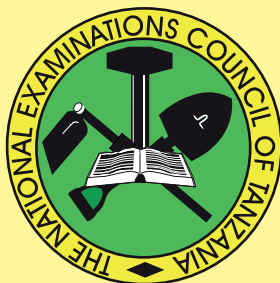


**THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA**



**CANDIDATES' ITEM RESPONSE ANALYSIS REPORT FOR  
DIPLOMA IN SECONDARY EDUCATION EXAMINATION  
(DSEE) 2018**

**733 BIOLOGY**

**THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA**



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## **FOREWORD**

This report is based on the analysis of the performance of candidates who sat for Biology Examination for Diploma in Secondary Education in May 2018. It has been prepared to give feedback to candidates, tutors, policy makers, curriculum developers and other education stakeholders on how candidates responded to the questions. Candidates' responses are indicators of what the candidates achieved in their two years of Diploma in Secondary Education studies.

This report indicates the analysis for each question where the percentage of each candidate who correctly or incorrectly responded to the question is analyzed. The major reasons which made some candidates fail to respond correctly to some of the questions are outlined as follows: lack of adequate knowledge in the respective topics, failure to understand the requirements of the questions as well as lacking competence in presenting answers. On the other hand candidates good performance has been a result of; candidates' adequate knowledge on the assessed topics, ability to understand the requirement of the question, good presentation skills and good mastery of English language.

The National Examination Council of Tanzania (NECTA) anticipates that the feedback and recommendations given in this report will enable education stakeholders to take the required measures in order to eliminate the challenges identified in the report, hence improve teaching and learning process as well improving the performance of candidates in future.

Finally, NECTA would like to express sincere gratitude to all those who contributed to the preparation of this report. The council will appreciate any constructive comments and recommendations from tutors, students and other education stakeholders aiming at improving the quality of DSEE future reports.



Dr. Charles E. Msonde

**EXECUTIVE SECRETARY**

## 1.0 INTRODUCTION

This report on the performance of candidates aims at providing feedback about performance of the candidates who sat for the Diploma in Secondary Education Examination in May, 2018 in Biology subject. A total of 622 candidates sat for the examination, out of which 463 candidates were using University of Dodoma (UDOM) curriculum and 159 were using the Tanzania Institute of Education (TIE) curriculum. The examination tested the candidates' competences in promoting biological knowledge and skills, applying various learner-centred approaches and techniques in teaching and learning Biology and analyzing and interpreting the Biology curriculum materials for Form 1-IV. The general performance of the candidates was good as the following Table shows.

Candidates Type	No. of Cand. Sat	No. of Candidates and Percentage					
		Passed	Grades				
			A	B	C	D	F
All	622	621	7	145	390	79	1
		99.84	1.13	23.31	62.70	12.70	0.16
UDOM Curriculum	463	462	3	64	316	79	1
		99.78	0.65	13.82	68.25	17.06	0.22
TIE Curriculum	159	159	4	81	74	0	0
		100.00	2.52	50.94	46.54	0.00	0.00

The Table shows that all candidates under TIE curriculum passed the examination and 99.78 percent of the candidates under the UDOM curriculum passed. There were no candidates with grade D and F in TIE curriculum. However, 1 candidate under the UDOM curriculum failed the examination by getting F.

Since the assessment for the candidates who are pursuing DSEE using UDOM curriculum is in transition; in this report, the detailed analysis was done on the performance in individual examination questions and topics based on the candidates who sat for examination using TIE curriculum only.

In the TIE curriculum, the Biology paper was composed basing on the academic and pedagogy syllabus of 2009. The examination intended to measure the competences acquired by a candidate after covering (11) topics

in two years as stipulated in the Diploma in Secondary Education Biology syllabus.

The paper consisted of three sections A, B and C. Section A consisted of ten short answer questions which were composed from both academic and pedagogy topics, each carrying four marks making a total of 40 marks. Section B comprised of three essay type questions from academic topics, each carrying 15 marks making a total of 30 marks, candidates were required to choose two questions from this section. Section C consisted of three essay type questions, set from the pedagogy topics whereby each question carried 15 marks making a total of 30 marks, the candidates were required to choose any two questions.

In this report candidates' performance in each question is categorized in three levels, poor, average or good. The performance is categorized as good if two third of the candidates score from 40 to 100, poor if only one third of the candidates or less scores ranges from 40 to 100. On the other hand, the performance is average if more than one third of the candidates but less than two third scores 40 to 100 marks.

Finally, conclusions, recommendations and analysis of candidates' performance by topic cover the last part of the report. It is expected that, this report will be useful to different education stakeholders in locating the areas for improvement in teaching and learning of Biology subject in teachers' colleges in Tanzania.

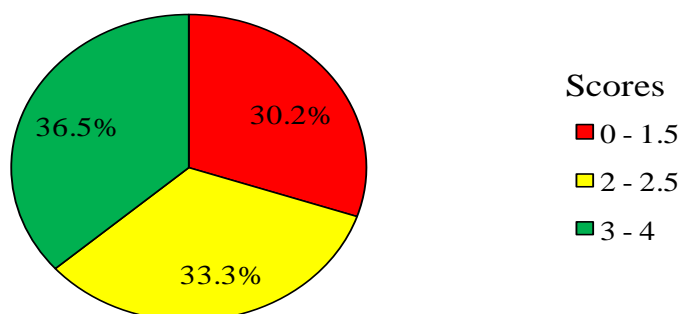
## 2.0 ANALYSIS OF THE CANDIDATES PERFORMANCE PER QUESTION

### 2.1 SECTION A: SHORT ANSWER

This section had ten questions from both academic and pedagogy topics each carrying a total of 4 marks. The performance of a candidate in a question in this section is categorized as poor if the candidate's scores are from 0 to 1.5 marks. The performance is moderate (average) if the candidate's scores lie from 2 to 2.5 marks and good performance if the candidate's scores lie from 3 to 4 marks.

#### 2.2.1 Question 1: Assessment in Biology

This question required candidates to explain the importance of test scores in the teaching and learning process. It was attempted by 159 candidates (100%). The analysis of candidates' performance in this question shows that 48 candidates which is equivalent to 30.2% scored from 0 to 1.5 marks. The candidates who scored 2 to 2.5 marks were 53 which is equivalent to 33.3% and 58 candidates (36.5%) scored from 3 to 4 marks. The performance in this question is summarized in Figure 1.



**Figure 1:** *Candidates' Performance in Question 1.*

The general performance in this question was good because 111 candidates, (69.8%) scored from 2 to 4 marks which enabled the candidates to perform well in this question.

The candidates who scored 2 marks and above, had enough knowledge on the topic of Assessment in Biology since they were able to explain the importance of test scores in teaching and learning process. Some of the correct responses to this question as presented in the standardized guide are



such as; test scores provide feedback of the process to all stakeholders, it helps in decision making, helps to improving teaching and learning methodology and to understand individual differences. In responding to this question one of the candidates wrote; *"test scores can help learners to be motivated in their learning, provides feedback to both teachers and students"*. Another candidate wrote; *"helps to understand learner's ability and their needs and helps teachers in making different decisions"*. These were correct responses as well which revealed that the candidates had adequate knowledge on the topic tested. Extract 1.1 shows the sample of good response from one of the candidates.

### Extract: 1.1

1	To give four point to support why test score important in the teaching and learning process.
	(i) It helps to determine strengths and weakness of learner during test that could enable a teacher to overcome those problems.
	Example: When teacher provide test and learner perform below, there fore teacher can helps the learner through remedial, Make assessment to him.
	(ii) It helps teacher to determine the effectiveness of teaching and learning strategies due to the score obtained.
	Example: Group discussion, Demonstration and Question and answer.
	(iii) It enable to grade learner according to their level of performance and understanding so that care more care will be provide to them and well handled
	Example: Those gifted and Intelligent learner and those slow learner.

**Extract 1.1** shows a sample of good responses from a candidate who correctly explained three importance of test scores in teaching and learning process. This raised the performance of the respective candidate.

Further analysis indicates that, candidates who scored 1.5 marks and below (30.2%) had limited knowledge on the topic tested as a result they could not explain the importance of the test scores correctly. For example in responding to this question one candidate wrote; *"test scores are used for understanding the next test and to record continuation process"*. Another

candidate wrote; "used in assessment activities, used to teach the next class and used for planning education system" of which none of them were correct responses. Consider extract 1.2 which shows the poor response of the candidate this question.

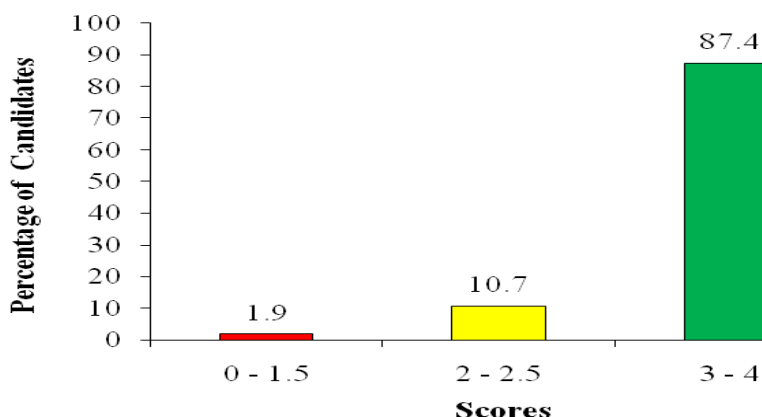
#### Extract: 1.2

1.	i, Used to measure the test validity.
	ii, Used to measure the test reliability.
	iii, Used in assessment activities. Example during conducting of <del>diagnostic</del> <sup>summative</sup> assessment.

**Extract 1.2** shows a sample of poor responses from a candidate who explained about the uses of test scores instead of importance of test scores. This lowered the performance of the respective candidate.

#### 2.2.2 Question 2: Biochemistry

This question had two parts (a) and (b). Part (a) required the candidates to define the concept of enzymes and in part (b), candidates were required to list down the properties of enzymes. The analysis of candidates' performance shows that 159 candidates (100%) attempted this question. The analysis shows that 3 candidates, (1.9%) scored from 0 to 1.5 marks while 17 candidates, (10.7%) scored from 2 to 2.5 and 139 candidates, (87.4%) scored from 3 to 4 as summarized in Figure 2.



**Figure 2:** The Summary of Candidates Performance in Question 2.

Generally, Figure 2 shows that the performance of the candidates in this question was extremely good as 156 candidates (98.1%) passed the question by scoring 2 marks and above of the total allotted marks.

