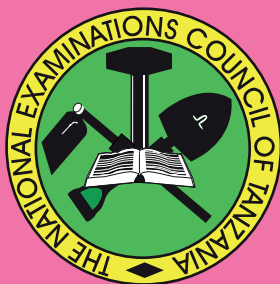


THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**CANDIDATES' ITEM RESPONSE ANALYSIS REPORT FOR
DIPLOMA IN SECONDARY EDUCATION EXAMINATION
(DSEE) 2019**

733 BIOLOGY

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(DSEE) 2019**

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FOREWORD

This report analyses the performance on Biology by the candidates who sat for the Diploma in Secondary Education Examination (DSEE) in May 2019. The DSEE marks the end of two years of diploma in secondary education. This summative assessment focuses on the competences acquired by the candidates in Diploma in Secondary Education. The report has been prepared to provide feedback to candidates, tutors, policy makers, curriculum developers and other educational stakeholders on the performance of the candidates on the Biology subject.

It highlights some reasons which made the candidates to score either low or high marks on each question. On one hand, lack of adequate knowledge in the respective topics, failure to understand the requirements of the questions and lack of competencies in presenting answer led to poor performances by some candidates. On the other hand, adequate knowledge about the assessed topics, the ability to understand the requirements of the question, good presentation skills and mastery of the English language led to good performance by the candidates.

The National Examinations Council of Tanzania (NECTA) believes that the feedback given in this report will enable education stakeholders to devise appropriate measures to improve the teaching and learning process for better performance of candidates in future.

Finally, the council would like to express its sincere gratitude to all those who contributed in the preparation of this report.



Dr Charles E. Msonde

EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report analyses the performance on Biology by the candidates who sat for Diploma in Secondary Education Examination in May 2019. A total of 2,730 candidates sat for the examination. Among them, 1, 877 candidates used the University of Dodoma (UDOM) curriculum and 853 used the Tanzania Institute of Education (TIE) curriculum. The examination consisted of questions which intended to measure the candidates' theoretical and practical competences in the contents indicated in the 2009 Biology academic syllabus for diploma in secondary education. The general performance of the candidates was good as Table 1 shows.

Table 1: General Performance of Candidates on Biology

Candidate s Types	No. of Candi date Sat	No. of Candidates and Percentage					
		Passed	Grades				
			A	B	C	D	F
All	2,730	2,643 (97.89%)	0 (0.00%)	116 (4.30%)	1,481 (54.85%)	1,046 (38.74%)	87 (3.22%)
UDOM Curriculu m	1,877	1,791 (95.42%)	0 (0.00%)	33 (1.76%)	825 (43.95%)	933 (49.71%)	86 (4.58%)
TIE Curriculu m	853	852 (99.88%)	0 (0.00%)	83 (9.73%)	656 (76.91%)	113 (13.25%)	1 (0.12%)

The Table shows that, out of 853 candidates who sat the examination under the TIE curriculum, 852 (99.88%) passed and 1 (0.12%) failed the examination by getting the F grade. Out of 1,877 candidates who sat the examination under the UDOM curriculum, 1,791 (95.42%) passed and 87 (3.22%) failed.

The analysis of the performance on individual examination questions and their corresponding topics was done based on the candidates who sat the examination using the TIE curriculum only. This is because the UDOM curriculum has been in transition.

In the TIE curriculum, the Biology paper was prepared based on the academic and pedagogy syllabus of 2009. The examination intended to measure the

competencies acquired by a candidate in two years as specified in the Diploma in Secondary Education Biology Syllabus.

The paper consisted of sections A, B and C. Section A consisted of ten short answer questions each carrying four marks making a total of 40 marks. Section B contained three essay type questions. The candidates were required to choose two questions from this section. Each question carried 15 marks, making a total of 30 marks. Section C consisted of three essay type questions; the candidates were required to choose and attempt any two questions. Each question carried 15 marks making a total of 30 marks. Questions in Section A were composed from both academic and pedagogy topics. In section B there were academic topics while in section C there were pedagogy topics.

The next section of the report is concerned with the analysis of candidates' responses to a particular question.

2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE PER QUESTION

In the analysis of the candidates' responses to particular questions, the performance was considered to be good, average or weak if the percentage of the candidates who scored 30% and above fell within the ranges of 70 to 100, 40 to 69 and 0 to 39 respectively. For easy presentation, three colours, namely green, yellow and red are used in figures and appendix to represent good, average and weak performance respectively.

2.1 SECTION A: SHORT ANSWER QUESTIONS

This section had ten questions from both academic and pedagogy topics each carrying a total of 4 marks. The candidates were required to answer all the questions.

2.1.1 Question 1: Classification of Living Things

This question required the candidates to outline four distinctive characteristic features which place human being in the Phylum Chordata. The analysis of the candidates' performance shows that 853 (100%) candidates attempted the question. Among them, 97.1 percent scored 0 to 1.5 marks. The candidates who scored from 2 to 2.5 marks were 2.4 percent and 0.5 percent scored from 3 to 4 marks out of the 4 marks allocated to this question. Figure 1 summarizes the performance.

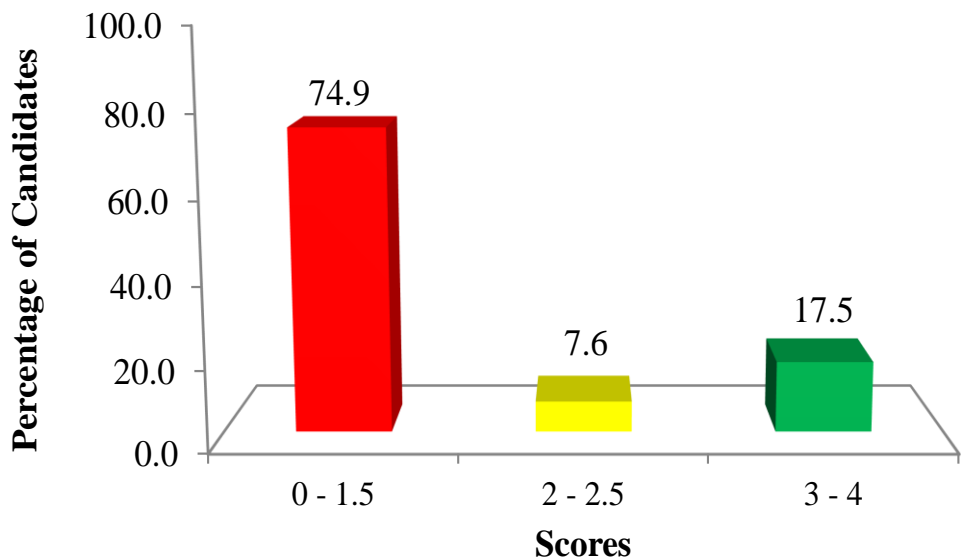


Figure 1: Distribution of the candidates' scores on question 1

Figure 1 shows that the candidates' performance on this question was weak since 97.1 percent of the candidates scored low marks (0 - 1.5). It was observed that most of the candidates in this category either failed to outline distinctive characteristic features which place human being in the Phylum Chordata or outlined one out of four required features.

Most of the candidates gave responses which are contrary to the demand of the question. For example, one candidate wrote the general features of Class Mammalia such as *they have mammary glands and breast for feeding their offspring, they reproduce through sexual means of reproduction, they are heterotrophic in mode of nutrition, and their bodies are covered by hair*. Another candidate wrote the general features of Class Aves as *they are warm blooded, they lay eggs, they can reproduce through sex and they have one pair of legs and their mouth differ to other human being*. However, the candidates were required to give responses such as *presence of pharyngeal (visceral clefts), presence of notochord at some stages in life history, possession of dorsal hollow nerve chord, possession of post-anal tail among others and formation of limbs from more than one body segments*. Extract 1.1 is an example of the candidates' poor responses.

1.	Distinctive characteristic features which place human being in the phylum chordata.
i/	They are heterotrophic mode of nutrition.
ii/	They are found on the terrestrial land.
iii/	They are multicellular.
iv/	They store food in form of glycogen.
v/	They undergo internal fertilization.

Extract 1.1: A sample of the candidate's poor response on question 1

Responses in extract 1.1 shows that the candidate failed to understand the demand of the question. Therefore, the candidate outlined general features of the Kingdom Animalia instead of the distinctive features.

Despite the poor performance, 2.9 percent of the candidates performed well. They managed to outline all or most distinctive characteristic features which place human being in the Phylum Chordata. This indicates that these candidates had adequate knowledge about the topic of Classification of Living Things particularly the *Major groups of living things*. Extract 1.2 shows the correct response from one of the candidates.

1.	i) Presence of postanal tail	
	ii) Presence of dorsal hollow nerve.	
	iii) Presence of notochord	
	iv) Presence of pharyngeal gill to some stage.	

Extract 1.2: A sample of the candidate's good response on question 1

The responses in extract 1.2 indicate that the candidate correctly outlined the distinctive features which place human being in the Phylum Chordata.

2.1.2 Question 2: Planning and Preparation for Teaching Biology

In this question, the candidates were required to state why it is important for a student teacher to carry out microteaching. The analysis indicates that 97.8 percent of the candidates scored from 3 to 4 marks. The candidates who scored from 2 to 2.5 marks were 1.8 percent whereas those who scored from 0 to 1.5 marks were 0.4 percent as depicted in Figure 2.

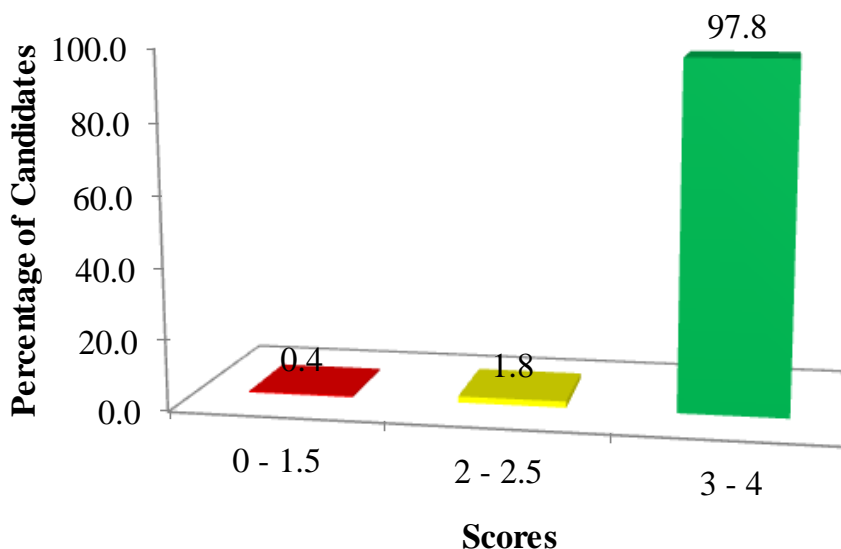


Figure 2: Distribution of the candidates' scores on question 2

Figure 2 shows that the candidates' performance on this question was good as 99.6 percent scored from 2 to 4 marks. This shows that most of the candidates had an adequate knowledge on the topic tested. They correctly outlined the importance of microteaching to student teachers in two to four points. Extract 2.1 shows a sample of responses from the candidate who answered the question correctly.

