ASSESSMENT OF PSYCHOMETRIC PROPERTIES OF 2018 MATHEMATICS BASIC EDUCATION CERTIFICATE EXAMINATION (BECE) IN FUNTUA EDUCATION ZONE, KATSINA STATE, NIGERIA

BY

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES THROUGH THE DEPARTMENT OF EDUCATION, BAYERO UNIVERSITY KANO IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF EDUCATION IN TESTS AND MEASUREMENT.

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AUGUST, 2019

DECLARATION

I Ibrahim Muhammad Ado SPS/15/MED/00008 hereby declared that this work is the product of my research efforts undertaken under the supervision of Prof. Kabiru Isyaku has not been presented anywhere for the award of degree or any certificate and all sources have been duly acknowledged.

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CERTIFICATION

This is to certify that the research work for this dissertation written by Ibrahim Muhammad Ado, was carried out under my supervision

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APPROVAL PAGE

This dissertation titled "Assessment of Psychometric Properties of 2018 Mathematics Basic Education Certificate Examination (BECE) In Funtua Education Zone, Katsina State" has been examined for the award of Master of Education Degree in Tests and Measurement.

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DEDICATION

This research work is dedicated to my parents Ibrahim Ado and Zulaihat Ibrahim for their patience, support and empathetic compromise. May Allah (SWT) reward them abundantly. Aameen.

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Operational Definition of Terms

Basic Education Certificate Examination (BECE):- is a mandatory examination designed by Education Resource Centre (ERC) and administered by Katsina State Ministry of Education for assessing and placing JSS III candidates to SS I.

Distractors: - are incorrect/wrong answers in a multiple-choice test items developed by Basic Education Certificate Examinations.

Education Resource Centre (ERC):- is a professional body responsible for designing BECE items in Katsina State.

Internal consistency reliability: - is a procedure that concerned with how items in Basic Education Certificate Examinations are consistent among themselves and with the test as a whole.

Item difficulty: - is the percentage of the person who answered an item correctly in Basic Education Certificate Examinations

Item discrimination: - is the ability of Basic Education Certificate Examinations items to discriminate among people having different amounts of construct being measured.

Psychometric properties: - are characteristics of test that describe attributes of a test and its appropriateness for use in a particular situation.

ABSTRACT

The study assessed the psychometric properties of 2018 Mathematics Basic Education Certificate Examination (BECE) in Funtua Education Zone, Katsina State. The study determined the reliability coefficient of internal consistency, item statistics, discrimination power and distractor effectiveness of the 2018 Mathematics Basic Education Certificate Examination (BECE). Four objectives and corresponding research questions were formulated for the study. The design for the study was Ex-post facto. The population of the study was 13742 all JSS III candidates who sat 2018 Mathematics Basic Education Certificate Examination (BECE). A sample of 378 candidates was drawn through multi stage cluster sampling procedure. The instrument for the study was responses of candidates in 2018 Mathematics Basic Education Certificate Examination (BECE) multiple choice items. Four research questions guided the study and were answered using Excel, descriptive statistics of SPSS and ITEMAN 4.3 software. The major findings indicated that the overall internal consistency reliability coefficient of the test as measured by the KR-20 was 0.93 which indicates high and an excellent reliability for the BECE 2018 Mathematics examination. The difficulty index showed that all the items have difficulty index that ranged between 0.13 to 0.80 which shows that their difficulties are moderate for all items. The item discrimination indices of all items ranges between -0.17 to 0.74 which indicated that 36 equivalent to (60%) of the items functions very well and differentiate between students of higher and lower abilities. On the distractor effectiveness, the findings also indicated that 176 out of 180 distractors which is equivalent to (97%) on the 2018 Mathematics Basic Education Certificate Examination (BECE) were effective and functioned properly. It was also concluded that, the test items of 2018 Mathematics Basic Education Certificate Examination were reliable and have discriminated between high ability and low ability students. It was recommended among others that the test was reliable and therefore should be used by teachers and other personnel to assess junior secondary school III students as well as to prepare them for internal and external examinations.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Test is one of the techniques for measuring teaching/learning outcomes. Test is an arranged situation comprising a set of questions which a student is expected to respond to, on which his performance is quantified. Test items are indispensable tools in the evaluation of students' achievement at school. Yoloye (2001) stated that, responses to test and other measuring instruments enable the examiner to assign numeral or set of numerals to the testee from which inferences could be made about testees' performance on whatever the test is supposed to measure. These tests could be achievement test, intelligence test, aptitude test and/or personality test. Each of these tests possesses some characteristics known as psychometric properties.

Psychometric properties are characteristics of tests and other measures that identify and describe attributes of an instrument as well as its appropriateness for use in particular situations. It also provides information about a tests appropriateness, meaningfulness and usefulness or validity. The test's psychometric properties provide test takers and users with evidence of whether the test performs as portrayed.

Psychometric properties are not statistics, but they are generally represented by a quantitative value. These values are often calculated using statistical procedures. For example, consider more carefully the notion of reliability which refers to the consistency of measurement. Reliability indicates whether one would obtain consistent information if one applied a testing procedure to a population of individuals or groups on repeated occasions. The idea of how consistently a test operates across several administrations is a psychometric property of a test. Statistics are used to

calculate values that permit statement about the psychometric property but do not represent the psychometric property.

It is important to investigate and learn about a test's psychometric properties for two or more reasons. First, this information is necessary for sound test construction. Professionals and other teachers who develop tests need to evaluate and describe how that test functions so that it can be built to a specified level of quality. This is in line with Osterlind (2006) who said "An evaluation of the psychometric properties of an instrument allows teachers, psychologist, psychometricians and other persons to use the instrument with confidence that it will provide reliable, valid and meaningful information that can be used in making decisions". Secondly, knowing or having the knowledge about the psychometric properties of a test provides evidence that information obtained from the instrument can provide a sound basis for decision making. With the above highlight, we can conclude that without knowing how well a test functions, interpretations are suspect.

The common psychometric properties of a test are item statistics and test statistics. Item statistics includes item difficulty, item discrimination and distractor effectiveness, whereas test statistics are reliability and validity. Each of these characteristics constitutes psychometric property. These tests could be either standardized achievement tests or teacher made tests. Specifically, this study investigated psychometric properties of Basic Education Certificate Examination (BECE) which is an example of standardized achievement test.

Basic Education Certificate Examination (BECE) is a mandatory examination designed by Education Resource Centre (ERC) Katsina and administered by Ministry of Education for students in the ninth year of their basic education class or third year of the Junior Secondary School in Katsina State. For any students who intend to continue their Senior Secondary School education in the state, such student must sit

for Basic Education Certificate Examination (BECE). The Basic Education Certificate Examination (BECE) is structured into two major parts for all subjects. The first is test of objective items or multiple-choice items, a typical multiple choice item consists of a question, referred to as the stem, and a set of two or more options that consist of possible answers to the question. The student's task is to select one option that provides the best answer to the question posed. The best answer is referred to as the keyed option and the remaining options are called distractors. The candidates are expected to shade with pencil the appropriate answer in the answer booklet as it relates to the items. The second part is the theory segment, this segment contains items that students are expected to provide answers for but do not contain any answer options.

Twenty five (25) subjects' tests are administered at the Basic Education Certificate Examination (BECE) level including Mathematics as a compulsory subject. A candidate is expected to sit for a minimum of seven (7) and maximum of ten (10) subjects including Mathematics, a candidate is deemed to have passed the BECE if he/she passes six (6) subjects including Mathematics. Any candidate that failed to pass Mathematics has automatically failed the BECE and must retake it again next year. This is in line with Kolawale (2007) who asserts that, "In Nigeria, attention has been focus on the teaching and learning of Mathematics, as a way of improving students' academic achievement in subject at all levels of Nigeria Education system". As a direct consequence of this, the Federal Government of Nigeria paid a particular attention to Mathematics and made it a compulsory subject at both primary and secondary education in Nigeria, as specified in the National policy on Education (NPE, 2013).

Specifically, the psychometric properties assessed by this study were reliability which refers to the consistency of measurement, item difficulty which is the amount of

candidates who answered an item correctly, item discrimination which is the ability to discriminate among candidates having differing amounts of constructs being measured and distractor effectiveness which is the likelihood that the correct answer could be chosen by guessing.

1.2 Statement of the Problem

The purpose of this study was assessment of psychometric properties of 2018 Mathematics Basic Education Certificate Examination (BECE). Katsina State government introduced a preparatory examination designed by Educational Resource Centre (ERC) and administered by the Ministry of Education to JSS III students commonly known as Basic Education Certificate Examination (BECE) in order to determine those who are qualified to be promoted to SS I.

Students are expected to study Mathematics as a subject in Junior Secondary School for three (3) years before they could be assessed with Mathematics Basic Education Certificate Examination (BECE) administered by Education Resource Centre (ERC).

It is a well-known fact that before students are promoted to SS I, they must have scored credit in Mathematics Basic Education Certificate Examination (BECE). Students have experienced poor performance especially in mathematics which result to re-sit or repeating of JSS III. These form the basis for this study by assessing the psychometric properties of test and items generated by Education Resource Centre (ERC). This study introduced to the ERC and other teachers generating BECE items the knowledge and idea about psychometric properties of test and items generated.

In Katsina State, whoever fails Mathematics in Basic Education Certificate Examination (BECE) took a re-sit. If he/she failed or refused to re-sit had to return to the JSS III classroom because it had become a yardstick for promotion of students

from JSS III to SS I. Therefore, there is the need to assess the psychometric properties of this Basic Education Certificate Examination (BECE) to describe how it was functioned and to provide evidence that information obtained from BECE provides sound basis for decision making especially promoting students from JSS III to SS I by Education Resource Centre (ERC) Katsina.

Therefore, this study assessed the psychometric properties of 2018 Mathematics Basic Education Certificate Examination (BECE) in Funtua Education Zone, Katsina State. Through these psychometric analyses, the items with good discrimination indices, moderate difficulty, distracter effectiveness and the reliability of the test was ascertained. A thorough study of these process in which the test items developed by Education Resource Centre as well as their psychometric properties may suggest ways of improving items generated and student' achievement in Mathematics.

1.3 Objectives of the Study

The main aim of this study was assessment of psychometric properties of 2018 Mathematics Basic Education Certificate Examination (BECE). Specifically the study determined;

1. The reliability coefficient (Estimate of Internal Consistency) of the test items of 2018 Mathematics Basic Education Certificate Examination (BECE).
2. The item difficulty (Difficulty Index) of 2018 Mathematics Basic Education Certificate Examination (BECE).
3. The discrimination power of 2018 Mathematics Basic Education Certificate Examination (BECE).
4. Ascertain the distracter effectiveness of the 2018 Mathematics Basic Education Certificate Examination (BECE).

1.4 Research Questions

The following research questions guided this study;

1. What is the reliability coefficient (Estimate of Internal Consistency) of the 2018 Mathematics Basic Education Certificate Examination (BECE)?
2. What is the item difficulty (difficulty index) of 2018 Mathematics Basic Education Certificate Examination (BECE)?
3. What is the discrimination power of the test items used by Education Resource Centre (ERC) in 2018 Mathematics Basic Education Certificate Examination (BECE)?
4. What is the effectiveness of the distractors of 2018 Mathematics Basic Education Certificate Examination (BECE)?

1.5 Significance of the Study

The beneficiary of this study comprises Educational Resource Centre (ERC), Zonal Education Quality Assurance Coordinators, Principals, Teachers, Parents and Students. Therefore, psychometric properties of 2018 Mathematics Basic Education Certificate Examination (BECE) would be a powerful technique to stakeholders and can be used to plan and improve the quality of education in general.

The study also could stands as a greater benefit to all stakeholders in education such as Educational Resource Centre (ERC), Zonal Education Quality Assurance Coordinators, Principals, Teachers, Parents and Students in completing their efforts for making education better in the state.

The study also provides the basic ideas and knowledge of psychometric properties to Education Resource Centre (ERC) and teachers, having this knowledge helped them in generating test items with good psychometric standard.

Secondary school teachers in the Zone benefited from this study in improving students' performance especially in Mathematics Basic Education Certificate Examination (BECE) and other external examination like West African Examinations Council (WAEC), National Examination Council (NECO), National Business and Technical Examinations Board (NABTEB) and Joint Admissions and Matriculation Board (JAMB) also benefits from the study and enable them to improve their classroom practices and in the selection of test items. The study also provides Mathematics teachers with some meaningful and useful information of efficient class discussion of the test result, the general improvement of classroom instruction, evaluation in teaching learning process, and improvement in test construction.

Parents also have an insight into the performance of their children, having this knowledge may encourage some of them to complement teachers' efforts in molding the right type of behaviour by encouraging their children to work hard through extra lesson for better results.

This study gave the trainers basic understanding that assessment and evaluation cannot be made and assumed only by basing on students outer performance or guessing. But test should be made to evaluate students' understanding and ability.

This study was beneficial for the tests constructors as additional reference in constructing and analyzing test items and their procedures. The results of this study helped to establish the quality of examination conducted by Education Resource Centre Katsina. These go a long way to establish to the society public trust and acceptability of results from this examination body. The results of this study probably convinced the public that the exams conducted by Education Resource Centre (ERC) are of good standard.

Students have a complete picture of their performances through this study which enable to assess themselves and get prepared for future examination and future learning in general.

1.6 Scope and Delimitation of the Study

This study covers the responses of students in Mathematics Basic Education Certificate Examination multiple choice items sets and administered by Education Resource Centre (ERC) conducted in all public junior secondary schools in Funtua Education Zone of Katsina state in 2018, because the zone has all demographic attributes (urban, semi-urban, and rural schools) to produce good psychometric analysis.

This study was delimited to other test and test items conducted by Education Resource Centre (ERC) Katsina in other years, schools that are under Science Board, Private and Federal Schools were not considered in this study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents the review of related literature relevant to psychometric properties. The chapter was reviewed under the following sub-headings: Conceptual/Theoretical Framework, Review of Empirical Studies and Summary and Uniqueness of the study.

2.2 Conceptual Framework

2.2.1 Test and Testing

According to Munn (2000) in Sidhu (2005) defined test as "an examination to reveal the relative standing of an individual in the group with respect to intelligence, personality, aptitude or achievement".

Onuigbo (2003) defined test as a set of questions, problems, puzzles, symbols and exercises used to determine a person's ability, aptitude, qualifications, interest and level of social adjustment. Therefore, test can be defined as the presentation of a standard set of item to be answered which qualifies as relevant information gathering instrument that elicit general or specific responses from the individual.

According to Mohamad (2002), Testing can be defined the process of submitting a standard set of questions which are required to be answered or a set of instrument or systematic procedure to measure the sample of change or a student's or individual's behaviours. It can also be an official procedure to measure and evaluate students' performance. Therefore, testing can be define as a systematic procedure to observe the

behavior of an individual for the purpose of generating information about their level of skills and knowledge that will help in making decisions.

2.2.2 Types of Test

According to Sidhu (2005) type of test are Achievement Tests, Intelligent Tests, Aptitude Tests and Personality Tests.

2.2.3 Achievement Tests

According to Anastasi & Urbina (1997), Achievement tests are tests that are designed to measure the effects of a specific program of instruction or training. It also measures the effects of relatively standardized sets of experiences such as a course in trigonometry or computer programming. Achievement test represents the terminal evaluation of the individual's status on the completion of training.

Aloysius (2013) opined that, Achievement tests are relevant for measuring important aspects of a subject and accurately reflect the emphasis placed on important aspects of instructions as well as measure appropriate level of student's knowledge in a school subject.

Achievement tests are tests that stimulate an analysis of educational objectives and encourage a critical examination of the content and methods of instruction. Achievement tests can be Teacher Made Test (TMT) and Standardized Achievement Test (SAT).

2.2.4 Teacher Made Tests (TMT)

Teacher made tests also called Teacher-Made Classroom Tests (TMCT), are tests that play more emphasis in covering the content of specific courses or part of courses that are prepared by instructors for use in their own classrooms. According to Anastasi &

Urbina (1997) on teacher-made test, the diversity among courses on the same subject and with identical titles especially at the high school level and beyond is well known. Newell (2002) asserts that "teacher-made tests usually measure only a limited part of a subject area; they do not cover a broad range of abilities and they rely heavily on memorized facts and procedures".

Therefore, Teacher Made Tests can be seen as tests that are designed by subject teacher in order to measure the knowledge and skills that the students learned in the class or to determine the academic progress they have made over a period of time. It is also designed by classroom teacher for the purpose of assessing what the students have learned during the course of instruction and for differentiating between brilliant and dull students as well as for certifying their students. The development of classroom tests can be divided into three major steps among which are; planning the test, item writing and item analysis.

2.2.5 Standardized Achievement Tests (SAT)

According to James, David, Neal, Susan, Steven, Jeffrey & Madhabi (2014), standardized achievement tests are tools that enjoy widespread use in decision making and research context at all levels in education around the worlds which is designed by test developers to have particular properties and is best suited for serving particular purposes.

Standardized achievement test is any form of test that requires all test takers to answer the same questions or selection of questions from common bank of questions in the same way and it is scored in a standard or consistent manner which makes it possible to compare the relative performance of individual student or group of students

(WebCrowler, 2017). It is prepared by publishing companies, formal testing agencies and Universities.

They are also formal tests that allow comparing students with other students in the region or country. These tests are usually valid and reliable because they have been tested on large sample populations and have been revised to eliminate unreliable or invalid items (Anastasi & Urbina, 1997).

Therefore, intelligence test is a questionnaire or series of exercise designed to measure intelligence. It measures the learning and/or ability in a wide variety of areas and skills. Scores may be presented as IQ (Intelligence Quotient) as a mental age or on a scale. Aptitude tests are tests used to determine an individual's ability/potential to succeed in a certain task, without prior knowledge or training. It can also be used in school exams and part of pre-employment assessment. Larsen and Buss (2018) asserts that, personality test is also known as personality inventory which is a test usually involving a standardized series of questions or tasks used to describe or evaluate a subjects' personality characteristics.

2.2.6. Test Analysis

Test analysis is a systematic procedure that will provide specific information on how the test items were arranged. It is the statement of tests in order to obtain the items that have an adequate quality. Test analysis is the identification process of each item to get feedback to make improvements, enhancements and refinements of the test items. It is also aimed at obtaining a good quality item so as to obtain an actual overview of students' learning outcome.

The activity of test analysis is the process of collecting, summarizing and using information from students' responses to make decisions about each assessment. The

purpose of test analysis is to find out the standard quality of test and the quality of test can be investigated by analyzing the test items in order find out the test items that should be revised or omitted. These qualities of the test will help teachers to get the result of evaluation which is reliable and valid.

Anikweze (2013) stated that, a good measuring/testing instrument should possess the qualities of Reliability, Validity and Usability. Any instrument (Test) that is constructed to provide accurate and authentic information should have these qualities such as reliability, validity and usability. These qualities constitute test analysis.

2.2.7 Reliability

According to Ugodulunwa and Ugwuanyi (1999), "Reliability is the consistency of measurement and is expressed as a correlation coefficient. It indicates the degree to which a test is consistent in measuring whatever it does measure". According to Eboh (2009), reliability refers to the degree to which a given measurement procedure will give the same description of that phenomenon if that measurement is repeated.

Reliability therefore, is the degree to which measuring instrument or test consistently measures what it is measuring. The information or scores obtained from the instrument (test) are essentially the same information or scores would be obtained if the instrument (test) were administered to the same test takers at another time by different person.