The candidates who performed well were able to correctly give the meaning of enzymes and their properties. In part (a), the candidates were supposed to give the meaning of enzymes as: the biological catalysts which are protein in nature and can speed up the rate of various metabolic activities. A significant number of candidates complied to this definition. For example some of the responses as picked from candidates' scripts include: "*Enzymes are biological catalysts that are protein in nature and can speed up the rate of metabolic activities but remain unchanged*". Another candidate defined enzyme as; "*proteineous biological catalysts that speed up the rate of metabolic activities within the body of an organism*". This indicates that the candidates had sufficient knowledge on the particular topic as depicted in their responses.

In part (b), candidates were required to mention properties of enzymes, 156 candidates (98.1%) mentioned all/some of the properties correctly. According to the standardized marking guide, candidates were supposed to mention properties of enzymes as; enzymes are destroyed by heat, enzymes are specific, the end product of enzymatic work remain the same and enzymes act rapidly at a particular degree of acidic and alkalinity. In answering this question, these candidates wrote correct responses as revealed in one candidate's script that; *enzymes are efficient, enzymes are specific, and enzymes can be affected by temperature and PH*. Also, another candidate listed; *enzymes are proteins, enzymes work under particular conditions and enzymes are efficient* of which all were correct responses. This justifies that these candidates had sufficient knowledge on the topic of Biochemistry. Extract 2.1 presents a sample of good responses from one of the candidates.

### Extract: 2.1

2.	a) Enzymes are biological catalysts which are proteins in nature that alter the rate of metabolic activities in the body but remain unchanged at the end of metabolic reactions.
	b) (i) Enzymes catalyse the specific type of reactions and are reversible reactions.
	(ii) They are proteins in nature.
	(iii) They are affected by temperature, concentration, pH and presence of inhibitor.

**Extract 2.1** shows that, the candidate had sufficient knowledge on the topic tested in this question as all responses given were correct. This raised the performance of the respective candidate.

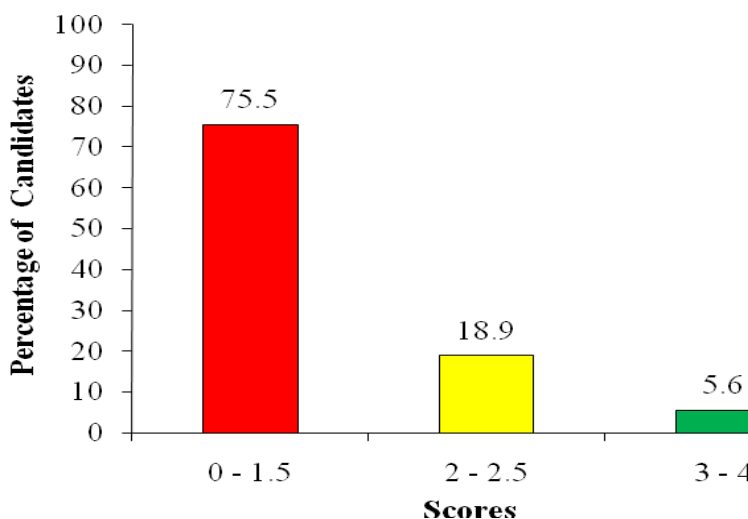
Despite the candidates' good performance in this question, further analysis revealed that, 3 candidates (1.9%) scored 1.5 marks and below. These candidates failed to give correct answers to most or all parts of the question. Their failure was mostly attributed to insufficient knowledge on the topic. For example in part (a), one candidate defined enzymes by explaining its composition instead of giving the meaning of enzymes. Some of the responses given by this candidate include; "Enzymes are globular proteins, Enzymes are made of amino acids" just to mention a few.

Similarly, in part (b), some candidates did not realize the demand of the question. For example, a candidate drew the structure of lock and key theory. Another candidate listed different information related to protein such as; "enzymes are combinations of many globular proteins, enzymes are coded by DNA," Furthermore, another candidate mentioned the properties of enzymes as; "enzymes can speed up cell digestion, and enzymes work as team," of which all were incorrect responses.

### 2.2.3 Question 3: Classification of Living Things

In this question candidates were required to elaborate briefly the biological terms; Exoskeleton, Moulting, Jointed appendages and Haemocoel. The analysis shows that, 159 candidates (100%) attempted this question out of

which 120 (75.5%) scored from 0 to 1.5 marks, while 30 (18.9%) scored from 2 to 2.5 and 9 (5.6%) scored from 3 to 4 marks as summarized in Figure 3.



**Figure 3:** *The Summary of Candidates Performance in Question 3.*

As illustrated in Figure 3 the general performance on this question was poor because more than three quarter (75.5%) of the candidates scored from 0 to 1.5 marks. These candidates gave incorrectly responses on the asked biological terms. This indicates that the candidate had poor knowledge on the terms and the topic in general. For example, a candidate elaborated exoskeleton as follows: "*Exoskeleton are those organisms which have hard part outside their bodies and soft parts inside their bodies*". Another candidate elaborated molting as "*... the part of incomplete metamorphosis where enhances the growing of organism*", Furthermore, another candidate described Haemocoel as "*... a fluidal part of some organisms which helps to move from one place to another like in earthworm with hydro-skeleton*", In the same vein another candidate elaborated jointed appendages as "*... a situation of an organism to possess either antenna or legs that helps in different activities like cockroach*". All of these responses were incorrect hence contributed to poor performance in this question. Extract 3.1 shows a sample of incorrect responses from one of the candidates.

### Extract: 3.1

3.	a) Exoskeleton : Is the kind of skeleton which found in earthworm. This a kind of external of the body structure of an organism -
	b) Molting : Is the growth structure which found in grasshoppers helping them for feeding process.
	c) Jointed appendages : Is the kind of joint which found in centipede which have joined at the same area.

**Extract 3.1** shows that the candidate had inadequate knowledge on the biological terminologies asked in this question as all responses were incorrect. This lowered the performance of the respective candidate.

Despite the majority of the candidates performing poorly in this question, 39 candidates (24.5%) had good understanding of the biological terms in question. These candidates had adequate knowledge on the topic such that they were able to explain correctly some of the biological terms asked. For example, a candidate defined; "Exoskeleton as a hard outer covering of organisms like insect acting like skeleton". The candidate also described Moulting as "... a process whereby outer cover of organisms like insects shed out periodically to allow growth". Another candidate defined Haemocoel as "... a cavity that is filled with blood in organisms with open circulatory system". Extract 3.2 shows a sample of good responses from one of the candidates.

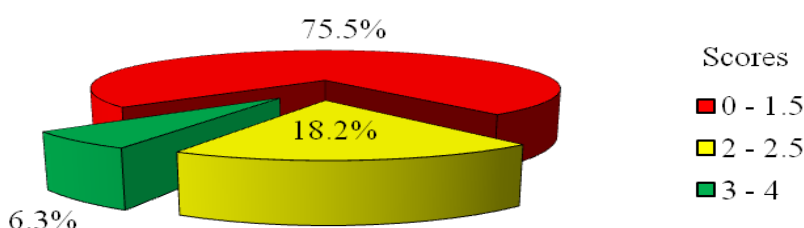
### Extract: 3.2

3:	(a) Exoskeleton; is the hard outer part of living thing as the skeleton; for example the external part of the lobster	
	(b) Molting; is the process by which insects outer body part detach as the process of growth. Especially the grasshopper experience molting in the grow stages.	
	(c) Jointed appendages; These are legs of insects that have segmented at a regular points, for example the legs of grasshopper has segmented parts.	

**Extract 3.2** shows a sample of good responses from the candidate who correctly explained the biological terms given. This shows that the candidate had sufficient knowledge on the topic tested hence good performance in this question.

#### 2.2.4 Question 4: Ecology

This question required candidates to explain briefly any four phases of population growth of organisms. This question was attempted by 159 (100%) candidates. The analysis of candidates' responses shows that, 120 candidates, (75.5%) scored from 0 to 1.5 marks, 29 candidates (18.2%) scored from 2 to 2.5, while 10 candidates (6.3%) scored from 3 to 4 marks. Figure 4 shows a summary of candidates' performance in question 4.



**Figure 4:** The Summary of Candidates Performance in Question 4.

Basing on the analysis as shown in figure 4, the general performance of the candidates in this question was poor because 120 (75.5%) of the candidates scored poorly in the range of 0 to 1.5 marks. Poor performance was due to the fact that, most of the candidates did not understand the demand of the question. For example, the question demanded the candidates to explain

phases of population growth but, some of these candidates explained the stages of population growth, requirements for growth of an organism and others gave phases which does not relate to population growth. This confusion might be caused by lack of sufficient knowledge on the topic. For example, a candidate explained phases of population growth as follows; *"First phase of population growth is reproduction because organisms reproduce in large amount; second phase is life expectancy, third food availability and lastly absence of predators"*. However, other candidates could not specify which phase has to come first for example a candidate wrote; *"exponential phases, acceleration phase, stationary phase"*. This indicates that these candidates had inadequate knowledge on the topic of Ecology as indicated in extract 4.1.

**Extract: 4.1**

4.	Four phases of population growth.
	(i) primary phase.
	- this is a prime phase where by the population starts to be very small in size and made up of single generation.
	(ii) a secondary phase.
	- It is a second level/phase that population expands as the newly generation is produced and the size of the population expands.

**Extract 4.1** shows a sample of poor response from a candidate who had inadequate knowledge on the phases of population growth. This lowered the performance of the respective candidate.

Despite poor performance by majority of the candidates (75.5%) in this question, 39 candidates (24.5%) managed to score 2 marks and above which implies good performance. These candidates had adequate knowledge on this topic such that they were able to explain correctly all or some of the population growth phases in sequential order of which include the following as per marking guide; *Lag, Logarithm, Saturation and Negative acceleration phases*. In answering this question, one candidate used the terms: *lag, exponential, stationary and deceleration phases* of which were correct responses according to standardized guide. Extract 4.2 shows a sample of good response from one of the candidates.



