNEXURE A



Descriptors	Possible Mark	Obtained Mark
Outlines	2	
Construction	2	
Hidden detail	2	
Interpretation	6	
Texture Rendering/ Colour	3	
Title	2	
TOTAL	17	

NAME AND SURNAME: CLASS: TITLE: DATE:

TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING [18 marks]

QUESTION 4 (SYSTEMS AND CONTROL - MECHANICAL)

4.1. Investigate the sketches below and differentiate them according to the letter of the correct class of lever.
(8)

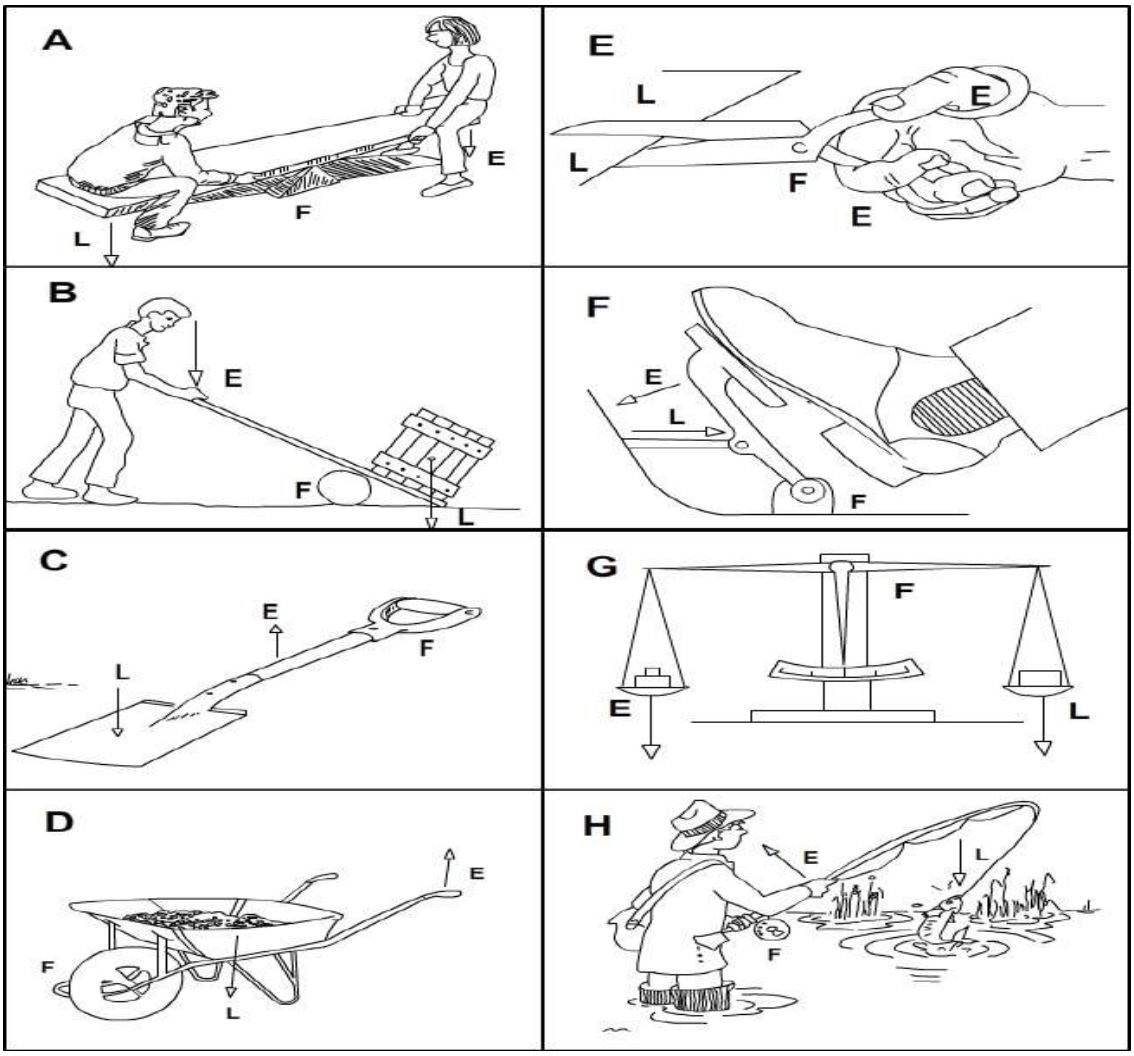


Figure 2

Class of Lever	Answers
Class 1	
Class 2	
Class 3	

QUESTION 5 (SYSTEMS AND CONTROL – ELECTRICAL)

5.1. Draw the correct symbols for the following electrical components.

(3)

Component	Symbol
Battery	
Open Switch	
Lamp	

QUESTION 6 (KNOWLEDGE)

6.1. Analyse and conclude from the three possible answers which is the correct answer from answers given. Cross the letter of the alphabet of your correct answer in the space provided. (4)

6.1.1. This structure encloses and protects an object.

(1)

a) Frame structure

b) Shell structure

c) Solid structure

A
B
C

6.1.2. Changing raw material into a product is known as …

(1)

A

a) Salting
b) Freezing
c) Processing

B
C

6.1.3. The material for making a rain coat must be …..
(1)

a) Heat resistant
b) Water resistant
c) Hard

A
B
C

6.1.4. What strengthening technique is shown in the picture?
(1)

a) Laminating
b) Corrugation
c) Folding

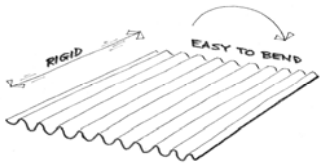


Figure 3

A
B
C

QUESTION 7 (MECHANICAL SYSTEMS)

You have made a hydraulic system using two syringes connected by a length of tubing, and filled with water. Syringe A has a volume of 5ml and syringe B has a volume of 20 ml. (3)

7.1 Select which syringe will you use as the **input** syringe if the **output** must be as far as possible?

_____

_____

7.2. Point out the **advantage** of using the 20 ml syringe as an **input** syringe?

_____

_____

_____

_____

TECHNOLOGY, SOCIETY AND THE ENVIRONMENT [12 marks]

QUESTION 8 (SAFETY IN A TECHNOLOGY CLASSROOM)

8.1. Study the picture of a Technology Classroom below and respond to the questions that follow:

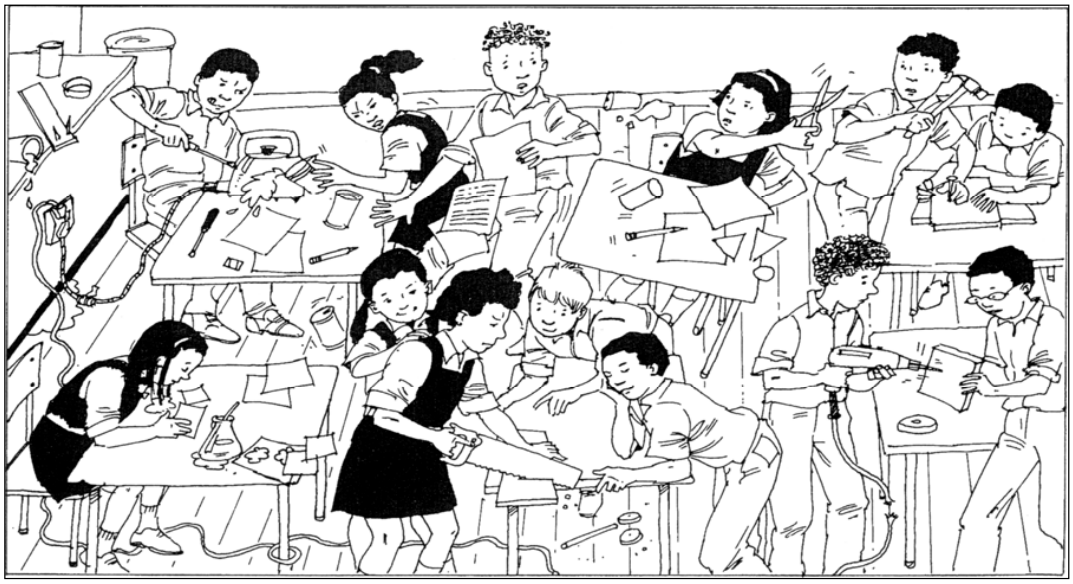


Figure 4

8.1.1. Identify 2 safety hazards in the Technology class illustrated above.

(2)

_____

_____

_____

_____

_____

_____

_____

_____

8.1.2. You are a team leader of one of the teams in your grade 7 Technology class. Write a dialogue between yourself and members of your team discussing the importance of observing safety in a Technology classroom.

Your dialogue must not be more than a half of a page. It is also important to outline your planning of the dialogue by using a mind map of a flow of your ideas.

(10)

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

GRADE 7 COMMON ASSESSMENT

NOVEMBER 2016

MARKS : 60

TIME : 1 hour

MEMORANDUM

This question paper consists of 5 pages.

TECHNOLOGICAL DESIGN PROCESS AND SKILLS **[30 marks]**

QUESTION 1 (DESIGN – DESIGN BRIEF, SPECIFICATION AND CONSTRAINTS)

1.4. *We/I will design and make (✓) a (learners describe their toy of choice) (✓) that the grade R learners can play with (✓).*

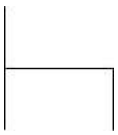
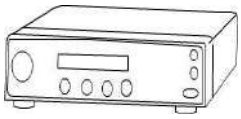
1.5. (Any of the following three)

- Toy must be used by children between 2 to 6 years. (✓)
- Toy must be easy to damage (must be durable). (✓)
- Toy must be attractive and beautiful (aesthetics). (✓)or
- Toy must be safe for children to play with. (✓)

1.6. The toy must be made from recyclable materials. (✓)

QUESTION 2 (DESIGN – 2D AND 3D DRAWINGS)

2.1.

A. **2D*(✓)*** 	B. **3D*(✓)*** 
C. **3D*(✓)***	D. **2D*(✓)*** 
E. **3D*(✓)*** 	F. **3D*(✓)*** 

QUESTION 3 - ANNEXURE A

Descriptors	Possible Mark	Obtained Mark
Outlines	2	
Construction	2	
Hidden detail	2	
Interpretation	6	
Texture Rendering/ Colour	3	
Title	2	
TOTAL	17	

TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING [18 marks]

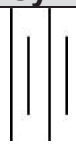
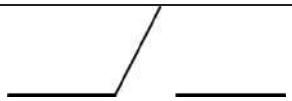
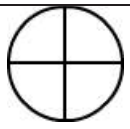
QUESTION 4 (SYSTEMS AND CONTROL – MECHANICAL)

4.2.

Class of Lever	Answers
Class 1	A (✓); B (✓); E (✓); G (✓)
Class 2	D (✓); F (✓)
Class 3	C (✓)√; H (✓)

QUESTION 5 (SYSTEMS ND CONTROL – ELECTRICAL)

5.1.

Component	Symbol
Battery	 (✓)
Open Switch	 (✓)
Lamp	 (✓)

QUESTION 6 (KNOWLEDGE)

6.1.1. **B** *(✓)*

6.1.2. **C** *(✓)*

6.1.3. **B** *(✓)*

6.1.4. **B** *(✓)*

QUESTION 7 (MECHANICAL SYSTEMS)

7.**1** **The 20 ml syringe** *(✓)*

7.2 Less effort is used to move a bigger force *(✓✓)*

TECHNOLOGY, SOCIETY AND THE ENVIRONMENT **[12 marks]**

QUESTION 8 (SAFETY IN A TECHNOLOGY CLASSROOM)

8.1.3. **Any of the two answers below**

- Use professional judgement but the following answers serves as guidelines
  - Accidents will take place.
  - Damage to equipment, materials and tools.
  - Learners not wearing protective clothing
  - Lack of classroom rules will result in the lack of understanding of roles and responsibilities of all stakeholders in a classroom, etc.

MARKS	LEVEL DESCRIPTORS
9-10	*Learner developed a dialogue using of all **relevant*** • Uses a variety of life skills in authenticating contexts by using a mind map that shows the flow of dialogue between team members. • All role players are clearly identified. Dialogue is logical, sequential, structured and well developed. • Uses a variety of skills to link abstract concepts to concrete understanding of the importance of safety issues/procedures in a Technology classroom • Use and engages with knowledge in a purposeful way. • Evaluates existing processes and systems.
6-8	*Learner developed a dialogue using 4 **relevant*** • Uses a variety of life skills in authenticating contexts by using a mind map that shows the flow of dialogue between team members. • All role players are clearly identified. Dialogue is logical, sequential, structured and well developed. • Uses a variety of skills to link abstract concepts to concrete understanding of the importance of safety issues/procedures in a Technology classroom • Use and engages with knowledge in a purposeful way. • Evaluates existing processes and systems.
3–5	*Learner developed a dialogue using **most (3)** of **relevant*** • Uses a variety of life skills in authenticating contexts by using a mind map that shows the flow of dialogue between team members. • All role players are clearly identified. Dialogue is logical, sequential, structured and well developed. • Uses a variety of skills to link abstract concepts to concrete understanding of the importance of safety issues/procedures in a Technology classroom • Use and engages with knowledge in a purposeful way. • Evaluates existing processes and systems.
1 – 2	*Learner developed a dialogue using **some** (1 or 2) **relevant*** • Uses a variety of life skills in authenticating contexts by using a mind map that shows the flow of dialogue between team members. • All role players are clearly identified. Dialogue is logical, sequential, structured and well developed. • Uses a variety of skills to link abstract concepts to concrete understanding of the importance of safety issues/procedures in a Technology classroom • Use and engages with knowledge in a purposeful way. • Evaluates existing processes and systems.

School: .....