2.2.8 Types of Reliability

According to Harbor-Peters (1999), there are basically four (4) types of reliability estimates. These includes; Reliability of Stability, Reliability of Equivalence, Reliability of Internal Consistency and Scorer or Inter-rater Reliability

For the purpose of this study, the researcher is interested on the internal consistency reliability of the test items.

Reliability of internal consistency: is concerned with how items in a test are consistent among themselves and with the test as a whole. Internal consistency requires only one test administration and it can be measured through three different approaches which include; Split half, Kuder-Richardson, and Cronbach's Alpha.

a. **Split half method:** a test is divided into two halves and administered once, the scores for the two halves (say Odd and Even) will be correlated and apply the Spearman-Brown correction formula to get reliability of internal consistency.

$$\text{rtt} = \frac{\mathbf{2} \times \boldsymbol{r\ half\ test}}{\mathbf{1} + \boldsymbol{r\ half\ test}}$$

Source: Spearman and Brown (1910)

Where $\mathbf{r_{tt}}$ is the reliability of the whole test

$\mathbf{r_i}$ is the reliability of half of the test.

b. **Kuder-Richardson formula 20 (KR-20):** is a frequently used method for determining internal consistency if the items are dichotomously coded. Basically, the computation requires three pieces of information, namely the number of items, the mean, and the standard deviation. It also refers to consistency of students' responses across the items on the test. KR 20 can be thought of as a measure of the extent to which the items on a test provide consistent information about a students' level of knowledge of the content assessed by the test. Assuming that all the items on a test relate to a single content domain, we would expect students with a very high level of knowledge of the domain to answer most items correctly and students with a very low level of knowledge of the domain to answer most items incorrectly.

This value can range from 0 to 1, with numbers closer to 1 reflecting greater internal consistency. In Kuder-Richardson method, internal consistency is estimated when the items are dichotomously scored using the formula;

$$KR_{20}r_{xx} = \frac{n}{n-1}\left(1 - \frac{\sum pq}{V}\right)$$

Source: Brown, (2005) p.181

Where:

r_{xx} = internal consistency reliability of the test results

p = proportion of people passing the item

q = proportion of people failing the item

n = number of items in the test

V = variance of the total test

$\sum$ = summation of the values

KR_{20} is used for binary scored items while KR_{21} is used for polytomously scored items.

c. **Cronbach's Alpha:** This method is applicable for dichotomously scored and essay type questions having items of varying point values or attitude scales that provide responses, such as Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree to estimate the internal consistency. It also takes care of items that are not scored dichotomously (0 or 1).

2.2.9 Item Analysis

Many teachers in those days find it difficult to set standard questions for tests and examinations. As a result of these, the questions no longer test the students on course content. Therefore, there is the need for item analysis in order for them to know how good or bad their test items are.

According to Harbor-Peter (1999) item analysis deals with the processes involved in determining the psychometric qualities of the tests and that since the qualities of the test items determine the quality of the whole test, the assessment of those qualities of items constitute item analysis.

Instructional Assessment Resources (IAR, 2011) believes that "an item analysis involves many statistics that can provide useful information for improving the quality and accuracy of multiple-choice or true/false (questions)". The quality of each item is analyzed to evaluate item statistics and item discrimination.

Bichi (2015) stated that, item analysis involved statistics that help in analyzing the effectiveness of the item and improving test items. These statistics can provide useful information to determine the validity and accuracy of an item in describing learners or examinees ability from their response to each of the item in a test.

Therefore, item analysis is a procedure for examining students' responses to test items in order to evaluate the quality of those items and the test as a whole. Item analysis is important in improving the quality of items which will be used in a test and to eliminate ambiguous items or misleading items in a single test administration. Item analysis is a procedure, steps and or method of reviewing items on a test both qualitative and quantitative. Qualitative item analysis deals with the content validity and how effective the items are in terms of item writing procedure or guidelines.

Whereas quantitative item analysis deals with item statistics, item discrimination and effectiveness of the distracters.

The objective of item analysis is to identify problematic, bad and or ambiguous items. The items may be problematic because they are: poorly written causing the students to be confused during response, do not have a clear response and a distraction may potentially qualified as the correct answer, graphs or diagrams and pictures are not clear, items containing distracters that most students can see are wrong increasing the chance of correct guessing.

2.2.10 Item Difficulty

According to Backhoff, Larrazolo and Rosas (2000), item difficulty is understood as the proportion of the persons who answered an item correctly. The higher the proportion, the lower the difficulty. This means that it has to do with an inverse relationship; the greater the difficulty of an item, the lower its index will be.

Matlock-Hetzel (1997) as cited in Shafizan (2013) asserts that "item difficulty is simply the proportion of examinees taking the test that got an item or answer it appropriately. The larger the percentage getting an item correctly, the easier the item is understood to be. It is also known as p-value, the p-value can be calculated using the formula below;

$$P = \frac{R}{T}$$

Source: Nitco, (1983) as cited in Nuryulia, (2009)

Where:

P = item difficulty index

R= number of correct responses to the test item

T= total number of responses comprising both correct and incorrect responses.

The p-values range from 0.00 to 1.00. A high p-value indicates an easy item. Instructional Assessment Resources (IAR, 2011) acknowledge values of difficulty index and their evaluation as tabulated in Table 2.1:

Table 2.1: Evaluation of Item Difficulty for Item Analysis

Item Difficulty Index (P)	Item Evaluation
P>0.70	Easy Item
P≥0.30≤ 0.70	Moderate Item
P≤0.30	Difficult Item

Source: Instructional Assessment Resources (IAR, 2011)

Another formula for measuring item difficulty (p-value) given by Gronlund (1993) is written as;

$$P = \frac{R}{N} \times 100$$

Where:

P = the percentage of examinees who answered items correctly.

R = the number of examinees who answered items wrong.

N = total number of examinees who tried the items.

The categorization of difficulty index is divided into five which are; too difficult, difficult, sufficient, easy and too easy test items. The categorization is based on the standard stated by Brown (2004), that a test items is called too difficult if the number of p-value (index of difficulty) is 0.00, it is difficult if the index is between 0.00 – 0.30. It is sufficient if the index of difficulty is between 0.31 – 0.70, it is also called easy test if the index is between 0.71 – 1.00 and it is called too easy if the number of p

is equivalent to 1.00. The appropriate test item will generally have p that ranges from 0.15 – 0.85

An item will have poor difficulty index if it cannot differentiate between brilliant students and dull students. It happens if brilliant students and dull students have the same score on the same item.

According to Nitro (1996), the formula to be used in order to find difficulty level is

$$\text{DL} = \frac{Rh+Ri}{T}$$

Where:

Rh = the number of students in the high-scoring group half who responded correctly.

R*i* = the number of students in the low-scoring group half who responded correctly.

T = the total number of students

If the item is binary scored, the difficulty level of the item is equal to the proportion of persons tested. To compute the item difficulty, divide the number of people answering items correctly by the total number of people answering item. The proportion is usually denotes as p and is called item difficulty. The larger the percentages getting an item right, the easier the item and the higher the difficulty index, the easier the item is understood to be (Nitro, 1996).

2.2.11 Item Discrimination

Shafizan (2013) define item discrimination as a measure used to discriminate between students in the top group with that of low group who obtained the correct responses. It also differentiates students who are knowledgeable and those who are not showing the

top scorers and low scorers achievement in each item. The value of discrimination index ranges between -1.0 to 1.0

Item discrimination index (D) is calculated by the formula

$D = \frac{UG-LG}{n}$ where D is discrimination index, UG is the number of students in the upper group 27% who responded correctly, LG is the number of students in the lower group 27% who responded correctly and *n* is the number of students in the upper and lower group.

The higher the discrimination index the better the test item discriminates between the students with higher test scores and those with lower test scores.

Table 2.2: Evaluation of Discrimination indexes

Discrimination Index	Interpretation
≤ -0.01	Worst (must be discarded)
0.00 – 0.19	Poor
0.20–0.29	Moderate
0.30 – 0.39	Reasonably Good
D ≥ 0.40	Very Good

Source: Arikunto (2003) in Fajar Furqon (2013).

Shafizan (2013) clarified two ways of determining power of test item to be the discrimination index and discrimination coefficient. He also emphasized the advantage of using discrimination coefficient instead of index. Discrimination coefficients include every single person taking the test despite the fact that only the upper (27%) and lower (27%) is included in the discrimination index calculation process. According to Instructional Assessment Resources (2011), discrimination coefficients are a measure using point bi-serial correlation. The correlation commonly

known as “Pearson Product Moment Correlation Coefficient” is computed to determine the relationship between students’ performance in each item and their overall scores.

Item discrimination is a procedure that investigates how each item differentiates between students with knowledge and skills and those that does not have knowledge and skills. It can also be seen as the process of measuring the extent to which a test item discriminates between high ability and low ability students who got the item correct divided by the number in either group.

In a nutshell, item discrimination is an indicator of how well an item discriminates between weak and strong candidates. It is also refers to the degree to which success or failure on an item indicates the possession of the ability being measured. A highly discriminating item reveals that students with high score got the item right and students with low score got the item wrong.

2.2.12 Distractors

Distractors are classified as the incorrect answers in a multiple-choice question. According to Instructional Assessment Resources (IAR, 2011), students’ performance in a test items are very much influenced by the quality of the given distractors. Analyzing the distractors is useful in determining the relative usefulness of the decoys in each item. An item should be revised if none of the students select certain multiple choice alternatives for that item (Matlock-Hetzel, 1997). Hence, it is necessary to determine the effectiveness of each distractors.

The multiple-choice questions have several possible answers. Among the existing choice, there is only one correct and others were incorrect or wrong answers. The wrong answers or incorrect is called distractors. The main purpose of putting the

distractors on each item is that, from a lot of participants in the test is interested in selecting it. Therefore, good distractor is avoidable by learners who are good and have intelligent, while it will be chosen only by learners who are less intelligent.

The distractor has done its function properly if it has been chosen by at least 5% out of participants in the test. The questions with the distractors functioned properly can be saved as item/question Bank and can be used in the next test. If candidate ignore all options (do not select) is called omit. Viewed in terms of omit, an item is said to be good if its omission is not more than 10% of the test takers. Analyzing the distractors aimed not only to know which item cannot work properly, but also to check why particular test taker failed to answer certain item correctly. The analysis of distractor is done by comparing the number of students in upper group with students in lower group based on their answers. In addition, good distractor will manipulate more students in the lower group than students in upper group. If there are more students chosen the distractors, it means that the item does not function as expected and it must be revised (IAR, 2011).

2.3 Theoretical Framework

In educational measurements, there are two (2) main frameworks by which a test and the item it contains can be studied. These are Classical Test Theory (CTT) and Item Response Theory (IRT).

2.3.1 Classical Test Theory (CTT)

Embretson & Reise (2000), Hambleton & Jones (1993) were all consistent in stating that, classical test theory was an emanation of the early 20th century approach to measurement of individual differences. Classical test theory has three basic concepts which are; test score or observed score, true score and error score.

Classical Test Theory (CTT) tries to explain the link between the observed score (test score) X, the true score T, and error score E. In classical test theory, there is a model commonly known as "classical test model" it is a simple linear model linking the observable test score (X) to the sum of two unobservable (latent) variables, that is true score (T) and error score (E).

$$X = T + E$$

There are two unknowns in the equation (i.e. X and E) and this makes it not easily solvable unless some simplifying assumptions are made. Assumptions of classical test model are; true scores and error scores are uncorrelated, the average error score in the population of examinees is zero and error scores on parallel test are uncorrelated. Classical test theory utilizes item and sample dependent statistics such as item difficulty, item discrimination, validity and reliability. The analysis of these psychometric properties under classical test theory has focused on examinees assessment at the test score level not at the item level as in the case of item response theory. Analysis of test scores using CTT also includes measure for the reliability of the scores, item statistics, discrimination indices, distracter effectiveness etc.

2.3.2 Advantages of Classical Test Model

The major advantage of CTT is that, it is relatively weak theoretical assumption which makes CTT easy to apply in many testing situations (Hambleton & Jones, 1993). Relatively weak assumption does not only characterize classical test theory but also its extensions on such as generalizability theory. Although CTT's major focus is on test level information, item statistics (item difficulty and item discrimination) are also important aspect of CTT models.

The second advantage of CTT is that, at item level the CTT model is relatively simple. It does not require a complex theoretical model to relate an examinee's ability to success on a particular item. The CTT instead considers a pool of examinees and empirically examines their success rate on an item.

Another advantage of CTT is that, the analysis can be performed with smaller representative samples of examinees. This is particularly important when field testing of an instrument.

According to Schumacker (2009), the two statistics that form the cornerstone of classical test theory i.e. item difficulty and item discrimination are both sample dependent. Higher item difficulty values are obtained from examinees samples of lower-average knowledge. While for the discrimination, the higher values tend to be obtained from heterogeneous sample of examinees and lower values from homogenous samples. Such sample dependencies reduce the overall utility of these statistics.

This study was based upon classical test theory, the classical test theory is on test level information and the variables investigated were; reliability of internal consistency, item difficulty, item discrimination and distractor effectiveness. Meanwhile, the assessment of these psychometric properties under classical test theory focused on examinees assessment at the test level not at item level information as the case may be in item response theory.

2.3.3 Item Response Theory (IRT)

According to National Council on Measurement in Education (1999), Item Response Theory (IRT) is also known as latent trait theory, strong true score or modern mental test theory. Is a paradigm for the design, analysis and scoring of tests, questionnaires

and similar instrument measuring abilities, attitudes or other variables. The primary interest is on the item-level information in contrast to the CTT's primary focus on test-level information. IRT is a modeling technique that tries to describe the relationship between an examinee's performance and the latent trait underlying the performance (Hambleton & Jones, 1993). According to Ojerinde (2013), Wang and Hanson (2001), the most commonly used IRT models are built off a single ability parameter symbolized by the Greek letter θ **(**Theta) which is very similar to the CTT's total test true score (X). The relationship between the observed score and the ability parameter is the same relationship as the observed score and true score. In contrast to classical test theory, item response models are lauded for their ability to generate invariant estimate of item and person parameter, i.e. theoretically, item response theory (IRT) ability estimates (θ) are "item free" (i.e. would not change if different items were used) and item difficulty statistics are "person free" (i.e. would not change if different person were used).

2.4 Empirical Studies

A number of studies have been carried out on the psychometric properties of a test such as reliability, item difficulty, item discrimination, and distractor effectiveness on different subject. Among of them were;

2.4.1 Reliability

Nurliyanto (2015) conducted a study on test analysis of final examination on economics subject in Grade XII IPS SMA Negeri Banyumas Academic Year of 2014/2015 in terms of validity, reliability, difficulty level, distinguishing power, and the pattern of answer distributions. The subjects of the research are the grade XII IPS SMA Negeri Banyumas who's sampled was 112 students. Quantitative descriptive

research design was employed. Data collecting was done by documentation method of Odd Semester Exam Accounting Economics Subject consisting of 35 multiple choice items and 5 essay items. Data was analyzed using Anates program version 4.0.9. The findings indicated an excellent internal consistency reliability of 0.70. The analysis shows that: items of multiple choice questions can be said as reliable because the r_{11} lower than 0.70. Another study conducted by Osadebe (2014) on the establishment of reliability for the Senior Secondary School (SS III) Economics achievement test in Delta and Rivers States. The study was instrumentation design with 100 items of multiple-choice test was analyzed and a sample of 1000 students out of 2000 was randomly selected. After the analysis, the result shows that, the test has a reliability coefficient of at least 0.95 established through the use of KR_{20}. The findings concluded that, the test is valid and reliable for assessing students internally and prepare them for external examination. Also Nworgu and Agah (2012) applied three parameter logistic models in the calibration (standardization) of a mathematics achievement test. The sample was 1514 SS III students in Rivers and Cross river States, the instrument for the study was a 40 items of multiple-choice questions. The data analysis was done using BILOG MG software. They also found empirical reliability coefficient of0.79 which indicated an excellent reliability of internal consistency for the test. Similarly, Shafizan (2013) conducted a study on test analysis of student comprehensive test for research in teaching beginner string ensemble using model based teaching among music students in public Universities. The quality of each item was analyzed in terms of difficulty, discrimination and distractor efficiency. The sample was 16 students with various music backgrounds. The string instrument consists of 41 multiple choice items. The data was analyzed using KR20 for reliability and Microsoft Excel for difficulty and discrimination index. The findings shows that, the quality of item as a whole indicates a reliable value Kuder-Richardson (KR20)

value of 0.72 and Kuder-Richardson (KR21) value of 0.703. The findings also suggested that in order to measure students' performance effectively, necessary improvement should be done where items with poor discrimination index should be reviewed. Quaigrain and Arhin (2017) also conducted a study on using reliability and item analysis to evaluate a teacher developed test in educational management and evaluation. The study focused on item and test quality and explored the relationship between difficulty index (p-value) and discrimination index (DI) with distractor efficiency (DE). The study was conducted among 247 first year students pursuing Diploma in Education at Cape Cost Polytechnic, Ghana. Fifty (50) multiple-choice items were administered as an end of semester examination in educational measurement course. Internal consistency reliability of the test was 0.77 using kuder-Richadson (KR20). The finding also reveals that 30 items (60%) of the test fall into the reasonably good or acceptable value ranges.

2.4.2 Difficulty Level

Kumari and Bhattacharya (2016), conducted a study on item analysis of domestic test in English language skills of secondary school students. The study deals with the analysis of diagnostic test items made by the researcher in English language skills at secondary level. This analysis involves difficulty index and index of discrimination. 370 students of secondary school of Central Board of Secondary Education (CBSE) and Board of High School and Intermediate Education (UP Board) in Uttar Pradesh India were selected randomly for the samples to include both male and female. The test consists of 87 multiple choice questions to collect the data was analyzed using Anates program version 4.0.9. The findings showed that, difficulty index were between 0.25 to 0.80. The findings also reveals that 54 items out of 86 were selected after item analysis. Moyinoluwa (2015) investigated the psychometric properties of

Mathematics examinations conducted by four examinations body (NABTEB, JAMB, WAEC, NECO) to establish quality of the items presented to secondary school students for the purpose of certification and placement. The study employed descriptive survey research design to seek for information from a segment of the population of senior secondary students to make generalization on all Nigerian students adopting the multistage stratified sampling technique. From each of the 6 geo-political zones, 2 states were randomly selected to obtain a total of 12 states. One co-educational Federal Government College was purposively sampled from each state, plus 3 public schools, 1 private secondary school and 1 technical college from each state. Thirty (30) SS 3 students were selected using the systematic random sampling technique in each of the sampled schools that have been presenting students for public examination. A fairly high proportion of the test items have appropriate difficulty index within the range of 0.25 to 0.75. It is recommended that for easy, test attention should be given to higher order skills required of graduate of secondary schools and coverage of most aspects of syllabi prescribed by examination bodies. It is also recommended that, the present standard of examinations in Nigeria should be sustained and improved upon. In another study conducted by Nurliyanto (2015) on test item analysis of final examination on economics subject in Grade XII IPS SMA Negeri Banyumas Academic Year of 2014/2015 in terms of difficulty level. The research is quantitative descriptive research. The subjects of the research are the grade XII IPS SMA Negeri Banyumas with 112 students. Quantitative descriptive research design was employed. Data collecting was done by documentation method of Odd Semester Exam Accounting Economics Subject consisting of 35 multiple choice items and 5 essay items. These data was analyzed using Anates program version 4.0.9. The findings showed that: items of multiple choice items categorized as easy items amounted to 19 equivalents to (52.3%), medium category 11 items (31.4%), and

difficult category are 5 items (16.3%). The findings indicated that 52% of test items have acceptable difficulty level. It was also concluded that, items in the category medium level can be included into question bank for re use as an evaluation tool in the future and items that are easy and/or difficult can be re-examine to determine the cause of the question to be easy or difficult so that can be revised and tested on the next test. Similarly, Nworgu and Agah (2012) applied three parameter logistic models in the calibration (standardization) of a mathematics achievement test on SS III students in Rivers and Cross river States. 40 items of multiple-choice questions was used. The data analysis was done using BILOG MG. They found that, item difficulty parameter *b* ranges from -0.40 to 1.79 for all ability levels. Shafizan (2013) also conducted a study on item analysis of student comprehensive test for research in teaching beginner string ensemble using model based teaching among music students in public Universities. The finding shows that, the result indicates that 44% of the total test items exceed the difficulty index of 0.80 suggesting easy items.