2.	(i) Helps the student teacher to integrate theory knowledge with practical skills during the teaching process
	(ii) Helps student teacher to build confidence which are very important for teaching process
	(iii) Helps student teacher to gain experience of teaching before going to block teaching practice
	(iv) Helps student teacher to correct some problems like language problems system of pronunciation and the proper way of organizing and managing the classroom

Extract 2.1: A sample of the candidate's good response on question 2

In extract 2.1 the candidate gave correctly explained the importance of the student teacher to carry out microteaching.

Despite the good performance on this question (97.8%), further analysis shows that 3 candidates (0.4%) scored low (0 - 1.5) marks. These candidates either failed to explain why it is important for a student teacher to carry out microteaching or gave responses which deserved low marks. For example, one candidate gave responses which focused on microteaching as a means of improving communication skills by writing: *it helps student teacher to develop language, it help student teacher to have communication skills, helps student teacher to know how to speak English language.* These responses show that the candidates lacked clear understanding of the tested concepts.

2.1.3 Question 3: Laboratory Management and Maintenance

The question required the candidates to outline four pieces of basic information required during preparation of common dilute acids in the laboratory. The question aimed at measuring the candidate's awareness of preparing common dilute acids from concentrated acids as prospective biology teachers.

The analysis shows that 74.9 percent of the candidates scored from 0 to 1.5 marks, 7.6 percent of candidates scored from 2 to 2.5 marks whereas 17.5 percent scored from 3 to 4 marks as illustrated in Figure 3.

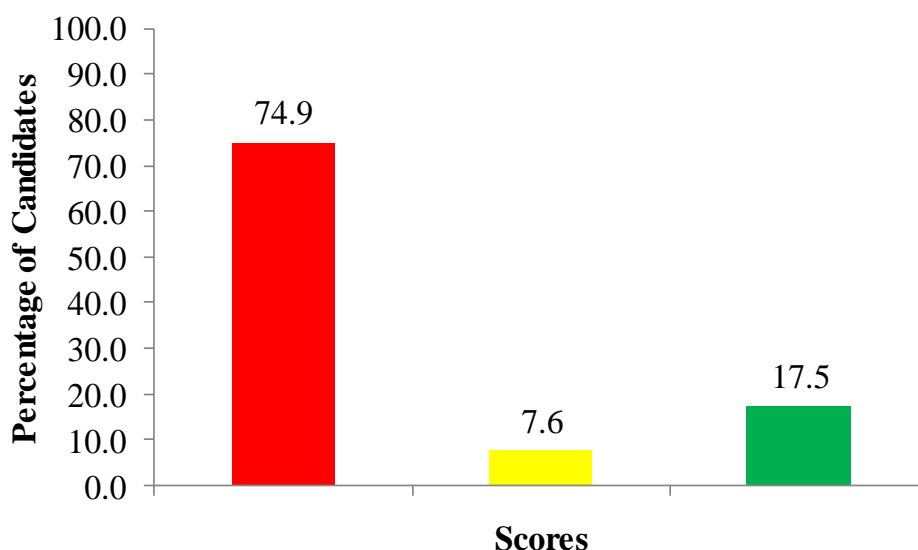


Figure 3: Distribution of the candidates' scores on question 3

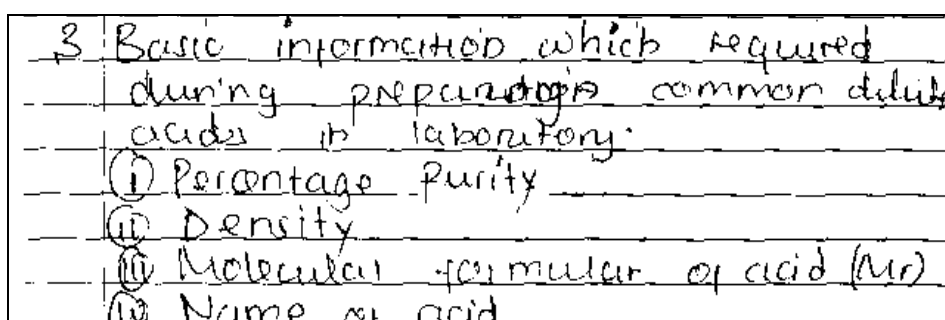
The general performance of the candidates was weak since the majority of the candidates (74.9%) obtained low marks (0 - 1.5). Most of the responses given by these candidates were contrary to the demand of the question. For example one of the candidates wrote that the basic information required during preparing common dilute acids in the laboratory comprises; *sample of the solution, distilled water, strong acids such as hydrochloric acid and procedures*. Another candidate wrote *prepare water, prepare concentrated acids, prepare beaker, then put acids into the water which present into beaker*. Extract 3.1 exemplifies further.

3.	i) Demonstration of the apparatuses and chemicals which are going to be used.
	ii) procedures on how to prepare the solution of dilute acids
	iii) The aim of preparing that solution of dilute acids (The little title of experiment).
	iv) Materials used in that experiment of preparing the dilute acids.

Extract 3.1: A sample of candidate's poor responses for question 3

The extract 3.1 indicates that the candidate lacked adequate knowledge about Laboratory Management and Maintenance.

However, 25.1 percent of the candidates gave correct basic information required during preparation of common dilute acids in the laboratory. In their responses they included answers such as knowing the important information such as percentage composition by mass of the reagents (percentage purity), the chemical formula of the reagent, specific gravity/density and molecular formula; and reading the safety warning information carried by the symbols. This indicates that the candidate had adequate knowledge of the concept tested. Extract 3.2 shows a sample of a correct response by one of the candidates.



Extract 3.2: A sample of candidate's good response in question 3

In Extract 3.2 the candidate gave correct basic information required during preparation of common dilute acids in the laboratory such as molecular formula of the acid.

2.1.4 Question 4: Genetics

This question required the candidates to state four differences between DNA and RNA. It intended to measure the candidate's ability to differentiate the nucleic acids DNA and RNA. The performance of the candidates on this question was average as Figure 4 summarises.

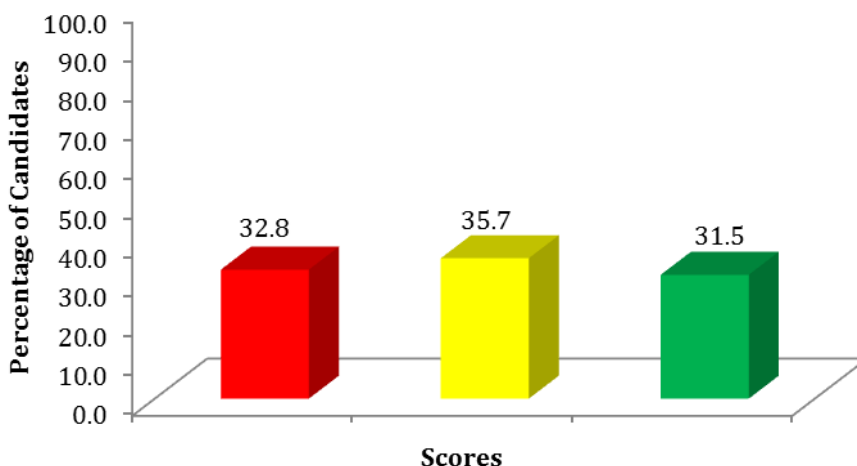


Figure 4: Distribution of the candidates' scores on question 4

Considering Figure 4, the candidates' performance on this question was average because more than two thirds (67.2%) of the candidates scored from 2 to 4 marks. Further analysis from candidates' scripts revealed that the candidates had an adequate knowledge of Genetics. Therefore they managed to correctly state two to four structural differences between DNA and RNA. According to the marking guide, the structural differences between DNA and RNA are DNA has double polynucleotide chain while RNA has single polynucleotide chain; in DNA the pentose sugar is deoxyribose while in RNA the pentose sugar ribose; in DNA the organic bases present are adenine, guanine, cytosine and thymine while in RNA there are adenine, guanine, cytosine and Uracil; and DNA has Hydrogen bond while RNA do not have.

In responding to this question, one of the candidates wrote that *DNA has deoxyribose sugar while RNA has ribose sugar, DNA is a double strand while RNA is a single strand and DNA has hydrogen bonds while RNA does not have hydrogen bonds*. The correct responses given by the candidate indicate that the candidates had an adequate knowledge of the topic. Extract 4.1 exemplifies further.

4.	Differences between DNA and RNA are.
i)	DNA contain double strand while RNA contain single strand.
ii)	Pentose sugar in DNA is deoxyribose while pentose sugar in RNA is ribose.
iii)	The nitrogenous base in DNA are guanine, thymine, adenine and cytosine while nitrogenous base in RNA are guanine, cytosine, adenine and uracil.
iv)	DNA have hydrogen bonds, while RNA have no bonds.

Extract 4.1: A sample of the candidate's good responses in question 4

Extract 4.1 shows that the candidate had an adequate knowledge as he/she managed to give correct responses such as presence of double strand in DNA and single strand in RNA.

Despite the average performance on this question, about one third (32.8%) of the candidates gave responses with either only one correct points or all irrelevant points. Most of the candidates who gave irrelevant responses explained the functions of RNA and DNA. For example one candidate wrote the role of DNA as *contains genetic information, helps in replication and involves in protein synthesis*. Others interchanged the answers where they wrote the answers of DNA in place of RNA as shown in Extract 4.2.

4.	DNA	RNA
i)	It contain single strand in its structure	It contain double strand in its structure
ii)	It has a pentose sugar called deoxyribic Acid.	It contain pentose sugar called Ribonucleic Acid
iii)	It contain uracil in its base	It contain thymine (T) in its base
iv)	It is special for protein synthesis	It is special for amino acid formation example mRNA and rRNA also tRNA

Extract 4.2: A sample of the candidate's poor response in question 4

In Extract 4.2 the candidate wrote the structure of RNA in DNA and vice versa. For example, DNA has single stand while RNA has two strands.

2.1.5 Question 5: Biology Curriculum Materials

This question required the candidates in four points to give the importance of using teachers' manual in the teaching and learning process. Data indicate that 15.2 percent of the candidates scored from 0 to 1.5 marks; 32.7 scored from 2 to 2.5 marks whereas 52.1 percent scored from 3 to 4 marks. Figure 5 summarizes the performance.

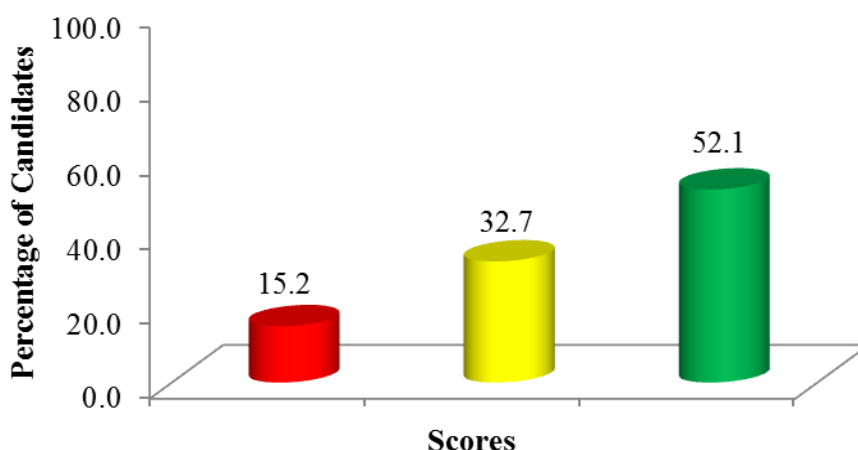


Figure 5: Distribution of the candidates' scores on question 5

Figure 5 shows that the general performance on this question was good because the majority (84.4%) of the candidates scored from 2 to 4 marks. This shows that the candidates had an adequate knowledge about the topic. This enabled them to write two to four correct points. Their responses included *it enables the teacher to use uniform procedures in teaching and learning and eventually evaluation, it gives confidence to both students and teachers as they are well guided through procedures in doing experiments, it reduces chances of accidents during laboratory work, it suggests equipment and apparatus needed for the experiments, it suggests alternative resources and materials needed for the experiments*. Extract 5.1 is illustrative.