Grade 8

PAT

Term 1: STRUCTURES/ MECHANICAL SYSTEMS AND CONTROL

(MODEL: Design and Make - a Model to crush)

Time: 7 hours

Investigate:	Evaluate different designs, Design brief, Specifications and Constrains.	[6] [6]	
Design :	How to make structures stronger, Decide which mechanism to use.	[8] [4]	
Make:	Draw your design of parts to add to the model, Make improvements to the model. Draw an artistic drawing in perspective of your model, Build the basic model with the mechanism in it..	[12] [10] [12] [12]	
TOTAL		**70**	

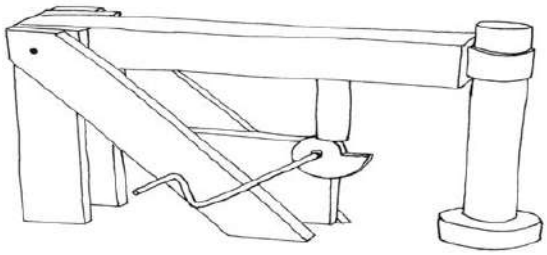
INVESTIGATE

(Compare different designs and make your own design)

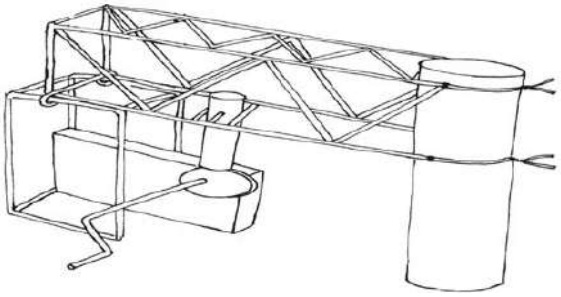
Individual work

Evaluate different designs that other people made: [30 min]

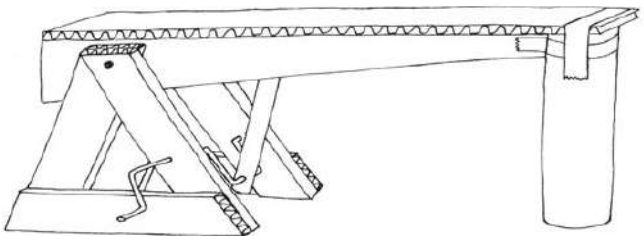
The drawings below show rough designs of grain crushers that other people made. These designs are not complete and there could be problems with them. However there could be useful ideas that you may get to design your own model.



DESIGN A



DESIGN B



DESIGN C

Make a list of the advantages and the disadvantages of the different designs. (Remember you will be accessed on the last two rows of the table).

	DESIGN A	DESIGN B	DESIGN C
How strong and stable is the structure?			
Which material and tools are needed to make the structure?			
How easy is it to make the structure?			
How hard and fast will the pestle hit the floor?			
What is the mechanical advantage of the lever?			
Advantages			
Disadvantages			

[6]

Design brief, Specifications and Constrains: [30 min]

1. Write the **design brief**. (A design brief tells you what the problem is and who will benefit from the use of the solution).

[1]

(A machine to crush grain will usually be powered by an electrical motor that provides rational movement. You will not use an electrical motor in your model but will rather turn the handle of a crank by hand – hand operated model. This rational movement should be changed into reciprocating movement so that the grain will be crushed like hitting it with a hammer. The mechanism of your hand operated model should be hosted in a strong, stable structure to prevent bit from collapsing or flipping over).

2. Answer the following questions in order to identify the **specifications** for your design:

   a) What different mechanisms could make the grain crusher work?

   [1]

   b) What forces should the structure be able to withstand?

   [1]

3. Identify the **constrains**:

   a) How much time do you have to design and complete the model?

   [1]

   b) What materials can you find easily to build the model?

   [1]

   c) What tools do you already have with which you can make the model?

   [1]

[6]

DESIGN

Design to make the structure stronger: [45 min]

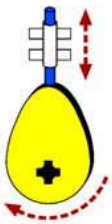
Make a rough sketch below of your plan of how you will make the structure stronger. Each group member should make his/ her own sketch of his/ her own idea and indicate how he/ she plans to make the structure stronger. Add notes and labels to the sketches to explain your designs.

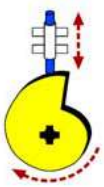
[4]

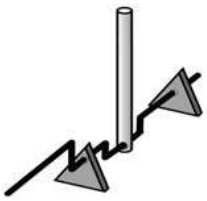
2. Compare your rough designs with each other in your group. Then decide together on what design you will use to strengthen the structure. Each group member should make a neat sketch of the chosen design in the space below. Add notes and labels to the sketches to explain your designs.

[4]

Decide which type of mechanism you are going to use:
(Below are a few mechanisms to choose from).







1. What mechanism did you choose and why? **[4]**

MAKE

Draw your Design and Make the Model: [60 min]

1. Make a 2D working drawing

Make a 2D working drawing of the parts that you will add to the structure to prevent it from collapsing or toppling over. Decide for yourself what the scale of the drawing will be so that the drawing will fit into the space below.

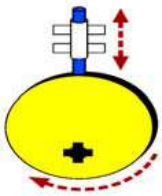
See to the following!

Marks will be allocated as follow:

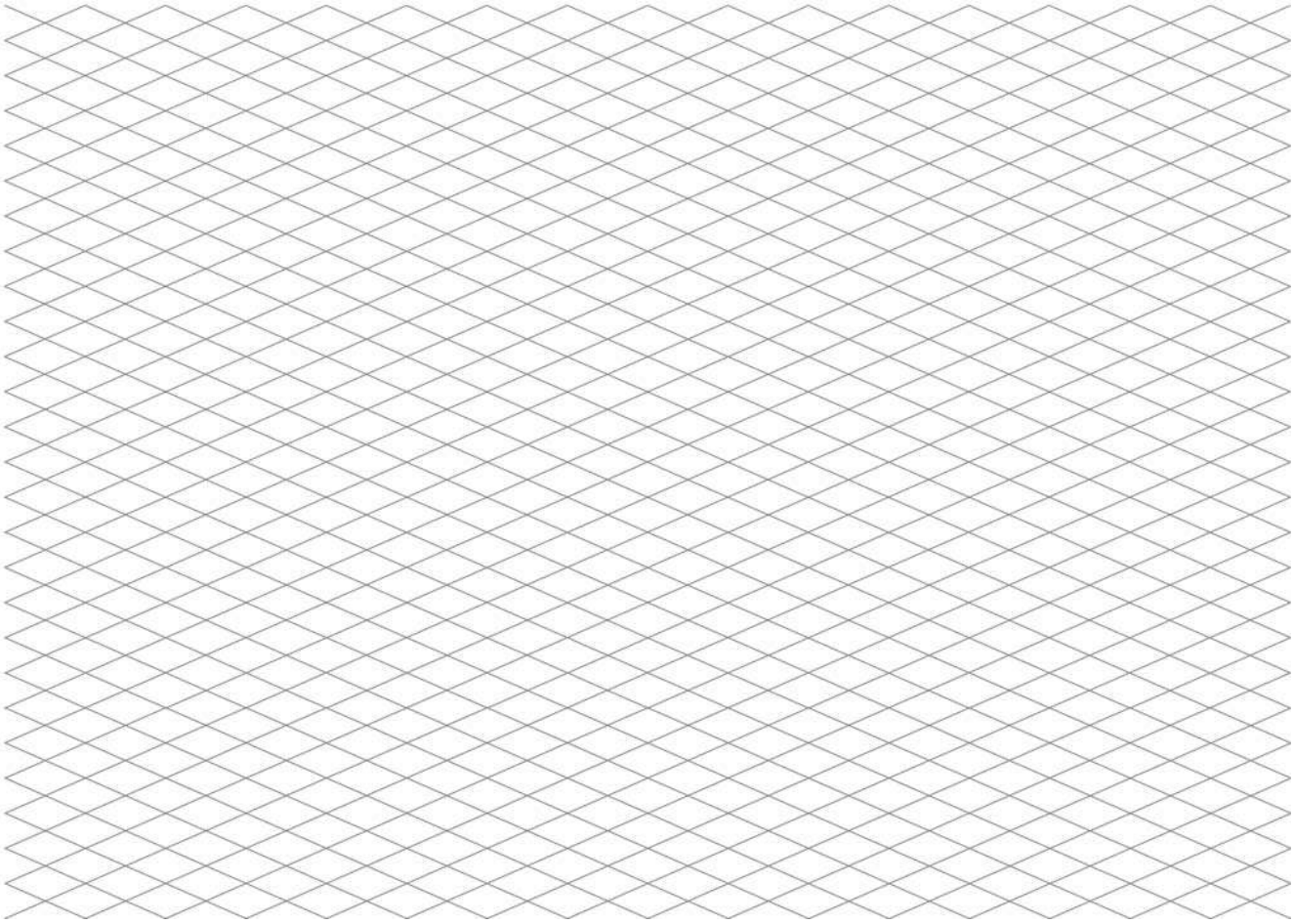
The drawing is an accurate sketch of the chosen design,	[2]	
The drawing shows all important dimensions,	[2]	
The drawing is to scale and the scale is shown,	[1]	
The drawing shows all hidden lines.	[1]	

[6]

2. Make a 3D isometric drawing of what you will add to the structure. Decide on yourself what the scale of the drawing will be so that the drawing will fit onto the grid paper.



Marks will be allocated as follow:



[6]

The drawing is an accurate sketch of the chosen design,	[2]	
The drawing shows all the dimensions in the correct way,	[3]	
The drawing is to scale and the scale is shown.	[1]	

3. Add all improvements and draw the model in artistic perspective in the following space. (double vanishing point perspective) [45 min]

VP 1 VP 2

[10]

Marks will be allocated as follow:

It is easy to understand what the drawing shows,	[3]	
A Rough sketch is made before the final drawing,	[2]	
A Rectangular box is drawn in which the model fits, feint lines is used for visible and hidden lines,	[1]	
The drawings are drawn in double vanishing point perspective , vanishing points are far away,	[2]	
Construction lines are shown as feint lines,	[1]	
Outside lines of the model is shown as dark lines,	[1]	
Shading is used to make the sketch look more realistic	[2]	

[12]

Group work

Build the model: [2 hours 30 min]

4. Build the model with the mechanism which is housed in a strong, stable structure.

Marks will be allocated as follow:

Plans and instructions was followed successfully,	[4]	
'n Mechanism to change rotational movement of a handle into reciprocating movement of a pestle,	[3]	
The parts that turn on axles cannot move sideways, ,	[2]	
The model works well.	[3]	

[12]

TOTAL: [70 Marks]

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Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

TEST

GRADE 8

QUESTION AND ANSWER SHEET
GRADE 8

MARKS : _____ / 60

TIME : 1 hour

This question paper consists of 13 pages.

NAME AND SURNAME :_____
NAME OF SCHOOL :_____
GRADE :_____
NAME OF TEACHER :_____

LEARNER SIGNATURE: _____ **DATE:** _____

QUESTIONS	POSSIBLE MARKS	MARKS OBTAINED	MODERATED MARK
1	11		
2	11		
3	8		
4	12		
5	6		
6	12		
TOTAL	60		

SIGNATURE OF TEACHER: _____ **DATE:** _____

SIGNATURE OF HOD :_____**(MODERATED) DATE:** _____

INSTRUCTIONS:

1. Make sure you have all *12* pages clearly printed.
2. Write your name, class and initial of your teacher on each answer sheet
3. All answers must be completed on the question paper.
4. 15 minutes reading time is allowed.
5. The invigilator will tell you when you may start to write.
6. Only use a blue pen when answering the questions.
7. All sketches or drawing must be done in pencil.
8. Write neatly and legibly.
9. Read the instructions for EACH question carefully.
10. Consult the rubrics and marks allocated to guide you when answering the questions.

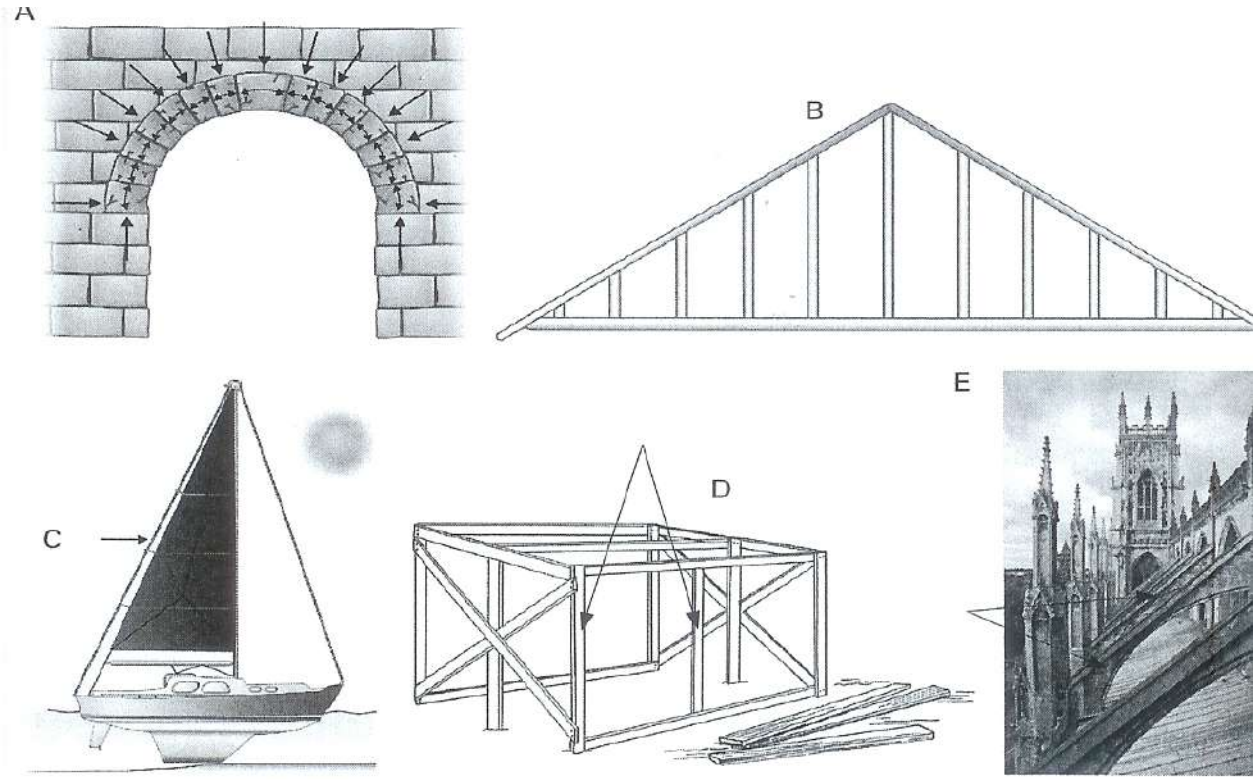
SPECIFIC AIMS ASSESSED

TECHNOLOGICAL PROCESSES AND SKILLS	50%	30 Marks
TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING	30%	18 Marks
TECHNOLOGY, SOCIETY AND THE ENVIRONMENT	20%	12 Marks

QUESTION 1 (STRUCTURAL MEMBERS AND COMPONENTS)

1.1 Name the components indicated in the frame structures below

(5)



A.