2.4.3 Discrimination Power

Quaigrain and Arhin (2017) conducted a study on using reliability and item analysis to evaluate a teacher developed test in educational management and evaluation. The study focused on item and test quality and explored the relationship between difficulty index (p-value) and discrimination index (DI) with distractor efficiency (DE). The study was conducted among 247 first year students pursuing Diploma in Education at Cape Cost Polytechnic, Ghana. Fifty (50) multiple-choice items were administered as an end of semester examination in educational measurement course. The mean discrimination index was 0.22 (SD 24.09%). Items having high discrimination power with functional distractors should be integrated into future test to improve the quality of the assessment. Using DI, it was observed that 30 items (60%) of the test fall into

the reasonably good or acceptable value ranges. In a study conducted Nurliyanto (2015) on test item analysis of final examination on economics subject in Grade XII IPS SMA Negeri Banyumas Academic Year of 2014/2015 with 112 students in terms of discrimination power. The analysis shows that: items of multiple choice questions that categorized to poor items are 10 items (28.6%), satisfactory category 19 items (54.3%), and good category are 6 items (17.1%). In another study conducted by Nworgu and Agah (2012) applied three parameter logistic models in the calibration (standardization) of a mathematics achievement test on SS III students in Rivers and Cross river States. 40 items of multiple-choice questions was used, the item parameter indices obtained dedicated that the discrimination parameter *a* ranges from 0.29 to 2.05 for all ability levels. Similarly, Shafizan (2013) conducted a study on item analysis of student comprehensive test for research in teaching beginner string ensemble using model based teaching among music students in public Universities. Using 41 test items as an instrument for the analysis, he found that, 59% of items obtained acceptable range of discrimination index. His findings suggest that in order to measure students' performance effectively, necessary improvement need to be done where items with poor discrimination index should be reviewed. Another study conducted by Osadebe (2014) conducted a study on the establishment of validity and reliability for the Economics achievement of Senior Secondary School (SS III) in Delta and Rivers States. 100 items of multiple-choice test was analyzed and a sample of 1000 students out of 2000 was randomly selected. After the analysis, the discrimination index was established through point bi-serial statistics for each item with a correction coefficient of at least 0.3. Another study conducted by Kumari and Bhattacharya (2016) on item analysis of domestic test in English language skills of secondary school students. The study deals with the analysis of diagnostic test items made by the researcher in English language skills at secondary level. This analysis

involves difficulty index and index of discrimination. 370 students of secondary school of Central Board of Secondary Education (CBSE) and Board of High School and Intermediate Education (UP Board) in Uttar Pradesh India were selected randomly for the samples to include both male and female. The findings showed that, discrimination power was between 0.25 and above. The findings also reveals that 54 items out of 86 were selected after item analysis.

2.4.4 Distractor Effectiveness

Nworgu and Agah (2012) applied three parameter logistic models in the calibration (standardization) of a mathematics achievement test on 1514 SS III Students in Rivers and Cross river States. 40 items of multiple-choice questions was used, they found that; the probability of guessing c_i in the test correctly ranged from 0.02 to 0.50 for all the ability levels using BILOG MG software. Based on the findings, it was concluded that well-functioning distractor should be kept in the question bank and can be used in the next test. Again, Shafizan (2013) conducted a study on item analysis of student comprehensive test for research in teaching beginner string ensemble using model based teaching among music students in public Universities. 41 test items was used as an instrument for the analysis. 30 distractors were regarded as implausible due to the fact that those distractors were selected neither by the top scorer nor the low score. Item 15 clearly indicates a confusing item seeing that distractor A was selected by more than the correct answer C. The findings reveal that some distracters were not effective. The findings also suggest that in order to measure students' performance effectively, necessary improvement need to be done where items with ineffective distractors should be reviewed. In another study conducted by Nurliyanto (2015) on test item analysis of final examination on economics subject in Grade XII IPS SMA Negeri Banyumas Academic Year of 2014/2015 in terms of distractor effectiveness.

This research is quantitative descriptive research. The subjects of the research are the grade XII IPS SMA Negeri Banyumas who's sampled was 112 students. Data was analyzed using Anates program version 4.0.9. The analysis shows that: 5 items (16.3%) had distractors that work very good, 10 items (28.6%) had good functioning distractors, 5 items (16.3%) had distractors that work fair, 11 items (31.4%) had less good distractors, and four items (11.4%) had not good distractors. Based on the findings, it was concluded that well functioned distractor should be kept in the question bank and can be used in the next test.

2.5 Summary and Uniqueness of the study

Assessment of psychometric properties deals with the processes involved in determining the psychometric qualities of the tests and that since the qualities of the test items determine the quality of the whole test, the assessment of those qualities of items constitute test and item analysis (Harbor-Peter, 1999).

Test analysis is the process of looking at something that can be used to derive test information. This basis for the test is called test basis. Test analysis an activity which defines "WHAT' need to be tested in form of test condition. Test conditions are identified by analyzing the test basis, test objectives and products risk. Test conditions should be traceable backward to test basis and forward to other test work products like test cases.

The activity of test analysis is the process of collecting, summarizing and using information from students' responses to make decisions about each assessment. The purpose of test analysis is to find out the standard quality of test and the quality of test can be investigated by analyzing the test items in order find out the test items that

should be revised or omitted. These qualities of the test will help teachers to get the result of evaluation which is reliable and valid.

Item analysis is a procedure of reviewing items on a test qualitatively and quantitatively. Qualitatively in terms of content validity and how effective the items are in terms of item writing procedure. Whereas, quantitative item analysis deals with item difficulty, item discrimination and distractor effectiveness. Concepts on validity, reliability, item statistics, item discrimination and distractor effectiveness as well as methods of estimating them were also reviewed.

This chapter also reviewed two test theories (classical test theory and item response theory).Number of studies by Nworgu and Agah (2012), Osadebe (2010), Nurliyanto (2015), Moyinoluwa (2015), Shafizan (2013), Kumari and Bhattacharya (2016) and Quaigrain and Arhin (2017) were reviewed. During this review, no study could be accessed that was conducted in Katsina state based on classical test theory (CTT) or item response theory (IRT)in their test or item analysis. All these afore mentioned studies were not critically related to this study in the sense that most of them were carried out outside Nigeria, none of the study was carried out on Basic Education Certificate Examination (BECE) in Katsina State.

Since no study has been conducted on assessment of psychometric properties of 2018 Mathematics Basic Education Certificate Examination (BECE) in Katsina state using classical test theory, then there is need for assessment of 2018 mathematics BECE examination. At the same time, the above mentioned studies differed from this study in the area of number of test items, and type of examination body, research design, geographical location and sample size, these makes this study different and unique from other studies.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The methodology of this research was discussed under the following sub-headings which are; research design, population and sample, instrument for data collection, validation of the instrument, procedure for data collection and procedure for data analysis.

3.2 Research Design

This study employed Ex-post facto research design. Ex-post factor design is a quasi-experimental study examining how independent variable present prior to study affects a dependent variable. Ex-post factor design was employed since the data involved in the study was collected from the source without manipulation with the purpose of determining the quality of test and test items of 2018 Mathematics Basic Education Certificate Examination (BECE).

This approach was considered more appropriate because the researcher analyzed data to determine reliability of internal consistency, item difficulty, item discrimination and effectiveness of the distractors in 2018 Mathematics Basic Education Certificate Examination. This is in line with McMillan (2011) who stated that " in ex-post facto research design, the investigator decide whether one or more different pre-existing condition have caused subsequent differences when subjects who experienced on type of conditions are compared to subjects who experienced a different condition".

3.3 Population and Sample

3.3.1 Population of the Study

The population of this study comprises all junior secondary school student year three (3) candidates who wrote 2018 Mathematics Basic Education Certificate Examination (BECE) in a state owned secondary schools (Public) in Funtua Education Zone of Katsina State. The research subjects (2018 JSS III Mathematics Candidates) would have covered the Basic Education Certificate Examination (BECE) syllabuses. These represent both male and female candidates. The total number of Junior Secondary Schools in Funtua Education Zone as at 2018 was twenty one (21) while number of candidates who sat for the 2018 Mathematics Basic Education Certificate Examination was 13,742. The reason for using candidates as a population is because the data collected was candidates' responses on 2018 Mathematics Basic Education Certificate Examination (BECE).

Here, there is need to clarify between population as a units of analysis with population as observation units. According to Awotunde, Ugodulunwa and Ozoji (1997), "a units of analysis refers to the person or thing under study"…. While observation unit is the "element from which information is collected". Although in some studies, the two may be the same, but in this study they are different. The items on the 2018 Mathematics Basic Education Certificate Examination (BECE) were the units of analysis whereas; the Junior Secondary School III candidates were the observation units. By implication, the sample was drawn from these candidates.

Table 3.1 Summary of Population

S/N	ZONE	LGA	SCHOOLS	NO OF CAND.
1.	Funtua	Funtua	GC (DW) Junior	970
2.	✓	✓	GGJSS Funtua	1550
3.	✓	✓	GDJSS Funtua	1017
4.	✓	✓	GDJSS (M) Funtua	1250
5.	✓	✓	GDSS Goya	208
6.	✓	✓	GDSS Dukke	453
7.	✓	✓	GDSS Maska	368
8.	✓	✓	GDJSS T/Iya	400
9.	Funtua	Danja	GDSS Tandama	320
10	✓	✓	GDJSS Danja	1063
11.	✓	✓	GDSS Kokami	380
12.	✓	✓	GDJSS Dabai	480
13.	✓	✓	GDSS Kahutu	275
14.	Funtua	Bakori	GDJSS Kurami	520
15.	✓	✓	GDJSS Bakori	1304
16.	✓	✓	GGJSS Kabomo	768
17.	✓	✓	GDSS Jargaba	259
18.	✓	✓	GDJSS Tsiga	610
19.	✓	✓	GDSS Barde	490
20	✓	✓	GDSS Guga	475
21.	✓	✓	GDSS Kakumi	580
				Total: 13,742

Source: Zonal Education Quality Assurance Funtua, (2018)

3.3.2 Sample Size

According to Research Advisors (2006) revised, a research population of 13,742 subjects, the sample size was 378 candidates at 95% confidence interval. In view of this, the sample size of this study which was drawn from the twenty one (21) schools in Funtua Education zone was 378 candidates. The key reason for being concerned with sample is that of external validity (i.e. the extent to which results will be generalized to the entire population).

Table 3.2 Summary of Sample Size

S/N	LGAs	SCHOOLS	POPULATION	SAMPLE
1.	Funtua	GDJSS (M) Funtua	1250	55
2.	✓	GDSS Goya	208	25
3.	✓	GGJSS Funtua	1550	100
4.	✓	GDSS Maska	368	30
5.	Danja	GDJSS Danja	1068	85
6.	✓	GDSS Kokami	380	25
7.	✓	GDJSS Dabai	480	35
8.	✓	GDSS Kahutu	275	23
Total				**378**

3.3.3 Sampling Technique

The sampling technique used for this study was multi-stage cluster sampling. Multi-stage cluster sampling is the process of taking samples in stages using smaller and smaller sampling units at each stages. At the first stage, two (2) local governments were selected out of the three local governments in the zone using simple random sampling through hat and draw. At the second stage, four (4) schools were randomly selected from each local government making eight (8) schools selected through hat

and draw. At third stage, 378 JSS III candidates were randomly selected out of the selected eight schools through systematic sampling whereby each 14^{th} member of the sampling frame was selected (5579/378 = 14^{th}). This selection is in line with random number table developed by Research Advisors (2006) revised. This is in line with Goldstein (1995) & Thompson (1992), they asserts that "multi-stage cluster sampling is where the researcher divides the population into stages; sample the stages and then resample, repeating the process until the ultimate sampling units are selected at the last of the hierarchical levels".

3.4 Instrument for Data Collection

The instruments for this study were 2018 Mathematics BECE and Proforma designed by the researcher. The BECE was made up of two parts (Part A and Part B), multiple-choice items and Essay. The data needed were binary scores of the marked scripts of Part A (60 items of multiple-choice of 2018 Mathematics Basic Education Certificate Examination) of the only sampled schools which was prepared and scored by Education Resource Centre (ERC) Katsina. A pro-forma form was designed by the researcher in which the candidates' particulars including candidate serial number, responses and test scores were recorded for easy analysis.

3.4.1 Scoring Procedure

The instrument used for this study consists of sixty (60) multiple-choice items. The items were scored dichotomously (i.e. right and wrong), correct item was scored one (1) while wrong item scored zero (0), omitted item scored (A) and raw score data inform of letter grade (A – D).

3.5 Procedure for Data Collection

The researcher went to the Education Resource Centre (ERC) Katsina with the identified number of candidates from each school selected as well as an introductory letter from the department of education Bayero University, Kano and request for their scripts.

The Director ERC explained to the researcher that a request letter should be written to the Commissioner of Education for endorsement and approval before the release of the results.

After getting the approval from the Commissioner of Education, marked scripts of 2018 Mathematics Basic Education Certificate Examination (BECE) of the sampled schools in Funtua Education zone were given to the researcher. The researcher using a proforma carefully extracted the needed data from the scripts. The data needed here were binary scores of 1 and 0, raw scores in form of letter grade (A – D) as well as the test scores.

Binary (1 and 0) data was used for item difficulty and item discrimination. Raw score data in form of options or letter grade (A – D) was used for distractor effectiveness. Also the overall test score was used for internal consistency reliability.

3.6 Procedure for Data Analysis

This research was to find out the difficulty index, discrimination index, reliability of the test and distractor effectiveness of the test items (test questions) of 2018 Mathematics Basic Education Certificate Examination (BECE) in Funtua Education Zone. Kuder-Richardson (KR-20) reliability determined the internal consistency of the test, the discrimination index discriminated between students in the top group with that of low group who obtained the correct responses, and difficulty index (p-values)

indicated the proportion of examinees that responded the item correctly while the distractor effectiveness indicated the proportion of students who answered item incorrectly. EXCEL was used to answer research question I (reliability of internal consistency), while ITEMAN 4.3 Computer Programmed was used to analyze the data collected. This technique was used to answers research questions II, III, and IV respectively. SPSS was also used for the descriptive statistics.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter concerned with data analysis and findings of the study. The purpose of this study was to evaluate the psychometric properties of the 2018 Mathematics Basic Education Certificate Examination (BECE) in Katsina Sate. The results are discussed in relation to the findings of similar studies, experts' opinions and other validated assertions.

4.2 Data Presentation

The item analysis to determine item difficulty, item discrimination indices and distractor effectiveness as well as the reliability of the items was carried out using the item analysis. The data summary is presented on table 4.1 below:

Table 4.1: Data Summary for the whole Test

SN	Indicator	Value
1	Number of Examinees	378
2	Number of Items	60
3	Number of response options	4 (A-D)
4	Number of Distractors + Key	180 (+60 key)
5	Mean score	33.34
6	Std. Dev. (Score)	11.91

The summary statistics on Table 4.1, above shows that, for the 60 item test administered to 378 students, the response options were 4 (A-D) with a test total of 240 options (60 key and 180 distractors). The test items mean score of the BECE 2018 Mathematics was 33.34 with a standard deviation of 11.91. This provides sound information on the test items.

Table 4.2: Data Summary for the Psychometric Properties

SN	Psychometric Properties	N	Mean	Std. Dev.
1	Item Difficulty	60	0.56	0.15
2	Item Discrimination	60	0.41	0.21
3	Distractors	60	24.52	20.29

The summary statistics on Table 4.2 above also shows that for 60 items administered to 378 students, the mean item difficulty (*p*) is 0.56 and mean item discrimination of the test items (r_{pbi}) is also 0.41 with standard deviation of 0.15 and 0.21 respectively. In case of the distractors (A, B, C and D), the mean were 27.32, 25.00, 22.78 and 22.97 with standard deviation 22.30, 22.76, 19.33 and 16.78 respectively. The overall mean and standard deviation for the 240 distractors was 24.52 and 20.29.

4.3 Data Analysis

The data collected from the 2018 Mathematics Basic Education Certificate Examination (BECE) in study as explained in the preceding chapter of the research methodology are analyzed using test item analysis procedures as established in the literature. The findings are presented based on research questions and interpreted in line with the stated guidelines in the following order:

4.3.1 Answer to Research Questions

Research Question 1: *What is the reliability coefficient (Estimate of Internal Consistency) of the 2018 Mathematics Basic Education Certificate Examination (BECE)?*

To answer the above research question the responses of the examinees from 2018 Mathematics Basic Education Certificate Examination (BECE) were scored and used to conduct an analysis to determine the internal consistency reliability of the test items. The result of the analysis is presented on Table 4.3 below:

Table 4.3: Internal Consistency Reliability of BECE 2018 Mathematics

SN	Indicator	Value
1	Number of Item	60
2	Kuder-Richardson (KR-20)	***0.929***

In Mathematics achievement test, all the items of a certain domain must measure different construct. Similarly, items are binary scored '1' correct '0' wrong. Moreover, in item analysis Cronbach's Alpha and Kuder-Richardson (KR-20 and 21) have the same procedure but KR-20, is reported for a dichotomous variables as in the BECE 2018 items. The internal consistency reliability as estimated by KR20 is high with coefficient of 0.93 which is high in line with the Nunnally (1978) who recommends acceptable value of 0.70. KR20 is generally considered to be a better reliability estimate than KR21 (Lord and Novick, 1968 and Traub, 1994).

The KR-20 was measured by EXCEL using K is =SUM(B3:BI3), pj is =B382/COUNT(B4:B382), qj is =SUM(1-B384), σ2 is VARP(BJ4:BJ381), ∑pjqj is =SUM(B386:BI386) and P_{KR20} =SUM(B388/(B388-1)*(1-B389/B390).In 2018 Mathematics Basic Education Certificate Examination, 93% of the variability in observed scores represents true individual differences and only 7% of the variability is due to random error. Excellent internal consistency reliability was obtained as a result of two factors i.e testing situations and chance factor which include freedom from distractions, clarity of instructions, race of the teachers and luck in selection of answers by guessing. This is in line with David, Murphy and Charles (2005). They asserts that, the factors responsible for obtaining an excellent reliability coefficient of a test close to 1.00 and low reliability coefficient close to 0.00 were; temporary but general characteristics of individual, temporary and specific characteristics, aspect of testing situation and chance factor.