5.	It help the teacher to teach systematic ally the subject matter.
	It help He students to know He procedures of doing experiment
	It gives confidence to the teacher.
	It help to reduce accident in the laboratory because He student will follow all steps of doing experiment.

Extract 5.1: A sample of the candidate's good response in question 5

Extract 5.1 indicates that the candidate had an adequate knowledge. He/she gave correct importance of using teachers' manual in teaching and learning process.

Despite the good performance on this question, 15.2 percent of the candidates performed poorly. Some of these candidates had either partial or no knowledge about teachers' manual while others did not understand the demand of the question. For example, instead of explaining the importance of teacher's manual, some candidates described teachers' manual as *teaching and learning aid that is very attractive to students*. Others gave responses which focus on the importance of using teaching aids. For example one candidate wrote *used to draw attention to the learner, promote active participation in the class, builds cooperation, it accelerate inquisitive mind it*. Extract 5.2 is a sample response by one of the candidates.

5.	(i) It gives additional information about a certain content
	(ii) It guide teachers in teaching and learning activities.
	(iii) It show assessment of different topics, which helps teacher to give his/her learners.
	(iv) Also it can be used by the learners to find different additional knowledge and skills of a certain topic.

Extract 5.2: A sample of the candidate's poor responses in question 5

In Extract 5.2 the candidate wrote did not understand the demand of the question. He/she wrote the importance of reference book such as getting additional information about certain content instead of explaining the importance teacher`s manual.

2.1.6 Question 6: Biochemistry

This question had parts (a) and (b). Part (a) required the candidates to explain the meaning of enzyme inhibitors while part (b) required them to explain the concept of key and lock mechanism of enzyme action. The candidates` performance is summarised in Figure 6.

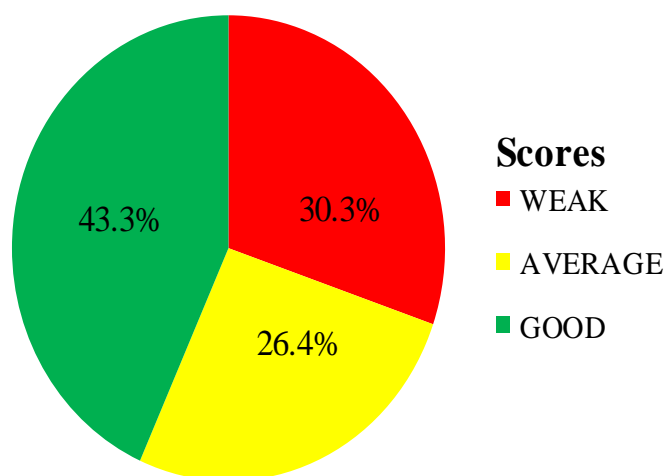


Figure 6: Distribution of the candidates' scores on question 6

Figure 6 shows that, the candidates' performance on this question was average since 69.7 percent scored from 2 to 4 marks. Candidates' average performance on this question was attributed to their moderate knowledge of the topic such that, in part (a), they were aware that enzyme inhibitor is a small substance which reduces the function of enzyme controlled action. For example, one candidate wrote that *enzyme inhibitor is a small molecule that attaches itself to enzyme as a result the enzyme fails to work completely*. Another candidate wrote; *enzyme inhibitor is a molecule which hinders the enzyme during respiration and digestion*. In part (b), most candidates partially described the key and lock mechanism of enzyme action leading to average performance. Some of the responses given by one of the candidates include; *Enzyme are very specific and have*

a particular shape into which the substrate fit exactly. This is referred to as lock and key, where the substrate is imagined being like a key whose size is smaller and shape is complementary to the enzyme/lock whose size is bigger than that of the substrate. The site where the substrate binds in the enzyme is called active site. This response shows that the candidate was knowledgeable in the concept tested. Extract 6.1 exemplifies further.

6. Enzymes Inhibitory - It is a substance that hinder the enzymes function	
6. Is the enzyme action mechanism, where by the key (substrate) binding to the active site that present in Lock (enzymes) to produce the Enzyme-substrate complex and further more produce enzyme-product complex and at the end produce the Enzyme and product	
$E + S \rightleftharpoons E-S \text{ complex} \rightleftharpoons E-P \text{ complex} \rightleftharpoons E + P$	

Extract 6.1: A sample of the candidate's good response in question 6

Candidate's response in Extract 6.1 shows that he/she had moderate knowledge on the concept tested.

Nonetheless, some of the candidates (30.3%) scored from 0 to 1.5 marks which is a poor performance. In responding to part (a) of the question, one of the candidates wrote; *enzyme inhibitors are conditions that support enzyme reaction* and in part (b), *lock and key is an action where by enzyme and substrate is reacting*. Most of the candidates in this category scored a zero mark in part (b) but not (a). This indicates that the candidate lacked enough knowledge about the tested concepts. Extract 6.2 is an example of a response from candidate with inadequate knowledge on the topic.

6'	(a) Enzyme inhibitors,	
	- Are the condition that support an enzyme to alter the reaction	
	- Inhibitors help enzyme to function.	
	(b) Key and Lock mechanism of enzymes	
	- It show how enzymes is specific to the food substrate	
	- As each key function to its lock, applied also in specificity of the enzyme in a food substrate.	
	- Forexample each food substrate have its enzyme to be catalysed.	
	- Hence enzymes acquire the structure of the food substrate hence to fit in it.	

Extract 6.2: A sample of the candidate's poor response in question 6

In Extract 6.2 the candidate gave unclear response. This indicates poor mastery of the tested concept.

2.1.7 Question 7: Assessment in Biology

This question required the candidates to mention four advantages of true/false items. Their performance on this question was good since 94.7 percent scored from 2 to 4 marks. Figure 5 summarizes the performance.

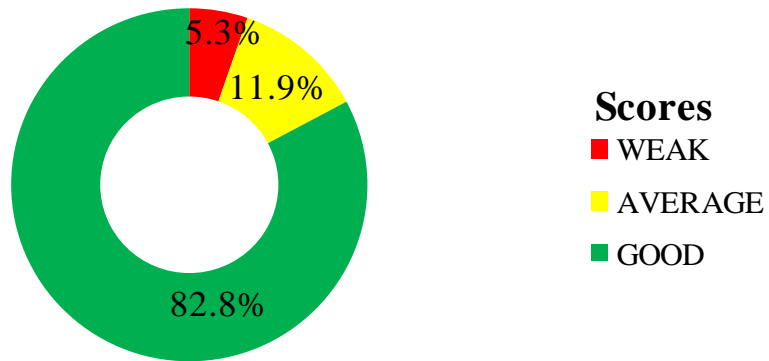


Figure 7: *Distribution of the candidates' scores on question 7*

Figure 7 shows that a total of 94.7 percent passed by scoring from 2 to 4 marks. Such good performance on this question was attributed to their adequate knowledge of the topic. They thus understood the demand of the question. Thus, they managed to connect the knowledge acquired in the class to teaching and learning. Most candidates responded correctly by giving two to four correct responses, such as the items are easy to score; they are objective questions such that scores are consistent even if different markers are involved in marking; they can be used to measure large coverage of content of subject matter and they can be used to measure all levels of Blooms' taxonomy. Specifically, one of the candidates mentioned advantages of true false items as *it covers large area of the cognitive domain, it is simple to construct, it is simple to mark and it save time* Another candidate wrote *it is easy to score, it is easy to construct, it saves time during answering and it provide a chance for wide coverage of the content for assessment*. Moreover, another candidate wrote *they are easy to construct, they are simple to mark and they are simple for learners to score and save time during the process of scoring*. From these responses, it is clear that these candidates had a sufficient knowledge of the topic. Extract 7.1 is a sample of a response by a candidate with a sufficient knowledge of the tested concept.

7	Advantage of true and false items.	
	i) It is easily to construct.	
	ii) It cover large domain in learning, True and false item can cover large learning domain in the test.	
	iii) It is easily to Mark the True and false item, does not consume alot of time in Marking this item.	
	iv) It reduce bot biasness in scoring.	

Extract 7.1: A sample of the candidate's good response in question 7

In extract 7.1 the candidate managed to correctly state the advantage of true/false items such as easy to mark and construct.

Despite the large number of candidates who passed this question, a few candidates (5.3%) scored poor marks. Some of them candidates did not understand the demand of the question. For example, some candidates wrote about the factors to consider when constructing true/false items such as *use simple language, avoid clues, and avoid the use of the negative words*. Others had inadequate knowledge about the topic. Most of their responses were incorrect. Such responses are *promotes cheating, it does not bore learners while answering and it helps to measure language*. Extract 7.2 shows a sample of responses from the candidate with inadequate knowledge of the tested concept.

70	It serve time instead of writing examati on	
	i) It serve for those who are poor handwriting	
	ii) It improve confidence to student because can predic answer	
	iii) It reduce cost for buying pens and question papers	

Extract 7.2: A sample of the candidate's poor response in question 7

In extract 7.2 the candidate wrote the advantage of using computer in writing such as to serve for those who have poor handwriting instead of

writing the advantages of true/false items. This candidate did not understand the demand of the question.

2.1.8 Question 8: Health and Immunity

This question had parts (a) and (b). Part (a) required the candidates to explain the difference between active immunity and passive immunity. Part (b) required the candidate to explain briefly how phagocytes and lymphocytes blood cell carry out body defense. The candidates' performance on this question is presented in Figure 5.