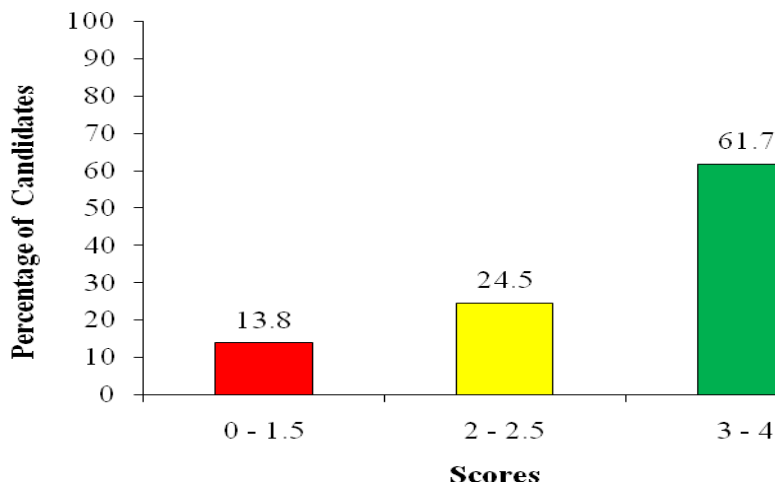
#### Extract: 4.2

4	(i) lag phases is the first stage of population growth of organism in which organism start to adapt new environment. In this phases organism present are very few and have no ability to reproduce due to the limit environmental factor.
	(ii) log phases is the second phase of population growth of organism in which rate of growth is very rapid because organism present here are already adapted new environment and reproduction potential increase and environment capacity is very high.
	(iii) stationary phase. is the another phase of population growth in which organism present become limit to increase because environmental resource and number of organism become equal. Rate of birth become equal to the rate of death.
	(iv) decline/deceleration phase. This is the phase of population growth in which organism decrease usually because environment resource fail to support present organism hence lead to have less.

**Extract 4.2** shows sample of a response from the candidate who gave correct responses on population growth phases. This raised the performance of the respective candidate.

#### 2.2.5 Question 05: Planning and Preparation for Teaching

The question had two parts (a) and (b). In part (a) the candidates were required to explain the need for teachers to do reflection on the teaching and learning process while in part (b), they were required to describe three components of a lesson plan that can be filled after a lesson has been completed. The analysis shows that out of 159 candidates who attempted this question, 22 (13.8%) scored from 0 to 1.5 marks, while 39 (24.5%) scored from 2 to 2.5 and 98 (61.7%) scored from 3 to 4 marks as depicted in Figure 5.



**Figure 5:** *The Summary of Candidates Performance in Question 5.*

Basing on the analysis as presented in Figure 5, the general performance of candidates on this question was good because the majority, 137 candidates (86.2%) scored between 2 to 4 marks. This shows that the candidates had enough knowledge on the topic that enabled them to answer most or all parts correctly. Also, they had ability to contextualize skills achieved during Block Teaching Practice (BTP), which enabled them to remember and retrieve easily preparation of lesson plan and the process of teaching. As per marking guide, the candidates were expected to answer this question as follows; the teacher need to do reflection in teaching and learning process because it provides an opportunity to identify the effectiveness of the teaching and learning strategies used, challenges raised in the process of teaching and learning for improvement. Also, the components of the lesson plan that have to be filled post teaching are; students evaluation, teachers evaluation and remarks. Extract 5.1 shows a sample of candidate`s good response.

### Extract: 5.1

5	a) Teacher need to <sup>do</sup> reflection of the teaching and learning process due to the following
	(i) To make evaluation on his/her or her lesson whether the students understood the lesson or not understood. This is done by either asking questions or otherwise ways.
	b) The following are the three components of a lesson plan that can be filled after lesson has been taught. These are:
	i) Teacher's evaluation. This is the teacher evaluation on whether the student <del>evaluate</del> understand the lesson. This is done by exercise or any
	ii) Students evaluation - This is the evaluation done by the teacher if the strategy used by the teacher is clearly understood or not
	iii) The another is Remarks - This is the teacher comment on the lesson whether he or she will proceed with the next lesson or not.

**Extract 5.1** shows the candidate who correctly explained the need for teachers to do reflection and the components to be filled after the lesson has been taught. This raised the performance of the respective candidate in a given question.

The analysis indicates that candidates who scored poorly in this question failed to understanding the requirement of the question. For example, instead of providing the importance of reflection to teachers some were explaining the importance of reflection to students. In part (a), some incorrect responses from a candidate's script include; *"the teacher need to do reflection so as to relate the content taught to the real life situation, to make meaningful of content, to associate theory with facts"*. Also in part (b), some candidates mentioned any component related to lesson plan without considering the components that has to be filled after completion of the lesson. Extract 5.2 shows a sample of candidates' poor response:

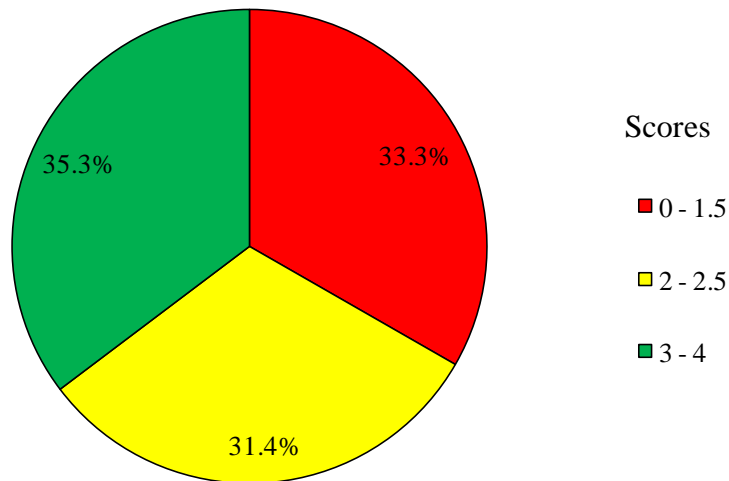
### Extract: 5.2

a) A teacher need to do reflection in order to relate content taught with real life situation
b) lesson plan- is the plan of action guiding the implementation of targeted competences.
The components of a lesson plan that can be filled after a lesson has been taught.
Preliminary part: This part contain the class, date, subject and numbers of learners
Lesson development: This part consist of teaching activities, learning activities, assessment and time
Teachers and learners: Evaluation: These are the teachers and learners judgement concern the understanding of subject matter and teaching method used.

**Extract 5.2** shows sample of candidate's poor response. The candidate explained about the general components of a lesson plan instead of components that are to be filled after a lesson has been covered. This lowered the performance of the respective candidate in this question.

#### 2.2.6 Question 6: Health and Immunity

This question had two parts (a) and (b). In part (a), the candidates were required to explain the meaning of the term menopause while in part (b); they were required to explain the roles of oestrogen hormone in the menstrual cycle. All candidates 159 (100%) attempted this question. The analysis of candidates' responses shows that 53 candidates (33.3%) scored from 0 to 1.5 marks, 50 candidates (31.4%) scored from 2 to 2.5 and 56 candidates (35.3%) scored 3 to 4 marks. Figure 6 summarizes candidates' performance in question 6.



**Figure 6:** *The Summary of Candidates Performance in Question 6.*

Basing on the analysis from Figure 6, it shows that the general performance in this question was good because more than two third of the candidates 106 (66.7%) scored from 2 to 4 marks. Further analysis from candidates' scripts revealed that the candidates had adequate knowledge on the topic of Health and Immunity used to answer correctly some parts of the question. According to the marking guide, candidates were required to define menopause as: a cessation of the monthly period which marks the end of a woman`s fertility. One of the candidate defined it as; *"the is a period where by female monthly release of an ovum stops hence no menstrual cycle, or is a situation where by menstruation cycle stops which marks the end of woman fertility"*. Another candidate defined it as; *"a period where by the ability of females to produce young ones end"*. All of these responses were correct indicating that the candidates had adequate knowledge on the topic.

In part (b) the candidates were supposed to outline roles of oestrogen as; It causes repair of the uterus lining following menstruation period, stimulate the pituitary gland to produce luteinizing hormone. In responding to this question one of the candidate explained the following roles of oestrogen hormone; *"oestrogen is used for ensuring contraction and relation of endometrial wall during menstruation"*. Another candidate wrote; *"to ensure the maintenance of the uterus lining"*. These responses are correct indicating that the candidates had sufficient knowledge on the topic. Extract 6.1 shows sample of responses from a candidate who explained correctly the meaning of menopause.

### Extract: 6.1

6.	(a) Menopause- Is the period where by women
	do not got into menstruation.
	and it occurs when a women reach
	45 years and above.
	OR
	Is the period where by women
	do not get menstruation.

**Extract 6.1** shows that, the candidate had sufficient knowledge on the topic tested in this question as he/she correctly explained the meaning of menopause. This raised the performance of the respective candidate in this question.

Despite good performance attained by some candidates, 53 candidates (33.3%) scored poorly in this question. These candidates had inadequate knowledge on issues related to menstrual cycle and failure to link the relationship between menopause and the roles of oestrogen. In part (a), of the question, most candidates 53 (33.3%) incorrectly defined the term menopause, for example, one candidate defined menopause as; "... a *stage where woman enter to the heat*" Another candidate defined menopause as; "... a *period where by females fail to fertilize eggs*".

Additionally, in part (b) these candidates failed to explain the role of oestrogen in menstrual cycle. In this part some of the candidates provided poor responses such as; "*Oestrogen is used to promote the fertilization process, in baby growth within the body and in production of eggs*". This reveals that the candidates had inadequate knowledge on the topic from which this question originated. Extract 6.2 shows a sample of poor candidate's response in answering question 6.

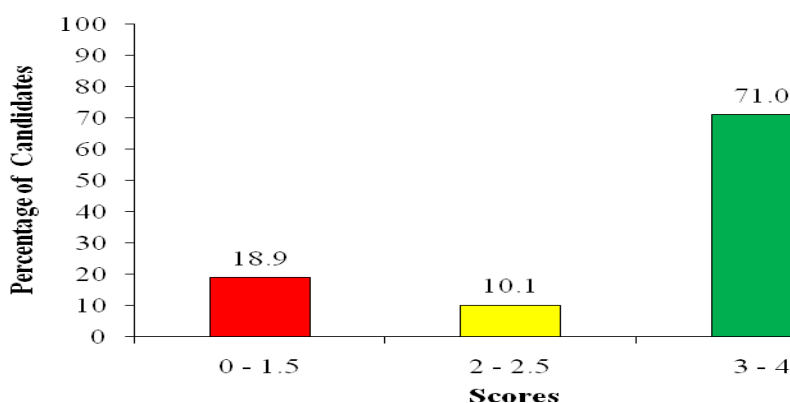
## Extract: 6.2

6	(a) Menopause - Is the failure of eggs to be fertilized due to infertility or diseases and genetic problems.	
	(b) - (i) It helps in production of ovum, which is egg and hence facilitate easy fertilization.	
	- (ii) It helps in production of eggs in female	

**Extract 6.2** shows a sample of candidate's weak responses. This reveals that the candidate had inadequate knowledge on the topic tested in this question. This lowered the performance of the respective candidate in a given question.

### 2.2.7 Question 07: Analysis of Curriculum Materials

This question required the candidates to list down four non-textual curriculum materials. A total of 159 candidates which is equivalent to (100%) attempted for this question. The analysis shows that 30 candidates (18.9%) scored from 0 to 1.5 marks while 16 of them (10.1%) scored 2 to 2.5 and 113 (71.0%) scored from 3 to 4 marks. The summary of candidates' performance in this question is depicted in Figure 7.