_____

B.

_____

C.

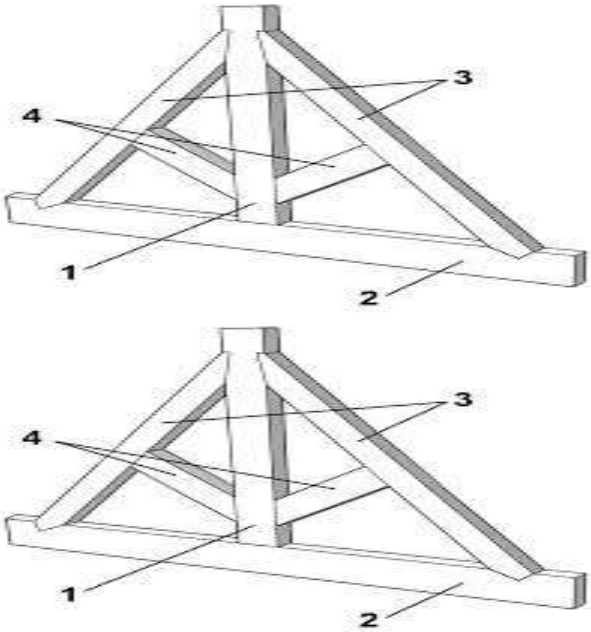
_____

D._____

E.

_____

1.2 Study the sketch below and answer the question that follows:



1.2.1. Use the words in the box below to indicate the following parts in the drawing above. (4)

King Post, Rafter, Strut, Tie

_____

_____

_____

_____

_____

1.2.2. Which TWO parts of the drawing are experiencing compression and tension force? (2)

_____

_____

_____

QUESTION 2 (MECHANICAL SYSTEMS AND CONTROL) **[14]**

Mechanical system involves four types of motions namely Linear motion, Rotary motion, Oscillating motion and Reciprocating motion.

2.1. What type of motion each of the following has? (4)

2.1.1. Electrical fan : _____

2.1.2. Girl riding on a bicycle : _____

2.1.3. Wheels of a bicycle :_____

2.1.4. Needle of a sewing machine: _____

2.2. Draw a gear train with two gears in the box below. The driver gear has 10 teeth and the driven gear has 50 teeth. Use arrows to show the direction in which the gears turn. Label the drawing correctly (4)

2.2.1. Calculate the **gear ratio** using the gear train drawn above (2)

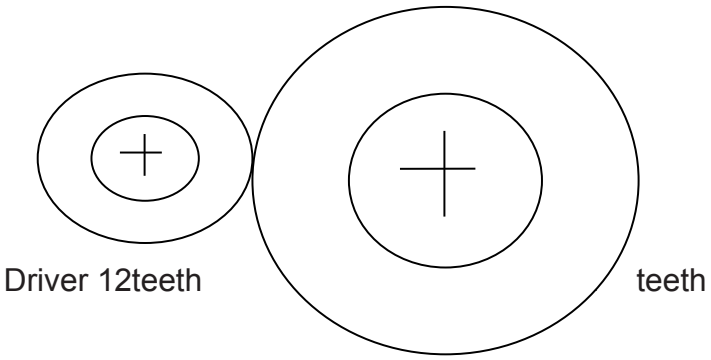
_____

_____

_____

_____

2.3 Calculate Gear/ Velocity Ratio (1)



QUESTION 3 (GRAPHIC COMMUNICATION)
[10]

3.1. Name three methods of enhancing 2D or 3D drawing. (3)

3.2. When scaling up a diagram are we making it bigger/smaller? (1)

3.3. Is a drawing with a scale of 1:3 three times bigger/smaller than the real object? (1)

_____

_____

3.4. Draw the type of line next to the name (4)

Number	Line types	Drawing (illustration)
3.4.1.	Outlines	
3.4.2.	Construction lines	
3.4.3.	Hidden detail lines	
3.4.4.	Centre Lines	

QUESTION 4 (IMPACT OF TECHNOLOGY)

CASE STUDY: Comparison of traditional structures **[12]**

A The domed grass dwelling of the Amangwane clan near Bergville

In the foothills of the Drakensberg Mountains, there are high winds. The need was to build a shelter of readily available material. Flexible thin poles or laths of Black Wattle or Grey Poplar were used for the frame and local thatching grass and reeds were used for the covering of the dome and for the door. The hut was easily constructed from local materials using local expertise.

The dome was usually self-supporting, but occasionally props were used. Although there were no windows, it was well ventilated through the grass. It was also well insulated against the weather as thatch is cool in summer and warm in winter.

B The Igloo of the Inuit or Eskimos

For many years the Inuit or Eskimos have been building dome-shaped igloos made from blocks of frozen snow. These are used as temporary winter quarters and can be built in two hours by a skilled man using a metal snow knife to cut the blocks from deep, tightly packed snow drifts.

The blocks measure about a meter and are about twenty cm thick. Each layer is stacked leaning slightly inward to allow for the dome shape until the final circle at the top has a much smaller circumference that the base. A hole for ventilation is left at the top. Entrance is through a small tunnel to keep out the cold winds.

The dome design affords less resistance to the wind than a rectangular dwelling and sleet (freezing rain) slides down the sides and freezes, strengthening the structure.

4.1. Which dwelling is a shell structure and which is a shell-and-frame structure? (2)

4.2. Why is the shape of the dome suitable in each case? (4)

4.3. Compare how the shape of the dome is constructed in each example. (3)

4.4. Explain why you think this material is suitable or unsuitable. (3)

_____

_____

_____

_____

_____

QUESTION 5 (DEVELOPMENT OF INVESTIGATION TOOL)

Scenario – Background context

Nowadays there are increasing dangers for children trying to get to school. Some of the problems are dangerous crossings for pedestrians, no specified safe areas for bicycles, un-roadworthy taxis, public transport where buses are often on strike, inadequate parking and drop-off facilities for parents trying to drop off children at school and no clear pedestrian crossings. In rural areas, the problems include inadequate or non-existent public transport, long distances to walk and lack of a safe crossing across a local stream.

Survey

You need to conduct a survey of a sample of 50 children from your school on what they think can be done to improve the safety of children going to and coming from school. Depending on your community, you will need to design your questions accordingly, based on some of the suggested factors or other relevant factors.

Compile a series of SIX clear questions that will assist you to complete the survey based on the above scenario.

(6)

_____

_____

_____

_____

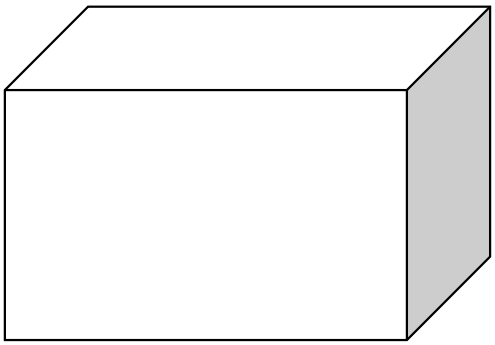
_____

_____

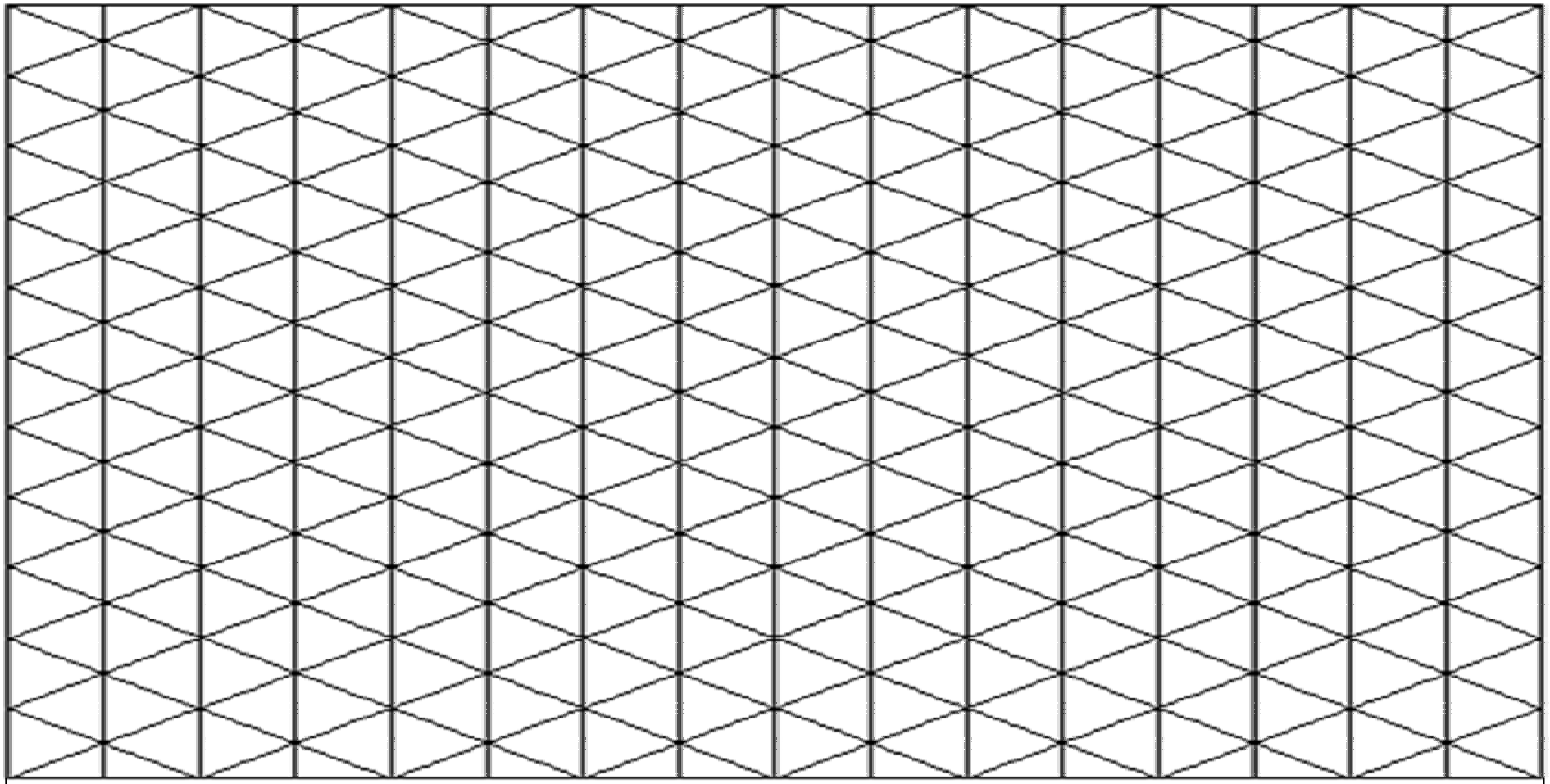
Marks	Descriptors
5-6	All 6 survey questions give a clear idea of the research objectives, uses technological terminology and no aspects are left out and all are clearly explained
4	5 survey questions gives a clear idea of the research objectives, uses technological terminology BUT some aspects are left out and poorly explained
2-3	2-3 survey questions gives some idea of the research objectives BUT does not use technological terminology and not all stages are clearly covered
1	No systems diagram or very poor; cannot determine what the learner has in mind

QUESTION 6 (ISOMETRIC DRAWING)

Draw the following oblique drawing in isometric projection on ANNEXURE A attached. [12]



Level	Descriptors	Marks
6-7	Drawing is accurate, neat, and isometric with shading texture rendering or colour and all relevant information according (Title) to the oblique tube above.	10-12
4-5	Drawing is accurate; isometric with texture rendering or colour, shading and title of the oblique tube above.	7-9
3	Drawing is accurate; isometric with texture rendering or colour and shading of the oblique tube above.	4-6
2	Drawing is accurate; isometric with some texture rendering or colour and shading of the oblique tube above.	2-3
1	Drawing is inaccurate, not isometric, without texture rendering or colour and shading	0-1



NAME AND SURNAME:_____**SCALE:**_____**TITLE:**_____

End of Question and Answer Paper **TOTAL: 60**

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Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

TEST

MARKING MEMORANDUM
GRADE 8

MARKS : _____ / 60

TIME : 1 hour

This question paper consists of 6 pages.