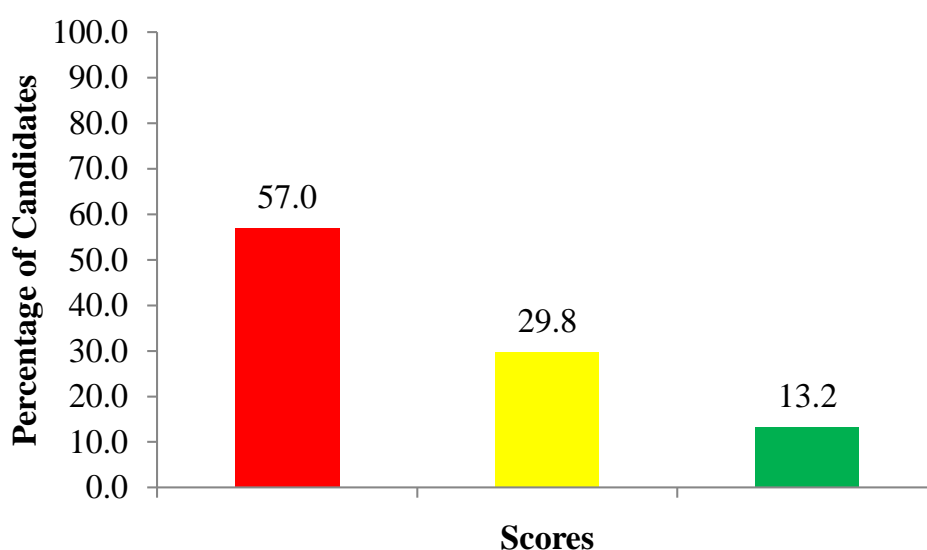
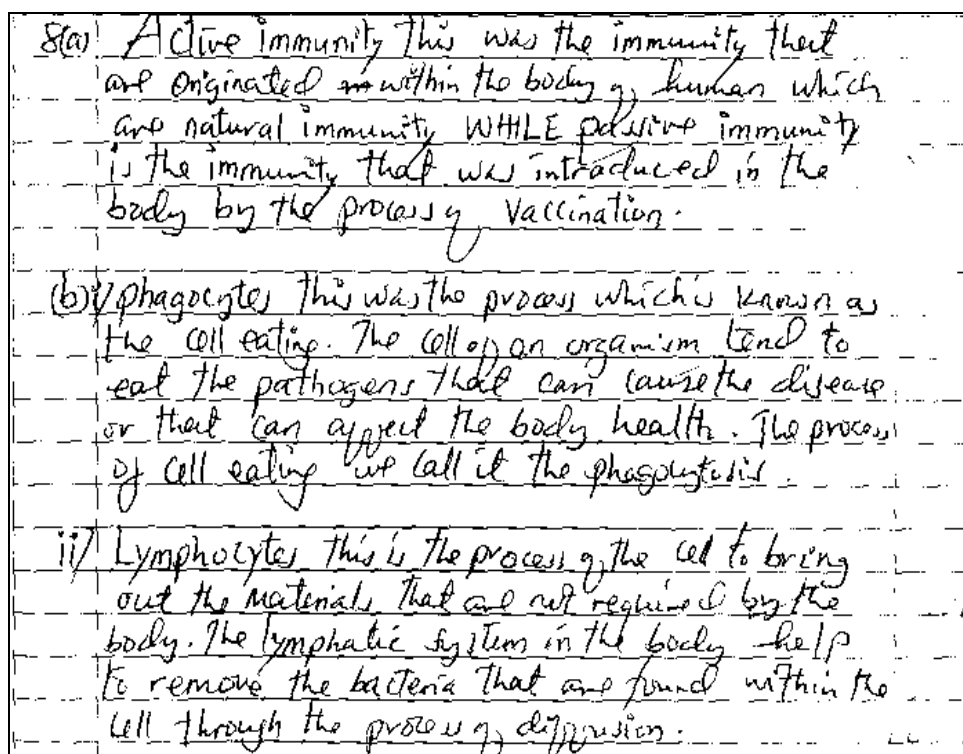


Figure 7: Distribution of the candidates' scores on question 7

Considering Figure 8, the general performance on this question was good because 86.8 percent of candidates passed by scoring from 2 to 4 marks. This performance was attributed to their adequate knowledge of the tested concept. Most of these candidates responded according to the marking guide where in part (a) they explained the difference between active and passive immunity by giving responses such as active immunity is the ability of the body to produce its own antibodies that fight against infections/pathogens, while passive immunity is the acquired immunity due to the introduction of new antibodies that may help to fight against infections before the body mechanism does. To be specific, one candidate wrote *active immunity is the ability of the body to produce its own antibodies that fight against diseases, while passive immunity is the*

immunity due to the introduction of new antibodies in somebodies so as to fight against infections. Another candidate explained; active immunity is the type of immunity that operates naturally from the body against infections while passive immunity operates by introduction of external antibodies.

Similarly, in part (b) of this question, the candidates were required to explain the way phagocytes and lymphocytes blood cells carry out body defense. Most of the candidates who scored less than four marks failed to explain how lymphocytes carry out body defense. Those who scored four marks responded accordingly by explaining that phagocytes are white blood cells that engulf and digest invading microorganisms and lymphocytes as blood cells that produce chemicals that neutralize bacteria/viruses and make them easy to be destroyed. These responses show that the candidates were knowledge about the topic as they managed to explain clearly the ideas. Extract 8.1 is an example of a correct response by one of the candidates.



Extract 8.1: A sample of the candidate's good response in question 8

Considering Extract 8.1, the candidate had sufficient knowledge on the topic. The candidate gave correct explanation in parts (a) and (b) of the question.

Besides, 13.2 percent scored low marks (0 - 1.5). Their responses were incorrect, indicating insufficient knowledge of the tested concept. Some of the responses given by one of them were *active immunity is the immunity we acquire through antibodies while passive immunity passes from one individual to another*. Another candidate wrote *active immunity is the one in which an individual acquire it during life process while passive immunity is the immunity an individual acquire from the mother*. Furthermore, another candidate wrote *active immunity is where the body make it for natural vaccination while passive immunity can be transmitted from individual to individual*. These responses suggest that the candidates had insufficient knowledge of the tested concept.

Similarly, in part (b), most of the candidates either gave no response or gave incorrect explanation on the way phagocytes and lymphocytes carry out body defense. For example, one of the candidates wrote *Phagocytes are red blood cell which fights against disease and lymphocytes are white blood cells which fight against disease by flushing it away*. Another candidate responded as *phagocytes deals with eating hard substances and lymphocytes deals with eating soft substance*. Likewise, another candidate wrote *phagocytes are blood cells which carry pathogens and lymphocytes are blood cell which carries lymph*. These responses suggest that candidates had insufficient knowledge of the tested concept. Extract 8.2 is illustrative.

8.a Active immunity	Passive immunity
It is unborn immunity which acquired after birth	Refer to the immunity transferred from mother to child
b/v Phagocytes: This are blood cells which act as a source or defensive. When the pathogens enter in the body of an organism / human being it develop a mechanism to fight against such pathogens. The main function of this blood cell is to fight against pathogens and other microorganism which enter in the body.	
c Lymphocytes: This are blood cells whose its function is to control blood flowing or blood clotting when a person get wound. When a person get wound the cell is activated to travel to effected area where they develop mechanism of blood clotting to prevent	

Extract 8.2: A sample of the candidate's poor response in question 8

Extract 8.2 is a response from the candidate who wrote unclear explanation such as passive immunity is the one which is obtained in the body.

2.1.9 Question 9: Principles of Teaching and Learning Biology

This question required the candidates to outline four principles of teaching and learning Biology that teachers should follow for effective teaching and learning. The performance of the candidates is presented in Figure 9.

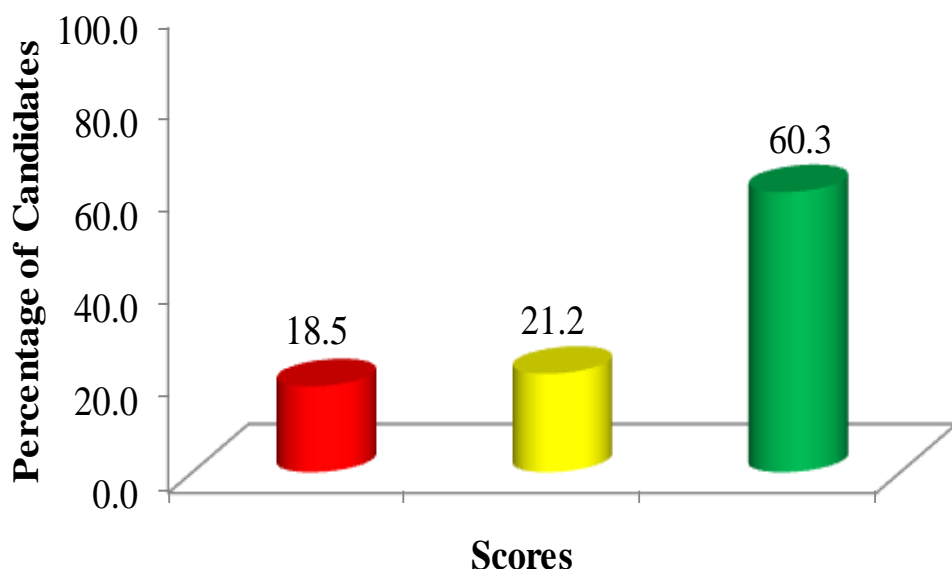


Figure 9: Distribution of the candidates' scores on question 9

Figure 9 shows that the general performance of candidates on this question was good because the majority of the candidates (81.5%) scored from 2 to 4 marks. Most of these candidates gave two to three correct responses. Good performance on this question indicates their adequate knowledge of the topic; the question was part of what they exercised during BTP. This enabled them to connect what they learnt in class and the actual practice in the field.

According to the marking guide, the candidates were required to respond to this question as teaching/learning environment should promote students participation in practical activities; it should promote teamwork (cooperative learning); it should take care of safety precautions, it should connect strongly with communities practices beyond classroom; and assessment of practical activities should be given a reasonable proportional weight as theoretical work. In answering this question one of the candidates wrote *teaching and learning of Biology should promote practical participation beyond classroom activities, should promote cooperative and team working, should enhance creativity and curiosity should ensure safety when working out in the environment*. Another candidate responded as *promotes team working or cooperation, helps to connect ideas with community or contextualization, promotes creativity, curiosity which promotes critical thinking and helps to take precautions during teaching and learning process*. The analysis of these responses

suggests that the candidates had an adequate knowledge of the tested concept. Extract 9.1 shows a sample of a correct response by one of the candidates.

9	Principles of teaching and learning Biology	
	i/ Teaching and learning in safe environment	
	ii/ Teaching and learning which encourage cooperation	
	iii/ Teaching and learning which encourage coop curiosity and a	
	iv/ Teaching and learning by doing, observation and experiments	

Extract 9.1: A sample of the candidate's good response in question 9

In Extract 9.1 the candidate was able to explain clearly the principles of teaching and learning Biology. He/she had adequate knowledge of the test concept.

Other candidates scored low marks (0 - 1.5). They wrote irrelevant responses indicating their lack of knowledge while others gave only one correct response. An example of irrelevant responses given by one of the candidates was; *timely assessment is needed for students, prior knowledge of the learner is important*. Another candidate wrote; *appropriate approach of learning should be employed and classroom work should be appropriate to the community*. Extract 9.2 exemplifies this situation further.

Q9. 2-	Inquiry principle	
	i. Observational principle	
	ii. Experimentation	
	iv- Reading	

Extract 9.2: A sample of the candidate's poor response in question 9

In extract 9.2, the candidate wrote irrelevant responses. This shows that he/she had insufficient knowledge of the tested concepts.

2.1.10 Question 10: Respiration

This question required the candidates to state four uses of energy released during respiration. The performance of the candidates on this question was good as 73.2 percent scored above 1.5 marks. Figure 10 illustrates the performance.