Research Question 2: *What is the item statistics (difficulty index) of 2018 Mathematics Basic Education Certificate Examination (BECE)?*

To answer the above research question the responses of the examinees from 2018 Mathematics Basic Education Certificate Examination (BECE) were scored and used to conduct an item analysis to determine the difficulty parameters of the test items. The result of the analysis is presented on Table 4.4 below:

Table 4.4: Item difficulty of BECE 2018 Mathematics

Item	Item Difficulty *(P)*	Item	Item Difficulty *(P)*	Item	Item Difficulty *(P)*
1	**0.80**	21	0.67	41	0.47
2	**0.71**	22	0.63	42	0.65
3	**0.75**	23	**0.75**	43	0.57
4	0.57	24	0.66	44	0.61
5	0.52	25	**0.76**	45	0.33
6	0.67	26	0.49	46	0.65
7	0.61	27	0.52	47	0.52
8	0.34	28	0.66	48	0.67
9	**0.13**	29	0.54	49	0.64
10	0.44	30	**0.17**	50	0.62
11	0.57	31	0.60	51	0.53
12	0.49	32	0.66	52	0.43
13	0.33	33	0.69	53	0.57
14	0.48	34	0.54	54	0.31
15	0.68	35	0.66	55	0.44
16	0.65	36	0.66	56	0.61
17	0.51	37	**0.71**	57	0.51
18	0.60	38	0.65	58	0.55
19	**0.25**	39	0.63	59	0.35
20	**0.71**	40	0.66	60	0.32

The result of analysis presented on Table 4.4 shows item difficulty index of 2018 Mathematics Basic Education Certificate Examination (BECE). The item difficulty **(*p*)** indices were generated using ITEMAN 4.3. The value of each item difficulty index is stated and the highest items difficulty index is 0.80 (item 1) and the lowest is 0.13 (item 9). The item difficulty indices presented above were used for answering the

research questions 2 based on the pre-determined standards or guidelines for determining test item quality. The suitability of the items is explained in line with standards in Table 4.5 below:

Table 4.5: Item difficulty interpretation of BECE 2018 Mathematics

Difficulty index	Items	Total Items
Easy ($P > 0.70$)	1, 2, 3, 20, 23, 25, 37	7 (12%)
Moderately ($0.31 \leq$ 0.70)	4,5,6,7,8,10,11,12,13,14,15,16,17,18,20, 21,22,24,26,27,28,29,31,32,33,34,35,36, 38,39,40,41,42,43,44,45,46,47,48,49,50, 51,52,53,54,55,56,57,58,59,60	50 (83%)
Difficult ($P \leq 0.30$)	9, 19, 30	3 (5%)

Based on the set standards for interpreting difficulty indices 50 (83%) of the Items were of moderate difficulty, 7(12%) were easy, and 3(5%) were considered difficult. With this rule, 3 items were difficult and can be considered 'poor' or 'faulty' items. In conformity with the required standards, 50 out of the 60 items are "good" (moderately difficult) and 7 items can be seen as "fair" (easy). On the basis of the item selection criteria of difficulty indices of ($0.31 \geq P \geq 0.70$), 10 items that failed to satisfy the condition are considered 'faulty or defective' items.

Research Question 3: *What is the discrimination power of the test items used by Education Resources Centre (ERC) in 2018 Mathematics Basic Education Certificate Examination?*

To answer the above research question the responses of the examinees from 2018 Mathematics Basic Education Certificate Examination (BECE) were scored and used to conduct an item analysis to determine the discrimination parameters of the test items. The result of the analysis is presented on Table 4.6 below:

Table 4.6: Item discrimination of BECE 2018 Mathematics

Item	*Item Discrimination* (r_{pbi})	Item	*Item Discrimination* (r_{pbi})	Item	*Item Discrimination* (r_{pbi})
1	0.30	**21**	0.47	**41**	0.56
2	0.62	**22**	0.45	**42**	0.24
3	0.38	**23**	0.59	**43**	0.66
4	0.47	**24**	0.57	**44**	0.63
5	0.63	**25**	0.43	**45**	**-0.07**
6	**0.16**	**26**	0.36	**46**	0.36
7	0.66	**27**	0.65	**47**	0.33
8	**0.09**	**28**	0.55	**48**	0.59
9	**-0.04**	**29**	0.40	**49**	0.62
10	**0.12**	**30**	**-0.17**	**50**	0.48
11	0.71	**31**	0.47	**51**	0.35
12	0.44	**32**	0.57	**52**	0.45
13	0.24	**33**	0.49	**53**	0.47
14	0.39	**34**	0.57	**54**	**0.04**
15	0.49	**35**	0.35	**55**	0.47
16	0.46	**36**	0.51	**56**	0.74
17	0.69	**37**	0.40	**57**	0.29
18	0.38	**38**	0.64	**58**	0.39
19	**-0.15**	**39**	0.35	**59**	0.26
20	0.50	**40**	0.55	**60**	**0.07**

The result of analysis presented on Table 4.6 shows item discrimination indices **(r_{pbi})** of 2018 Mathematics Basic Education Certificate Examination (BECE). The item discrimination indices **(r_{pbi})** were generated using ITEMAN 4.3. The value of each item discrimination indices **(r_{pbi})** is stated and the highest items discrimination index **(r_{pbi})** is 0.74 (item 56) and the lowest is -0.17 (item 30). The item discrimination indices **(r_{pbi})** presented above were used for answering the research questions 3 based on the pre-determined standards or guidelines for determining test item quality. The suitability of the items is explained in line with standards in Table 4.7 below;

Table 4.7: Distribution of items based on discrimination Indices

Discrimination index	Items	Total Items
Very Good (D ≥ 0.40)	2,4,5,7,11,12,15,16,17,20,21,22,23,24, 25,27,28,29,31,32,33,34,36,37,38,40, 41,43,44,48,49,50,52,53,55,56	36 (60%)
Reasonably Good (0.30 – 0.39)	1,3,14,18,26,35,39,46,47,51,58	11 (18%)
Marginal (0.20-0.29)	13,42,57,59	4 (7%)
Poor (D ≤ 0.19)	6,8,9,10,19,30,45,54,60	9(15%)

On the basis of discriminating index criteria set, the results indicates that 9 (15%) of the items failed to differentiate between students of different abilities (Higher and lower ability students), 4 (7%) items are marginal and needed to be reviewed, 11 (18%) of the items are satisfactory and 36 (60%) of the items functions very well. based on the selection criteria of discriminating index (i.e. $r_{pbi} \leq 0.20$), 9 items are 'poor' and failed to satisfy the condition the items can be eliminated or completely revise.

Research Question 4: *What is the effectiveness of the distractors of 2018 Mathematics Basic Education Certificate Examination?*

To answer the above research question the responses of the examinees from 2018 Mathematics Basic Education Certificate Examination (BECE) were scored and used to conduct an item analysis to determine the effectiveness of the distractors of the test items. The result of the analysis is presented on Table 4.8 below:

Table 4.8: Distractor Analysis

Item	A	B	C	D	Key	Item	A	B	C	D	Key
1.	8	6	79	6	C	**31**	7	60	15	18	B
2.	10	71	7	11	B	**32**	66	**4***	16	12	A
3.	12	7	75	6	C	**33**	69	6	11	12	A
4.	12	57	13	16	B	**34**	12	17	13	54	D
5.	52	10	11	25	A	**35**	9	66	11	12	B
6.	67	7	7	17	A	**36**	66	7	12	14	A
7.	61	14	7	17	A	**37**	71	8	9	11	A
8.	20	17	27	34	D	**38**	13	12	8	65	D
9.	13	22	38	26	A	**39**	8	14	63	13	C
10.	44	12	18	24	A	**40**	66	14	7	10	A
11.	15	57	11	16	B	**41**	14	11	47	27	C
12.	17	49	16	16	B	**42**	14	65	6	14	B
13.	24	33	21	20	B	**43**	21	8	12	57	D
14.	14	19	17	48	D	**44**	15	12	11	61	D
15.	10	68	9	11	B	**45**	19	27	19	33	D
16.	17	65	7	8	B	**46**	10	65	13	10	B
17.	51	11	21	13	A	**47**	12	20	52	14	C
18.	60	12	13	13	A	**48**	67	7	10	14	A
19	25	23	27	24	A	**49**	10	64	9	15	B
20.	71	**4***	13	12	A	**50**	13	5	62	17	C
21.	8	67	10	13	B	**51**	23	13	8	53	D
22.	15	10	63	11	C	**52**	22	8	43	23	C
23.	75	**1***	10	13	A	**53**	8	57	13	18	B
24.	9	66	13	12	B	**54**	30	7	31	30	C
25.	10	**4***	10	76	D	**55**	17	44	15	21	B
26.	49	14	23	13	A	**56**	61	8	14	15	A
27.	10	18	19	52	D	**57**	13	51	13	20	B
28.	11	12	10	66	D	**58**	16	8	55	17	C
29.	16	17	54	11	C	**59**	21	10	35	29	C
30.	8	12	63	17	D	60	32	17	22	22	A

****response options figures are in percentage***

Table 4.8 above depicts a more detailed how the distractors functions in the 2018 Mathematics Basic Education Certificate Examination (BECE). The 60 multiple choice items of the Examination has 240 responses/options out of which sixty (60) are the key or correct options and the remaining 180 are the wrong options or distractors in the data set. Only 4 (2.2%) of the distractors were flawed because they were not chosen by at least 19 (5%) of the examinees. These distractors were choosing by only 1% and 4% which are less than 5% of examinees as suggested by Tarrant et al. (2009). By this definition, only 176 (97%) of 180 distractors on the 2018 Mathematics Basic Education Certificate Examination (BECE) functioned properly.

4.4 Summary of Findings

The findings are:

i) The 2018 Mathematics Basic Education Certificate Examination (BECE) internal consistency reliability is adequate, high and acceptable. Obtaining the reliability coefficient of 0.93 indicates an excellent reliability for the BECE 2018 Mathematics examination.

ii) Majority 50 (83%) of the items were of moderate and acceptable level of difficulty. Thus the BECE 2018 Mathematics items are considered good for possessing acceptable difficulty parameters.

iii) On the basis of item discriminating criteria, majority (63%) of the items functions very well differentiate between students of different abilities (Higher and lower ability students) while only 15% of the items were poor, thus cannot discriminate between students of at different ability levels.

iv) The item distractors were effective as 176 (97%) of 180 distractors on the 2018 Mathematics Basic Education Certificate Examination (BECE) functioned properly. This is in spite of the fact that, 4 (2.2%) of the distractors were flawed because they were not chosen by at least 19 (5%) of the examinees.

4.5 Discussions

The focus of this study was to evaluate the quality of the 2018 Mathematics Basic Education Certificate Examination (BECE) used in assessing students' abilities in Katsina Sate. The findings of this study are discussed under each research question in relation to the findings of similar studies, experts' opinions and other validated assertions.

Finding on the reliability coefficient (Estimate of Internal Consistency) of the 2018 Mathematics Basic Education Certificate Examination (BECE) revealed that, the items have excellent and acceptable internal consistency reliability. The overall internal consistency reliability of the test as measured by the KR-20 was 0.93, which is high in line with the Nunnally (1978), who recommended the acceptable value of 0.70, this is because the reliability coefficient is higher than the recommended acceptable value of 0.70. Also as generally established in the literature that, KR20 is considered to be a better reliability estimate than KR21 (Lord & Novick, 1968 & Traub, 1994). This means that, the BECE 2018 Mathematics examination was considered as a reliable tool for assessing students' Mathematics ability, thus satisfying its purpose.

Finding on the item statistics (difficulty index) of 2018 Mathematics Basic Education Certificate Examination (BECE) shows that, based on the established standards 50 (83%) of the items were of moderate and acceptable level of difficulty ($0.31 \leq 0.70$), 7 items (37%) were easy, and 3 (18%) were difficult. Thus, majority of the BECE 2018 Mathematics items are considered good for possessing acceptable difficulty parameters. However, on the basis of the item selection criteria of difficulty indices of ($0.31>P>0.70$), 10 items that failed to satisfy the condition are considered 'poor' items and are to be rejected. This finding agreed with the findings of Pande et al. (2013); Suruci and Rana (2014) and Bichi (2015) whose findings revealed that, majority (75%) and (78%) of the items respectively, were of acceptable level as far as difficulty was concern. However, the finding is in contrast with that, of Ayanwale, Adeleke and Mamadelo (2018); Bichi and Embong (2018) whose findings based on the criteria set for item statistics revealed that, majority (55%) of the items were problematic and rejected respectively.

Finding on the discrimination power of the test items used by Education Resources Centre (ERC) in 2018 Mathematics Basic Education Certificate Examination revealed indicates that, majority (60%) of the items functions very well and differentiate between students of different abilities (higher and lower ability students) while only 15% of the items were poor, thus cannot discriminate between students of at different ability levels. Considering the Ebel and Frisbie, (1991) set criteria of item selection based on its discriminating index (i.e. rpbs ≤ 0.20), 9 items are "poor" and failed to satisfy the condition. These poor items can be reviewed, replaced or eliminated completely from the test. This finding also denotes that 85% of the test items are in the range of good and very good acceptable discrimination level, these excellent items can be maintained with little modification and can be replicated in the subsequent examinations. This study is consistent with the findings of Pande et al. (2013), Suruci and Rana (2014) and Bichi (2015) whose study on evaluating the quality of multiple choice questions revealed having 65%, 80% and 75% of the items within acceptable to excellent discrimination parameters. However, the finding disagree with the findings of Ayanwale, Adeleke and Mamadelo (2018); Bichi and Embong (2018) whose findings based on the criteria set for item discrimination indices revealed that, majority of the items were faulty in terms of their discrimination values.

Similarly, Finding on how functional are the distractors of the test items in 2018 Mathematics Basic Education Certificate Examination indicates that, the options or distractors analysis more detailed information on the performances of the distractors, out of the 240 options with 60 key or correct options; in the remaining 180 distractors, only, 4 (2.2%) of the distractors were flawed because they were not chosen by at least 19(5%) of the examinees, some were even chosen by one examinee. This means that the distractors of the test items in 2018 Mathematics Basic Education Certificate

Examination functioned effectively, only that the flawed options in the data set should be revised to make it more plausible choice because it is not contributing to the performance of the items. This can affect the entire test score reliability and the validity of the results, as according to Gajjar, Sharma, Kumar & Rana (2014) and Tarrant et al. (2009) a functional distractor is one that was selected by at least 5% of examinees. If a distractor appears so unlikely that almost no examinee selected it, such an item is not contributing to the performance of the item. This finding can be said to allay the fear that, flawed MCQ items affect the performance of high-achieving students' more than borderline students (Tarrant et al. 2009). Constructing balanced MCQs, therefore, addresses the concerns of the students of getting an acceptable average grade, (Carroll, 1993). Rodriguez (2005) says that numbers of non-performing distractors (NFDs) also affect the difficulty and discriminative power of an item.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter centered on Summary of the study, Conclusions, Recommendations from the study and Recommendations for further studies.

5.2 Summary

This study assessed the psychometric properties of 2018 Mathematics Basic Education Certificate Examination (BECE) in Funtua Education Zone, Katsina State. In the statement of the problem, the study focused on the poor performance of students in BECE especially in Mathematics. The study developed four objectives and corresponding research questions in assessing psychometric properties of 2018 Mathematics (BECE) in Funtua Education Zone, Katsina state. This study covers the responses of students in Mathematics multiple choice items sets and administered by Education Resource Centre (ERC) Katsina in 2018. This research work was restricted to test and test items of 2018 mathematics Basic Education Certificate Examination conclude in all public junior secondary schools in Funtua Education Zone, Katsina state.

The study also provides review of literature relevant to the study under the following sub-headings; conceptual framework, theoretical framework (Classical Test Theory and Item Response Theory), Review of related empirical studies, Summary and Uniqueness of the study. Above all, this research work was based on Classical Test Theory.

The study ex-post facto design, the population of this study comprises all junior secondary school students enrolled for 2018 Mathematics Basic Education Certificate

Examination (BECE) in a state owned secondary schools (Public) in Funtua Education Zone. There were twenty one (21) schools in the zone with the total number of 13,742 students. The samples of 378 candidates were selected through multi-stage cluster sampling technique, the instruments used for this study were 2018 Mathematics Basic Education Certificate Examination and a proforma form. The data was collected directly from Education Resource Centre (ERC) Katsina. EXCEL, SPSS and ITEMAN 4.3 software were used to analyze the data collected.

The data was presented with 378 candidates, 60 items, 4 options (A-D), 180 distractors including 60 Keys, Mean score of 33.34 and Standard Deviation of 11.91. A reliability coefficient of 0.93 was obtained which indicates an excellent reliability for the BECE 2018 Mathematics. Majority 50 (83%) of the items were of moderate and acceptable level of difficulty. On the basis of item discrimination, majority 36 (60%) of the items differentiate between higher and lower ability candidates. The distractors were effective and functioned properly as 176 (97%) out of 180 distrators contained in the 2018 Mathematics BECE. Lastly, the study centered on summary, conclusions, recommendations from the study and recommendations for further studies.

5.3 Conclusion

This study was guided by four (4) research questions and one of the conclusion drawn is that, the reliability coefficient of 2018 Mathematics Basic Education Certificate Examination (BECE) items is 0.93 as determined using Kuder-Richardson (KR-20) formulae. It was also concluded from this study that fifty (50) items which is equivalent to 83% of the total items in the test are psychometrically appropriate in terms of difficulty. Fifty one (51) items which is equivalent to 85% of the total test items are psychometrically appropriate in terms of discrimination. One hundred and

seventy six (176) out of 180 distractors which is equivalent to (97%) were effective and functioned properly.

It was also concluded based on these four (4) psychometric properties of reliability, item statistics, item discrimination and distractor effectiveness that, the test items of 2018 Mathematics Basic Education Certificate Examination were valid, reliable and have discriminate between high ability and low ability students. The test items also fall within acceptable difficulty and discriminate between students who knows the subject matter and vice versa. Therefore, the validated and acceptable version of 2018 Mathematics Basic Education Certificate Examination should be retained and kept in the item Bank for future used.

5.4 Recommendations

5.4.1 Recommendations from the Study

Based on the findings of this study, the following recommendations were made;

i. Since the 2018 Mathematics Basic Education Certificate Examination (BECE) internal consistency reliability coefficient is adequate, highly and acceptable with 0.93 index. It was recommended that, the test was reliable and therefore should be used by teachers and other personnel to assess junior secondary school III students' achievement as well as to prepare them for internal and external examinations.

ii. Since the findings of this study showed that the students' ability is moderate, it was recommended to the students to improve their ability into high ability through extra lessons and refresher courses.

iii. On the basis of distractors, 176 out of 180 distractors functioned effectively. It is therefore recommended that, this format of options (A - D) should be maintained.

iv. All Basic Education Certificate Examination (BECE) multiple-choice tests conducted by Education Resource Centre (ERC) Katsina should be subjected to psychometric test for validity, reliability, item statistics, item discrimination and distractor analysis as this will give the society's public trust about the test conducted by the Centre.