QUESTION 1 **[11]**

1.1

(5)

1.1.1. Arch √

1.1.2. Truss √

1.1.3. Stay √

1.1.4. Columns √

1.1.5. Flying buttress √

1.2

(4)

1.2.1. King post √

1.2.2. Tie √

1.2.3. Rafter √

1.2.4. Strut √

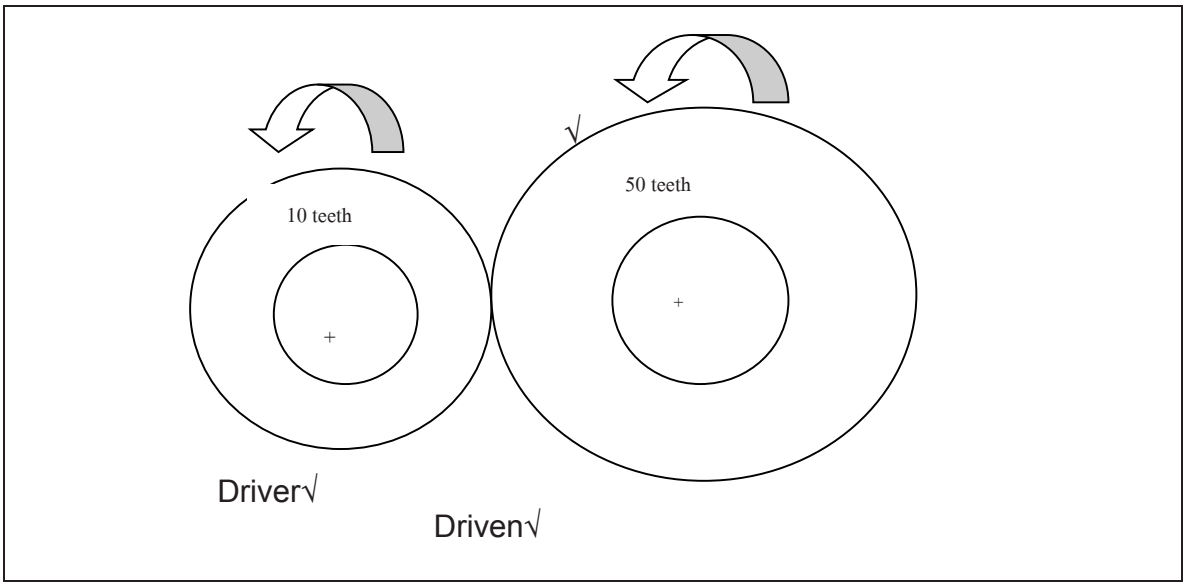
1.3. On the strut is compression force and on the tie is tension force.√√ (2)

QUESTION 2

[14]

2.1.1. Reciprocating motion√
2.1.2. Linear motion√
2.1.3. Rotary motion√
2.1.4. Oscillating motion√

2.2. (4)



2.2

(2)

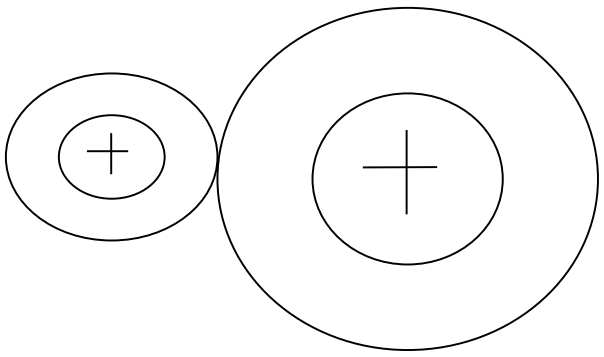
Gear Ratio

= No of teeth on driven gear = 50 teeth √

No of teeth on driven gear 10 teeth

= 5: 1√

2.3 Calculate Gear/ Velocity Ratio (1)



Driver 12teeth Driven 24teeth

Driver ÷ Driven = Velocity Ratio

12 ÷ 24 = ½ or 0.5 √

QUESTION 3

[10]

1. Using colour, texture and shading √√√ (3)

2. When we scale up we make it **bigger** √ (1)

3. A drawing with a scale of 1:3 is three times **smaller** than the real object. √ (1)

4. a) _____√

   b) _____ √

   c) _ _ _ _ _ _ _ _ _ _ _ _ _ _ √

   d) ____ – ____ – ____ - ____ √
   (4)

QUESTION 4

[12]

4.1 The igloo is a shell structure and the domed grass hut is a frame-and-shell structure.√√ (2)

4.2 The arch or dome shape is very stable√ – high winds go around it√ – not a flat surface to offer resistance and blow down.√ Also snow and rain runoff easily.√ (4)

4.3 In the grass dome, the flexible lath from the wattle or poplar is suitable√ because it can bend and weave in and out to form the arches over which the grass is placed.√ the blocks of frozen snow are stacked in diminishing circles, leading to a much smaller circumference at the top.√ Sleet freezes and seals cracks.√ ANY OF THE THREE (3)

4.4 In both cases the material is suitable√ because it is easily obtainable and cheap.√ It is also easy to build.√ It is a good insulator.√ ANY OF THE THREE (3)

QUESTION 5

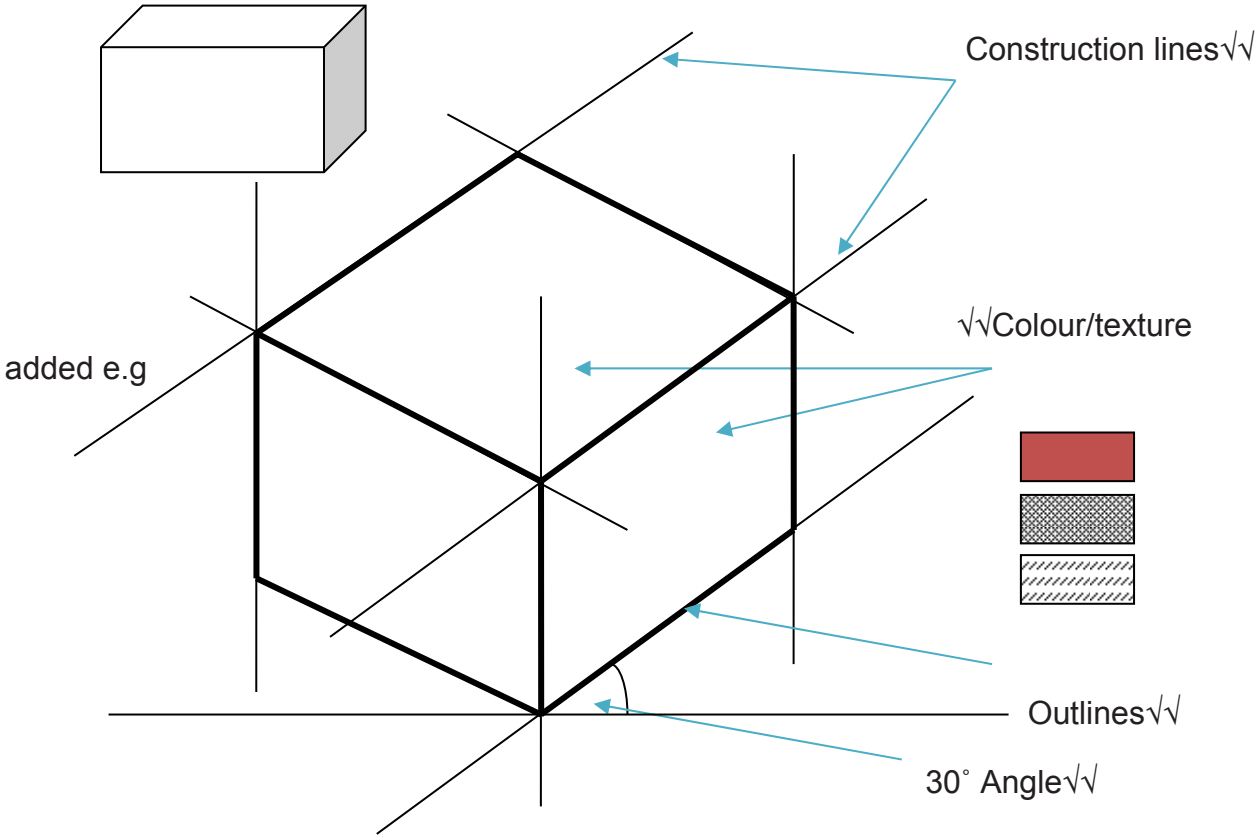
Use professional judgement in marking this question guided by the Rubric below.

Marks	Descriptors
5-6	All 6 survey questions give a clear idea of the research objectives, uses technological terminology and no aspects are left out and all are clearly explained
4	5 survey questions gives a clear idea of the research objectives, uses technological terminology BUT some aspects are left out and poorly explained
2-3	2-3 survey questions gives some idea of the research objectives BUT does not use technological terminology and not all stages are clearly covered
1	No systems diagram or very poor; cannot determine what the learner has in mind

QUESTION 6

[12]

Level	Descriptors	Marks
6-7	Drawing is accurate, neat, and isometric with shading texture rendering or colour and all relevant information according (Title) to the oblique tube above.	10-12
4-5	Drawing is accurate; isometric with texture rendering or colour, shading and title of the oblique tube above.	7-9
3	Drawing is accurate; isometric with texture rendering or colour and shading of the oblique tube above.	4-6
2	Drawing is accurate; isometric with some texture rendering or colour and shading of the oblique tube above.	2-3
1	Drawing is inaccurate, not isometric, without texture rendering or colour and shading	0-1



NAME AND SURNAME: BENEDICT MOENG	**SCALE:** NOT GIVEN	**TITLE:** ISOMETRIC TUBE

End of Memorandum **TOTAL: 60**

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

COMMON ASSESSMENT

QUESTION AND ANSWER SHEET

GRADE 8

MARKS : _____ / 60 **TIME : 1 hour**

NAME AND SURNAME:_____

SCHOOL :_____

CLASS :_____

TEACHER :_____

LEARNER SIGNATURE: _____ **DATE:** _____

This question paper consists of 9 pages.

QUESTIONS	POSSIBLE MARKS	MARKS OBTAINED	MODERATED MARK
1	15		
2	9		
3	6		
4	8		
5	10		
6	12		
TOTAL	60		

SIGNATURE OF TEACHER: _____ DATE: _____

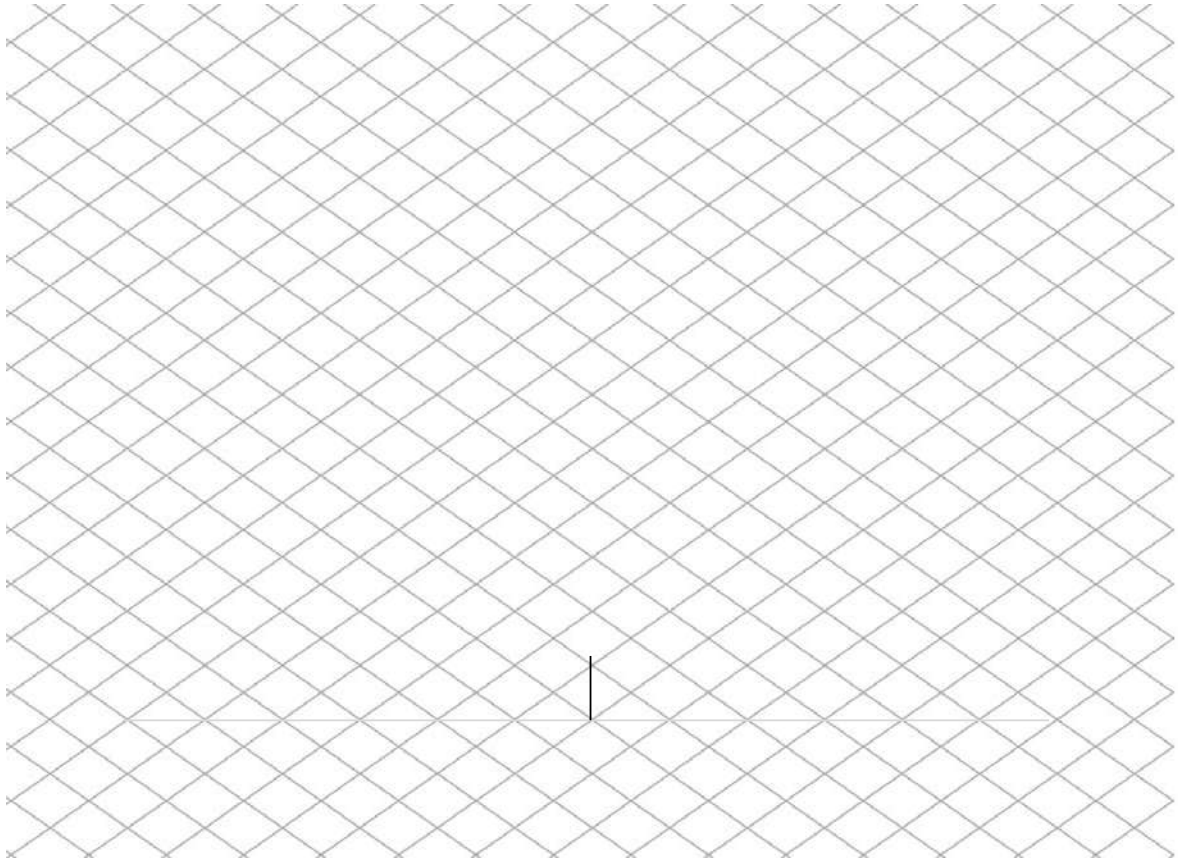
SIGNATURE OF HOD:_____(MODERATED) DATE: _____

SPECIFIC AIMS ASSESSED

TECHNOLOGICAL PROCESSES AND SKILLS	50%	30 Marks
TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING	30%	18 Marks
TECHNOLOGY, SOCIETY AND THE ENVIRONMENT	20%	12 Marks

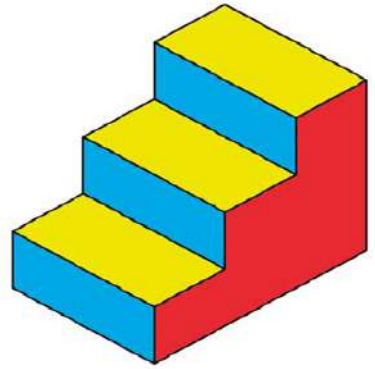
INSTRUCTIONS:

11. Make sure you have all *9* pages clearly printed.
12. Write your name, class and initial of your teacher on each answer sheet
13. All answers must be completed on the question paper.
14. 15 minutes reading time is allowed.
15. The invigilator will tell you when you may start to write.
16. Only use a blue pen when answering the questions.
17. All sketches or drawing must be done in pencil.
18. Ensure that you staple back the two drawing papers with your question and answer paper when you have finished writing and submit to your teacher.
19. Write neatly and legibly.
20. Read the instructions for EACH question carefully.
21. Consult the rubrics and marks allocated to guide you when answering the questions.



QUESTION 1 (ISOMETRIC DRAWING)

Use the given information and make a neat ISOMETRIC drawing of the model. (15)



MARKING GUIDELINE		
DESCRIPTOR	**MARKS**	
Correct technique /interpretation	**5**	
Construction lines	**3**	
Outlines Lines	**3**	
Neatness	**2**	
Title	**2**	
TOTAL	**15**	

NAME

GRADE

DATE

QUESTION 2 (IMPACT OF TECHNOLOGY ON COMMUNITY AND ENVIRONMENT)

Classify the given solid waste objects in the table below as biodegradable/ non-biodegradable waste.