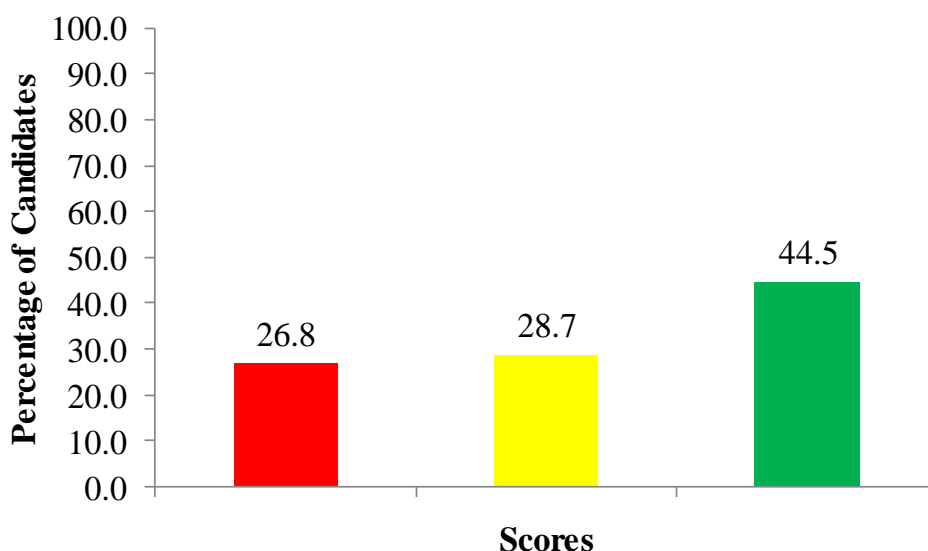


Figure 10: Distribution of the candidates' scores on question 10

Figure 10 shows that the general performance on this question was good because the majority of the candidates (73.2%) scored from 2 to 4 marks. In responding to this question one of the candidates wrote; *transportation of materials in the body, used in movement, used to keep heat in the body and used removal of waste products*. Another candidate wrote *used to control other metabolic activities, for transferring different materials from one part of the body to another, for breaking down food substances and for body movement*. The candidates who scored 2 or 3 marks gave two to three correct responses. Extract 10.1 is a sample of correct response.

10.		
10.	(i) Used for movement.	
	(ii) Energy released used for active transport.	
	(iii) Energy released used for secretion.	
	(iv) Energy release used for anabolic processes.	

Extract 10.1: A sample of the candidate's good response in question 10

Extract 10.1 shows that the candidate was able to explain clearly the function of energy released during respiration.

Besides, 26.8 percent of the candidates who scored low marks (0 -1.5) had either partial or no knowledge of the tested concept. Accordingly, they gave responses which do not reflect the requirement of the question. For example, one of the candidates explained why transfer of the energy in the ecosystem is not 100 percent instead of explaining the function of energy released during respiration. The candidate wrote *not all parts of the body are consumable parts; not all consumable organisms can produce energy; and another amount of energy is lost through air*. Another candidate wrote the stages of respiration such as *Kreb's cycle* and *glycolysis*. Extract 10.2 is a sample of incorrect responses by one of the candidates.

10.	uses of energy released during respiration.	
	(i). It is used to intermediate molecules	
	(ii). It is used during the formation pyruvic acid.	
	(iii). used the during formation of water by oxidation of hydrogen with oxygen. Eg $H_2 + O_2 \rightarrow H_2O$	
	(iv). It is used in electron transferring. ie Hydrogen and electron are passed in energy form.	

Extract 10.2: A sample of the candidate's poor response in question 10

In Extract 10.2 the candidate explained the use of energy stored in the body instead of functions of energy released during respiration.

2.2 SECTION B: ESSAY TYPE QUESTIONS

This section had three questions from academic topics each carrying 15 marks. The candidate was asked to choose any of the two questions. The performance of candidates on each question in this section is categorized as poor, if the candidates score from 0 to 5.5 marks; average if they score from 6 to 10; and good if they score from 10.5 to 15 marks.

2.2.1 Question 11: Reproduction

This question required the candidates to describe six artificial methods of birth control and their associated advantage and disadvantage. The performance of the candidates on this question is summarized in Figure 11.

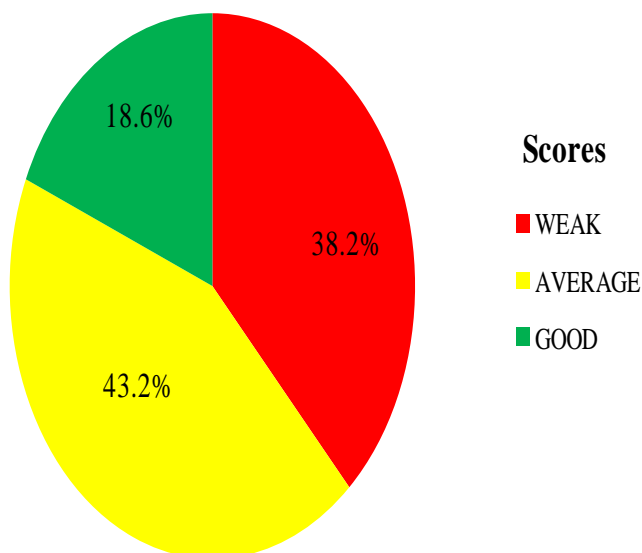


Figure 11: *Candidates' distribution of scores on question 11*

Figure 11 shows that the general performance on this question was average because 61.8 percent of the candidates passed by scoring from 6 to 14.5 marks. None of them scored full (15) marks. The candidates who scored higher marks in this question had sufficient knowledge of the tested concept. Most of the candidates gave some responses in line with marking guide. They wrote *oral contraceptives which have no interference with*

love but can cause thrombosis, nausea and water retention; injection contraceptives which is effective by 99% but may lead to irregular menstrual bleeding; implant contraceptives which is effective by 100% but can cause irregular menstrual bleeding; condoms which gives protection to STDs but reduce sensitivity during sex; intra-uterine devices which prevents implantation but may cause abnormal bleeding.

Specifically, one of the candidates wrote *a contraceptive pill which is easily accessible but can cause nausea, condoms which control STDs but reduces pleasure, surgery which is permanent but it is risk in operating it, use of implants which are very effective but may cause irregular bleeding.* Another candidate wrote *use of condoms which are easily accessible but can rapture during intercourse, oral contraceptives which are very simple to use but can cause irregular bleeding, injection which is very effective but can cause irregular bleeding, spermicide which is easily used but cannot be effective 100% and use of uterine device which is very effective but may cause irregular bleeding.* There were candidates who did not write the required points. Thus, they did not score the full marks. Extract 11.1 is a sample of correct responses by one of the candidates

11. **Injection.** This are the chemical which are entering the body through injected the body. This can prevent the occurrence of pregnancy until he or she stop to use that injection. The advantage of this it is simple method and it avoid the occurrence of pregnancy but the disadvantage is it can cause diseases or allergic reaction to the user. And if one frequently used it can cause infertility.

Diaphragm. This are the instrument introduced into the body of women so as it avoid the occurrence of pregnancy. The advantage of this it avoid pregnancy but disadvantage it can cause different disease to the user.

Surgery Method. This is the method which involves advanced and technological knowledge where by in a female some of the tube which used to transmit sperm are cut so as during sexual intercourse the sperm does not meet with an egg so the pregnancy does not occur. The advantage of this it avoid the occurrence of pregnancy but the disadvantage it can cause death due to the bleeding during surgery.

There are the artificially method of birth control has both advantage and disadvantage to the user. So if someone want to use he or she must follow the instruction from doctors.

Extract 11.1: A sample of the candidate's good response in question 11

In Extract 11.1 the candidate explained correctly the artificial methods of birth control including diaphragm and surgery.

Other candidates (38.2%) performed poorly in this question by scoring from 0 to 5.5 marks. The candidates gave unclear points which did not deserve full marks. The responses noted from the script of one of the

candidates include artificial methods of birth control include use of vaccines, putting implants in the fallopian tube and use of different medicines to prevent sex. Another candidate wrote pilling method and the use of syringe. These responses indicate their inadequate knowledge of the tested concept. Extract 11.2 is an additional sample of an incorrect response.

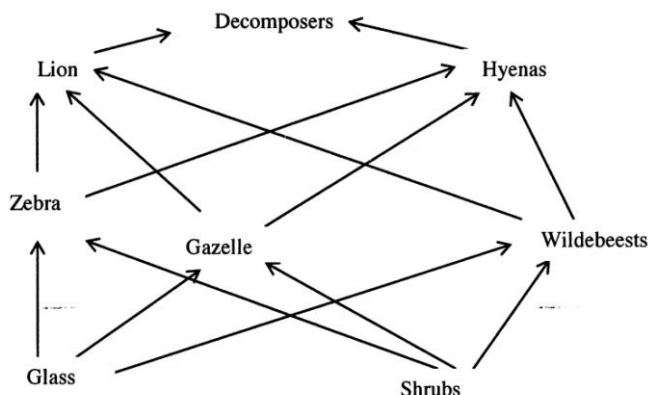
11	<p>To separate the male organism and female organism to live at different area. These method help the reduction of sexual intercourse that contribute to pregnancy. Example the one cow can live to the one room and another to another room. This method have advantage of reduction of continuous sexual intercourse but this methods tend to reduce the number of offspring.</p> <p>Releasing out the sperm during sexual intercourse. The sexual intercourse can be done but - during ejaculation the sperm can be released out not inside of the vagina. Advantage of this method help to increase interest to both male and female but its disadvantage this method can cause the pregnancy due to availability of first sperm to flow towards the vagina and can be fertilized.</p> <p>Avoiding of doing sexual intercourse - during the heat period. During this period was the time when the egg or ovum are released from the ovary. So in order to make the artificial method of birth control people should avoid to do sexual intercourse during this time. Advantage of this method help to planning the family but disadvantage this method cause the female to lack the protein from the sperm.</p> <p>Avoiding the rapping. This was the method when were avoided can reduce the birth control because when the raping increase tend to occurs the unpredictable pregnancy. Advantage of raping help to increase the number of offspring easily and its disadvantage the raping cause the spreading of the different diseases.</p>
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Extract 11.2: A sample of the candidate's poor response in question 11

In Extract 11.2 the candidate explained the natural methods of birth control such as using calendar and withdrawing instead of artificial methods.

2.2.2 Question 12: Ecology

This question had parts (a) and (b). Part (a) required the candidates to describe the process of energy flow in the ecosystem. Part (b), asked the candidates to construct food chains from the following food web.



The performance of the candidates on this question is presented in Figure 12

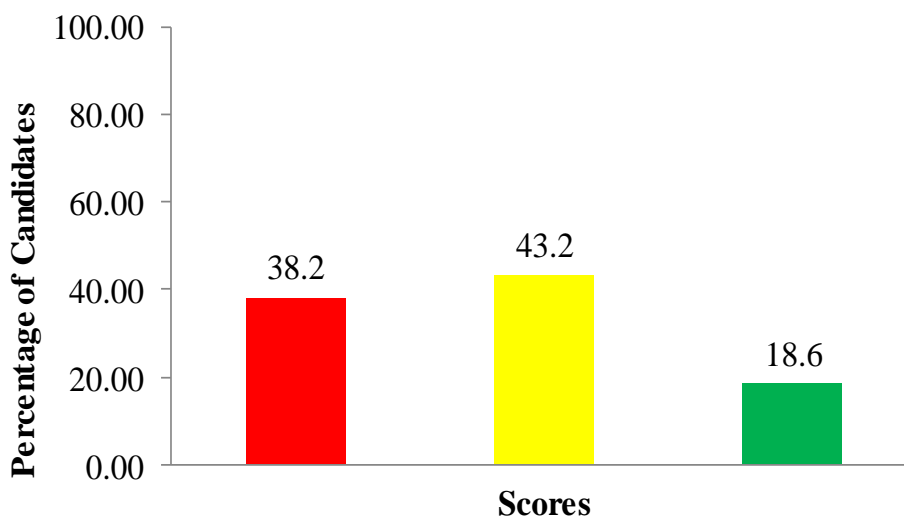


Figure 12: Distribution of candidates' scores on question 12

Considering Figure 12, the general performance on this question was good because the majority (91.6%) scored from 6 to 14 marks although none scored full (15) marks. These candidates provided correct responses to parts (a) and (b) of the question. They had adequate knowledge on the tested concept. For example, in part (a), one of the candidate described the process of energy flow in the ecosystem as follows *energy from the sun firstly reaches to primary producers, and then from primary producers*

which photosynthesize to produce food energy is transferred to secondary consumers, the chain continues until it reaches to decomposers. Another candidate expressed the process of energy flow from the sun to the top consumers pictorially and explained briefly the way energy passes from one stage to another.