5.4.2 Recommendations for Further Study

The following suggestions are made for further studies;

i. A study should be set up and conducted on the assessment of psychometric properties of other Basic Education Certificate Examination (BECE) subjects conducted by Education Resource Centre (ERC).

ii. Further research should be carried out on assessment of psychometric properties of Mathematics Basic Education Certificate Examination (BECE) conducted in Private Junior Secondary School in Funtua Education Zone.

iii. Another study should be conducted to assess the psychometric properties of BECE conducted in Schools under Science Board in Katsina State.

iv. Another study should also be conducted to assess other psychometric properties of Basic Education Certificate Examination (BECE) such as content validity, differential item functioning (DIF) and standard error measurement (SEM).

References

Adebule, S.O. (2004). Relationship between difficulty and discriminating indices of multiple-choice and true false test items in a mathematics test. *InternationalJournal of Education and research*. www.ijern.com ISSN: 2201-6333. Retrieved on 17thJan, 2017.ISSN 2201-6740, 12 December, 2016.

Aiken, L.A. (1979). *Psychological Testing and Assessment*. London: Allyn and Bacon.

Akinade, E.A. &Owolabi, T. (2009). *Research Methods: A pragmatic Approach for social sciences, Behavioral sciences and Education.* Lagos: ConnelPublication.

Aloysius, N. C. (2013). Measuring teachers' competencies in constructingclassroom-based testsinNigerian secondary schools: Need for a test construction skill inventory. *Academic Journals of Educational Research and Reviews,*http://www.academicjournals.org/ERR

Anastasi, A. & Urbina, S. (1997). *Psychological Testing* (7thed.) India: Pearson Education Inc. PHI learning Private Limited.

Anikweze, C. M. (2013). *Measurement and Evaluation for Teacher Education* (3rded). Ibadan: Constellation (Nigeria) Publishers.

Arikunto (2003) in Fajar F. (2013). Correlation Between Student' Vocabulary Mastery and Their Reading Comprehension. UniversitasPendidikan Indonesia. Retreived on February 2nd 2018, form http://repository.upi.edu

Ary, D., Jacobs, L. C., Razavieh, A. (2002). *Introduction to Research in Education* (6thed), Wadsworth, California.

Avwokeni, J.A (2006), *Research Methods: Process, Evaluation and Critique*. Porthacourt: Unicampus Tutorial Services.

Awotunde, P. O., Ugodulunwa, C. A., &Uzoji, E. D. (1997). *Fundamentals of educational measurement and evaluation.* Jos: Deka Publishers, Nigeria

Ayanwale, M. A., Adeleke, J. O. &Mamadelo, T. I. (2018). An assessment of item statistics estimates of basic education certificate examination through classical test theory and item response theory approach. *International Journal of Educational Research Review*, 3(4), 55-67

Boyle, G. J., Saklofske, D. H., & Mathew, G. (2015). *Measures of Personality and Social Psychological Constructs*. Amsterdam:Elsevier/Academic Press. ISBN9-780123869159. Doi.org/10.1016/B978-0-12-3869159.00001-2

Bacon, D. R. (2003). Assessing learning outcomes: A comparison of multiple-choice and short answer questions in a marketing context. *Journal of Marketing Education, 25,* http://dx.doi.org/10.1177/0273475

Backhoff, E., Larrazolo, N., & Rosas, M. (2000). *The level of difficulty and discrimination power of the Basic Knowledge and Skills Examination (EXHCOBA)*. Revista Electronica de InvestigacionEducativa, 2 (1). Retrieved on February 2nd 2018, from http://redie.uabc.mx/vol2no1/contents-backhoff.html

Baker, B. F. (2001). *The basics of item response theory*. (2nded.). ERIC Clearinghouse on Assessment and Evaluation, University of Maryland, College Park, MD.

Bichi, A. A. (2015). Item analysis using a derived science achievement test data. *International Journal of Science and Research (IJSR)*. Vol/Issue: 4 (5),

Birnbaum, A. (1968). Some latent traits models and their use in inferring an examinee's ability: *Theories of mental test score*. Reading, MA: Addison-Wesley.

Braden, J. (2009). Historical and contemporary definitions of validity: critical issues in assessment validity. Retrieved on 6th February 2018 from http://www.education.com/reference/article/validity/

Brown, J. D. (2004). *Language Assessment Principles and Classroom Practices*. San Francisco: Longman, Inc

Brown J. D. (2005). *Testing in Language Programs*: A Comprehensive guide to English Language assessment. New York: Mc Grow-Hill College.

Brown, W. (1910). Some experimental results in the correlation of mental abilities. *Journal of psychology, 3, 296-322*

Carrol, J. B. (1993). *HumanCognitive Abilities: A survey of factor analytic studies*. New York, NY, US: Cambridge University Press. ISBN 0-521-38712-4

David, S., Murphy, K. R. & Charles, O. (2005). *Psychological testing:principles and applications (6thed)*. Upper Saddle River, N. J.: Pearson/Prentice Hall. ISBN 0-13-189172-3

Dikko, S. (2015). *Handbook on Measurement and Evaluation*. Dutsinma: IsahKaita College of Education Dustinma.

Downing, S. M. (2005). The effects of violating standard item writing principles on tests and students: the consequences of using flawed test items on achievement examinations in medical education. *Advances in Health Sciences Education*. http://dx.doi.org/10.1007/s10459-4019

Dusen, V. J., Mojisola, T., Elhai, D. J., & Todd, K. (2015). Gratitude depression and PTSD: Assessment of structural relationship. Retrieved from http://dx.doi.org/10.1016/j.psychres.2015.11.036.

Eboh, E. C. (2009). *Social and economic research: Principles and methods* (2nded). Enugu: African Institute for Applied Economics

El-Uri, F. I., Malas, N. (2013). *Analysisi of Use of a single best answer format in an undergraduate medical examination*. Qatar Med. J. (1) 3.

Embreston, S.E. &Reise, S.P. (2000). *Item Response Theory for Psychologists*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Federal Republic of Nigeria, (1998) *National Policy on Education.* (3rded*)*. Nigerian Educational Research and Development Council (NERDC), Lagos Federal Government Press.

Federal Republic of Nigeria, (2013) *National Policy on Education (6thed)*. National Educational Research Council (NERC) Press: Lagos Nigeria.

Fridah, M. W. (2002). *Sampling in Research*, Retrieved on 4th February 2018, from http://trochim.human.cornell.edu/tutorial/mugo/tutorial.html

Gronlund, N. E. (1993). *How to Make Achievement Tests and Assessments*. Boston: Allyn and Bacon.

Hambleton, R.K. & Jones, R.W. (1993). Comparison of Classical Test Theory and Item Response Theory and their Applications to Test Development. *Educational Measurement*. Issues and Practice 12(3): 38-47.http://dx.doi.org/10.1111/j.1745-3992.1993.tb00543.x

Hambleton, R.K., Swaminathan, H. & Rogers, H.J. (1991). *Fundamentals of Item Response Theory.*Vol. 2. Newbury Park, CA: Sage

Harbor-Peters, V.F.A. (1999). *Noteworthy Points in Measurement and Evaluation*. Snaap Press Ltd. Enugu.

Instructional Assessment Resources, (2011). *Item Analysis*. Retrieved November 10, 2016 from University of Texas at Austin, http://www.utexas.edu/academic/ctl/assessment/iar//report/itemanalysis/php

James W. P., David, C. B., Neal, M. K., Susan, H. F., Steven, M. L., Jeffry, C. &Madhabi, C. (2014). "*Can today's standardized achievement tests yield instructionally useful data?: Challenges, Promises and the state of the art",*Quality Assurance in Education, Vol. 22 Issue 4, pp. 303-309. Retrieved from https://dx.doi.org/10.1108/QAE07-2014-0033.

Kaufman, A. S. & Elizabeth, O. L. (2001). *Assessing Adolescence and Adult Intelligence*. Boston: Allyn and Bacon

Kerlinga, F.N (1973) in Nworgu, B.G (1991). *Educational Research: Basic Issues & Methodology*. Ibadan: Wisdom Publishers Limited.

Kolawale, E.B. (2007) Cognitive Entry Grades as Predictor of Students' Academic Performance in Mathematics in Nigerian Universities. *Medwell Journal of Social Science 2(3), 323-324.*

Kumari, A. & Bhattacharya, S. B. (2016). Item Analysis of Diagnostic Test in English Language Skills of Secondary School Students. *IOSR Journal of Research & Method in Education.* e-ISSN:2320-7388, P-ISSN: 2320-737X. DOI: 10.9790/7388-0604010105

Larsen, R. R. & Buss, D. M. (2018). Personality Psychology: Domains of knowledge about Human Nature. *Journal of Research in Personality*, 98(1), 160-17

Matlock-Hetzel, S. (1997). *Basic Concepts in Item and Test Analysis*. A paper presented at the Annual meeting of the southwest Educational Research Association. Austin

McMillan, C. (2011). *Esucational Research: Fundamentals for theconsumer*(6th ed). New York: Longman

Mohamad S. N., (2002). *Testing an interpreting in classrooms*. International Islamic University of Malaysia Publications.

Moyinoluwa, T.D. (2015). Analysing the Psychometric Properties of Mathematics in Public Examinations in Nigeria. *Research on Humanities and Social Sciences*. Vol. 5, No.7, 2015. ISSN (paper) 2224-5766 ISSN (online) 2225-0484. www.iiste.org

Mustapha, I.A and Yunusa, U. (2013). *Measurement and Evaluation*: An Overview. Kano: Prints and Publishing Coy. Ltd.

National Council on Measurement and Education. (1999). *Standards for educational and psychological testing*. Washington, DC: American Psychological Association.

Newell, R. J., (2002). *A different look at accountability*: The Edvisions approach. Phi Delta Kappan, 84: 208

NTI (2013). *Measurement and Evaluation for Postgraduate Diploma in Education*. Kaduna: National Teachers' Institute. PGD 105, p.35-37.

Nurliyanto, D. (2015). *Test Item Analysis of the Final Examination on Economics Subject in Grade Xii IPS SMA NegeriBanyumas*. Unpublished Undergraduate Thesis. Yogyakarta State University.

Nunally, J. C. (1978). *Psychometric Theory*. (2nd ed). New York. McGraw-Hill

Nworgu B.G. &Agah J.J. (2012). Application of three parameter logistic model in the Calibration of a mathematics Achievement Test. *Journal of Educational Assessment in Africa* 29 (7) 162 – 172.

Nworgu, B. G. (2006). *Educational Measurement and Evaluation: Theory and Practice*. Nsukka: University Trust Publishers.

Ojerinde D. (2013). *Classical test theory (CTT) VS item response theory (IRT)*: An evaluation of the comparability of item analysis results. A guest lecture presented at the Institute of Education, University of Ibadan on May 23rd, 2013.

Onuigbo, A.U. (2003). *Simplified Measurement and Evaluation*. Enugu: C.O. Ondo Publishing Ltd.

Osadebe, P.U. (2014). Construction of Economics Achievement Test for Assessment of Students. *World Journal of Education*. Retrieved on July 13th, 2017 from http://dx.doi.org/10.5430/wje.v4n2p58

Osterlind, S. J. (2006). *Modern Measurement: Theory and Applications of Mental Appraisal (2nd ed)*.Upper Sadle River, NJ: Prentice Hall

Ovwigo, B.O (2013). Empirical Demonstration of Techniques for Computing the Discrimination Power of a Dichotomous Item Response Test. *IOSR Journal of Research and Method in Education (IOSR-JRME*).e-ISSN: 2320–7388, ISSN: 2320–737X. www.iosrjournals.org

Popoola, S. O. (2011). *Comprehensive Guide to Reasearch Methodology*. Retrieved on February 2nd 2018, from https://nairaproject.com/m/blog/006.html

Quaigrain, K. &Arhin, A. K. (2017). Using reliability and item analysis to evaluate a teacher-developed test in educational measurement and evaluation. *IOSR Journal of Education. Cogent Education* retrieved on March 21st, 2018 from http://dx.doi.org/10.1080/2331186X.2017.1301013

Rasch, G. (1960). *Probabilistic Models for some Intelligent and Attainment Tests*: Chicago: MESA press ltd.

Schumacker, R.E. (2009). Classical Item Analysis International. *Journal of Educational and Psychological Assessment*, Vol. 1 No.1

Suruchi, K. &Rana, S. R., (2015). Test item analysis and relationship between difficulty level anddiscrimination index of test items in Biology.*Indian Journal of Research*. 3(6), 56

Semijima, (1969), In Anastasi, A. & Urbina S. (1997). *Psychological Testing* (7thed.) India: Pearson Education Inc. PHI learning Private Limited.

Sidhu, K.S. (2005) *New Approaches to Measurement and Evaluation*. India Sterling Publishers Private Ltd.

Shafizan, S. (2013). Item analysis of student comprehensive test for research in teaching beginner string ensemble using model based teaching among music students in public Universities. *InternationalJournal of Education and Research*. www.ijern.com. ISSN: 2201-6740 (print) ISSN: 2201-6740 (online) Vol. 1, No 12, 2013.

Spearman, C. (1910). Correlation Calculated from Faulty Data. *British Journal of Psychology*. 3,271 - 295

Tarrant, M., & Ware, J. (2008). Impact of item-writing flaws in multiple-choice questions on student achievement in high-stakes nursing assessments. *Medical Education, 42, 198-206.*http://dx.doi.org/10.1111/j.1365-2923.2007.02957.x.

Terrant, A., Vedle, G. V., Beaton, D., Hogg-Johnston, S. & Hurwitz, E. (2009). Rasch analysis provides new insights in to the measurement properties of the next disability index. *American College of Rheumatogy. 61(4) 544-551*

Ugodulunwa, C.A and Ugwuanyi, C.I (1999). *Understanding Educational Evaluation*. Jos: Fab Anieh (Nig.) Ltd.

Wang, T., & Hanson, A.(2001).*Development and an item response model that incorporates response time.* A paper presented to the annual meeting of the American Education Research Association in Settle, April 26th 2001.

WebCrowler, (2007). *Standardized Achievement Test*. Retrieved on 15th October, 2017. from https://www.edglossary.org/standardized-test/

Yoloye, E. A. (2004). *Continuous assessment tests and scores: Scope process and procedures*. A paper presented at the workshop on transition from Junior Secondary School, held at University of Ilorin, Ilorin, Kwara state, Nigeria.

APPENDIX C

Result Analysis Output of EXCEL and (SPSS)

Cell	Entity	Formula Used
388	K	=SUM(B3:L3)
384	Pj	=B386/COUNT(B4:B382)
385	Qj	=SUM(1-B384)
386	p*q	=SUM(B384*B385)
389	∑pjqj	=SUM(B386:BI386)
390	VAR	VARP(BJ4:BJ381)
391	P_{KR20}	=SUM(B388/(B388-1)*(1-B389/B390)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Difficulty_index	60	.13	.80	.5578	.14620
Valid N (listwise)	60				

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Item_discrimination	60	-.17	.74	.4112	.21305
Valid N (listwise)	60				

Report

	A	B	C	D
Mean	27.3167	25.0000	22.7833	22.9667
N	60	60	60	60
Std. Deviation	22.30489	22.76036	19.33127	16.77565

APPENDIX D

Result Analysis Output (ITEMAN 4.3)

Item Properties

Item	Key	points	average	difficulty	discrimination
Q #1	C	1	0.8	0.79	0.30
Q #2	B	1	0.7	0.71	0.62
Q #3	C	1	0.7	0.75	0.38
Q #4	B	1	0.6	0.57	0.47
Q #5	A	1	0.5	0.52	0.63
Q #6	A	1	0.7	0.67	0.16
Q #7	A	1	0.6	0.61	0.66
Q #8	D	1	0.3	0.34	0.09
Q #9	A	1	0.1	0.13	-0.04
Q #10	A	1	0.4	0.44	0.12
Q #11	B	1	0.6	0.57	0.71
Q #12	B	1	0.5	0.49	0.44
Q #13	B	1	0.3	0.33	0.24
Q #14	D	1	0.5	0.48	0.39
Q #15	B	1	0.7	0.68	0.49
Q #16	B	1	0.6	0.65	0.46
Q #17	A	1	0.5	0.51	0.69
Q #18	A	1	0.6	0.60	0.38
Q #19	A	1	0.3	0.25	-0.15
Q #20	A	1	0.7	0.71	0.50
Q #21	B	1	0.7	0.67	0.47
Q #22	C	1	0.6	0.63	0.45
Q #23	A	1	0.7	0.75	0.59

Q #24	B	1	0.7	0.66	0.57
Q #25	D	1	0.8	0.76	0.43
Q #26	A	1	0.5	0.49	0.36
Q #27	D	1	0.5	0.52	0.65
Q #28	D	1	0.7	0.66	0.55
Q #29	C	1	0.5	0.54	0.40
Q #30	D	1	0.2	0.17	-0.17
Q #31	B	1	0.6	0.60	0.47
Q #32	A	1	0.7	0.66	0.57
Q #33	A	1	0.7	0.69	0.49
Q #34	D	1	0.5	0.54	0.57
Q #35	B	1	0.7	0.66	0.35
Q #36	A	1	0.7	0.66	0.51
Q #37	A	1	0.7	0.71	0.40
Q #38	D	1	0.6	0.65	0.64
Q #39	C	1	0.6	0.63	0.35
Q #40	A	1	0.7	0.66	0.55
Q #41	C	1	0.5	0.47	0.56
Q #42	B	1	0.7	0.65	0.24
Q #43	D	1	0.6	0.57	0.66
Q #44	D	1	0.6	0.61	0.63
Q #45	D	1	0.3	0.33	-0.07
Q #46	B	1	0.6	0.65	0.36
Q #47	C	1	0.5	0.52	0.33
Q #48	A	1	0.7	0.67	0.59
Q #49	B	1	0.6	0.64	0.62
Q #50	C	1	0.6	0.62	0.48

Q #51	D	1	0.5	0.53	0.35
Q #52	C	1	0.4	0.43	0.45
Q #53	B	1	0.6	0.57	0.47
Q #54	C	1	0.3	0.31	0.04
Q #55	B	1	0.4	0.44	0.47
Q #56	A	1	0.6	0.61	0.74
Q #57	B	1	0.5	0.51	0.29
Q #58	C	1	0.6	0.55	0.39
Q #59	C	1	0.3	0.35	0.26
Q #60	A	1	0.3	0.32	0.07

APPENDIX E

Result Analysis Output (ITEMAN 4.3)

Distractors

Item	Key	points	A	B	C	D	points	A %	B %	C %	D %	point%
Q #1	C	1	30	24	298	22	4	8%	6%	79%	6%	0.0
Q #2	B	1	39	269	26	40	4	10%	71%	7%	11%	0.0
Q #3	C	1	44	25	283	23	3	12%	7%	75%	6%	0.0
Q #4	B	1	47	216	49	61	5	12%	57%	13%	16%	0.0
Q #5	A	1	197	38	43	94	6	52%	10%	11%	25%	0.0
Q #6	A	1	252	28	25	65	8	67%	7%	7%	17%	0.0
Q #7	A	1	231	54	25	64	4	61%	14%	7%	17%	0.0
Q #8	D	1	76	65	102	130	5	20%	17%	27%	34%	0.0
Q #9	A	1	50	82	142	100	4	13%	22%	38%	26%	0.0
Q #10	A	1	166	47	67	92	6	44%	12%	18%	24%	0.0
Q #11	B	1	56	217	40	60	5	15%	57%	11%	16%	0.0
Q #12	B	1	66	186	60	60	6	17%	49%	16%	16%	0.0
Q #13	B	1	92	123	81	75	7	24%	33%	21%	20%	0.0
Q #14	D	1	52	72	64	181	9	14%	19%	17%	48%	0.0
Q #15	B	1	39	257	35	42	5	10%	68%	9%	11%	0.0
Q #16	B	1	66	245	28	29	10	17%	65%	7%	8%	0.0
Q #17	A	1	192	42	80	48	16	51%	11%	21%	13%	0.0
Q #18	A	1	225	45	50	50	8	60%	12%	13%	13%	0.0
Q #19	A	1	96	86	103	91	2	25%	23%	27%	24%	0.0
Q #20	A	1	267	16	51	44	0	71%	4%	13%	12%	0.0
Q #21	B	1	30	253	37	50	8	8%	67%	10%	13%	0.0
Q #22	C	1	58	39	237	42	2	15%	10%	63%	11%	0.0
Q #23	A	1	283	5	36	51	3	75%	1%	10%	13%	0.0