(**9**)

Cardboard plastic bottles rubber pipes wooden box polyester shirt Cooldrink cans leather shoes pencil case glass bottle

Biodegradable	Non-Biodegradable

QUESTION 3 (IMPACT OF TECHNOLOGY ON COMMUNITY AND ENVIRONMENT)

Write a paragraph of not less than 50 words on the impact of waste on the environment. You may use the given picture as reference and /or a resource. (6)

Source: www.thebookoflife.org

[6]

SECTION B

QUESTION 4: (TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING)

Match keywords in column B with the explanation in Column A. Write only the letter of the correct answer next to the relevant question number. E.G 1.1 D

(8)

COLUMN A	ANSWER	COLUMN B
1.1. Does not harm the natural world		A - Bio-plastics
1.2. A natural resource that will always be available to use		B - Processing
1.3. Able to be destroyed by natural processes without harming the environment		C - Toxic
1.4. Able to continue without damaging the environment		D - Biodegradable
1.5. Series of actions we do to raw materials or products to change them to form a new product		E - Synthetic
1.6. Not a natural substance		F - Renewable
1.7. Made from renewable raw materials		G - Sustainable
1.8. Poisonous		H - Environmentally friendly

[8]

QUESTION 5: (TECHNOLOGY, SOCIETY AND ENVIRONMENT)

Use the information below to assist you in answering the given questions.

Coal

Coal is a non-renewable energy source because it takes millions of years to create. It is a combustible black or brownish-black sedimentary rock composed mostly of carbon and hydrocarbons—molecules containing hydrogen and carbon. The energy in coal comes from the remains of prehistoric plants and animals, making it part of the fossil fuels family.

Demand for Coal

Worldwide proven coal reserves are more than 847 billion tons — enough to last approximately 130 years at current consumption levels. The countries with the largest reserves of coal are the United States, Russia, China and India. Together they make up 67% of the world's coal reserves.

Coal provides 26% of global primary energy needs and generates 41% of the world's electricity, according to the World Coal Institute Coal Facts 2008. The US Energy Information Administration expects coal use to double by 2030 to meet rising world energy demand.

Uses for Coal

In some countries, coal may be burned directly for heat or cooking, but most coal is used in power plants to generate electricity. Coal has plenty of uses outside of electricity too. Materials that contain coal and coal coke (a concentrated form of coal that has been stripped of its volatile materials) are used in many products we use every day, including:

- Tar
- Perfumes
- Golf balls
- Chalk
- Paper clips
- Sugar substitute
- Soap

- Aspirin
- Dyes

How Does Coal Mining Affect the Environment?

Coal mining and coal use has historically had a negative impact on the environment, particularly by creating harmful gases like carbon dioxide and methane. But the coal industry is working to improve these detrimental effects.
Coal companies reduce carbon dioxide emissions by capturing the gas and injecting it into deep geological formations for storage. Mining also produces methane gas, which has a much greater global warming potential than carbon dioxide. Using technological advances, the industry has been successful in recovering the methane and preventing it from being released into the atmosphere. According to the International Energy Agency, replacing older coal-fired power plants with more efficient plants could significantly reduce the industry's greenhouse gas emissions.

Coal mining's effect on the environment reaches beyond the atmosphere: the Earth also feels its effects. Land – Coal mining can lead to soil erosion and dust, and it causes disturbance to large tracts of land.

Water – Acid mine drainage, a metal-containing water that is formed by the chemical reaction between water and rocks containing sulphur-bearing minerals, can pollute water around a coal mine with heavy metals like copper, lead and mercury. Methods coal companies can use to minimize water pollution include building specialized water treatment plants and recycling contaminated water.

Plants and animals – Coal mining, particularly surface mining, can disturb land that is used for grazing, animal habitats, forests, crops and more. But the coal-mining industry makes rehabilitating land once mining is complete a top priority. After mining is complete, companies reshape the area, replace top soil and replant vegetation, making the reclaimed land suitable for wildlife, agriculture and more.

Source: http://energy4me.org/all-about-energy/what-is-energy/energy-sources/coal/

5.1 Explain the impact of using coal for energy and the impact it has on the environment. (2)

_____

_____

_____

_____

_____

5.2 Name 3 sources of renewable energy that could replace the use of natural materials for fire to cook and to keep warm.

(3)

_____

_____

_____

5.3 Explain the concern that scientists have about the burning of coal / fossil fuels on a large scale. (2)

_____

_____

_____

_____

5.4 Briefly explain what you understand the term “global warming” means? (2)

_____

_____

_____

5.5 Justify why do we need to create new sources or materials or find new ways to use sources for energy?

(1)

_____

_____

_____

[10]

SECTION C

QUESTION 6 (TECHNOLOGY, SOCIETY, ENVIRONMENT)

6.1 Recommend methods on how you can contribute to your community to keep it clean and free of waste. (3)

_____

_____

_____

_____

_____

_____

_____

6.2 Name 4 different items at you school that is thrown away that can be recycled. (4)

_____

_____

_____

_____

_____

_____

6.3 Create a flow chart to demonstrate how paper is recycled. (5)

[12]

TOTAL: 60 MARKS

END OF THE QUESTION AND ANSWER PAPER

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Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

COMMON ASSESSMENT

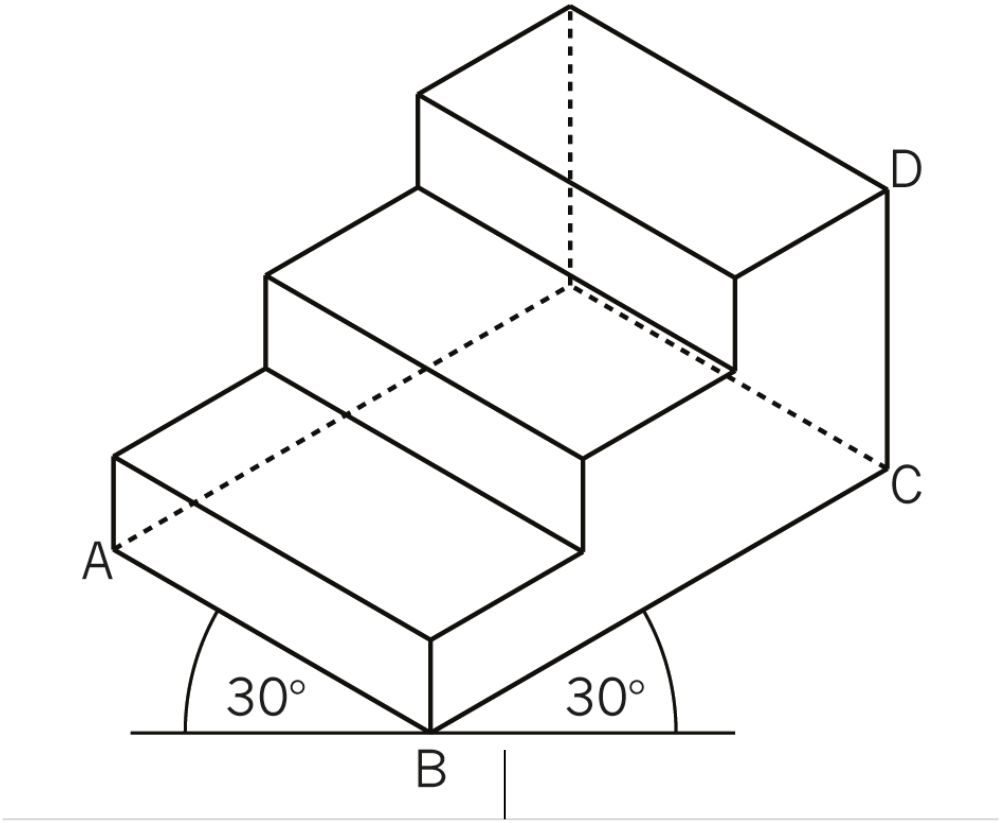
MEMORANDUM

GRADE 8

MARKS : _____ / 60

TIME : 1 hour

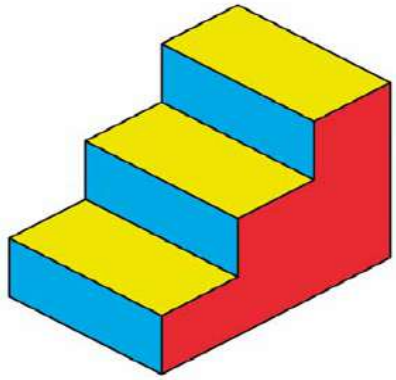
This MEMORANDUM consists of 5 pages.



QUESTION 1(ISOMETRIC DRAWING)

Use the given information and make a neat ISOMETRIC drawing of the model.

(15)



MARKING GUIDELINE		
DESCRIPTOR	**MARKS**	
Correct technique /interpretation	**5**	
Construction lines	**3**	
Outlines Lines	**3**	
Neatness	**2**	
Title	**2**	
TOTAL	**15**	

NAME

GRADE

DATE

QUESTION 2 (IMPACT OF TECHNOLOGY ON COMMUNITY AND ENVIRONMENT)

Classify the given solid waste objects in the table below as biodegradable/ non-biodegradable waste.

(9)

Cardboard plastic bottles rubber pipes wooden box polyester shirt Cool drink cans leather shoes pencil case glass bottle

Biodegradable	Non-Biodegradable
Cardboard √	**Glass bottle√**
Wooden box√	**Plastic bottles√**
Leather shoes√	**Pencil case√**
	Rubber pipes√
	Cool drink cans√
	Polyester shirt√

QUESTION 3 (IMPACT OF TECHNOLOGY ON COMMUNITY AND ENVIRONMENT)

Write a paragraph of not less than 50 words on the impact of waste on the environment. You may use the given picture as reference and /or a resource. (6)

Source: www.thebookoflife.org

USE PROFESSIONAL JUDGEMENT TO MARK THIS QUESTION – LANGAUGE/ UNDERSTANDING OF THE CONTEXT AND PRESENTATION SHOULD GUIDE YOU

[6]

SECTION B

QUESTION 4: (TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING)

Match keywords in column B with the explanation in Column A. Write only the letter of the correct answer next to the relevant question number. E.G 1.1 D
(**8**)

COLUMN A	ANSWER	COLUMN B
4.1 Does not harm the natural world	**H**	A - Bio-plastics
4.2 A natural resource that will always be available to use	**G**	B - Processing
4.3 Able to be destroyed by natural processes without harming the environment	**A**	C - Toxic
4.4 Able to continue without damaging the environment	**F**	D - Biodegradable
4.5 Series of actions we do to raw materials or products to change them to form a new product	**B**	E - Synthetic
4.6 Not a natural substance	**E**	F - Renewable
4.7 Made from renewable raw materials	**D**	G - Sustainable
4.8 Poisonous	**C**	H - Environmentally friendly

QUESTION 5: (TECHNOLOGY, SOCIETY AND ENVIRONMENT)

Use the information below to assist you in answering the given questions.

5.1 Explain the impact of using coal for energy and the impact it has on the environment.
(2)

Not sure how to mark this or what exactly were looking for - the question is very much an open-ended question. Not enough parameters given or provided. Use professional judgement to mark this question.

5.2 Name 3 sources of renewable energy that could replace the use of natural materials for fire to cook and to keep warm.

(3)

solar, wind, water, bio-fuels,

5.3 Explain the concern that scientists have about the burning of coal / fossil fuels on a large scale.

(2)

Has to do with global warming , USE PROFESSIONSL JUDGEMENT T MARK THIS QUESTION.

5.4 What do you understand the term “global warming” means?

(2)

Warming of the earth’s climate due to increased use of fossil fuels and gases and synthetic materials

5.5 Justify why do we need to create new sources or materials or find new ways to use sources for energy?

(1)

Fossil fuels are not renewable, they will finish at some stage, we need to have replacements by then.

[10]

SECTION C

QUESTION 6 (TECHNOLOGY, SOCIETY, ENVIRONMENT)

6.1 Recommend methods on how you can contribute to your community to keep it clean and free of waste. (3)

learners own answer - any sound, logical idea that is feasable and makes sense. USE PROFESSIONAL JUDGEMENT.

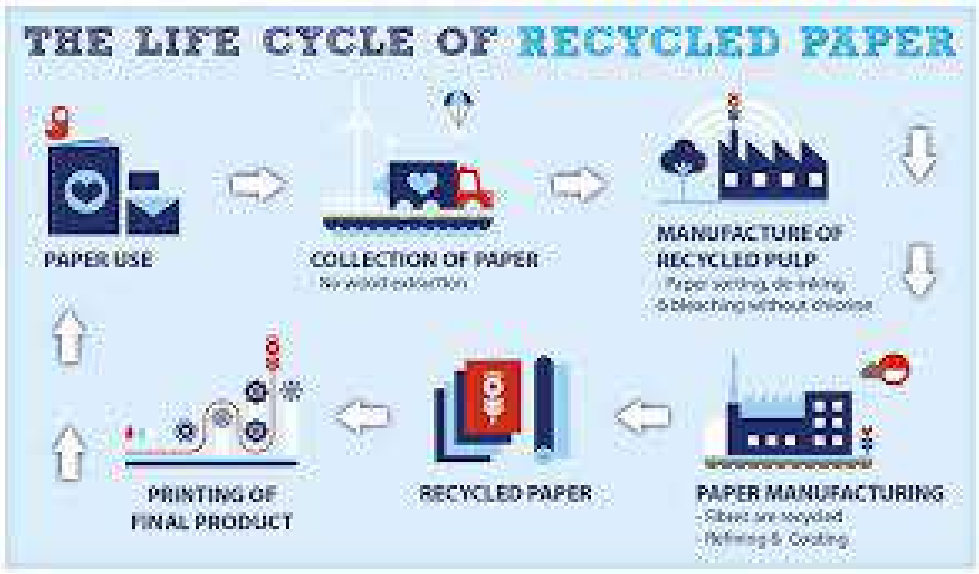
6.2 Name 4 different items at you school that is thrown away that can be recycled. (4)

paper, plastic, glass, food (bio-mass), rubber, metals, etc.

6.3 Create a flow chart to demonstrate how paper is recycled. (5)

THE ILLUSTRATION BELOW MUST SERVE ONLY AS A GUIDE FOR MARKING. LEARNERS MAY USE VARIED APPROACHES IN RESPONSE TO THIS QUESTION

BUT THE PRINCIPLE OF A FLOW CHART MUST BE AT THE CENTRE OF THEIR RESPONSES.



[12]

END OF THE MARKING MEMORANDUM

Situations where electronic circuits control electric circuits (30 minutes).

There are many household appliances that use electronic circuits to control electric circuits with bigger currents. The following two devices are used inside the electric switchboard (or distribution board) of every building that is connected with electricity in a safe way.

• **Ordinary circuit breakers:**

Shuts off a circuit (for example the circuit supplying all the lights in a house) when the current becomes too big (if the current is too big for the thickness of wire used, the wire will overheat).