In part (b), the candidates managed to construct five to seven food chains from the given food web. Most of the candidates scored good marks. They were aware that the food chain should start with producers and ends up with top consumers. Extract 12.1 shows a correct response to part (a) of the question.

12(a) The following is the way energy flow in an ecosystem. The energy flows from first Trophic level to the tertiary Trophic level and forth from the primary producers; these are the green plants that obtain food through photosynthesis. These are found on first Trophic level. They contain large amount of Energy.

The primary Consumers; This includes the group of Organisms that feed on primary producers they are called Herbivores. eg. Goats, Cows, Antelopes

The Secondary Consumers This includes all organism that feed on primary consumers that are called Carnivores. For example lions, leopard and hyena

The tertiary Consumers are feeding on both primary and secondary Consumers. They are called omnivores for example Human.

The Quaternary Consumers are called Decomposers; These are all Bacteria and other Saprophytes that decompose on dead Organisms for example Bacteria

In all Trophic levels from first to forth Energy tend to decrease from low trophic level to higher since it is lost through Evaporation,

Extract 12.1: A sample of the candidate's good response in question 12 (a)

In Extract 12.1 the candidate explained correctly the process of energy flow in ecosystem in part (a) of the question.

Furthermore, 8.4 percent of the candidates who scored low marks (0 - 5.5) most of them failed to describe the process of energy flow and to construct correct chains. They were not aware that the food chain should start with producers to consumers. Some managed to construct one to five food chains. Extract 12.2 shows incorrect response from one of the candidates.

12	The energy flow of ecosystem can be described as follow	
	Ecosystem is a natural unit which composed of biotic factor and Abiotic factor. Where biotic factor is a living part in an ecosystem and Abiotic factor is a non living part of an ecosystem. Biotic factor depend on Abiotic factor, produce Light which supposed support Abiotic factor to take place as	
	Biotic Factor also can depend of sunlight to as to get energy, and this energy can be used for different	
	REASON	

Extract 12.2: A sample of the candidate's poor response in question 12 (a)

In Extract 12.2 the candidate described abiotic and abiotic factors of ecosystem in relation to sunlight energy instead of flow of energy in ecosystem.

2.2.3 Question 13: Classification

This question required the candidates to use a diagram in describing the life cycle of a moss plant. The performance of candidates on this question is summarized in Figure 13.

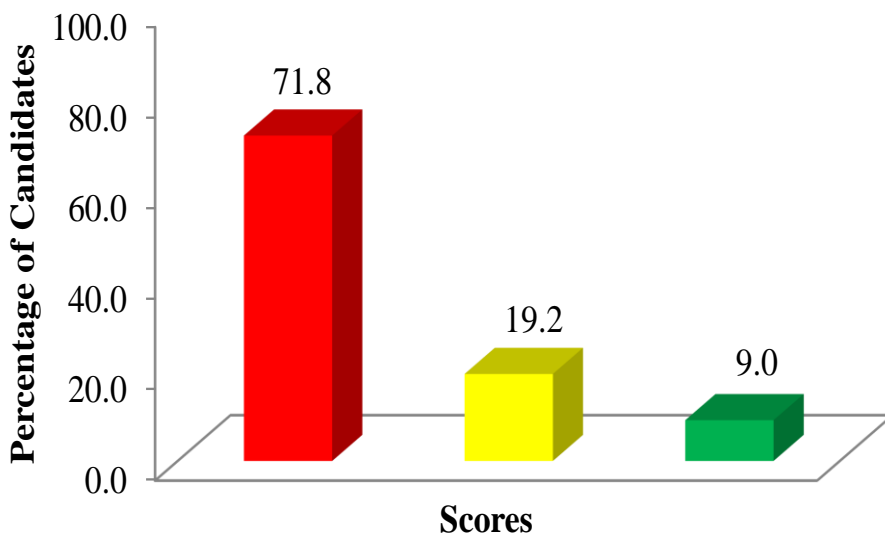
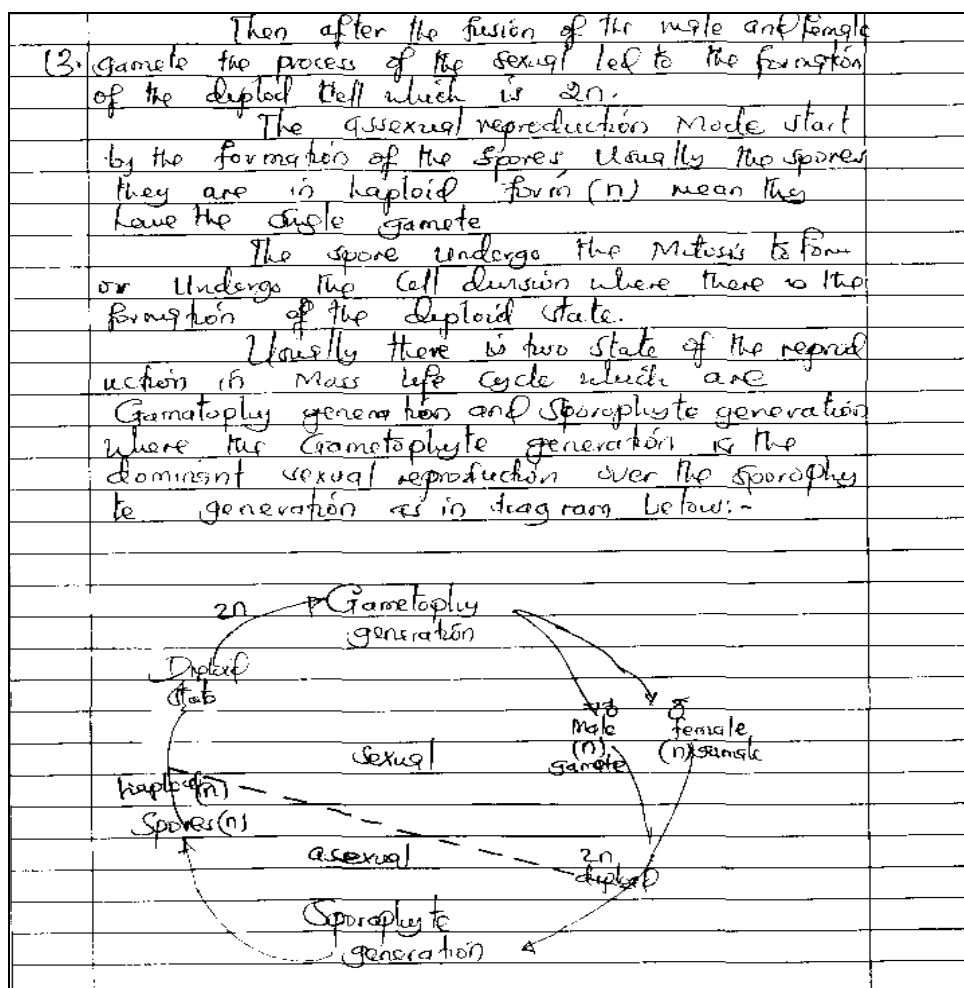


Figure 13: Distribution of candidates' scores in question 13

Figure 13 portrays the candidates' good performance since the majority (71.8%) scored above 5.5 marks. The candidates who provided correct description included all or some of the following concepts in their responses: *moss shows a life cycle which alternate between gametophyte and sporophyte generations; they are the first plants to colonize the land; gametophyte generation which has leafy shoots bear separate male and female gametangia termed antheridia and archegonia; the antheridium produces flagellated sperms which swim through external water to an archegonia which consists one egg; the sperm fuses with an egg to form an zygote which develops within the archegonium and become a mature sporophyte, the mature sporophyte growing on the gametophyte shoots develops where meiosis occurs and spores are produced, when the covering and capsule fall off, the spores are mature and ready to escape, released spores are dispersed by air current, upon landing on the appropriate site the spores germinate into protonema which is the first stage of gametophyte.*

Some of the correct responses given by one of the candidates are *moss plant reproduce themselves in a sexual mode, moss plant is found in moist places and moss plant produces spores which prefer water to swim for fertilization* Another candidate wrote *moss has both male and female reproductive organs, moss plants undergoes alternation of generation, diploid sporophyte develop spore and haploid gametophyte fuse to form*

zygote. These responses suggest that the candidates were knowledgeable about the tested concept. Extract 13.1 shows another correct response from one of the candidates.



Extract 13.1: A sample of the candidate's good response in question 13

In Extract 13.1 the candidate managed to draw a cycle and show some important stage.

Despite the good performance on this question, 28.2 percent of the candidates scored below the pass mark (0 – 5.5). These candidates had either little or no knowledge of the tested concept. Some wrote few correct points and others skipped the question. Some candidates drew the structure of a moss plant instead of its life cycle. Others described the life cycle

without considering the stages. They thus lost most marks. Extract 13.1 is an example of such responses.

13.	
A diagram of a moss plant.	
A life cycle of a moss plant.	
(i) A moss plant, mostly found in moist area together with aquatic areas.	
(ii) A moss plant undergoes spore format ion.	
(iii) spores formation occurs where it becom es a dry season, and already are xual reproduction take place, it reapture the seeds through cut the capsule, re ady to make generation of another cycle.	
(iv) During spores formation occurred, the	

Extract 13.1: A sample of the candidate's poor response in question 13

In Extract 13.1 the candidate did not understand where the life cycle starts and ends.

2.3 SECTION C: ESSAY TYPE QUESTIONS

This section had three questions from pedagogy topics, each carrying 15 marks.

2.3.1 Question 14: Biology Curriculum Materials

The question required the candidates to describe seven qualities of a well prepared Biology syllabus. The performance of candidates in this question was good since 97 percent of candidates passed by scoring from 6 to 15 marks. Figure 14.summarizes the performance.