Q #24	B	1	34	249	49	46	0	9%	66%	13%	12%	0.0
Q #25	D	1	36	16	36	289	1	10%	4%	10%	76%	0.0
Q #26	A	1	186	53	86	51	2	49%	14%	23%	13%	0.0
Q #27	D	1	36	69	73	197	3	10%	18%	19%	52%	0.0
Q #28	D	1	40	46	39	251	2	11%	12%	10%	66%	0.0
Q #29	C	1	60	66	203	40	9	16%	17%	54%	11%	0.0
Q #30	D	1	32	46	237	63	0	8%	12%	63%	17%	0.0
Q #31	B	1	26	225	58	67	2	7%	60%	15%	18%	0.0
Q #32	A	1	251	17	62	47	1	66%	4%	16%	12%	0.0
Q #33	A	1	261	22	43	46	5	69%	6%	11%	12%	0.0
Q #34	D	1	45	66	50	203	14	12%	17%	13%	54%	0.0
Q #35	B	1	33	249	41	46	9	9%	66%	11%	12%	0.0
Q #36	A	1	250	26	47	52	3	66%	7%	12%	14%	0.0
Q #37	A	1	270	29	34	42	3	71%	8%	9%	11%	0.0
Q #38	D	1	51	46	32	244	5	13%	12%	8%	65%	0.0
Q #39	C	1	31	53	238	49	7	8%	14%	63%	13%	0.0
Q #40	A	1	248	54	28	39	9	66%	14%	7%	10%	0.0
Q #41	C	1	54	43	178	101	2	14%	11%	47%	27%	0.0
Q #42	B	1	54	246	23	54	1	14%	65%	6%	14%	0.0
Q #43	D	1	79	30	45	214	10	21%	8%	12%	57%	0.0
Q #44	D	1	55	47	40	229	7	15%	12%	11%	61%	0.0
Q #45	D	1	70	103	72	123	10	19%	27%	19%	33%	0.0
Q #46	B	1	36	245	50	39	8	10%	65%	13%	10%	0.0
Q #47	C	1	45	74	197	53	9	12%	20%	52%	14%	0.0
Q #48	A	1	255	28	38	52	5	67%	7%	10%	14%	0.0
Q #49	B	1	37	242	34	55	10	10%	64%	9%	15%	0.0
Q #50	C	1	51	20	233	66	8	13%	5%	62%	17%	0.0

Q #51	D	1	86	48	29	200	15	23%	13%	8%	53%	0.0
Q #52	C	1	84	32	163	88	11	22%	8%	43%	23%	0.0
Q #53	B	1	31	216	48	67	16	8%	57%	13%	18%	0.0
Q #54	C	1	113	27	116	113	9	30%	7%	31%	30%	0.0
Q #55	B	1	66	165	58	79	10	17%	44%	15%	21%	0.0
Q #56	A	1	232	29	52	55	10	61%	8%	14%	15%	0.0
Q #57	B	1	50	193	50	75	10	13%	51%	13%	20%	0.0
Q #58	C	1	62	29	209	66	12	16%	8%	55%	17%	0.0
Q #59	C	1	81	37	132	108	20	21%	10%	35%	29%	0.1
Q #60	A	1	120	64	85	84	25	32%	17%	22%	22%	0.1

APPENDIX F

Candidates' Responses on 2018 Mathematics (BECE) in Funtua Education Zone

Number of Items From 1 – 60

1	1	1	1	1	0	1	0	0	0	1	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	0	1	1	1	0	1	0	1	1	1	1	0	1	0	1	1	0	1	1	0
1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	0	0	1	1	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	0	0	1	1	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	0	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	0	0	1	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	0	1	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	1	1	1	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	0	1	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1	1	0	1	0	0	1	1	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0	1	1	0	1	0	0	1	0	1	1	1	1	0	0	0	0	0	1	1	0	1	0	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	1	0
1	1	1	1	1	0	1	0	0	0	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	1	0	0	1	1	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	0	0	1	1	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	0	1	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	1	0	0	0	1	0	0	1	0	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	A	1	1	1	0	0	0	1	1	1	1	0	1	0	1	1	1	1	1	0
0	0	0	0	0	1	0	0	1	0	1	1	0	1	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	0	1	1	1	0	0	1	1	0	0	1	0	0	1	0	0	0	1	0	1	0	1	0	0	1	1	0	0	1	0	0	1	0	1	A	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
1	0	0	1	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	A	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
1	0	0	1	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	A	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	1	0	1	0	1	0	0	0	1	1	1	0	1	0	0	1	0	1	1	0	0	1	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	1	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0
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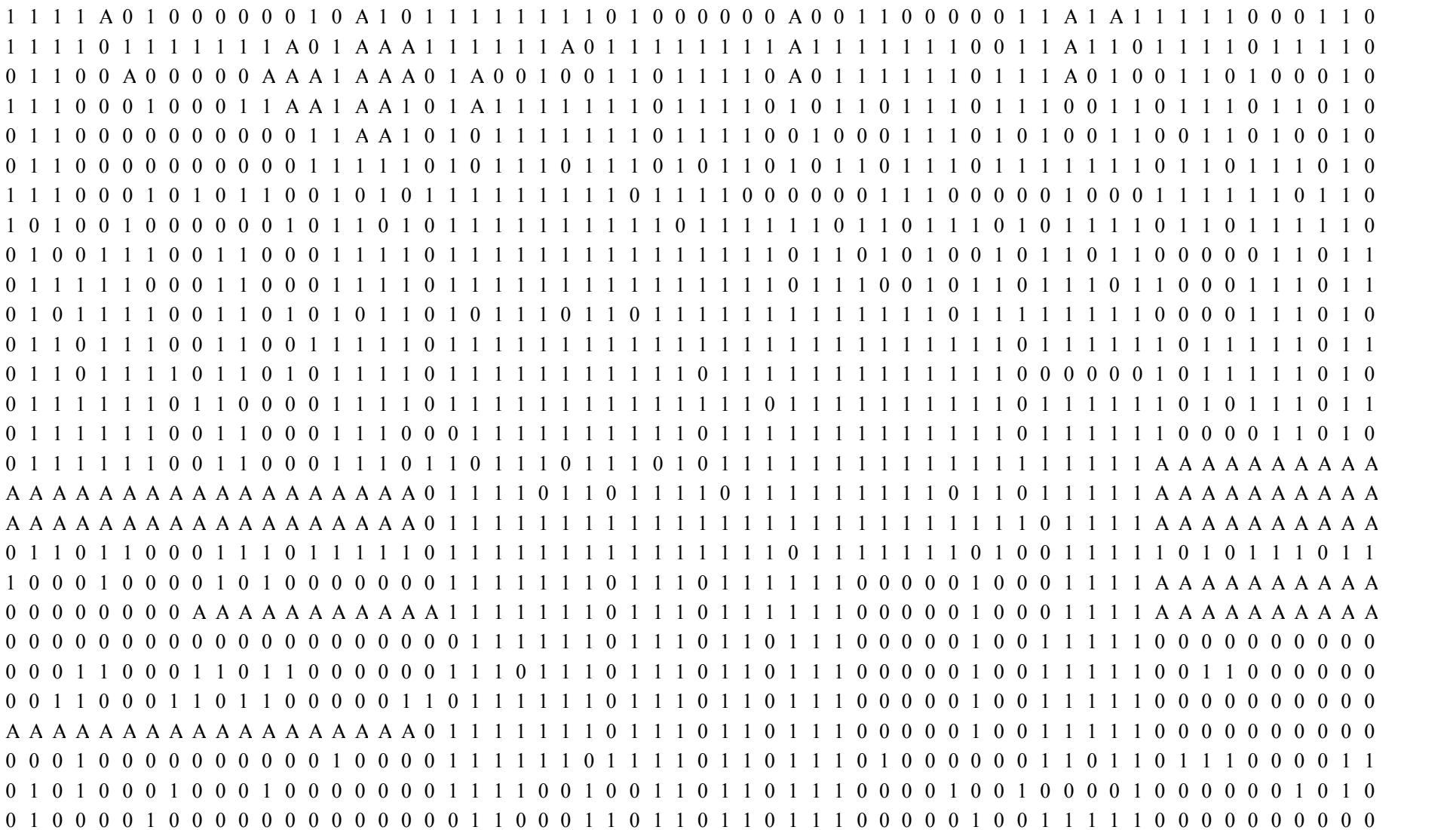