• **Residual-current circuit breakers:**

Switches off the main power supply if it detects a leakage of power, such as when a person accidentally touches a "live" electrical wire or contact and the electricity is then conducted through his or her body. This device has to cut the current very quickly; otherwise the person can die due to electric shock. Therefore, it switches off the power even when it detects only a small amount of leakage of electrical current.

An electrical distribution board with circuit breakers

An **electronic circuit** is different from an electric circuit because it only uses a very small current, and because it uses electronic control devices such as thermistors, LDRs, diodes and transistors.

The following household appliances use electronic circuits to control them:

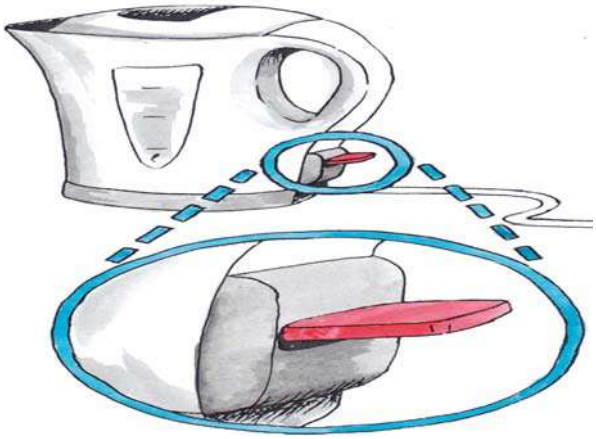
• Ovens: to control the temperature,
• Radios and other music appliances: to control the volume of the speakers,
• Some energy-saving lights: to switch off automatically when there is enough natural light, and
• Kettles: to switch off when the water boils.

1. Give two examples of situations or applications where electrical circuits are used. (1)
2. Give two examples of situations or applications where electronic circuits are used. (1)
3. Give three examples of situations or applications where electronic circuits and electric circuits are used together. (3)

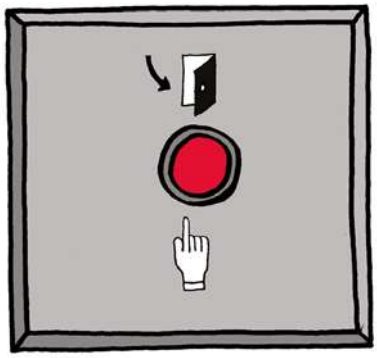
Total [5]

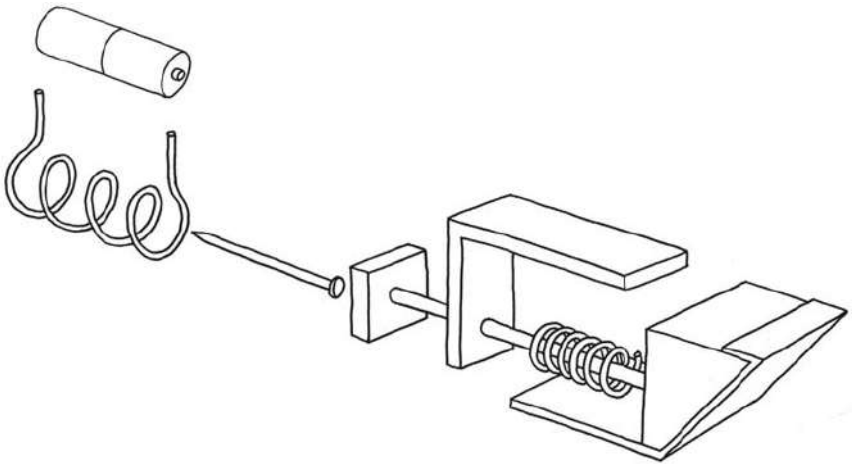
The scenario

A kettle uses electricity at a rate 30 times higher than a normal light bulb. A lot of electricity can be saved if a kettle is used more effectively. If a kettle keeps boiling without being switched off, it uses electricity unnecessarily. This leads to a waste of electricity. If you drink your tea or coffee without cold milk, you do not want boiling hot water (100 °C), since it will burn you. So, it is a waste of electricity and time to bring the water to boiling point (100 °C). Most of the time, a kettle only needs to heat water to a temperature of about 75 °C. If the kettle keeps heating the water to a temperature of 100 °C, it is a waste of electricity. You will design and make an “energy saving switch” for a kettle. The switch will be controlled by an electronic circuit so that the kettle will automatically switch off when the water reaches the required temperature. The electronic circuit will have a variable resistor so that the temperature at which the kettle will automatically switch off can be set by the user



The drawings below show how an electric door lock works. This may give you useful ideas for your design of an energy-saving kettle switch.





An exploded 3D assembly drawing of the parts inside an electric door lock

Design brief

1. What is the purpose of the switch you will be designing?

Hint:

Think about how easy it is for people to do things, the impact on the environment, and costs involved. (½)

Specifications

1. What parts should the device have where the user must press or turn something by hand? (½)
2. Are there part(s) of the device that would sometimes be moved by the user, and other times be moved automatically? (1)
3. How should the moving parts of your switch work? For example, what should cause it to move one way, and what should cause it to move the other way? Use names for the different moving parts, as well as for the other parts that will make the moving parts move or stop them from moving. (2)
4. What type of electrical component can generate the automatic movement that your

device has to perform? This component will be the output device in the control circuit. (½)

5. Does your device need a container or supporting structure to keep all the parts together? What type of container or structure do you think will work well? (½)

Constraints

1. Make a list of all the materials you will need. (1)
2. Make a list of all the tools you will need (½)
3. Make a time schedule showing how much time you have to design and make the product. (½)

Design sketches

1. Make at least two rough sketches of your design. Use labels and notes to explain your design. If your second sketch is an improvement on your first sketch, keep the first sketch, but simply label the second sketch as "improved design".

Total marks [**5**]

Evaluate as a team: Learn from one another's designs to make a better design together (60 minutes)

1. Each team member should explain his or her design to the rest of the team, and the others should ask questions if they don't understand something.

2. After everyone has explained their designs, you should make a list of the advantages and disadvantages of all the designs.

Learn from the different designs that different people made.

Don't throw an idea away too quickly even if there is a problem with it. First sketch and explain it to the others. This idea can lead to another better idea. If everyone throws their ideas away too quickly, there will be no ideas on the table to work with. Design teams work well when they separate the work into two stages:

- First generate ideas, sketch and explain them, without anyone saying anything negative about the ideas.
- Once you have several ideas on the table, start thinking about how and whether the different ideas will work or not. Don't talk about "Mary's design" or "Sipho's design". Rather talk about "Design C" or "Design B". Once someone has put a design on the table, you talk about the design. You do not talk about the person. You evaluate the designs. You do not evaluate yourself or someone else.

There is no such thing as a perfect design! For example, you can make a complicated design that will work very well, but that will be expensive and difficult to build. Or you can make a simple and cheap design that works, but is not strong enough.

If someone makes a negative remark at this stage, you should say *"Red flag! No negative remarks at this stage."*

Saying "Mary's made a bad design" or "Sipho's is much better", for example, will hurt someone's feelings or make others feel proud or arrogant. If someone says "Mary's design ...", you should say

*"Red flag! We call that Design C."*1

3. Now combine different ideas from different designs into one better design. Your team will only succeed at this if you talk and sketch together "creatively". Being creative means "playing with ideas". To communicate well and to be creative, you have to make many rough sketches. Do that in the space provided below. Include labels and notes to help explain the sketches.

(4)

4. Now each person should make their own sketches of the improved design that the team made together. Once again, show labels and notes to explain the sketches. Make at least two sketches, so that both the whole design and hidden detail can be seen. You might want to draw the design from different view points, or draw a few parts on their own.

(4)

Make individually: 2D Working drawing and 3D drawings of your design (60 min)

1. Make a 2D working drawing of your design in first angle orthographic projection. It should be drawn to scale and show as much detail as possible. Show dimensions and the scale. Show all hidden details.

(8)

2. Make an isometric drawing of your design to scale. Do not show the container or structural support for the inner parts of your design. Only show the inner parts. Do not show any hidden details, but choose your view point so that as much detail as possible is shown. Show the scale, but do not show the dimensions.

(7)

Make and test your prototype of the switch (120 minutes)

1. Work in groups to build a model of your design for the switch. A model of a new design is called a prototype.
2. Work in groups to build the output device for the control circuit that you will later connect to your switch.
3. Test your model with a simple circuit consisting of a battery and the electric output device that you made.

You will probably find that your model does not work the first time you test it. This is normal! Most new things that people design don't work the first time they test it. Try to find out what's wrong, and then go back and fix it before you test it again.

Your teacher will give you marks for the following:

- You brought all the materials needed to make a model of your design. (2)
- You accurately made the model according to your design drawings. (8)
- You successfully built the electric output device. (2)
- You connected your model to the simple circuit with the output device, and used a good method to test it. (1)
- After you tested your model for the first time, you made a list of all the possible reasons that your model is not working or why it is not working well. (2)
- You used the list to fix or improve your model. (2)
- You tested your model again, writing down the problems, and going back and fixing or improving your model until it worked, at least one more time. (4)
- Your model worked, or you wrote a good explanation and made sketches of what you still need to change on your model to make it work. (4)

Designers and engineers usually make many **prototypes** before the design is good enough to start manufacturing and selling it. Each prototype is an attempt to improve on the previous one.

Present your design process and final prototypes

Your team will give a presentation of your project later this week. The presentation should be between three and five minutes long. Each member of your team should do a part of the presentation. The other learners in the class may ask you questions after your presentation. Your presentation should be mostly about the design process that you followed to design, make and improve your prototypes.

Team meeting: Prepare your presentations **(30 minutes)**

1. Decide which part of the presentation each of you will do. Write it down below. (1)
2. Decide in what order you will give the different parts of the presentation. Who will talk first, and who will talk next? Write the parts of the presentation in the order that you will do them below, and write who will do which part. (1)

Giving the presentation **(90 minutes)**

Your teacher will look at the following to give you marks for your part of your team's presentation:

- You were well prepared for your presentation. (2)
- You explained how you made progress during the design process. (2)
- You looked at your audience and spoke clearly. (1)

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

COMMON ASSESSMENT

GRADE 9
QUESTION AND ANSWER SHEET

MARKS : _____ / 60

TIME : 1 hour

This question paper consists of 13 pages.

NAME OF DISTRICT :_____
NAME OF CIRCUIT :_____
NAME OF CLUSTER :_____
NAME AND SURNAME :_____
NAME OF SCHOOL :_____
GRADE :_____
NAME OF TEACHER :_____

LEARNER SIGNATURE: _____ DATE: _____

QUESTIONS	POSSIBLE MARKS	MARKS OBTAINED	MODERATED MARK
1	5		
2	5		
3	15		
4	10		
5	6		
6	13		
7	5		
TOTAL	60		

SIGNATURE OF TEACHER: _____ DATE: _____

SIGNATURE OF HOD :_____(MODERATED) DATE: _____

INSTRUCTIONS:

20. Make sure you have all *13* pages clearly printed.
21. Write your name, class and initial of your teacher on each answer sheet
22. All answers must be completed on the question paper.
23. 15 minutes reading time is allowed.
24. The invigilator will tell you when you may start to write.
25. Only use a blue pen when answering the questions.
26. All sketches or drawing must be done in pencil.
27. Write neatly and legibly.
28. Read the instructions for EACH question carefully.
29. Consult the rubrics and marks allocated to guide you when answering the questions.

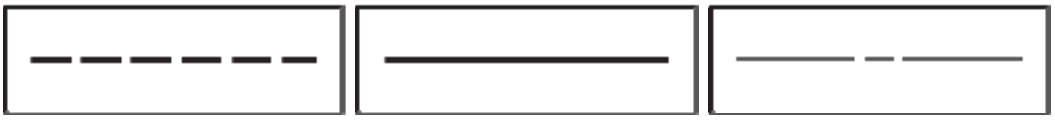
SPECIFIC AIMS ASSESSED

TECHNOLOGICAL PROCESSES AND SKILLS	50%	30 Marks
TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING	30%	18 Marks
TECHNOLOGY, SOCIETY AND THE ENVIRONMENT	20%	12 Marks

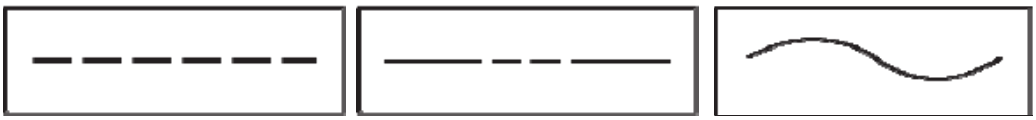
QUESTION 1 (LINE TYPES)

Mark the correct line type with a tick (✓) inside the block **[5]**

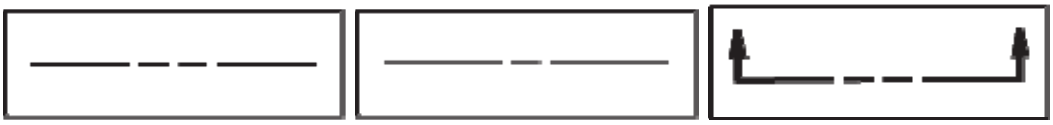
1.1. Visible Line (1)



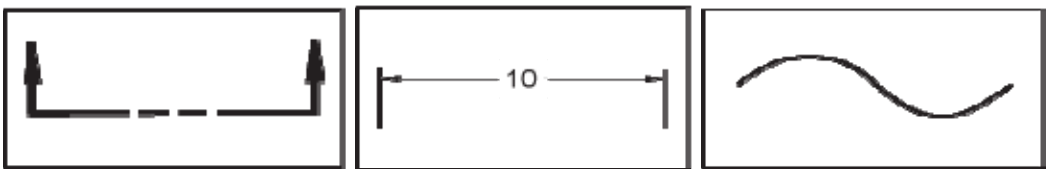
1.2. Hidden Line (1)



1.3. Centre Line (1)



1.4. Dimension & Extension Lines (1)



1.5. Section Line (1)

QUESTION 2 (GRAPHIC COMMUNICATION)

Answer the following questions by drawing a circle around the correct answer.