**Figure 7:** The Summary of Candidates Performance in Question 7.

Basing on the analysis, Figure 7 indicates that the general performance in this question was good because the majority 129 candidates (81.2%) were able to score from 2 to 4 marks. Further analysis indicates that those candidates who performed well in this question had adequate knowledge on different types of curriculum material since they were able to list non-textual curriculum materials. In responding to this question the candidates

were required to mention non-textual curriculum materials like; charts and graphs, laboratory equipment, computers, models, chalks and boards, real objects just to mention a few. In answering this question, one candidate listed the following; "*models, projector and computers, graphs and charts*". Another candidate mentioned; "*software and hardware equipment and laboratory equipment*". This is an indicator that the candidates were well informed about this topic. Extract 7.1 shows a sample of candidates' good response.

### Extract 7.1

7	Non-textual curriculum material
	i) Models
	ii) Real object
	iii) Pictures
	iv) Graphs

**Extract 7.1** shows a sample of a candidate who responded correctly to the question by listing down examples of non-textual curriculum materials. This made the candidate to perform well in a given question.

However, few candidates (18.9%) scored 1.5 marks and below in this question indicating poor performance due to misconceptions between textual and non-textual curriculum materials and lack of understanding the demand of the question. This can be justified by the following response from a candidate who listed non-textual curriculum materials as; "*Text books and syllabus*". Another candidate mentioned; "*teachers' manual and laboratory guide*". Furthermore, another candidate mentioned; "*text book, syllabus and journals*". All these responses were incorrect showing that the candidates had inadequate knowledge on the topic. Consider Extract 7.2 on a sample of candidates' poor response.



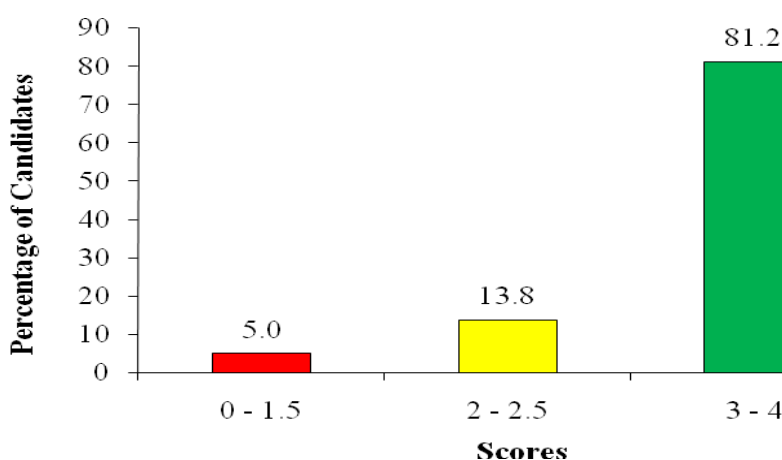
### Extract: 7.2

7.	Non-textual curriculum materials.	
	i> School rule	
	ii> Sports and games device	
	iii> Agricultural device	
	iv> School facilities	

**Extract 7.2** shows a sample of candidate's poor response. This candidate had inadequate knowledge on the topic tested and could not understand the demand of the question as he/she was listing tools used during extra-curricular activities. This contributed to poor performance of the respective candidate in this question.

### 2.2.8 Question 08: Fundamentals of Teaching and Learning Biology

This question had two parts (a) and (b). Part (a) required candidates to explain the meaning of instructional media while part (b), required them to outline three roles of instructional media in the teaching and learning process. A total of 159 candidates (100%) attempted this question. The analysis shows that 8 candidates (5.0%) scored from 0 to 1.5 marks whereas, 22 (13.8%) scored from 2 to 2.5 and 129 (81.2%) scored 3 to 4 marks. The summary of candidates' performance in this question is summarized in Figure 8.



**Figure 8:** The Summary of Candidates Performance in Question 8.

Analysis of candidate performance in this question indicates a good performance as shown in Figure 8 since majority of the candidates 151

(95%) were able to score from 2 to 4 marks. These candidates had sufficient knowledge on the topic such that they were able to define the term instructional media. One candidate defined it as "... all means or aids that teachers can use so as to facilitate the process of teaching and learning". Another candidate defined instruction media as;" all physical means that communicate instructional message to the learners/audience example computer, projector and others" These responses were correct which had impact on candidates performance.

Moreover, in responding to part (b), these candidates were able to outline correctly three roles of instructional media in teaching and learning process. Consider the following candidate's responses on roles of instructional media; "It simplifies the process of teaching and learning, reduces the time that can be used in delivering knowledge by teachers, promotes active learning in the classroom". Another candidate responded on the roles of instructional media as; "it helps students in promoting memory of what is taught, helps the teacher to present the idea systematically, smoothen students understanding". The responses imply that these candidates were knowledgeable on the topic. Extract 8.1 shows a sample of good responses from one of the candidates.

### Extract: 8.1

8	a) Instructional media are materials used by a teacher to help her to facilitate the teaching and learning process. for examples Textbooks, teachers guide, prepared slides, recorded audio, pamphlets and other supplementary materials.
	b) Roles of Instructional media in T/L process.
	→ Help to arise the learners interest, for example the use of Computer and projected materials
	→ Simplify teaching and learning process for example; the use of Computer.
	→ Motivate learners, through using Instructional media, learners are being motivated to learn thus improve teaching and learning process

**Extract 8.1** shows a sample of good responses from a candidate who precisely stated the meaning of instructional media and explained the roles of instructional media in teaching and learning process. This enhanced the performance of the respective candidate in a given question.

The analysis indicates that, candidates who scored poorly in this question, had inadequate knowledge on the topic. This is revealed through candidates' responses in defining instruction media. For example one candidate defined instructional media as; *"the media which provides instruction on how to teach"*. Another candidate defined it as; *"... the materials which guide teaching"*. These responses cement the fact that, the candidates had inadequate knowledge on the topic in question. Similarly, in responding to part (b) of the question, a candidate mentioned the following roles of instructional media in the teaching and learning process; *"it provides systematic presentation, it replaces the role of the teacher, it provide important knowledge of the lesson"*. The other candidate wrote; *"is a tool for entertainment, are used as textual and non-textual materials"*. All these were incorrect responses stipulating inadequacy of knowledge on the topic. Extracts 8.2 shows a sample of candidate's poor responses in this question.

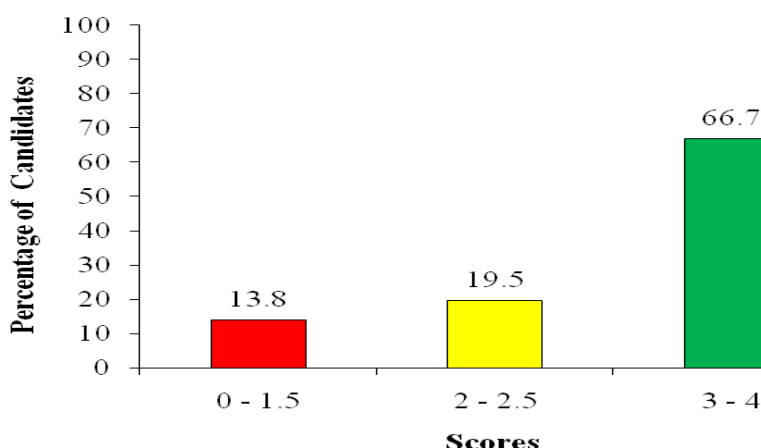
**Extract: 8.2**

Q 1a)	Instructional Media is the channel help
	in teaching and learning process. Example
	of Instructional is Visual, audio-visual
	tactile Media.
	Q 1b) i) used for entertainment
	ii) used to provide information
	iii) used for simulation

**Extract 8.2** shows a sample of responses from the candidate with insufficient knowledge on the topic tested in this question. This lowered the performance of the respective candidate in a given question.

## 2.2.9 Question 09: Basic Biology Laboratory Skills

This question required candidates to outline four roles of a Biology teacher in managing and maintaining the Biology Laboratory. A total of 159 (100%) candidates attempted this question. The analysis of candidates' responses shows that 22 candidates (13.8%) scored 0 to 1.5 marks while, 31 candidates (19.5%) scored from 2 to 2.5 and 106 (66.7%) scored from 3 to marks. The summary of candidates' performance in this question is depicted in Figure 9.



**Figure 9:** *The Summary of Candidates Performance in Question 9.*

Statistics in figure 9 indicates that the general performance on this question was good because 137 (86.2%) of the candidates were able to score from 2 to 4 marks which indicates good performance. The factors which enable them to perform well include adequate knowledge on the topic and understanding the demand of the question just to mention a few. Moreover, the question demanded them to answer what they have been experiencing to their science subject teachers since when they were in form one secondary education. This might have influenced the candidates' ability in combining both what have been taught in the class and their experience.

As per marking guide, the candidates were required to mention the following roles of a Biology teacher in managing and maintaining the Biology Laboratory; to budget and purchase Biology materials, to keep records of laboratory equipment, to store chemicals and equipment in proper place, to maintain Laboratory safety, to instruct Laboratory technician, to make sure that all systems are intact just to mention a few. In responding to this question the following were some of the candidates' responses; *arranging the laboratory properly, to make sure that specimens are available, to ensure that the laboratory rules are available and assisting the technician in the preparation of practical.* Other responses were; *to organize practical for students, to observe safety of the students while in the laboratory, to keep records of the laboratory facilities.* All of these responses were correct which signifies that the topic was well understood by most of the candidates. Extract 9.1 shows a sample of candidate's good response.

### Extract: 9.1

9	Roles of a Biology teacher in managing and maintaining the Biology laboratory.
	(i) Give instructions to the students
	<del>(ii) To make sure that all needed equipment and specimen</del>
	(ii) To provide laboratory rule to the learners in order to reduce accidents in the laboratory
	(iii). To make sure that all the required supply system such as electricity, water and drainage system are present into the laboratory
	(iv) To make sure that all the biological chemical reagent are clear labeled and arranged into shelves
	(v) To make sure that all required specimens and equipment in the laboratory are present

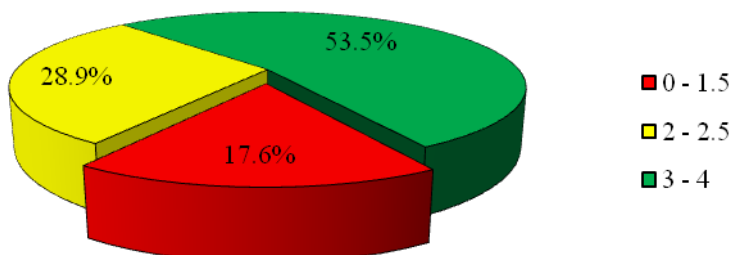
**Extract 9.1** shows a sample of candidates' good response on the topic tested in this question. He/she correctly outlined the roles of a Biology teacher in managing the Biology Laboratory. This raised the performance of the respective candidate.