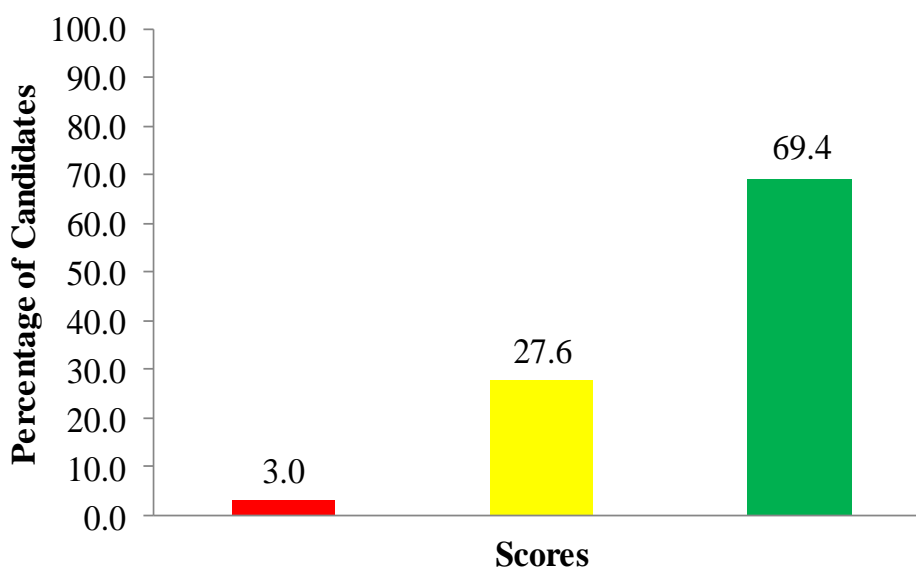


Figure 14: Distribution of candidates' scores on question 14

Considering Figure 14, 97 percent of the candidates passed by scoring from 6.0 to 15. These candidates described four to seven qualities of a well prepared Biology syllabus. The good performance was influenced by the candidates' adequate knowledge of the topic. This is because the Biology syllabus is one of the main documents that, apart from learning it during classroom sessions they use it during their field training. Some correct responses given by one of the candidates were *objectives of the content should be well addressed, it should indicate teaching and learning strategies, it should indicate time frame for meeting pre-planned objectives, it should suggest teaching and learning materials and aids and should have good mechanical make up*. Another candidate wrote *a well prepared Biology syllabus should show competences to be met by students, should consider the level of the learners, should show suggested teaching*

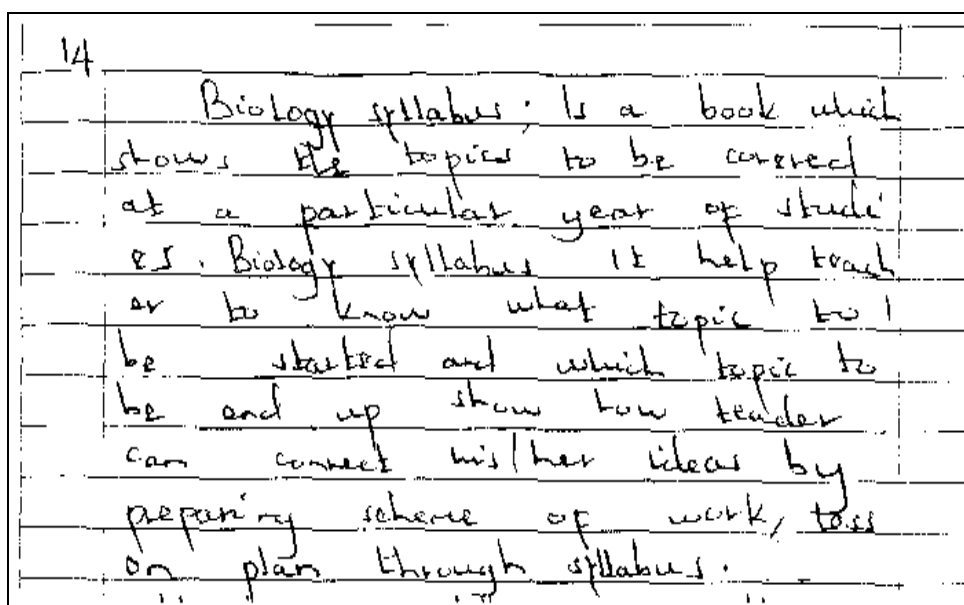
and learning materials, should show both teaching and learning activities, should be well organized in terms of different aspects and should suggest teaching and learning resources for meeting pre planned objectives. Extract 14.1 is a correct response by another candidate.

14.	<p>Syllabus, is a document which shows outline of topics, sub-topics, instructional objectives and teaching strategies to be employed during teaching and learning process as instructed in the Curriculum to meet the goals intended. The following are seven qualities of a well prepared biology syllabus.</p> <p>It should have enough set suggested teaching and learning resources. This will help teacher and students to teach effectively and well understood of the lesson during presentation. for example It should have model materials relevant to the lesson.</p> <p>It should have suggested teaching and learning strategies, techniques and tactics are more essential as when employed during the process of teaching and learning. for example group discussion makes active involvement in the lesson.</p> <p>It should have competencies which will implement the Curriculum goals; this is due to preparation of materials and topics, sub-topics which are manageable in a specific period of time.</p> <p>Instructional objectives should be manageable into the specified period of time as related to be achieved within a located time, so this help a teacher to regulate his or her speed in accordance of his or her students.</p>
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Extract 14.1: A sample of the candidate's good response in question 14

In Extract 14.1 the candidate correctly described the features of a well prepared Biology syllabus.

Similarly, 3 percent of the candidates showed poor performance by scoring from 0 to 5.5 marks. These candidates either lacked enough knowledge or had partial knowledge of the tested concept. Almost all their responses were incorrect. For example, one of the candidates wrote *a well prepared Biology syllabus should contain all things to be taught, should contain alternative ways, it should be big enough*. Another candidate explained as: *it should make a teacher competent, should build teacher confidence and should make active teaching*. These responses show that these candidates were describing the syllabus as a tool to make a teacher well equipped in teaching instead of explaining the features of a good syllabus. Extract 14.2 is another response from the candidate with insufficient knowledge of the tested concept.



Extract 14.2: A sample of the candidate's poor response in question 14

Extract 14.2 is a response from the candidate who gave incorrect explanation on the qualities of a well prepared Biology syllabus.

2.3.2 Question 15: Laboratory Management and Maintenance

The question required the candidates to explain in seven points what can happen once somebody fails to abide by the laboratory rules. The performance of candidates was good since 97.2 percent scored marks

ranging from 6 to 15 marks. The summary of the candidates' performance on this question is presented in Figure 15.

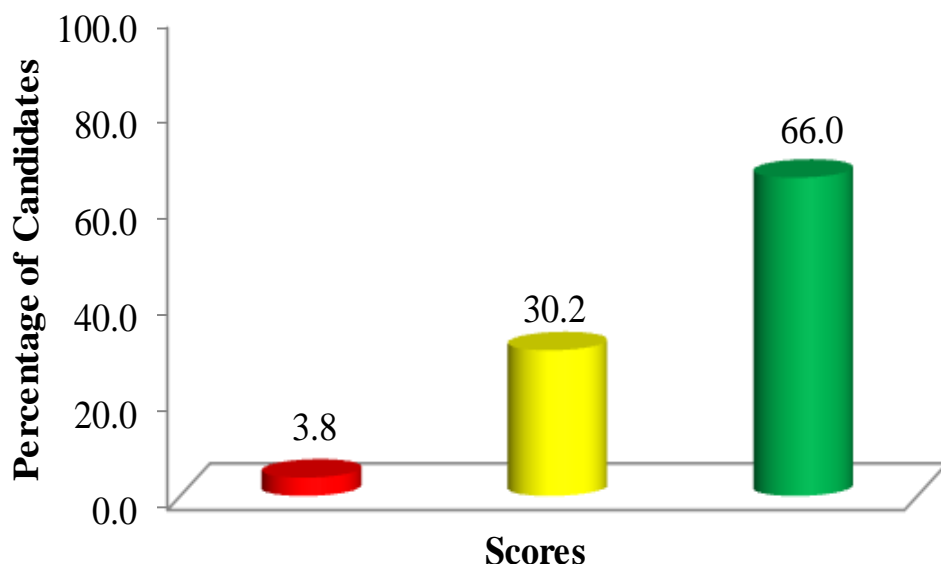


Figure 15: Distribution of candidates' scores in question 15

Figure 15 shows that, the majority of candidates (96.2%) scored higher (6 - 15) marks. This indicates that the candidates had adequate knowledge of the concept of laboratory rules which they gained not only from the college but also from secondary education.

Most of the candidates responded correctly by writing the following points: *running around laboratory may lead to falling and blockage of equipment, eating and drinking in the laboratory may cause contamination of toxins on what we eat; touching hot objects with bare hands may cause burning of one's hand, failure to clean laboratory apparatus will cause somebody to get wrong findings, failure to abide on instructions given by laboratory assistance will lead to detrimental effects, failure to read instructions on chemical use may cause health challenges among others.* For example, one of the candidates responded to this question as *breakage of apparatus may happen once somebody touches or uses laboratory facilities without permission, if somebody fails to read instructions on how to use a certain chemical may end up getting burning effects, destruction of facilities and equipment may happen once somebody is running in the laboratory room and use of un-cleaned apparatus may result to wrong findings.* Another candidate explained that *failure to switch of electrical appliances in the laboratory may cause fire outbreak moving around the*

laboratory may cause destruction of apparatus, entering the laboratory while fume chamber is open may cause health effects, quarrels in the laboratory may cause destruction of laboratory facilities. These responses suggest that the candidates had adequate knowledge of the topic. Extract 15.1 is a response by a candidate with sufficient knowledge of the tested concept.

15	It will lead to the falling down in the laboratory if one fails to abide the laboratory rules. One of the laboratory rules is that don't run in the laboratory so if one is running in the laboratory can fall down and cause injury.	
	It can cause fire outbreak in the laboratory, one of the laboratory rules is don't smoke in the laboratory so if one enters with a cigarette can cause the fire in the laboratory.	
	Burning from chemicals, one of the laboratory rules is wear gloves when conducting the experiment so if one fail to abide this rule conducting the experiment with free hands then hands can burn from the open chemicals like concentrated sulphuric acid (H_2SO_4).	
	Swallowing of chemicals, if one fails to abide to the laboratory rules which says that don't drink anything in the laboratory and one drinks in the laboratory can lead to the swallowing of chemicals like sodium hydroxide ($NaOH$) which can lead to death of the person who has swallowed the chemicals.	

Extract 15.1: A sample of the candidate's good response in question 15

In Extract 15.1 the candidate explained correctly what will happen once laboratory rules are not abided.

Contrarily, 3.8 percent of candidates scored from 0 to 5.5 marks indicating poor performance. Most of these candidates gave responses which do not relate to the question while others gave points which lacked explanation. Hence, they did not get full marks. For example, one of the candidates wrote that failure to follow the laboratory rules can cause *death, diseases,*

vision problem, loss of body parts. Another candidate wrote *can cause heart problem, can cause spoil of chemicals can cause to fall down*. These responses suggest that these candidates did not understand the demand of the question. Instead of explaining different laboratory rules and their effects upon violation, they generally explained the effects of violating laboratory rules. Extract 15.2 a sample response.