[5]

2.1 What is a 2D representation of a 3D shape called?

A. A section

B. A projection

C. A proportion

2.2 At what angle do you draw the sloping lines in an isometric drawing?

A. 15^0

B. 30^0

C. 45^0

2.3. In perspective drawing, what is the meeting point called for the lines going back?

A. Meeting point

B. Vanishing point

C. Horizon point

2.4. What does the symbol below mean?

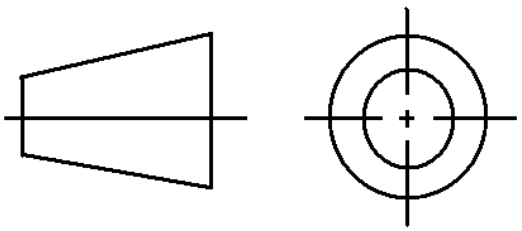


Figure 3

A. First angle orthographic projection

B. Second angle orthographic projection

C. Third angle orthographic projection

2.5 From what direction is a "plan view"?

A. From above, looking down

B. From the left, looking right

C. From the bottom, looking up

QUESTION 3 (ORTHOGRAPHIC DRAWING)

Draw the following isometric drawing in 1st angle orthographic projection on <u>ANNEXURE A</u> attached PAGE 12. Your drawing should show thwe following line types: outlines; construction lines

[15]

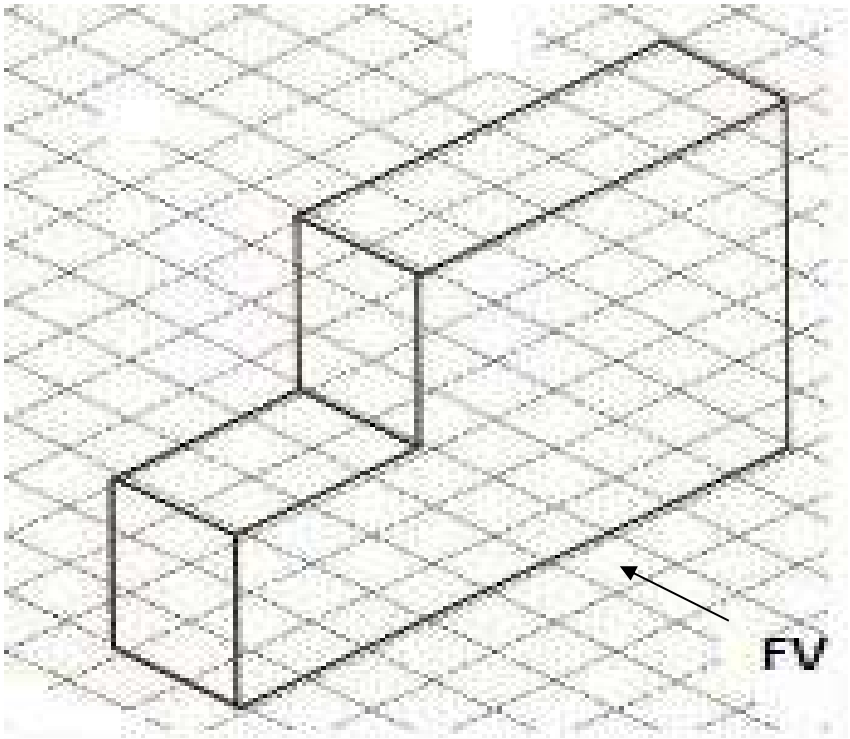


Figure 2

Descriptors	Possible Mark	Obtained Mark
Outlines	**3**	
Construction	**3**	
Views	**3**	
Accuracy	**4**	
Title	**2**	
TOTAL	**15**	

QUESTION 4 (FLOW DIAGRAM)

Design a flow diagram of the steps you would follow when making a model.

[10]

QUESTION 5 (STRUCTURES)

Read the following passage and then answer the questions that follow. [6]

NELSON MANDELA BRIDGE

Figure 3

The Nelson Mandela Bridge is a 'cable-stayed' bridge built in 2003 in Johannesburg. It is the longest cable-stayed bridge in the country. Its design allowed construction to continue without any disruption to traffic because the bridge was built from both sides and the cables supported the growing bridge as the two sides grew towards each other.

During the construction jobs were created and the following concerns were considered:

- Safety of construction workers
- Safety of the community
- Use of local labour
- Cost and time
- The bridge is strong and rigid enough to carry the load.

5.1. Give TWO concerns that builders should consider during the construction phase.

(2)

5.2. List TWO possible materials that were used in the construction of the bridge.

(2)

5.3. What types of load will the bridge carry that must be considered during the design phase?

(1)

5.4. Name ONE type of force that will act on the bridge throughout its life.

(1)

QUESTION 6 (SAFETY ISSUES)

Study the picture below depicting a Technology classroom in your school and answer the questions that follow.

[13]

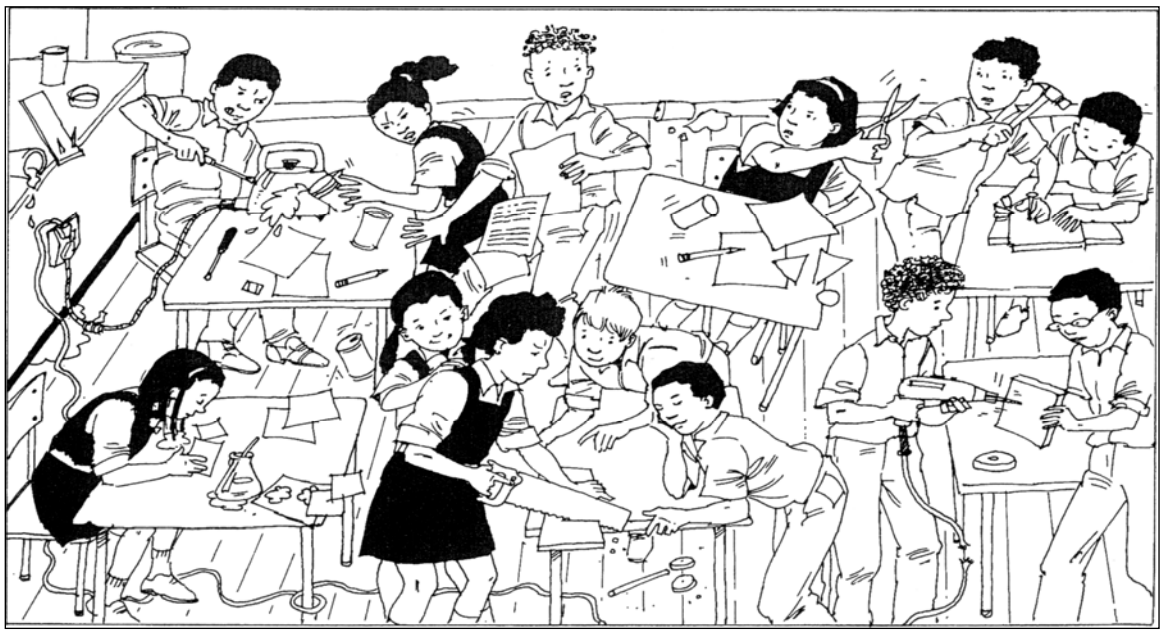


Figure 4

6.1. Analyse the picture of a classroom above and identify SEVEN safety hazards.

(7)

6.2. What safety measures must all Technologists should consider when working with materials and tools? Mention SIX.

(6)

_____

_____

_____

_____

QUESTION 7 (FORCES AND PROPERTIES OF MATERIALS)

[5]

TWO pieces of metal are held together with pop rivets and being pulled apart as seen in the picture below:

Figure 5

7.1. Conclude which force are the pop rivets under? (1)

_____

_____

_____

7.2. Determine the properties that the pop rivets have to resist this force mentioned above? Give at least two properties. (2)

_____

_____

_____

Read the following statements and answer the questions.

A static force is when a structure experiences a constant force in a certain direction even though no movement is involved.

A dynamic force *is* when the force is accompanied by movement.

Loads can be ***even*** *(*where the weight is evenly distributed) or ***uneven*** (where some parts of the structures carry more weight than other parts).

7.3. Formulate your understand of equilibrium? (2)

_____

_____

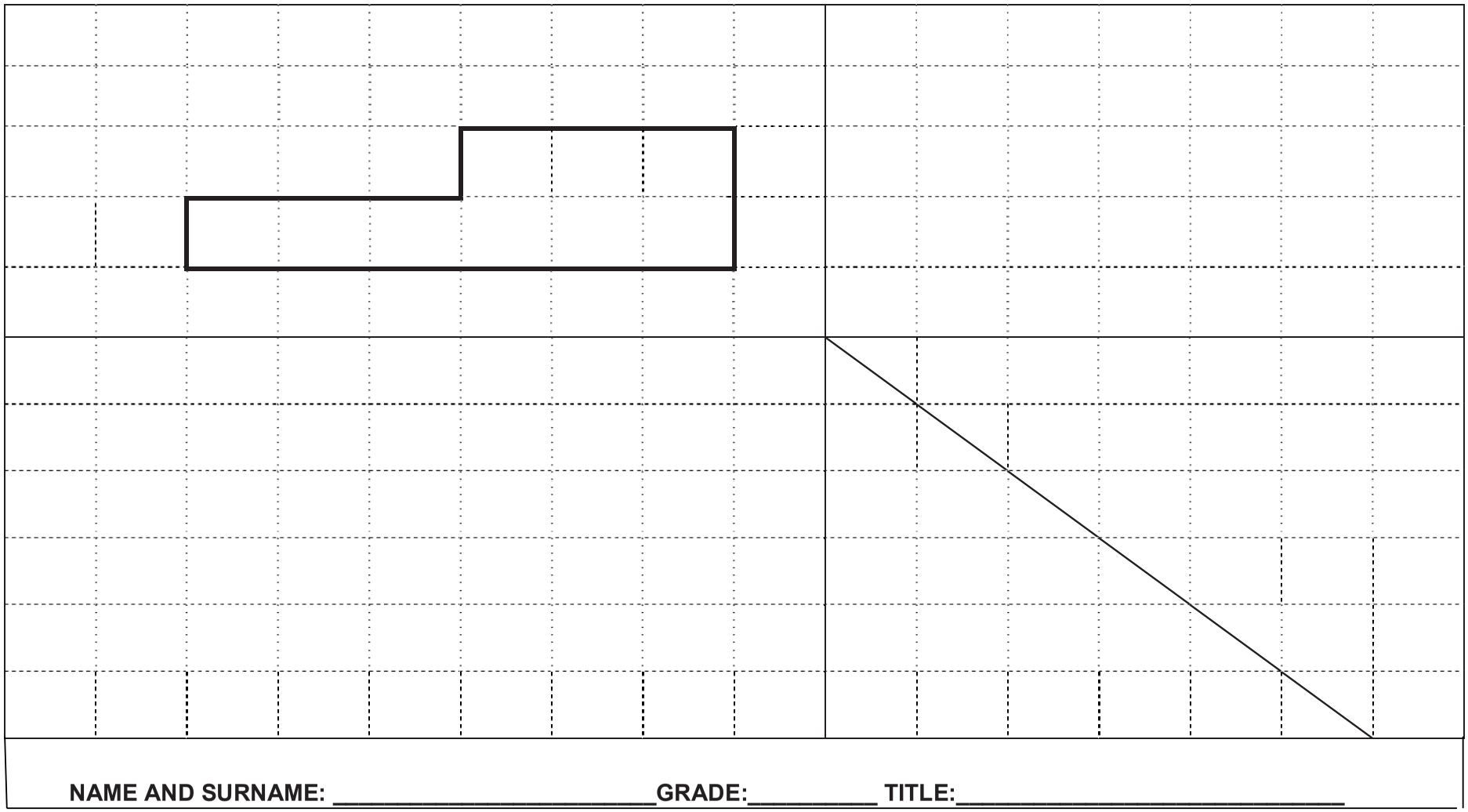
_____

_____

TOTAL: 60

End of Question and Answer Paper

ANNEXURE A



NAME AND SURNAME: _____GRADE:_____ TITLE:_____

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

COMMON ASSESSMENT

MARKING MEMORANDUM
GRADE 9

MARKS : _____ / 60

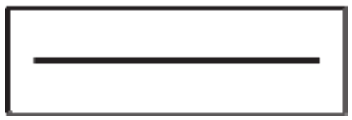
TIME : 1 hour

This question paper consists of 13 pages.

QUESTION 1

[5]

1.6. Visible Line (1)

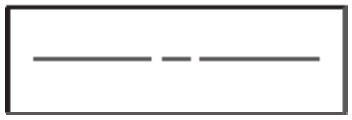


✓

1.7. Hidden Line (1)

✓

1.8. Centre Line (1)

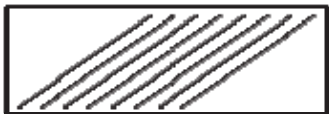


✓

1.9. Dimension & Extension Lines (1)

✓

1.10. Section Line (1)



✓

QUESTION 2 **[5]**

2.1

B. A projection✓

2.2

B. 30^0 ✓

2.3.

B. Vanishing point✓

2.4.