Generally, the candidates who performed poorly in this question, failed to understand the requirements of the question. For example, the question demanded them to outline the roles of a Biology teacher in managing and maintaining the Biology Laboratory but, some of them just explained about the best Laboratory layout. Consider response from one of the candidates; *must be proper arrangement of the laboratory, must write laboratory rules, chemicals and reagents that reacts must be placed separately*. Other responses from them were; *water supply is good, power supply is under for supply* just to mention a few. Generally, all of these responses were incorrect.

### 2.2.10 Question 10: Genetics

This question required the candidates to outline four roles of genetic engineering in human daily life. All candidates 159 (100%) attempted this

question. Statistics depicts that 28 candidates (17.6%) scored from 0 to 1.5 marks whilst, 36 (28.9%) scored from 2 to 2.5 and 85 (53.5%) scored 3 to 4 marks as summarized in Figure 10.



**Figure 10:** *The summary of Candidates Performance in Question 10.*

Statistics in figure 10 shows that the general performance on this question was good because the majority of candidates 121 (82.4%) were able to score from 2 to 4 marks which raised their performance in a given question.

Basing on analysis, the good performance of candidates on this question was contributed by having adequate knowledge on the topic which helped them to outline roles of genetic engineering correctly. Also, they were able to contextualize what have been learnt in the class and daily life experiences. For example, the use of new crop varieties in improving crop productivity. According to the marking guide the benefits of genetic engineering in daily life include; production of metabolic chemicals such as insulin, production of drought resistant varieties especially in the era of climate change, genetic modification of crops just to mention a few. In responding to this question one of the candidates outlined the benefits of genetic engineering as; *helps in the production of synthetic hormones, production of diseases resistant breeds, production of high yield plant breed, production of quality agricultural produce*. These responses imply that the candidates had sufficient knowledge on the topic tested in this question. Extract 10.1 shows a sample of candidate's good response.

### Extract: 10.1

10.	Benefits of genetic engineering in human - daily life.
	<u>Answer:</u>
a)	It help us to get genetically modified organism (GMO).
b)	It help us to get different medicines and vaccines from industries through application of genetic engineering.
c)	It help us to get resistant organism especially plants and animals, such as hybrid plants and animals.
d)	It help us to get artificial insulin of the human body.

**Extract 10.1** shows that, the candidate had sufficient knowledge on the topic tested hence correctly explained the benefits of genetic engineering in daily life. This raised the performance of the respective candidate in a given question.

From analysis, candidates who scored low marks 0 to 1.5 in this question did not understand the demand of the question as well as inadequate knowledge on the topic. This is revealed by the fact that some of them were just outlining the characteristics of living organisms and others outlined the benefits which does not apply to genetic engineering. For example, one candidate outlined the benefits of genetic engineering as follows; *used in hospitals, used in production of pesticides, used to control sewage system*. These responses imply that most of the candidate did not have enough knowledge on the topic. Also Extract 10.2 shows a sample of a response from a candidate who did not understand the demand of the question.

### Extract: 10.2

10.	(i) Have all characteristics of human being all characteristics are determining the features of human life.	
	(ii) Have containing Multicellular cells.	
	(iii) Have undergo Growth and development.	
	(iv) Eating and Reproduction.	

**Extract 10.2** shows the responses from a candidate who did not understand the demand of the question. Instead of outlining the benefits of genetic engineering, the candidate was mentioning the characteristic of living organisms. This resulted into poor performance of the respective candidate in a given question.

## 3.1 SECTION B: ESSAY TYPE QUESTIONS

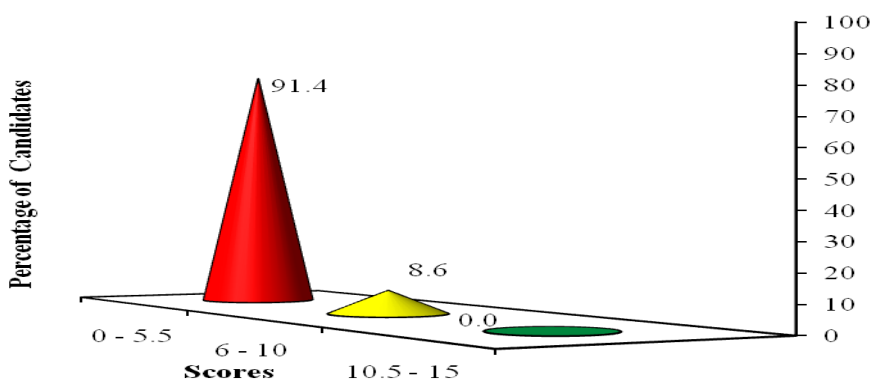
This section had three questions from academic topics each carrying a total of 15 marks. The performance of a respective candidate in each question of this section is categorized as poor if the candidate's scores lies from 0 to 5.5 marks. The performance is moderate (average) if the candidate's scores lie from 6 to 10 marks and good performance if the candidates scores lies from 10.5 to 15 marks.

### 2.3.1 Question 11: Respiration

This question had three parts namely; (a), (b) and (c). Part (a) required the candidates to explain the concept of oxygen debt. In part (b), the candidates were required to describe the respiratory pathway at which fat is used as a respiratory substrate and in part (c), they were required to explain as to why the oxidation of fat produces more energy than that of carbohydrates. The question was attempted by 81 candidates (50.9%) out of 159 (100%) who sat for this paper. The analysis of candidates responses shows that, 74 (91.4%) of the candidates scored from 0 to 5.5 while 7 candidates (8.6%) scored from 6 to 10 marks. In this question none of the candidates scored from 10.5 to 15 marks indicating a poor performance as compared to other



questions. The summary of candidates' performance in this question is presented in Figure 11.



**Figure 11:** *The summary of Candidates Performance in Question 11.*

Basing on the analysis as shown in figure 11, the general performance in this question was poor because majority of the candidates 74 (91.4%) scored from 0 to 5.5 marks and none of them scored from 10.5 to 15 marks. Candidates' poor performance to this question has been a result of insufficient knowledge and lack of understanding the demand of the question. For example, according to the marking guide in part (a) of the question, the candidates were required to explain the concept of oxygen debt as; the situation that occurs when an individual is doing vigorous activity, such that there is shortage of oxygen to meet body energy demand. During this time the body develop a mechanism by which anaerobic respiration is adopted to produce energy. In responding to this part of the question, one candidate explained oxygen debt as; "... the debt which occurs due to oxygen". Another candidate described it as; "... the oxygen used in the heavenly condition". From simple observation it is clear that these candidates had poor understanding of the question and insufficient knowledge on the topic.

In part (b) of the question, candidates were required to explain the way fat is hydrolysed as follows; fat molecules are hydrolysed to form fat acid and glycerol, glycerol is phosphorylated and converted into triose phosphate glyceraldehyde3-phosphate. This molecule then is incorporated into glycolysis pathway and finally to Krebs' cycle. Fat acid is progressively

broken down into the matrix of mitochondrion to produce acetyl-Co A which enters the Krebs` cycle. In responding to this question, one candidate explained it as follows; "... fat is used as respiratory substrate after carbohydrate is finished". Another candidate explained that; "... fat is respired in their steps initial middle and final". These responses signify that these candidates had insufficient knowledge on the process of respiration using fat as the respiratory substrates.

In part (c) of the question, as per marking guide, candidates were required to explain why the oxidation of fat produces large quantities of energy than that of carbohydrates as follows; fat have large amount of hydrogen ions ( $H^+$ ) these are transported to hydrogen carries and used to produce ATP. In responding to this question one candidate provided the reasons for fat to produce large quantities of energy as; "fat is good for energy production". Another candidate explained that; "fat has to be heated first before it is used for energy production". These responses indicate that the candidates lacked knowledge on the concept of respiration. Extract 11.1 shows a sample of responses from the candidate who had inadequate knowledge on the topic of respiration.

#### Extract: 11.1

11	a) oxygen debt
	is the amount of energy required or needed in the process of breathing because there have deficiency of oxygen so it's needed.
	b) Respiratory pathway
	(a) carbohydrate
	(b) protein
	(c) fat/lipids
	' fat is respiratory substrate because during the process of respiration the carbohydrate is used first and followed by protein and when protein completed the fat used.
	fat is used as respiratory substrate because it's used have high amount of energy.
	(c) Because oxidation of fat is incomplete while carbohydrate is complete.

**Extract 11.1** shows a sample of poor response from a candidate who failed to explain the process of respiration which had a negative implication to the performance of a respective candidate.

Nevertheless, 7 candidates (8.6%) managed to respond correctly to some parts of this question which helped them to score 6 to 10 marks. By observation, their performance was influenced by having moderate knowledge on this topic such that it helped them to answer correctly some

parts of the question. Extract 11.2 shows a sample of a response from the candidate who answered correctly some parts of the question.

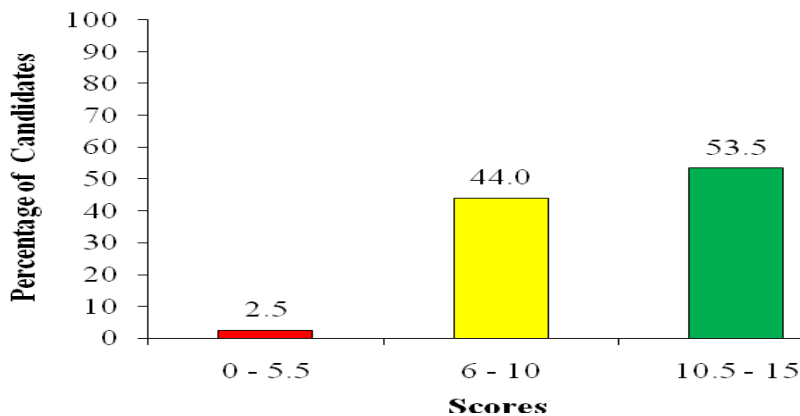
### Extract: 11.2

11.	(a) Oxygen debt: Is the extra oxygen that required to pay back the oxygen used to oxidise <del>lact</del> lactic acids to produce water and some amount of energy, after physical exercise.
	(b) Fat first is hydrolysed by lipase enzyme to form fatty acid and glycerol.
	fat $\xrightarrow{\text{lipase enzyme}}$ Fatty acids and glycerol.
	The glycerol is converted into glycerate phosphate which enter to the pyruvate then and the fatty acid also enter in an Acetyl CoA to proceed with Krebs cycle and produce energy.
	(c) This is because fat has high caloric value, during its oxidation the production of Hydrogen ions is high than in carbohydrate which is carried with Reduced NAD ( $\text{NADH}_2$ ) and Reduced FAD ( $\text{FADH}_2$ ) and enter in electron transport chain produce energy in form of ATP.