15.	<p>Laboratory is the special room in which experiment or scientific experiment are conducted; Laboratory rules are those principles to be followed when people or learners want to conduct experiment or learning in the laboratory. The laboratory rules should be abide to follow so as due the following reasons:</p> <p>Misconceptions of data: When students or teacher fails to abide to the laboratory rules may lead to collect long data in his or her experiment. Example Using Unlabelled bottle chemicals.</p> <p>Occurrence of accidents: This is an immediately event which occurs without depending so if teacher or student fails to abide to the laboratory rules accidents may happen. Example fail in following the rules of Never Add Water into acids this will cause first explosion.</p> <p>Correction of Wrong Information or data: When students or teacher fails to abide to the laboratory rules may correct wrong information.</p> <p>Costs: The costs may happen when - teacher fails to arrange well laboratory apparatus or labelling chemicals in which students may pass-through and break apparatus; that This will consume money to recover.</p> <p>Difficulties to reach in conclusion: Teacher and students together fails to reach in conclusion of certain experiment when they fails to follow some laboratory rules. Example Throwing of gaseous in the laboratory especially in preparation of Nitrogen gas.</p>
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Extract 15.2: A sample of the candidate's poor response in question 15

In Extract 15.2 the candidate gave irrelevant explanation on what will happen once laboratory rules are not followed. That explanation include as misconception of data and costs.

2.3.3 Question 16: Teaching

This question required the candidates to explain six reasons why it is advised to improvise teaching and learning aids and materials in the teaching and learning process. A summary of candidates' performance on this question is presented in Figure 16.

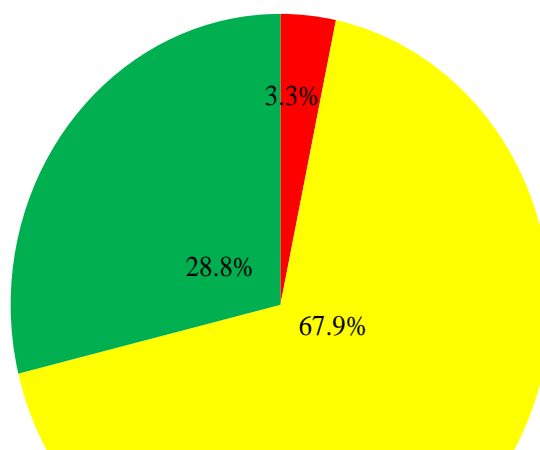


Figure 16: Distribution of the candidates' scores

The general performance on this question was good because majority of the candidates (96.7%) scored from 6 to 13.5 marks although none scored full marks. The performance on this question was influenced by the candidates' adequate knowledge of the topic which was enhanced by the fact that, before going for practical training, student teachers do prepare and improvise teaching and learning aids that are to be used during practical training (BTP). This enabled the candidates to connect between what they learnt while in class sessions and what actually happens in the field. Most of the candidates who responded to this question gave correct responses such as *it enable teachers and leaners to make effective use of the environment, it reduces costs; development of material can lead to discovery of new knowledge; it helps to bridge the gap between theory and practical, students talents can be discovered; improves school-community relationship when parents and other community members are involved in improvisation among others*. For example one of the candidates wrote *Improvisation of teaching and learning aid enhances creativity, enhances memory, it reduces costs, it arouses interest in learning, enhances proper utilization of natural resources*. Another one wrote; *it enhances creativity, it attracts learners' attention, improvisation helps in exploration of local*

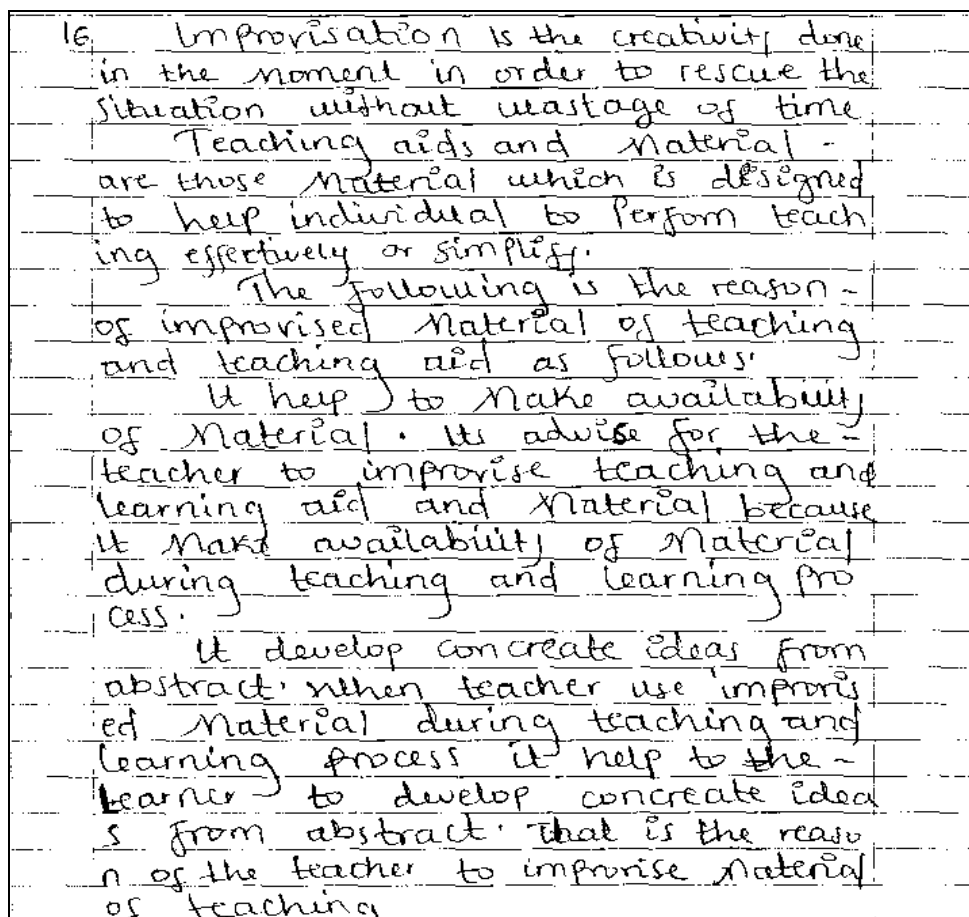
environment, and it helps in the reduction of costs. Moreover, another candidate explained follows it promotes creativity, reduces costs ensures availability of material, promotes high thinking among students, encourages optimum use of natural environment, and improves the process of teaching and learning. These responses indicate that the candidates had a clear understanding of the question demand and good English language command. Extract 16.1 is a sample of correct response.

16	<p>It help the student to remember content of presentation. The improvised Material in Teaching and - learning it help the teacher to Make the student to remember - content of presentation Example Pictures, models, Map without the - student to cream</p> <p>It Motivate and rise the - interest of the learner. Its advise when the teacher teach in order to - Make the teaching to go smoothly his ther can be advised to improvise Material because it Motivate and rise interest of the learner</p> <p>It help to avoid unnecessary - cost. When the teacher teach his lesson its advice to improvise - teaching aids and Material in - order to avoid buying of Materi als during preparation of lesson.</p> <p>improvised Material it is safe to be used to the learner. Also - improvisation of Material its very important because is the one of the Material which is safe to the lea rner during teaching and learning process</p> <p>It help to make teaching and learning more practically than theo ry. Also improvisation is important when you prepare the lesson because</p>
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Extract 16.1: A sample of the candidate's good response in question 16

In Extract 16.1 the candidate managed to explain the importance of improvising teaching and learning aids such as avoiding unnecessary cost.

On the other hand, 3.3 percent of the candidates who scored below the pass marks (0 – 5.5) showed either low or lack of knowledge of the tested concept. Thus, the candidates gave unclear responses in all or most of the points. For example, one candidate wrote *it maintains retention, it helps in relationship and it replaces the role of the teacher*. Another candidate wrote; *it is used to introduce the lesson, it help to cover large area and it discourage learning of art subjects*. Extract 16.2 is an additional example.



Extract 16.2. A sample of the candidate's poor response in question 16

In Extract 16.2 the candidate who failed to explain the importance of improvising teaching and learning aids.

3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE ON EACH TOPIC

The analysis of the candidates' performance on different topics indicates that 8 out of 12 topics which were tested in Biology Paper 1. Candidates demonstrated good performance *Planning and Preparation for Teaching* (98.2%), *Assessment in Biology* (94.7%), *Ecology* (91.6%), *Analysis of O`-Level Biology Curriculum Materials* (90.6%), *Fundamentals of Teaching and Learning Biology* (81.5%) and *Respiration* (73.2%). They demonstrated average performance on *Biochemistry* (69.7%), *Genetics* (67.2%), *Reproduction* (61.8%), *Biology Laboratory Skills* (60.7%) and *Body Health and Immunity* (43%). They demonstrated poor performance on *Classification of Living Things* (15.6%).

Appendix 1 summarizes the candidates' performance on different topics in the 2019 Biology examination.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

The statistics in this report showed that the performance of the candidates on the 2019 Biology DSEE was generally good, as 96.81 percent passed the examination. The analysis of the candidates' response also showed that the performance results from factors such as the candidates' good competence in most topics and their mastery of the English language, which helped them to express their responses clearly.

Beside the good performance, the analysis showed that 3.19 percent of the candidates scored below the pass mark. The majority of these either provided fewer responses than the required ones or lacked details that could have awarded them full marks.

Factors thought to have contributed to the candidates' poor performance include the following:

- (a) The candidates' lack of competencies in some Biology topics such as the *Classification of Living Things* in the DSEE syllabus made them to write fewer points than required or provided incorrect responses. This might be due to:

- (i) failure of some teachers to teach practically or through demonstration for candidates' clear understanding;
 - (ii) students' poor concentration in revising, leading to their failure to internalise the subject matter;
 - (iii) lack of students' self-evaluation through quizzes, tests and examinations to enable them to do self-rectification in the areas which they have learning weaknesses; and
 - (iv) the tendency of some students to memorize, instead of comprehending the subject matter.
- (b) failure of the candidates to read the questions carefully to understand their demand before attempting them.
 - (c) poor English grammar causing some candidates to write unclear sentences.

4.2 RECOMMENDATIONS

Considering the candidates' performance, the following recommendations are put forward:

- (a) In order to ensure that candidates acquire enough competencies to pass the examination, the following should be done:
 - (i) candidates need to do a good number of peer study/review, quizzes, homework and school examinations in order to master the subject contents.
 - (ii) teachers should ensure that they use various specimens when teaching the topic of *Classification of Living Things in* order to enhance students' understanding.
 - (iii) candidates should devote more time to their studies to be able to internalize the subject content.
- (b) candidates need to read questions between the lines to ensure that they clearly understand the requirement of each question before attempting them.
- (c) candidates should read novels and exercise speaking English in order to develop skills to express themselves in the English language.

The Candidates' Performance in 733 Biology DSEE in 2019 by Topic

S/N	Topics	Question number	%age pass		Remarks
			Percentage of Candidates who Scored an Average of 40 Percent or Above	Average	
1.	Planning and Preparation for Teaching	2	99.6	98.2	Good
		16	96.7		
2.	Assessment in Biology	7	94.7	94.7	Good
3.	Ecology	12	91.6	91.6	Good
4.	Analysis of O`-Level Biology Curriculum Materials	5	84.8	90.9	Good
		14	97		
5.	Fundamentals of Teaching and Learning Biology	9	81.5	81.5	Good
6.	Respiration	10	73.2	73.2	Good
7.	Biochemistry	6	69.7	69.7	Average
8.	Genetics	4	67.2	67.2	Average
9.	Reproduction	11	61.8	61.8	Average
10.	Biology Laboratory Skills	3	25.1	60.7	Average
		15	96.2		
11.	Body Health and Immunity	8	43	43	Average
12.	Classification of Living Things	1	2.9	15.6	Poor
		13	28.2		