D. First angle orthographic projection✓

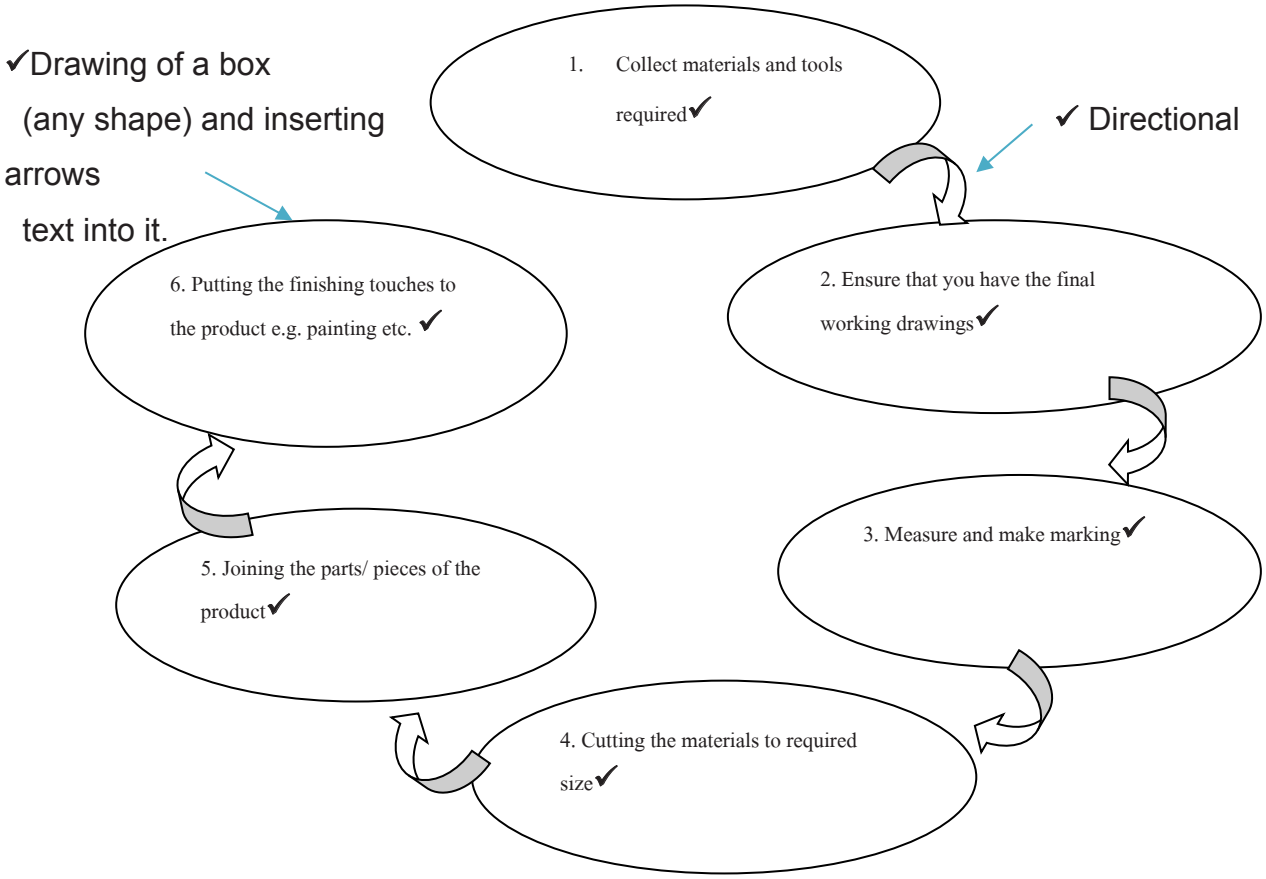
2.5

A. From above, looking down✓

QUESTION 4

[10]

FLOW DIAGRAM FOR MAKING OF A PRODUCT



✓✓ Logical sequencing of events in the flow chart.

N.B. The Flow Diagram can be linear or in any design format

QUESTION 5 **[6]**

5.1. Disruption of traffic, Safety of construction workers, Safety of the community, Use of local labour, Cost and time, Training of unskilled workers, job creation. (ANY 2 OF THE ABOVE) ✓ ✓ (2)

5.2. Steel sections ✓; Steel cables ✓ round bars✓; concrete✓; tar✓; steel reinforced concrete✓, sand✓, cement✓, stone✓, wood✓, Iron✓etc. (ANY TWO OF THE ANSWERS). (2)

5.3. Dynamic (or Uneven) AND/ Static (or even) ✓ (1)

5.4. Tension, Compression, Shearing and Torsion ✓ (ANY ONE OF THE ANSWERS) (1)

QUESTION 6 **[13]**

6.1. (7)

- Use professional judgement but the following answers serves as guidelines
    - Electrical cables. ✓
    - Learner not wearing any protective clothing. ✓
    - No teacher in the classroom to manage safety issues✓
    - Lack of classroom rules✓
    - Other learners using water close to electrical equipment✓
    - Unsafe use of tools e.g. the boy using a hammer✓
    - Work stations not properly managed, etc. ✓

6.2. USE PROFESSIONAL JUDGEMENT AS LEARNERS RESPONSES WILL DIFFER. (6)

Classroom rules, Occupation Health and Safety Act may serve as your guidelines for marking this question.

QUESTION 7

[5]

7.1. Shearing force ✓ (1)

7.2. Strong or tough ✓

Rigid or stiff ✓ (2)

7.3. **Equilibrium** when all forces or moments acting upon it are balanced.
This **means** that each and every force acting upon a body, or part of the body, is resisted by either another equal and opposite force or set of forces whose net result is zero. ✓✓ (2)

USE PROFESSIONAL JUDGMENT GUIDED BY THE ANSWER ABOVE

End of Memorandum

TOTAL: 60

Annexure 2: Composite Mark Schedules

(AS PER SA-SAMS SHEETS)

Exemplar: Grade 7

Exemplar: Grade 8

Exemplar: Grade 9

Annexure 3: Analysis grid for Cognitive levels of questions

Note - Excel Sheet attached:

Contains Cognitive Levels and Content Weighting for Controlled TESTS and EXAMINATIONS

ANALYSIS GRID FOR COGNITIVE DEMAND

GRADE 8 | **TECHNOLOGY** | **100**

Department of Education

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

			30%	40%		30%			
			30	6	34	22	0	8	
			Remembering	Understanding	Applying	Analysing	Evaluating	Creating	
			LOWER	MIDDLE		HIGHER			
Quest nr	ACTION VERB	Mark	30	40		30			Total mark
How are you doing?			30	40		30			100
1.1		2				2			2
1.2.		20				20			20
2		8			8				8
3		20			20				20
4.1		4			4				4

Test values

Test total correct

Correct

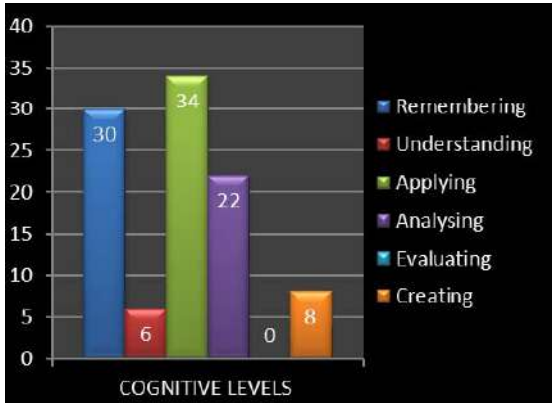
Correct

Correct

Correct

Correct

COGNITIVE LEVELS

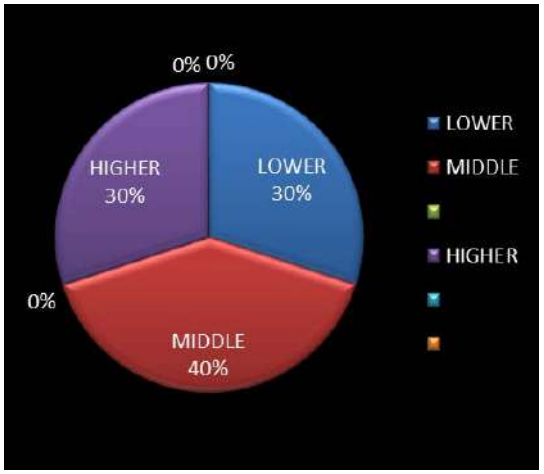


How to use this grid:

1. In column 1 - type the question number
2. In column 2 - type the action verb
3. In column 3 - type the mark of the question
4. Place same mark in lower, middle or higer order

4.2.		2	2						2	Correct
4.3.		4	4						4	Correct
5.1		2	2						2	Correct
5.2		1	1						1	Correct
5.3.		4	4						4	Correct
5.4.		2	2						2	FALSE
5.5.		2		2					2	Correct
5.6.		1		1					1	Correct
6.1.		2	2						2	Correct
6.2		1	1						1	Correct
6.3.		2		2					2	Correct
7.1.		1	1						1	Correct
7.2.		2	2						2	Correct
7.3		7	7						7	Correct
8.1		1		1					1	Correct
8.2		2						2	2	Correct
8.3		2	2						2	Correct
8.4.		2			2				2	Correct
8.5		2						2	2	Correct
8.6.		4						4	4	Correct
									0	Correct
									0	Correct
									0	Correct
		100	**30**	**40**		**30**			**100**	**Correct**
			30	6	34	22	0	8		
Note:		**Lower order is correct**						**Test total:**		**100**
		Middle order is correct								
		Higher order is correct								

5. See how you totals change



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Annexure 4: Developing formal assessment tasks

Formal assessment task development checklist

Subject: _____ **Grade:** _____ **Date:** _____ **Teacher:** _____

Descriptor	Developer	Moderator
Curriculum		
1. Are the CAPS requirements covered adequately?		
2. Have the correct topics been addressed?		
3. Have any topics been neglected or over- emphasised?		
Cognitive Levels		
4. Has a grid for cognitive levels, marks and time allocation been completed?		
5. Is the mark allocation to each question in keeping with the time weighting?		
6. Are the weightings on the grid correct?		
7. Does the assessment item allow for the average learner to have a reasonable chance of passing?		
8. Does the assessment item cater for learning barriers?		
Quality of questions		
9. Is the numbering of the questions correct?		
10. Are all the instructions clear?		
11. Are all questions framed without ambiguity?		
12. Are the diagrams, graphs, pictures and tables clear and user-friendly?		
13. Is there a variety of question types?		
14. Is there a precise indication of the mark allocation? Do the marks allocated add up to the total indicated?		
Quality of Teacher's Memorandum		
15. Is there a Teacher's Guide/Notes attached to the memorandum?		
16. Does the memorandum allow for alternative answers?		
17. Does the memorandum correspond with the question paper?		
18. Are the instructions and notes user-friendly?		

COMMENTS:_____
_____

Signature of Developer: _____

Signature of Moderator: _____

SCHOOL/DISTRICT STAMP

ANNEXURE 5 MODERATION TOOLS

TECHNOLOGY MODERATION INSTRUMENT

School:				Date:				
Principal:				HOD:				
Educator/s:								
Grade:	7	8	9	LOLT	English		Afrikaans	
Number of classes in grade				Subject Advisor:				
Class with most learners								

Min evidence of 6 learners to be moderated per Grade - 2 above average, 2 average and 2 below average.

NAMES OF LEARNERS WHOSE TASKS WERE MODERATED	MARK/LEVEL ALLOCATED BY TEACHER	MARK/LEVEL ALLOCATED BY MODERATOR
1.		
2.		
3.		
4.		
5.		
6.		

ASSESSMENT TASK	YES	NO	COMMENT
Does the task correspond with the **programme of assessment?**			
Are the task dated?			
Is the **duration** of the task indicated?			
Is there evidence that daily teaching and learning took place regarding the content of the formal activity?			
Does the task reflect the **topic** and **content** of the topic?			
Are the **instructions** clear?			
Does the task have a proper layout, free of spelling and grammatical errors, include clear and legible extracts/sketches?			
Is the language appropriate to the grade and subject?			
Does the task incorporate the different **cognitive levels e.g.** Blooms' Taxonomy?			
Are the **cognitive level grid** completed and submitted with the test/exam?			
ASSESSMENT TOOL			
Are the **assessment tools** e.g. rubric, memoranda, checklists, etc. for every assessment task included in the educator's file?			
Is the assessment tool appropriate to the task?			
Does the assessment tool make provision for various alternatives responses?			
MARKING			
Did the teacher sign and dated the task after marking?			
Did the educator include constructive feedback?			
Is **marking** done according to the assessment tool?			

RECORDING TOOL			
Is the mark sheet included in the file?			
Do the **learners' marks** corresponds with the mark sheet?			

A.: TERM _____ TEST

NEXURE G: PLANNING FOR ASSESSING CONSIDERING COGNITIVE LEVELS

RECALL	UNDERSTANDING	APPLICATION	ANALYSE	SYNTHESISE	EVALUATE
ROUTINE	DIAGNOSTIC	STRATEGIC	INTERPRET	CREATE	
Low Order	Middle Order		Higher Order		
30%	40%		30%		
ount	Classify	Change	Breakdown	Arrange	Appraise
efine	Compare	Compute	Differentiate	Combine	Conclude
lentify	Convert	Construct	Discriminate	Compile	Construct Critique
abel	Discuss	Demonstrate	Investigate	Construct	Criticize
ist	Distinguish	Draw	Relate	Create	Decide
latch	Define	Illustrate	Separate	Design	Evaluate
ame	Describe	Predict	Subdivide	Formulate	Grade
utline	Estimate	Relate		Generalise	Justify
oint out	Generalise	Solve		Generate	Interpret
uote	Give examples	Use		Group	Support
ecite	Illustrate			Integrate	Recommend
epeat	Infer			Organise	
eproduce	Interpret			Summarise	
elect	Match				
tate	Paraphrase				
race	Restate				
	Rewrite				
	Select				
	Summarise				

ANNEXURE H: MODERATION GRID FOR AN ASSESSMENT TASK

School : _____ Date : _____

Subject : Technology

SKV	Focus Area	Knowledge ("OHS)	Comprehension/ understanding	Application	Analysis	Synthesis	Evaluation	Form of assessment	Mark allocation
		30%	40%		30%				
		Low order	Middle order		High order				
50% A Skills	Investigate								
	Design								
	Make								
	Evaluate								
	Communicate (including – reports and presentation)								
30% B Knowledge	Structures								
	Processing								
	Mechanical S/C								
	Electrical S/C								
20% C Values	Indigenous								
	Impact (Environment: social, natural, economic)								
	Bias								

Moderators comments on the TEST:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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B: MODERATION TOOL FOR MINI-PAT: Grade: 7 ; 8 or 9 (Circle Grade) Term: _____

	CRITERIA	YES	NO	COMMENTS / RECOMMENDATIONS
1.	Was the sequence of the activities followed as required by CAPS?			
2.	Full coverage of required content, concepts and skills			
3.	Were clear instructions given for each activity/task?			

	SKILLS *ADDRESSED (tick (✓) relevant skills)*					SKILLS *ASSESSED (tick (✓) relevant skills)*				
4.	Investigate	Design	Making	Evaluating	Communicating	Investigate	Design	Making	Evaluating	Communicating

5.	MARKS ALLOCATED FOR DIFFERENT SKILLS	__ /__	__ /__	__ /__	__ /__	__ /__
	TOTAL NUMBER OF LEARNERS PER GRADE	Grade 7: _____		Grade 8: _____		Grade 9: _____
	NUMBER OF MINI-PATS MODERATED	Grade 7: _____		Grade 8: _____		Grade 9: _____
	TOTAL MARKS FOR MINI-PAT	___/____				

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