**Extract 11.2** shows a sample of good responses from the candidate who responded correctly to part (a) and (c) of the question. This raised the performance of the respective candidate in this question.

## 2.3.2 Question 12: Body Health and Immunity

This question required candidates to explain six reasons for adolescence to engage in drug abuse and addiction. This question was attempted by almost all candidates 157 (98.7%) of those who sat for the examination. The analysis of candidates' responses shows that 4 candidates (2.5%) scored from 0 to 5.5 marks, 69 (44%) scored from 6 to 10 while 84 (53.5%) scored from 10.5 to 15 marks. The summary of candidates' performance in this question is presented in Figure 12.



**Figure 12:** *The Summary of Candidates Performance in Question 12.*

Basing on the analysis as presented in figure 12, it shows that the general performance on this question was good as 153 candidates (97.5%) were able to score from 6 to 15 marks. These candidates were able to perform well in this question because they had enough knowledge on the topic and the question itself was related to contemporary issues happening in the society of which most of the candidates are informed and used to. The information related to this question could be obtained from Television, Radios and other social networks. According to the marking guide, the candidates were expected to explain the reasons for adolescence to engage in drug abuse and addiction as; curiosity, peer group pressure, to overcome frustration and depressions, excitement and adventure, looking for different world, promote ability of doing more mental and physical works, to get relief from pain and bad family history just to mention a few. In responding to this question, one candidate explained reasons for adolescence to engage in drug abuse as; "... *peer pressure, poor parental care, to increase confidence, poverty and desire to do to work more...*" Furthermore, another candidate responded as; "*peer group influence, family conflicts, poverty, lack of employment and gaining muscular ability*". These responses indicate that the candidates had adequate knowledge on the topic as they explained all the points correctly. Extract 12.1 shows a sample of candidate's good responses.

## Extract: 12.1

12.	<p>Drug abuse means misuse of drugs against instruction given by Doctors, and drug addiction means dependence on drugs or taking drugs as a part of life. In many areas in our country the most group engaged themselves in drugs are drug abuse and drug addiction are adolescence; there are many reasons which force them to engage in drug abuse and drug addiction, therefore the following are the reasons for adolescence to engage in drug abuse and drug addiction:</p> <p>Bad peer groups, Many adolescence are facing with peers whereby peers changing them to follow their practices include drug abuse, so bad peer groups are too much destructive of moral behaviors because they are influencing their fellow to companion them in their bad practices, this is one of the reasons of many adolescence to engage in drug abuse and drug addiction.</p> <p>To reduce stress, Many adolescence are facing with different challenges example be neglected or cheated by his/her partner or girlfriend/boyfriend, in order to overcome the situation of being feeling isolation he/she can engage themselves in drug abuse also poor performance in education is other reason of adolescence to engage in drug abuse and drug addiction.</p> <p>Poverty, this is another reason for adolescence to engage in drug abuse and drug addiction, failure of adolescence to obtain or acquire basic needs show differences between them which result</p>
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Extract 12.1 shows a sample of candidates' correct response in explaining the reasons for adolescences to engage in drug abuse. This raised the performance of the candidate on a given question.

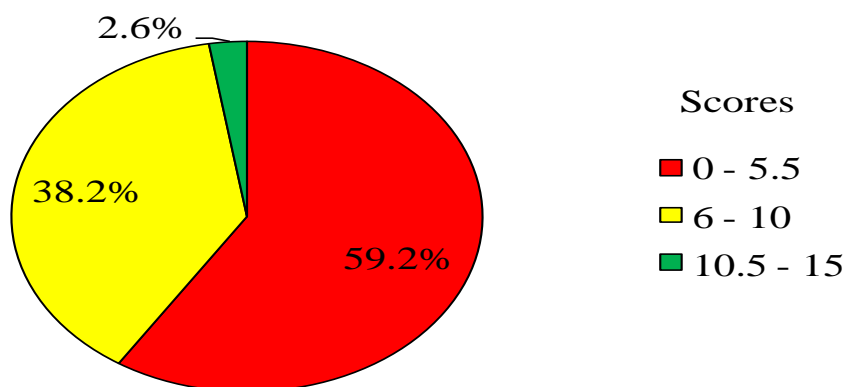
From the analysis, those few candidates who scored 5.5 marks and below (2.5%) in this question demonstrated inadequate knowledge on drug abuse and addiction. Also, it seems that they are not well informed on contemporary issues, poor language and writing skills, such that, they could not present ideas logically. For example one candidate with poor language and writing skills explained that;

*... Adolescents engage in drug abuse and addiction due to the declare for independences as the sexual driving force. The adolescence people require the full independence to do their work. They wish even to declare independence with their parents...*

Another candidate demonstrated lack of adequate knowledge on contemporary issues as he/she failure to differentiate hospital drugs from drugs in question by responding as; "... *Treatment other drugs are used because treatment of various infections. Thus adolescence engages in drug abuse due to treatment of a certain infections...*" These candidates had both language problem and lack of information on drug abuse and addiction.

### 2.3.3 Question 13: Classification of Living Things

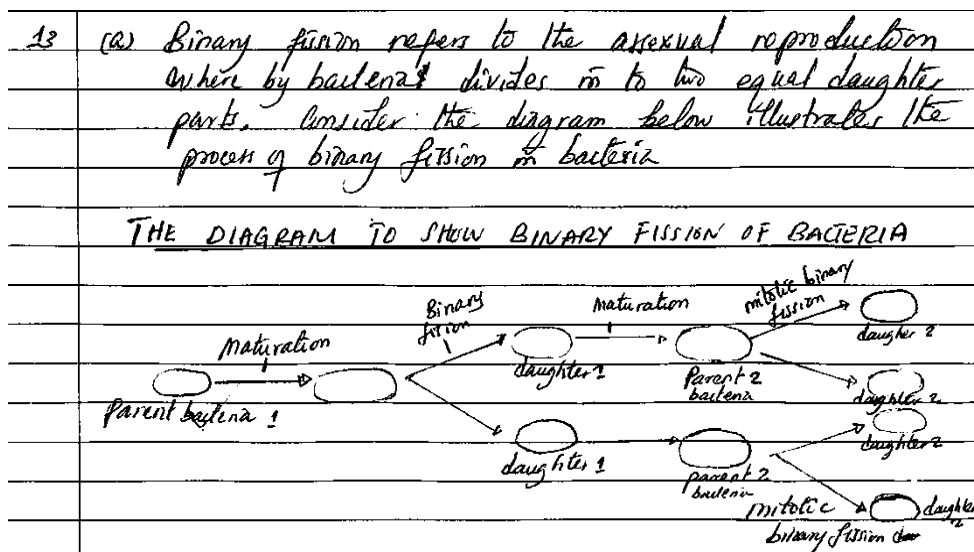
This question had two parts (a) and (b). Part (a) required candidates to describe the process of binary fission in bacteria by using a diagram, and part (b), required them to explain the importance of bacteria on earth by giving three points. A total of 76 candidates (47.8%) out of 159 attempted this question. The analysis of candidates responses shows that 45 candidates (59.2%) scored from 0 to 5.5 whilst, 29 of them (38.2%) scored from 6 to 10.5 and 2 candidates (2.6%) scored from 11 to 15 marks. The summary of candidates` performance in this question is represented in figure 13.



**Figure 13:** *The Summary of Candidates Performance in Question 13.*

Basing on the analysis as shown in figure 13, the general performance on this question is average because 31 candidates (40.8%) were able to score from 6 to 15 marks. The candidates who performed well in this question were able to explain the process of binary fission in bacteria by using the diagram and to explain the importance of bacteria on earth. According to the marking guide, the candidates were required to describe the process of binary fission showing how a single circular chromosome replicates and then two copies separates as the cell enlarges by using diagrams. Some candidates managed to show the process of binary fission by drawing as shown in extract 13.1.

### Extract 13.1



**Extract 13.1** shows a sample of good responses from the candidate who had sufficient knowledge on the topic tested. He/she used a diagram to show the process of binary fission in bacteria. Though he/she could not describe clearly what is happening in each stage.

In part (b) of the question, candidates were to explain the importance of bacteria on earth by giving points such as; bacteria helps in balancing carbon in the terrestrial ecosystem, used to decompose some materials, used in industries in the production of acetic acids, amino acids and enzymes and used in production of commercial goods. In responding to this question one candidate explained the importance of bacteria as follows; "used in increasing soil fertility by decomposing some materials, used in brewing industries" Another candidate responded that bacteria are; "... used for nitrogen fixation, helps in ecosystems can be used in the decomposition of organic matter". The candidates' responses were correct indicating that they had adequate knowledge on the topic. Extract 13.2 shows a sample of candidates' good response on this part of the question.

### Extract 13.2

(b) Bacteria is among of micro organism found on the earth and it is characterized with single celled organisms, bacteria reproduce itself through the process called binary fission.

Without bacteria life on the earth could not exist due to some reasons explained below.

Role of bacteria in plant growth and development, bacteria found in the soil is very essential for plant growth since it converts various materials in the soil to the form which can be absorbed and utilized by plants, example bacteria which convert nitrogen in to ammonia through the process called ammonification, therefore without bacteria plant growth and development will be depressed and stagnated due to lack of nutrients hence die.

Facilitates digestion in ruminant animals like cow, goat, sheep, horse, and others. Without bacteria ruminant animals can not digest grass which contain cellulose, in presence of bacteria ruminants animals can digest cellulose in to starch using cellulase enzyme provided by bacteria called c-eli-hene life exist.

Facilitate decomposition of biodegradable waste materials, the waste materials dumped on the earth's surface which are harmful to living organisms are decomposed in to harmless product by bacteria hence -

**Extract 13.2** shows a sample of good responses from the candidate who correctly explained the importance of bacteria on earth. Hence raised the performance the candidate in a given question

Conversely, for candidates who scored low marks 0 to 5.5 in this question had insufficient knowledge on the topic tested such that they could not explain correctly the process of binary fission. Others did not understand the demand of the question. For example, in part (a), some candidates were describing the process of binary fission without drawing while, others drew without providing explanations. Also, in part (b), these candidates were not able to explain in detail the importance of bacteria on earth.

This might be caused by poor competence in English language and lack of writing skills as extract 13.3 shows.