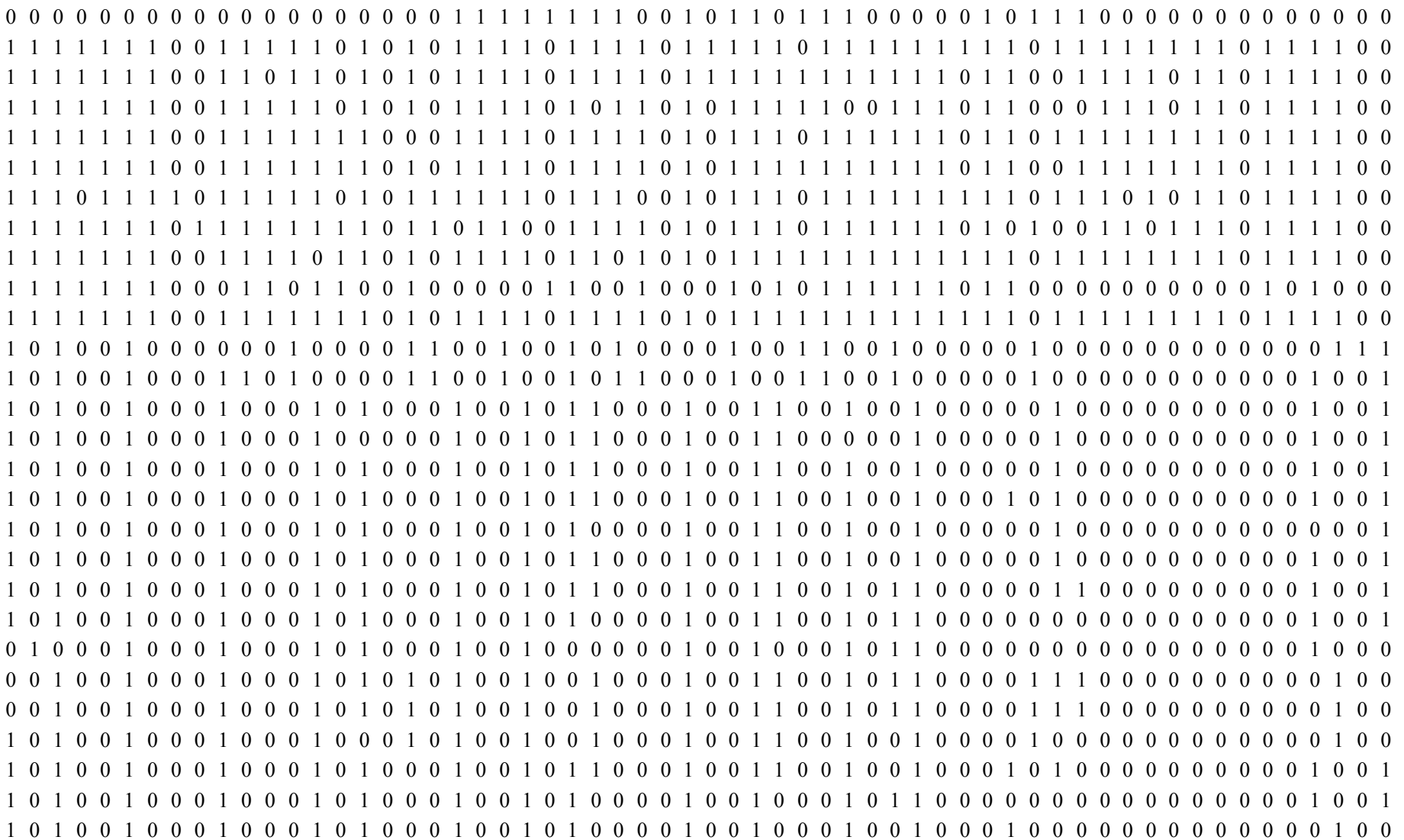

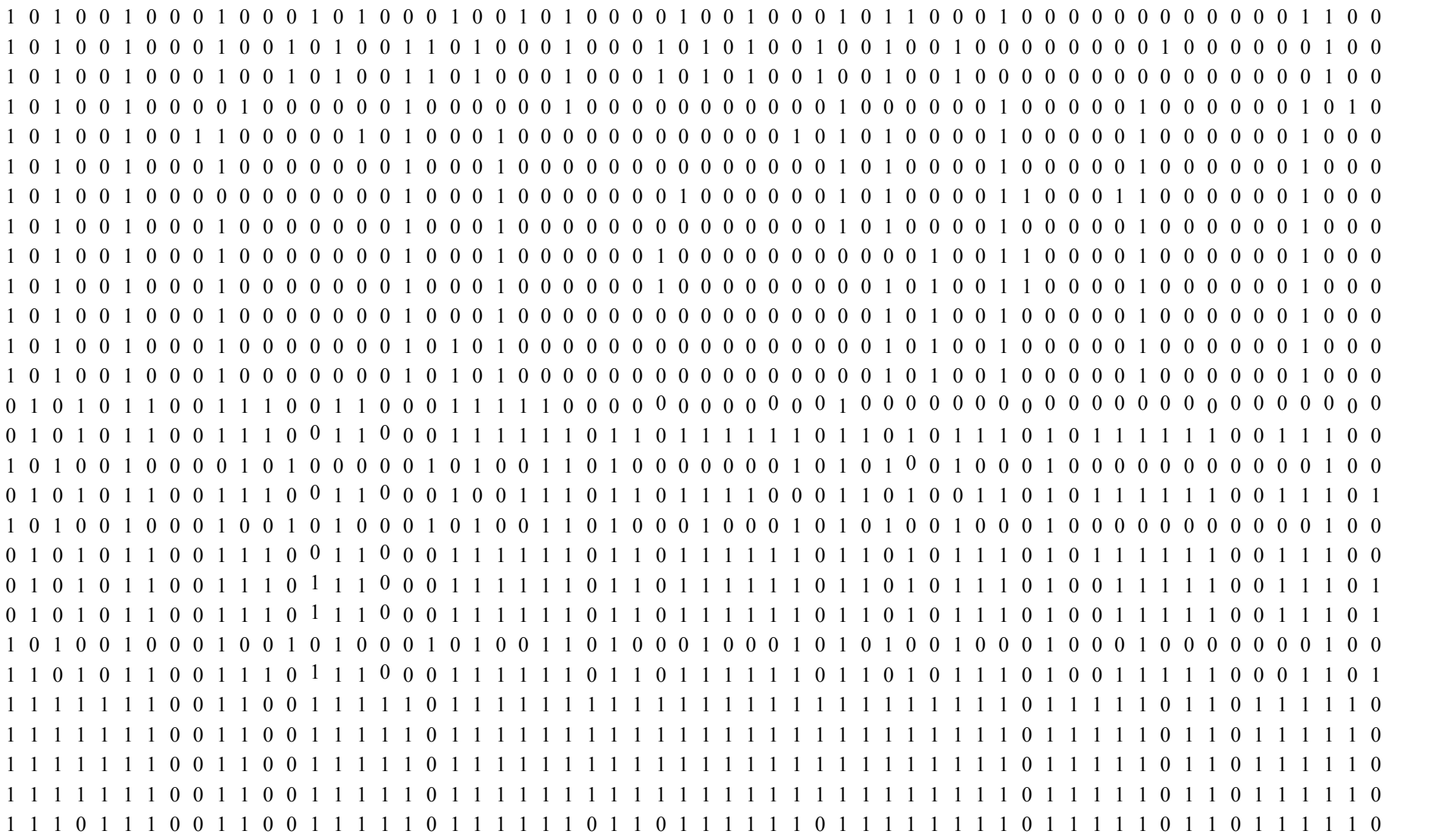

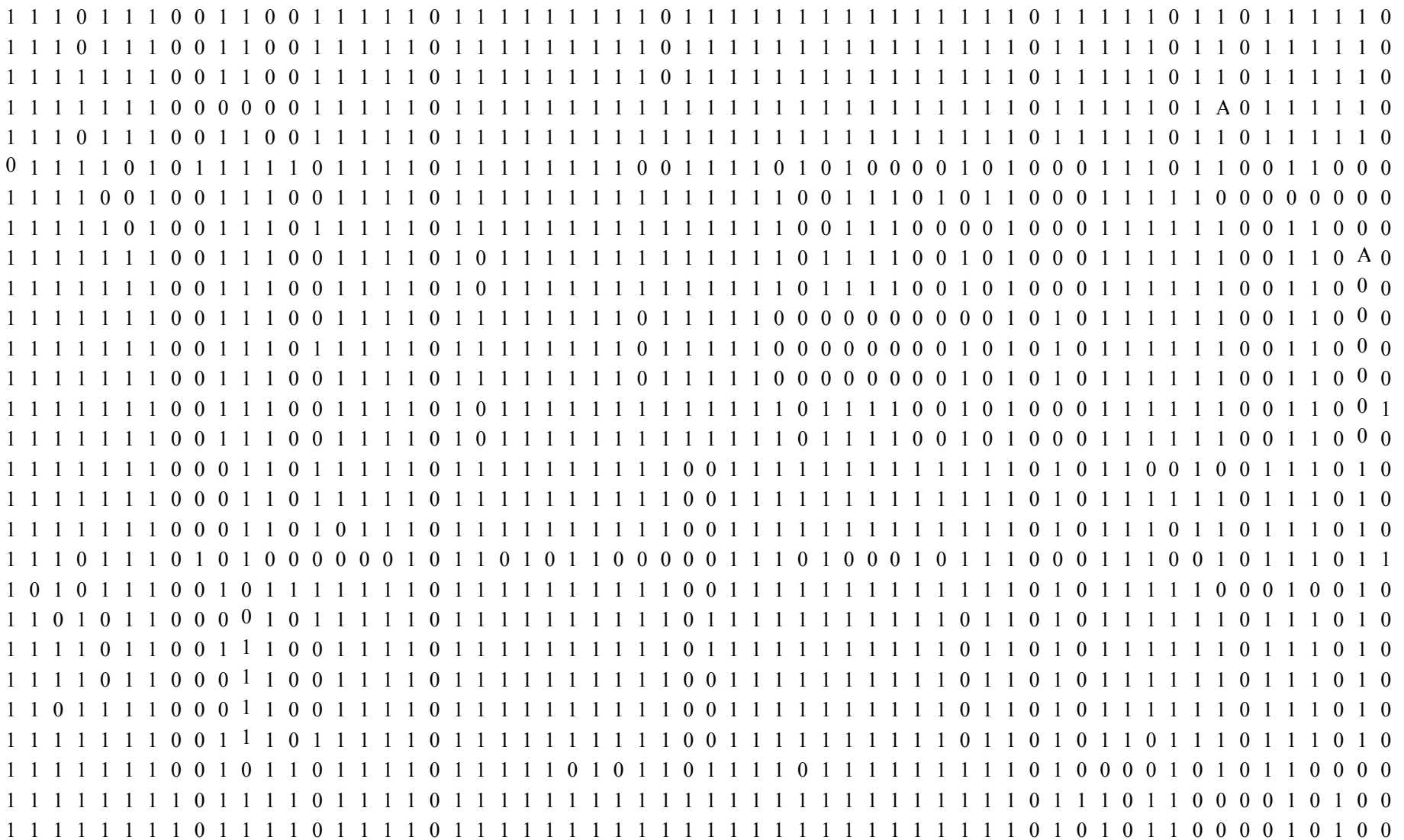

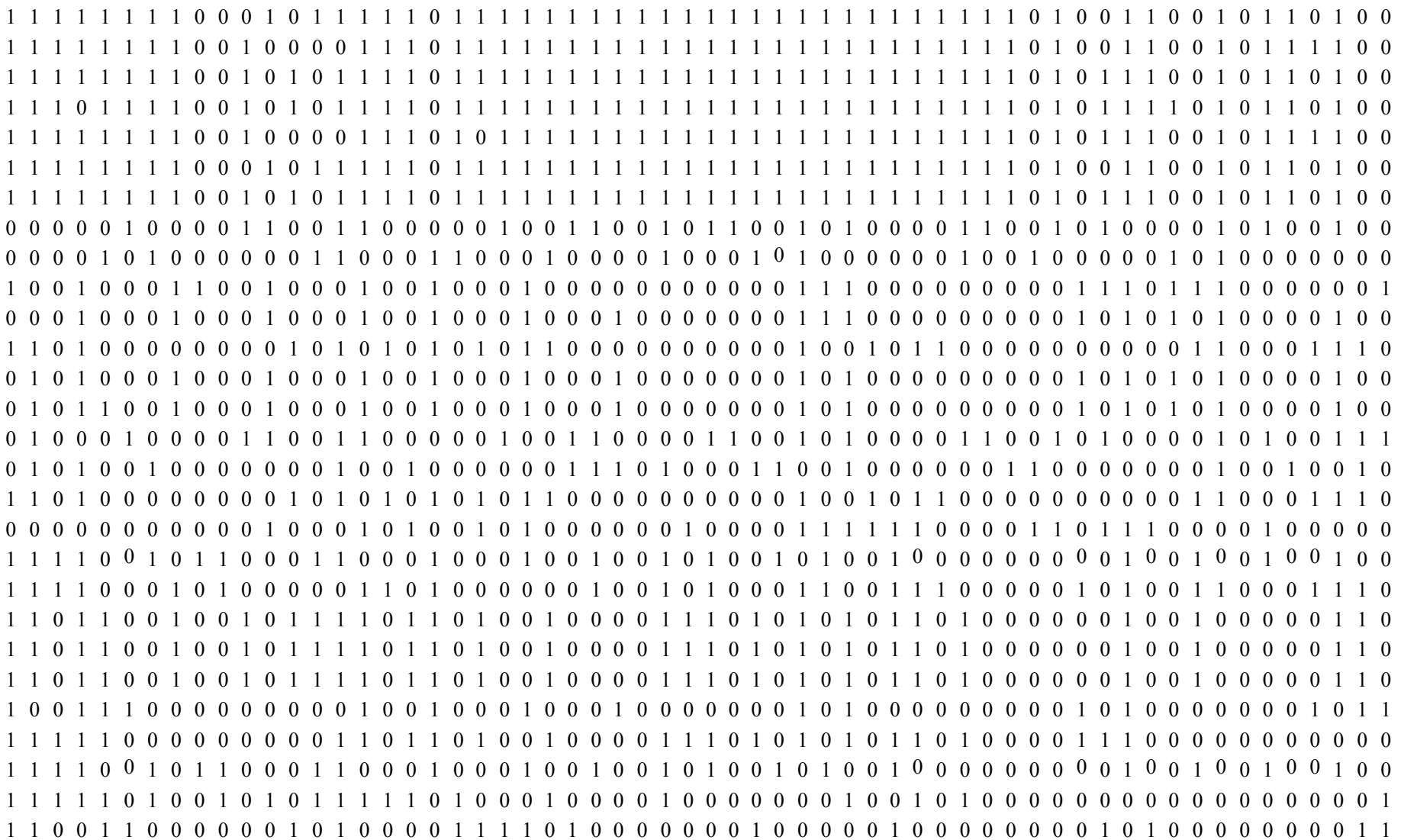

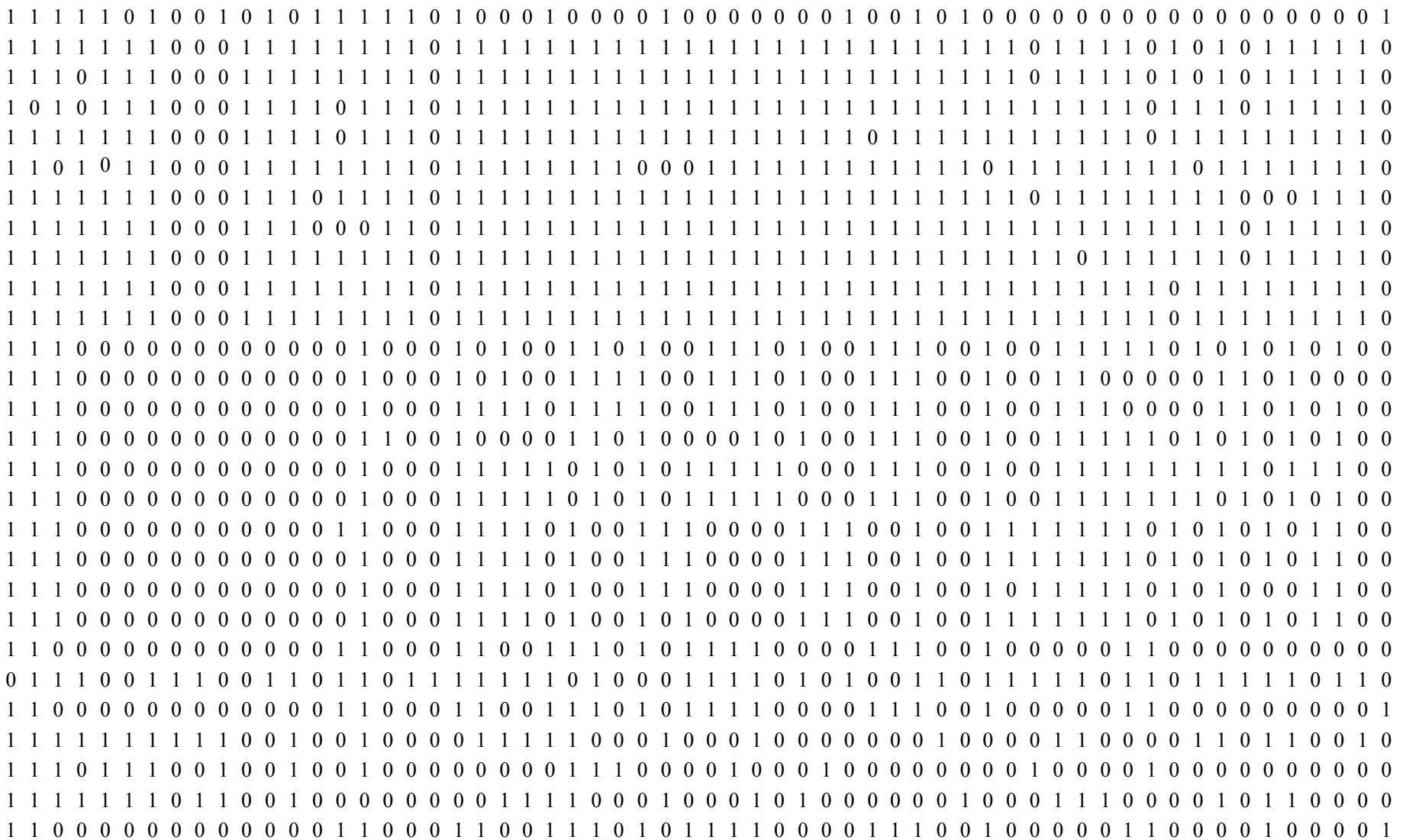

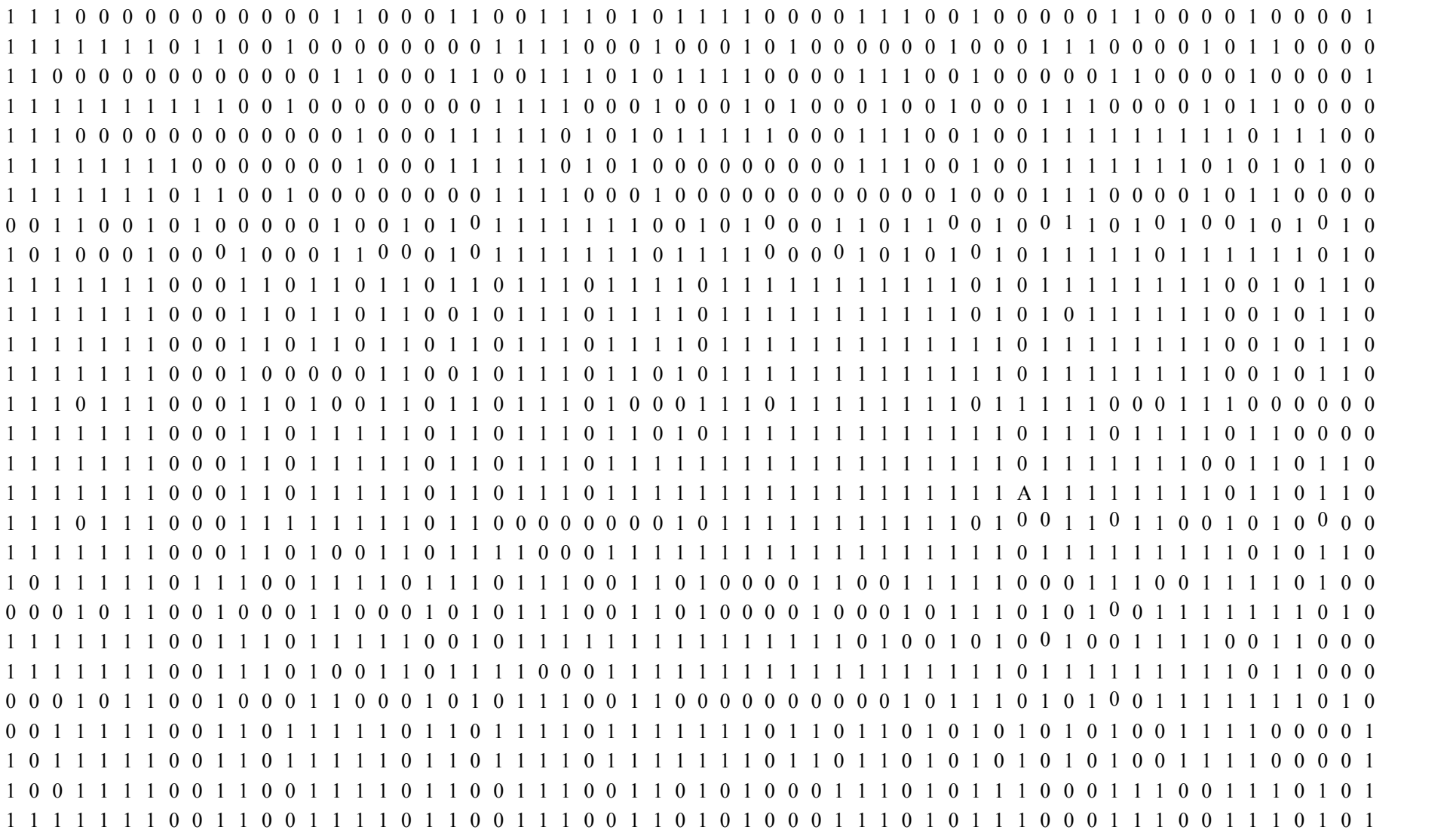

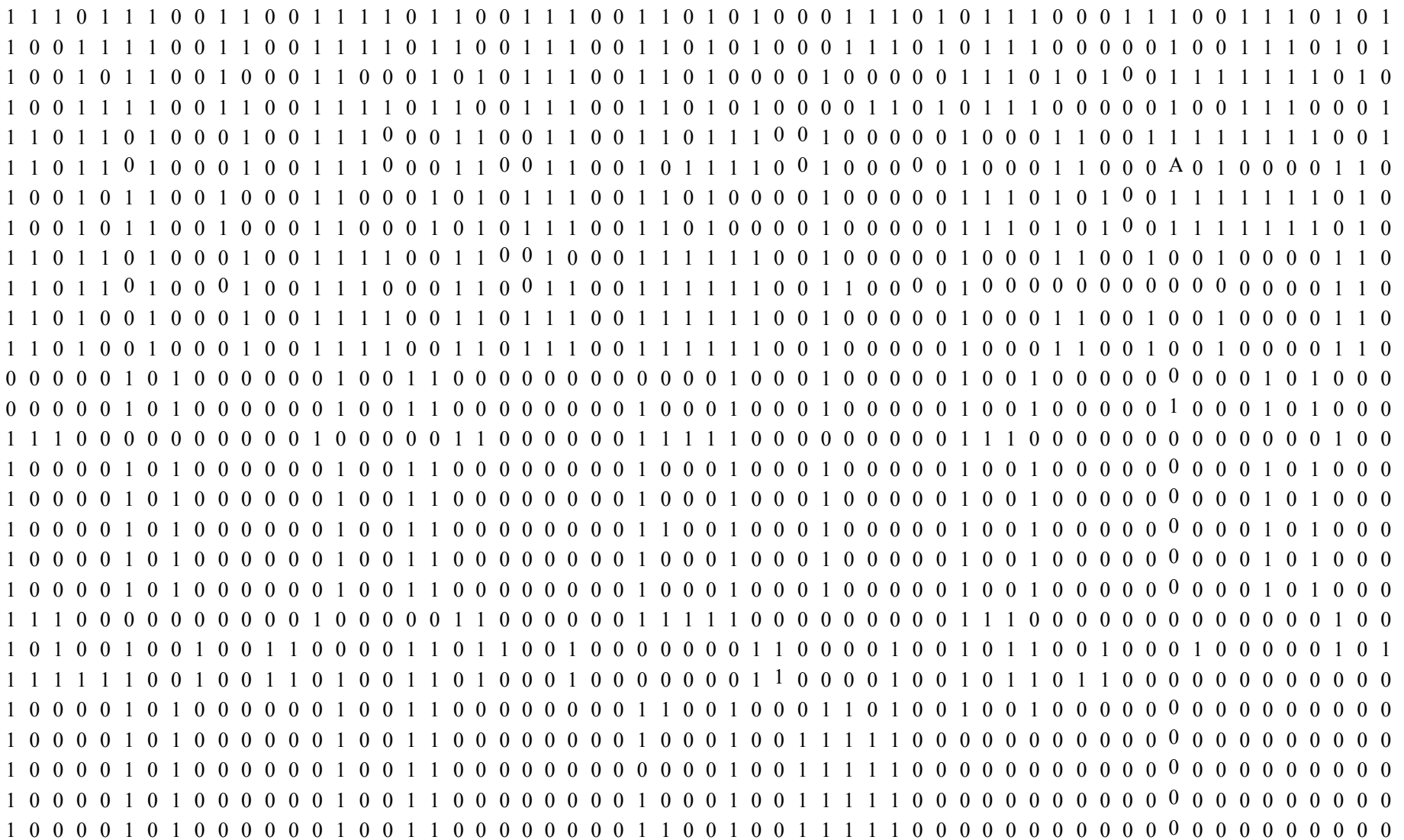

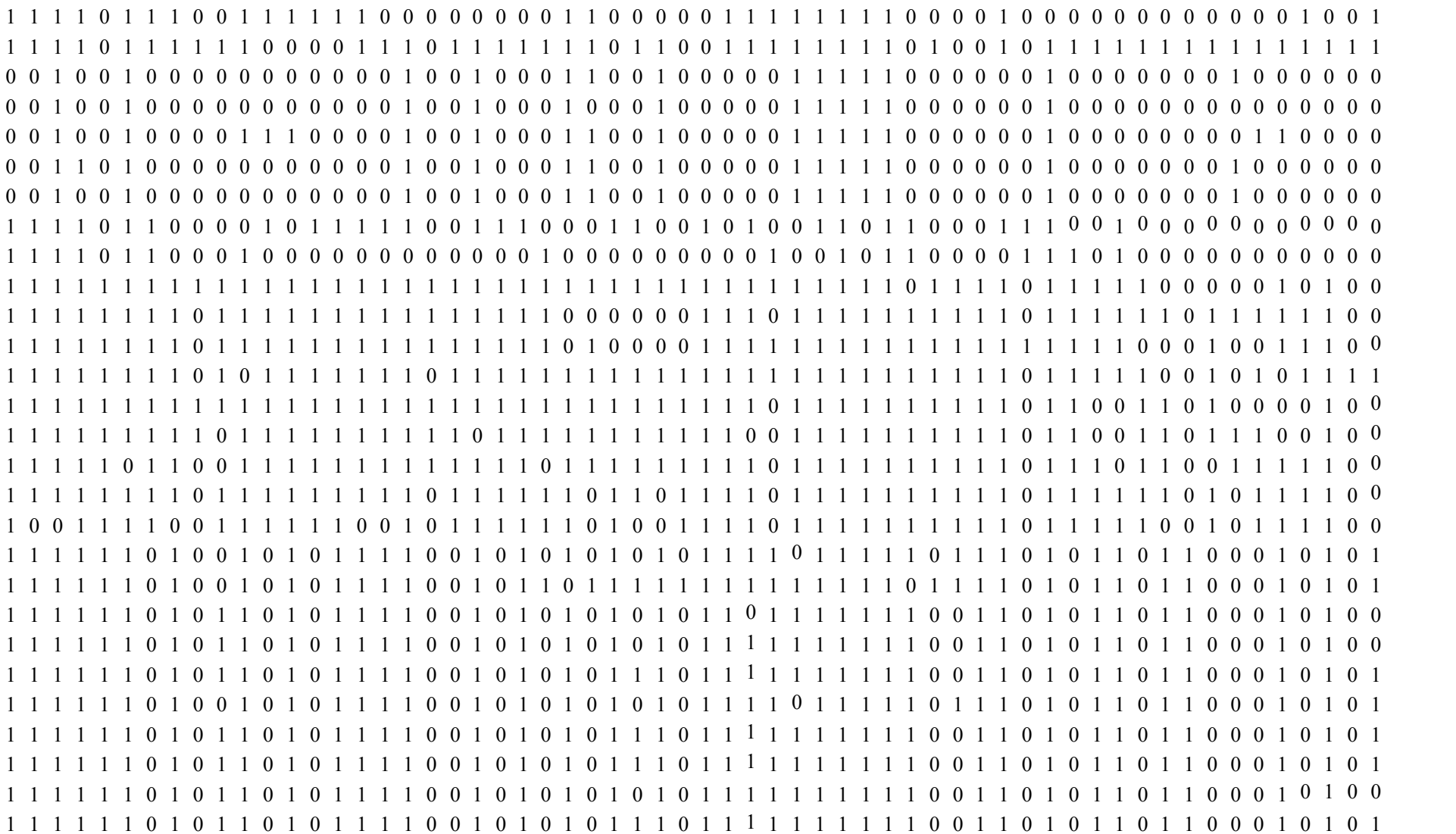

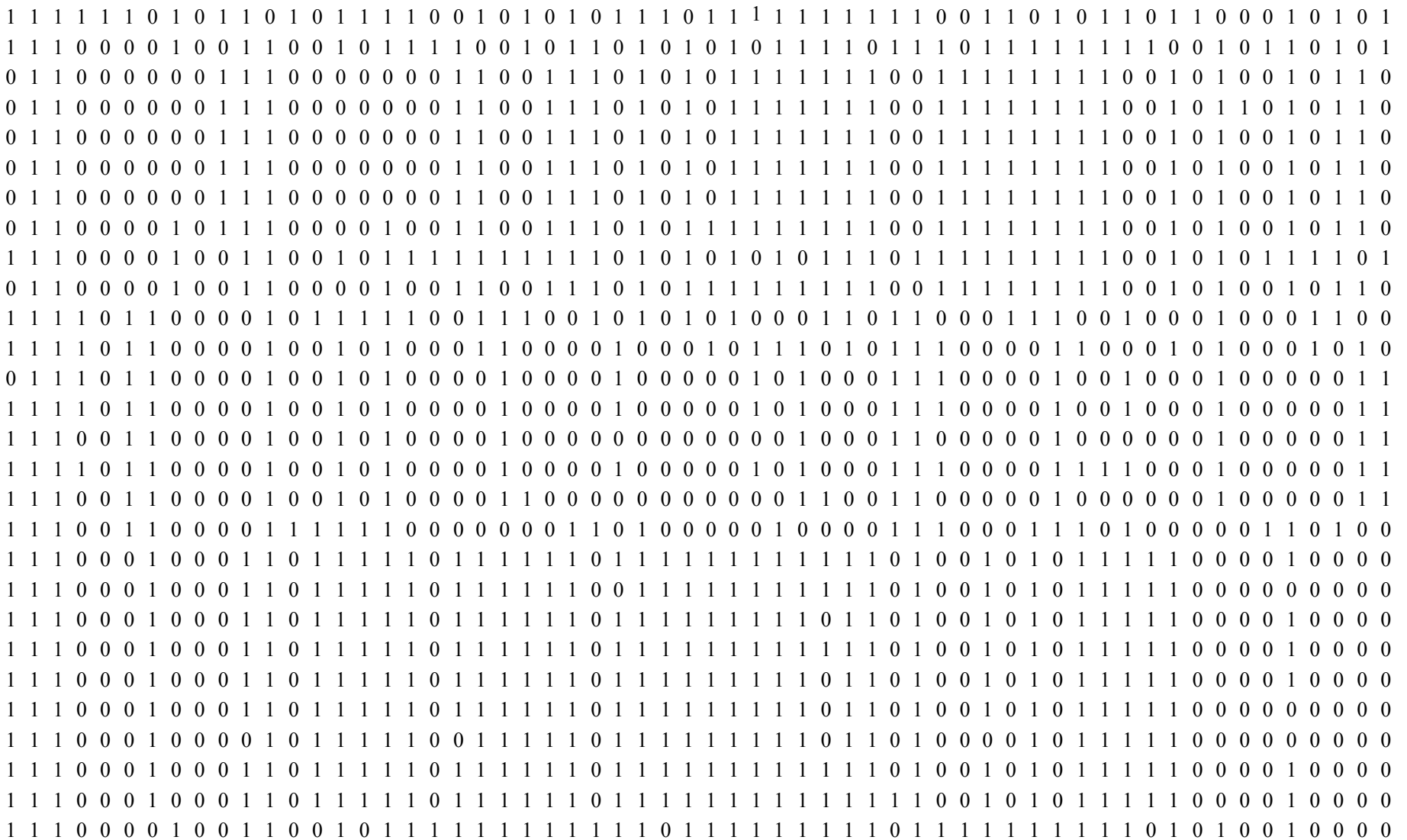

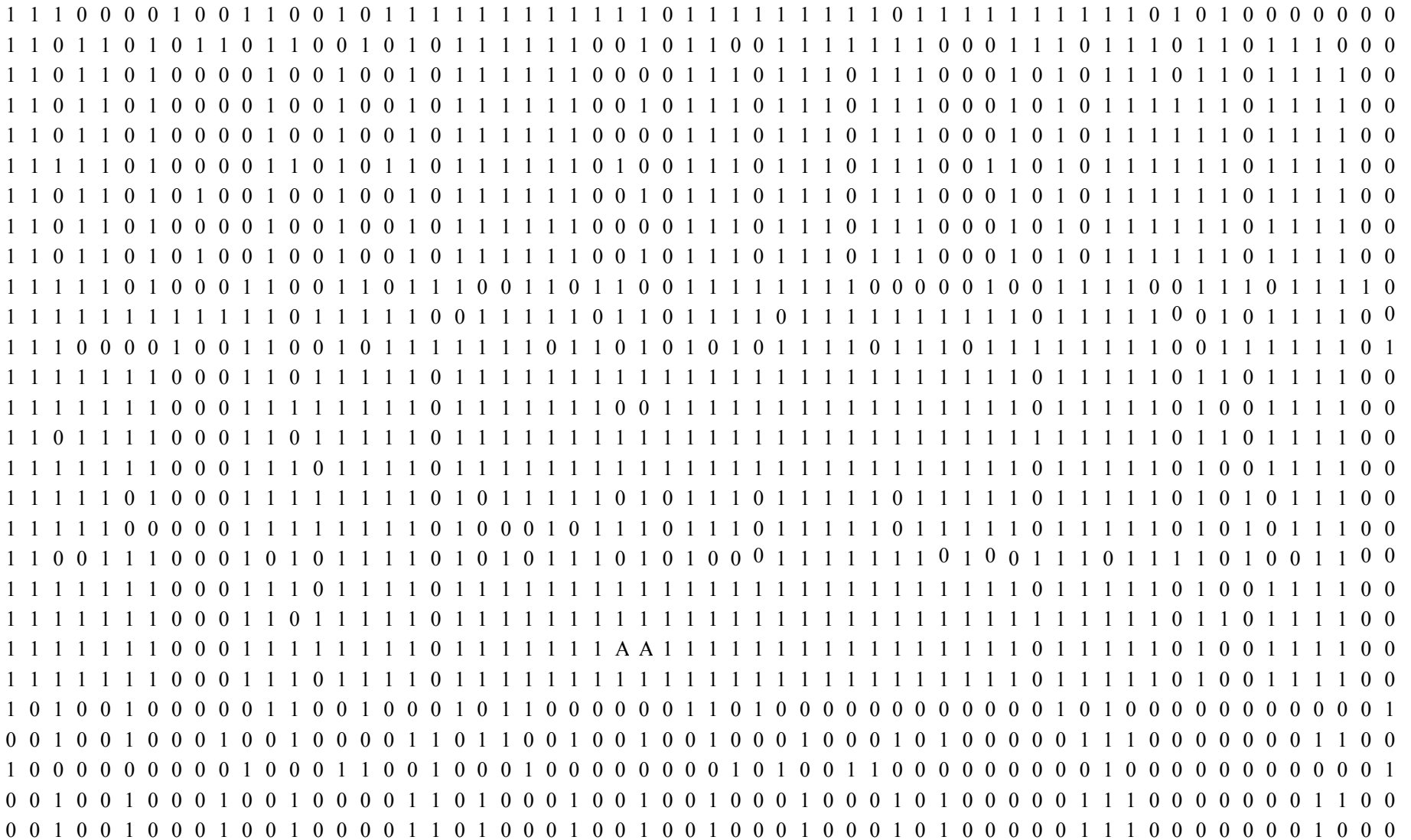

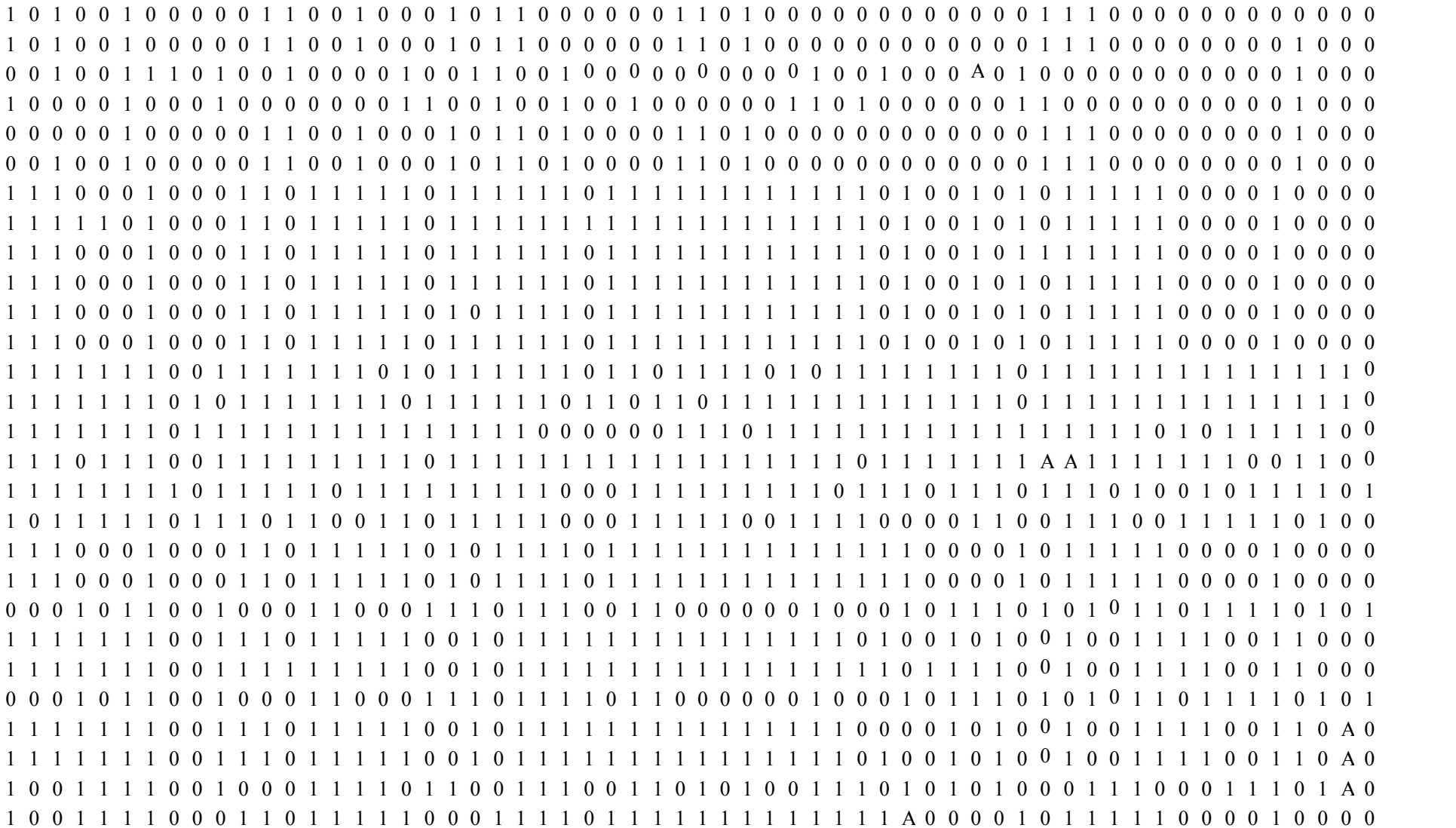

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APPENDIX G

Candidates' Responses on 2018 Mathematics Basic Education Certificate Examination (BECE) in Funtua Education Zone

Number of Items From 1 –30

	KEY	C	B	C	B	A	A	A	D	A	A	B	B	B	D	B	B	A	A	A	A	B	C	A	B	D	A	D	D	C
S/N	Cand. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	**7180001**	C	B	C	B	A	C	A	C	D	D	B	B	A	D	B	B	A	C	B	A	B	C	A	B	D	A	D	D	C
2	**7180002**	C	B	C	B	A	C	A	A	D	A	B	B	B	D	B	B	A	D	C	A	B	C	A	B	D	A	D	D	C
3	**7180003**	C	B	C	B	A	C	A	B	B	A	B	B	B	D	B	B	A	D	C	A	B	C	A	B	D	A	D	D	C
4	**7180005**	C	B	C	B	A	D	A	A	D	D	B	D	D	D	B	B	A	B	B	A	B	C	A	B	D	A	D	D	C
5	**7180523**	C	B	C	B	A	D	A	B	C	C	B	B	D	D	B	B	A	D	D	A	B	C	A	B	D	A	D	D	C
6	**7180549**	C	B	C	B	A	B	A	B	B	B	B	B	D	D	B	B	A	B	C	A	B	C	A	B	D	A	D	D	C
7	**7180553**	C	B	C	B	A	D	A	B	B	B	B	C	D	A	A	B	A	D	B	A	B	A	A	A	A	A	A	D	C
8	**7180600**	C	B	C	B	A	D	A	B	B	B	B	C	C	D	B	B	A	B	B	A	B	C	A	B	D	A	D	D	C
9	**7180621**	C	B	C	B	A	B	A	D	B	B	B	B	C	D	B	B	D	B	C	A	B	C	A	B	D	A	D	D	C
10	**7180977**	C	B	C	B	A	D	A	B	B	B	B	B	C	D	B	B	A	D	C	A	B	C	A	B	D	A	D	D	D
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13	**7180206**	A	C	A	C	A	A	D	D	A	A	A	A	B	D	D	A	A	C	C	A	D	A	D	B	A	A	B	D	B
14	**7180207**	C	D	D	B	B	A	D	D	B	B	A	A	B	A	C	B	B	B	C	D	C	A	A	A	A	B	B	C	B
15	**7180208**	B	C	A	B	B	A	D	D	C	B	A	B	C	A	C	B	B	B	B	D	C	A	A	A	A	C	C	B	B
16	**7180209**	B	A	B	A	B	B	D	A	C	A	A	B	C	C	B	B	C	C	C	A	C	C	D	B	A	B	B	D	C
17	**7180210**	B	A	B	B	B	B	C	A	C	D	D	D	C	C	A	A	A	A	D	A	B	C	D	C	D	C	C	B	B
18	**7180211**	D	A	B	B	B	D	C	A	C	D	D	D	C	C	A	D	B	D	A	A	C	D	A	C	A	B	B	C	C
19	**7180212**	D	D	B	B	A	D	A	A	C	A	B	D	B	B	A	B	D	D	D	D	C	C	D	B	D	C	C	C	B
20	**7180213**	C	B	A	A	D	D	C	D	A	D	D	B	B	D	B	B	D	A	B	C	C	B	A	C	A	A	D	C	B
21	**7180214**	A	D	A	B	D	D	C	D	A	D	D	D	A	B	A	A	D	D	A	C	C	C	D	C	A	C	C	C	B
22	**7180215**	C	B	C	D	A	A	A	A	C	D	B	A	B	D	A	B	A	A	D	A	B	D	A	B	D	C	D	D	C