### Extract 13.3

(5). Bacteria is the living organisms which helps many thing such as the decaying of the food matter in the soil. Bacteria are multiplied and be multiplied through different way such as by fission and cross fusion. The life in the earth will could not exist if there are no vast of bacteria as follows explained below. This is the reason why the life on the earth could not exist as explained below.

Firstly, will lead to have accumulation of wastes products in the world. As we know that wastes products are decomposed due to the presence of bacteria if the bacteria were not here will lead to the heap of waste products which would lead to death of people.

Secondly, Death of people, if was not existence of bacteria people would not able to survive since because the most of wastes to be accumulated will not be able to enable life for the living organisms.

Thirdly, Provision of more poisonous gases which will lead to the global warming. This also will tend to ~~decrease~~ destroy the layer of the global and lead to have the global warming.

Conclusively, Bacteria play a greater role in growing the life in the earth since because digest and destroy wastes products which are ~~not~~ resulted by the human uses.

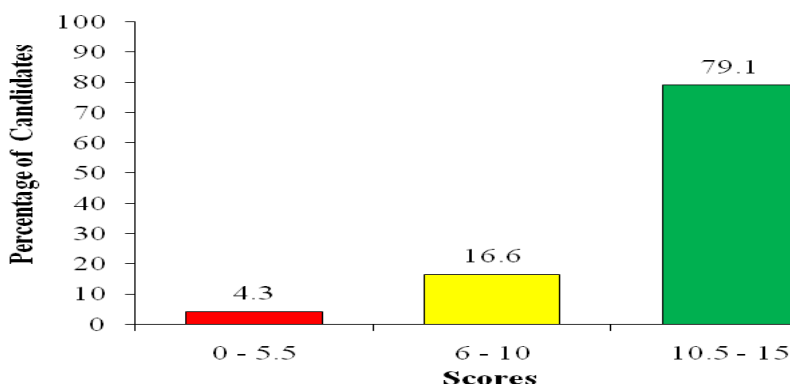
**Extract 13.3** shows a sample of responses from the candidate who had inadequate knowledge on the topic, poor language and writing skills, such that he/she could not clearly explain the importance of bacteria on earth. This lowered the performance of the candidate on a given question.

## 4.1 SECTION C: ESSAY TYPE QUESTIONS

This section had three questions from academic topics, each carrying a total of 15 marks. The performance of a candidate in each question of this section is categorized as poor if the candidate's scores ranges from 0 to 5.5 marks. The performance is moderate (average) if the candidate's scores lie from 6 to 10 marks and good performance if the candidates scores ranges from 10.5 to 15 marks.

### 2.4.1 Question 14: Planning and Preparation for Teaching

This question had two parts (a) and (b). In part (a) the candidates were required to use a diagram to describe parts of a lesson plan. Part (b) of this question, required the candidate to examine and re-write correctly the following specific objectives; students should define the term Biology, explain factors affecting the rate of photosynthesis and students must understand to explain the roles of enzymes found in the stomach. A total of 139 candidates (87.4%) out of 159 opted for this question. The analysis of candidates' responses shows that 6 candidates (4.3%) scored from 0 to 5.5 marks, 23 candidates (16.6%) scored from 6 to 10 while 110 (79.1%) scored from 10.5 to 15 marks as summarized in Figure 14.



**Figure 14:** *The Summary of Candidates Performance in Question 14.*

Basing on the analysis, as presented in Figure 14, it shows that the general performance on this question was good because the majority of candidates 133 (95.7%) scored from 6 to 15 marks due to the fact that they had adequate knowledge on the topic. Also, this topic is implemented practically during BTP which enables them to associate both theory and practise during their examination.

According to the marking scheme, the candidates were to write three major parts of a lesson plan namely; preliminary part, lesson development part, and culmination part and then inserting subparts in each part. In responding to this question 110 (79.1%) of the candidates show all or some of the components of a lesson plan correctly. For example, one candidate depicted in tabular form subparts as follows; *preliminary part consisting of pre-information like date, class, time, period number of students registered,*

*present and absent; lesson development part consisting of introduction, new knowledge, reinforcement, reflection and conclusion and lastly the culmination part consisting of; teachers` evaluation, student evaluation and remarks. This is an indicator that these candidates had adequate knowledge on the topic of Planning and Preparation for Teaching. This raised the performance of the candidate on a given question.*

As per guideline, part (b) of the question candidates were to write the objectives correctly by considering Specificity, Measurability, Attainability, Realistic and Time bound (SMART) as follows; by the end of 15 minutes a student should be able to; define the term Biology correctly, explain five factors affecting the rate of photosynthesis clearly, and explain the roles of enzymes in stomach clearly. In responding to this question one of the candidates re-wrote objectives as; *"by the end of 40 minutes a student should be able to define the term Biology correctly"*. Another candidate responded that; *"by the end of 80 minutes a student should be able to explain five factors affecting the rate of photosynthesis properly"*. Furthermore, another candidate wrote; *"by the end of 40 minutes a student should be able to explain the roles of enzymes in stomach correctly"*. These responses indicate that these candidates had sufficient knowledge on qualities of a well stated specific objective. Extract 14.1 shows a sample of candidate's good responses.

#### **Extract: 14.1**

	Hence, from the sentence given, Specific objectives should written as follows:	
	- By the end of 40 minutes, each student should be able to;	
	i/ Define the term Biology correctly.	
	ii/ Explain factors affecting the rate of photosynthesis, correctly.	
	iii/ Understand to explain the role of the enzyme found in the stomach effectively.	

**Extracts 14.1** shows a sample of a good response from a candidate who stated correctly two specific objectives. This raised the performance the candidate in a given question.

Despite good performance in this question some candidates 6 (4.3%) scored low marks ranging from 0 to 1.5 due to lack of understanding of the need of the question and insufficient knowledge on the topic such that they could not write specific objectives correctly. For example one candidate responded by outlining the characteristics of specific objectives such as; "*specific, measurable, attainable, Realistic, Time bound*", other candidates re-wrote the specific objectives without considering the characteristics of a well stated specific objective especially in the use of action verbs. However, in responding on parts a lesson plan, some candidates mentioned three parts namely; "*introduction, main body and conclusion*" without tabulating and indicating the sub-parts. This lowered the performance of the candidates in this question as shown in Extract 14.2.

#### Extract 14.2

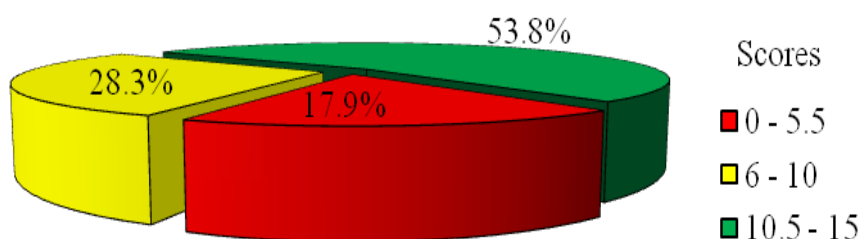
14	competence: In this part the student after a topic can have the ability to perform skills taught by a teacher
	Example: At the end of the topic student should be able to explain nature and properties of soil
	General objectives: This is stated in general in which students at the end of the lesson can have the ability to perform skills taught by a teacher
	Specific objectives - Must be SMART
	S - specific to the topic
	M - Measurable
	A - Attainable
	R - Realistic
	T - Time bound

**Extract 14. 2** show a sample of poor response from a candidate who did not understand the need of the question. He/she explained the component of the lesson plan and qualities of specific objectives which was not the demand of the question. This lowered the performance of the candidate on a given question.

#### 2.4.2 Question 15: Biology Laboratory Skills

This question had two parts (a) and (b). Part (a) required candidates to analyse five scientific approaches that are followed in gathering information from the natural world, and in part (b), to identify three

different skills that Biology students should have in order to perform practical task successfully. A total of 39 candidates (24.5%) out of 159 attempted this question. The analysis of candidates' responses shows that 7 candidates (17.9%) scored from 0 to 5.5 while, 11 (28.3%) scored from 6 to 10.5 and 21 (53.8%) scored 10.5 to 15 marks. The summary of candidates' performance in this question is presented in Figure 15.



**Figure 15:** *The Summary of Candidates Performance in Question 15.*

As observed in Figure 15, the general performance in this question was good because 32 candidates (82.1%) scored from 6 to 15 marks. As per marking guide, candidates were required to give explanations on the steps to be followed in scientific research which are: identification of the problem, formulation of hypothesis, experimentation, data collection and interpretation of the results, and making conclusions. Most of the candidates (53.8%) were able to explain 3 to 6 procedures correctly as shown in Extract 15.1. These candidates had adequate knowledge on the topic. This topic cut across all science subjects hence; the candidates had an opportunity of learning from different perspectives.

Nevertheless, in analyzing different skills of a Biology student should have in conducting a practical task successful, candidates were required to write: skills for using apparatus and procedures for experiments; ability to work safely and follow safety procedures; ability to collect, record, and analyse biological data; and ability to use data in different forms. In responding to this question one candidate explained the steps as follows; "*understanding procedures for conducting practical, ability to abide on laboratory rules*" Another candidate explained as: "*knowing how to use different laboratory tools, knowing procedures for conducting practical, understanding the*

properties of different chemicals and reagents. All of these responses indicated that, these candidates had adequate knowledge on the topic, hence raised their performance.

### Extract: 15.1

15	<p><u>Scientific approaches</u>: This are step by step procedures to be followed when solving different scientific experiments. The scientific experiments therefore needs to have the approaches which need to followed. The following are the scientific approaches to followed in gathering the information about the natural world.</p> <p><u>Problem identification</u>: This involves identifying clearly what problem need to used as the problem to be solved in the scientific way world wide. Example the problem can be the lower yield of maize in Monduli district. After identifying the problem is the first step toward the solution of it.</p> <p><u>Hypothesis formulation</u>: This involves the formulation of guess questions which can be the causes of the problems which need to be solved. Example the problem of low yield of maize at Monduli, can be formulate it's hypothesis as the low fertility of the soil and occurrence of pest and diseases where the causes of problem.</p> <p><u>Experimentation and data collection</u>: This involves the testing of the formulated hypothesis in the area which faced by that problems to prove what where the causes of that problem and the solution. In the problem above the farmer may decide to divide the farm in two plots, where one plots plants maize by using fertilizers and spraying pest and disease chemical control and other plots plants without. Then the farmer has two observe clearly what happen to each plots and record the data up to final stage of production.</p>
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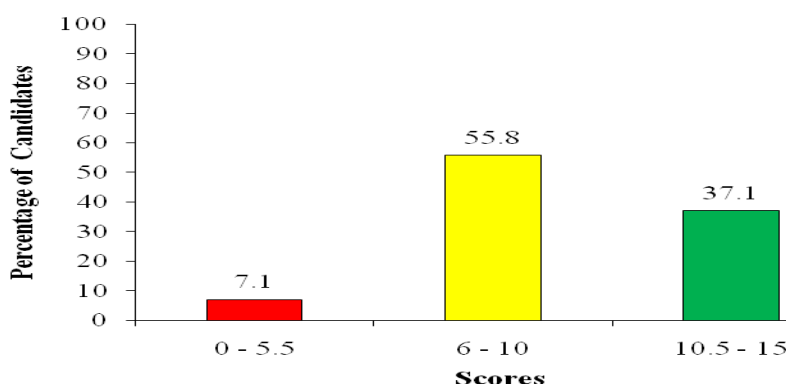
Extract 15.1 shows a sample of candidates' response demonstrating sufficient knowledge on scientific procedures. This raised the performance of the candidate on a given question.

In spite of good performance in this question, 7 candidates (17.9%) scored low marks ranging from 0 to 5.5 due to lack of understanding on the demand of the question. For example in part (a), instead of mentioning procedures for scientific investigation, 2 candidates mentioned tools for data collection namely: observation, interview, questionnaire and

*experiment*. Another candidate mentioned about; "*experimentation, observation and measurement*". These responses were incorrect showing that the candidate did not understand the requirements of the question. Also in responding about skills that Biology students should have in order to perform practical task successfully, one candidate mentioned; *ability to demonstrate, good understanding in theory and ability to handle apparatus* of which were incorrect responses. These responses indicated that the candidates had inadequate knowledge on this topic and could not understand the demand of the question hence poor performance of the question.

### 2.4.3 Question16: Analysis of O` Level Biology Curriculum Materials

This question required candidates to explain seven factors that are to be considered in selecting a quality text book. A total of 140 (88.1%) candidates out of 159 (100%) opted for this question. The analysis of shows that 10 candidates (7.1%) scored from 0 to 5.5 marks, 78 candidates (55.8%) scored from 6 to 10 while 52 candidates (37.1%) scored from 10.5 to 15 marks. The summary of candidates` performance in this question is summarized in Figure 16.



**Figure 16:** *The Summary of Candidates Performance in Question 16.*

Basing on the analysis as shown in Figure 16 the general performance on this question is categorized as good because 130 candidates (92.9%) scored from 6 to 15 marks. According to the marking guide, candidates were expected to explain the qualities to consider in selecting a text book as follows: content of the selected book, scope and sequence of the content, level of students, quality of writing, pedagogical design, review authors, and self-explanatory just to mention a few. In responding to this question

one of the candidates listed the following factors: "Age of learners, language used, and mechanical makeup of the book". Furthermore, another candidate listed; *discrimination free, should be authorized, should be in line to syllabus, and should be well organized*. All of these responses were correct indicating that these candidates had sufficient knowledge on the topic tested in this question as well as understanding the demand of the question. Extract 16.1 shows a sample of candidate's good responses;

### Extract 16.1

16	<p>Biology text books: Is the biology book which inline with syllabus which help teacher to teaching and learning process. The biology textbook is important because the biology textbook help the teacher in selection of content and also help them to know number of activities found in biology textbook. The following are the factors to consider in selecting quality textbook which are-</p> <p>Content: This is among of factor you will consider when selecting quality of the textbook because during selection of textbook you must look the content found in that textbook because there some of textbook have the content which are outside the form three biology textbook, so make sure that you see the content of biology textbook.</p> <p>Language: When you selecting the biology textbook first you may consider the language because there some of textbook use simple language some other textbook use complex language, so when you selecting textbook make sure that you look the language which is favourable to the form three student in order to like textbook.</p> <p>Front cover: When you select the textbook make sure that you look the front cover cover of the textbook because there some textbook the front cover is soft and other are hard, so make sure you choose the textbook which have hard cover in order to stay for long time.</p>
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**Extract 16.1** shows a sample of the response from a candidate who had sufficient knowledge on the topic tested such that he/she was able to explain correctly the factors to consider in selecting a quality text book. The response made the respective candidate to perform well in a given question.

Despite good performance in this question, few candidates (7.1%) scored less than 6 marks hence performed poorly in this question due to lack of understanding the demand of the question. For example, one candidates understood that the question demanded to explain basic issues that appears



on the preliminarily pages of a text book. Following this perception the candidates mentioned; "title of the book, authors and preamble organization of the textbooks' content" as qualities to consider while selecting a text book. Another candidate mentioned about accessibility of textbooks as: *physiological factors and the availability of the books*. These responses were incorrect as shown in Extract 16.2 of a sample of candidate's poor response.

### Extract: 16.2

16.	<p>Biology textbook is the book deals with biology subjects. But there are different textbook used in teaching and learning biology. The following are the factors to be consider in selecting quality textbooks:</p> <p><b>Contents</b> During selecting a quality textbook one of the factor must be consider is content or knowledge should be relevant to the syllabus because not all textbooks are quality for use in teaching and learning process.</p> <p><b>Structure</b> of the textbook. This is one of the factor used to consider in selecting quality textbook used in teaching and learning process. For instance the arrangement of topics from simple to complex.</p> <p><b>Authors</b> Due to selecting a biology textbook one of the factor can be consider is the author who writes that book textbook. Example of author is TIE (Tanzania Institute of Education)</p> <p><b>Publishers</b> This is the one of the factor used to selecting a quality of the textbook used in teaching and learning process. It is very important to know the publishers area and the year who published because of others textbooks are updates in teaching and learning process.</p>	
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**Extract 16.2** shows a sample of response from a candidate who gave some of the incorrect responses which are not factors to consider in selecting a quality textbook. This lowered the performance of the respective candidate in this question.

## 3.0 ANALYSIS OF CANDIDATES PERFORMANCE PER TOPIC

The DSEE 2018 Biology examination had a total of sixteen (16) questions in paper one and three questions in practical paper of which were set from eleven (11) topics. The analysis of candidates' performance in these topics reveals that, candidates performed well in 8 topics which is equivalent to

72.7% of all the examined topics. These topics include: Biochemistry (98.1%), Fundamentals of Teaching and Learning Biology (95%), Planning and Preparation for Teaching (91%), Analysis of Ordinary Level Biology Curriculum Materials (87%), Biology Laboratory Skills (84.2%), Genetics (82.4%), Body Health and Immunity (82.1%) and Assessment in Biology (69.8%).

On the other hand, the candidates performed poorly in 3 topics which is equivalent to (27.3%) of the examined topics. These topics include: Classification of Living things (32.7%), Ecology (24.5%) and Respiration (8.6%). The summary of candidates' performance by topics is attached in the Appendix A and B.

The good performance in the stated topics was due to the fact that most of the candidates had adequate knowledge, good command in English language and clear understanding of the demand of the respective questions. Moreover, most of them were able to organize their ideas well in responding to different questions.

Nevertheless, poor performance in the three stated topics was due to inadequate knowledge on these topics. For example in the topic of Respiration candidates were not able to explain the process of respiration by using fat as respiratory substrates. Also, in the topic of classification they were not able to correctly define the terms used in classification.

#### **4.0 CONCLUSION**

The general performance of the candidates in Biology Examination for Diploma in Secondary Education was good because all the candidates passed the examination by scoring grade A to C. The analysis shows that the candidates performed well due to a number of reasons namely, ability to understand the demand of the question, adequate knowledge to different topics and good writing skills. Despite strengths unveiled above, some of the candidates did not perform well in some of the questions due to various reasons including; inability to identify the demand of some questions, lack of sufficient knowledge on the topic tested and poor writing and language skills, which lowered their performance.

Therefore, the weak or moderate performance is a great challenge to tutors. This necessitates them to be in position of taking all the necessary initiatives in making sure that all Biology topics as stipulated in diploma in secondary school Biology syllabus are well taught. It is suggested that tutors and other education stakeholders take appropriate measures to address the challenges that hinder student teachers from performing well in their final examinations.

Generally, it is significant to ensure that all prospective teachers acquire basic skills on those subjects that they are going to teach in secondary schools in particular Biology. This will enable them to be in a position of making sure that what is going to be taught to their students is constructive.

## **5.0 RECOMMENDATIONS**

In order to improve the performance of the prospective candidates in Biology subject the following recommendations were made from the analysis basing on the examination questions and topics.

- 5.1 Tutors should ensure that they complete all the topics which are stipulated in the syllabus so as to make sure that candidates are able to tackle questions which are normally formulated under the guideline of the syllabus.
- 5.2 Tutors should give student teachers enough exercise related to all covered topics and give them feedback on their performance on time so as to enable them improve all subject areas.
- 5.3 Student-teachers should be prepared well for the final examinations so as to be able to identify the requirements of the questions in order to improve future performance in the examinations.
- 5.4 The government should provide regular job embedded trainings and outdoor trainings to Biology tutors in order to equip them with new and most relevant practical skills on pedagogical and content parts. Also, it will enable them improve in teaching some of the topics which most of the candidates performs worse year after year.
- 5.5 Policy makers should make sure that science education is given more priority in our education system. This will enable the country

to get competent science teachers and other experts who can work in different fields.

- 5.6 Researchers should conduct studies to find out causes for students poor performance in science subjects focusing on topics which are failed by the majority of the candidates year after year.
- 5.7 Parents and the society at large should play role of motivating students to take science subjects by assisting them in terms of learning materials and financial support.

## APPENDIX A

### SUMMARY OF THE CANDIDATES' PERFORMANCE PER TOPIC 733 BIOLOGY

S/N	TOPIC	PERFORMANCE IN EACH QUESTION		The % of Candidates who scored an average of 40% and above	REMARKS
		Question Number	The % of Candidates who scored 40% and above		
1.	Biochemistry	2	98.1	98.1	Good
2.	Fundamentals of Teaching and Learning Biology	8	95	95	Good
3.	Planning and Preparation for Teaching	5	86.2	91	Good
		14	95.7		
4.	Analysis of O`-Level Biology Curriculum Materials	7	81.1	87	Good
		16	92.9		
5.	Biology Laboratory Skills	9	86.2	84.2	Good
		15	82.1		
6.	Genetics	10	82.4	82.4	Good
7.	Body Health and Immunity	6	66.7	82.1	Good
		12	97.5		
8.	Assessment in Biology	1	69.8	69.8	Good
9.	Classification of Living Things	3	24.5	32.7	Poor
		13	40.8		
10.	Ecology	4	24.5	24.5	Poor
11.	Respiration	11	8.6	8.6	Poor

## THE BIOLOGY CANDIDATES' PERFORMANCE PER TOPIC DSEE 2018