23	**7180216**	C	D	C	D	D	D	C	C	A	D	D	A	B	B	A	D	B	B	B	A	B	C	A	B	D	A	D	D	B

24	**7180217**	C	B	C	B	0	D	A	C	C	D	D	D	A	D	D	0	A	C	A	A	B	C	A	B	D	A	0	D	B
25	**7180218**	C	B	C	B	D	A	A	D	A	A	B	B	0	A	B	0	0	0	A	A	B	C	A	B	A	0	D	D	C
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28	**7180807**	A	B	C	D	D	B	D	C	C	B	A	A	D	D	B	0	0	A	D	A	0	C	A	B	D	A	D	D	0
29	**7180808**	B	B	C	D	C	B	C	B	C	B	A	A	D	D	B	B	A	A	D	A	C	C	A	B	C	A	D	D	A
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31	**7180810**	C	D	C	D	C	A	B	B	C	B	D	A	B	B	B	B	C	A	C	A	B	C	A	B	D	A	D	D	C
32	**7180811**	A	B	D	D	B	A	A	A	C	A	B	C	C	A	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
33	**7180812**	D	B	C	B	A	A	B	B	C	A	B	C	C	A	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
34	**7180813**	B	B	C	B	A	A	A	A	B	A	B	C	B	A	B	A	A	A	B	A	C	C	A	B	A	A	D	B	C
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36	**7180815**	B	B	C	C	A	A	A	D	B	A	B	A	B	A	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
37	**7180724**	B	B	C	B	A	A	A	A	A	A	D	A	A	A	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
38	**7180725**	A	B	C	B	A	A	A	A	B	A	B	A	A	A	B	B	A	C	B	B	B	C	A	B	D	A	D	D	C
39	**7180726**	A	B	C	B	A	A	A	A	B	A	B	A	A	A	B	B	A	C	A	A	C	C	A	B	A	A	D	D	A
40	**7180727**	A	B	C	C	A	A	A	C	B	A	B	C	C	B	B	B	A	C	D	A	B	C	A	D	D	A	C	D	C
41	**7180729**	A	B	C	B	A	A	A	C	B	A	B	C	C	B	B	B	A	A	C	A	B	C	A	B	D	A	A	D	C
42	**7180730**	B	B	C	A	A	A	D	C	B	A	B	B	C	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
43	**7180731**	C	C	D	C	A	B	D	C	B	A	D	B	C	B	A	A	D	D	D	A	B	C	A	B	D	A	A	D	C
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45	**7180733**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B	C	B	C	A	B	D	A	0	D	C
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47	**7180735**	B	C	C	B	D	B	B	D	A	B	B	B	A	B	C	C	C	A	A	D	B	C	A	B	D	A	A	D	C
48	**7180736**	D	B	A	C	A	B	A	C	0	0	0	0	0	0	0	0	0	0	0	A	B	C	A	B	D	A	A	D	C
49	**7180737**	A	A	A	B	B	D	D	C	C	B	D	D	A	B	B	C	C	C	C	A	B	C	A	B	D	D	D	D	C
50	**7180738**	A	B	A	B	B	D	C	D	D	B	D	D	A	B	0	C	D	C	B	A	B	C	A	A	A	A	C	A	C
51	**7180739**	A	B	A	A	B	0	A	0	D	B	D	D	A	B	A	C	B	B	B	B	B	C	D	A	A	A	D	0	C

52	**7180740**	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B	A	B	C	A	B	D	A	D	A	A
53	**7180741**	C	B	C	B	A	A	A	B	D	A	B	B	B	D	A	B	C	A	C	A	B	C	A	A	D	A	D	D	D
54	**7180742**	C	B	C	B	A	A	A	B	D	A	B	D	B	D	A	B	C	A	B	A	B	C	A	A	D	A	D	D	A
55	**7180743**	C	B	C	B	A	A	A	B	D	A	B	B	B	D	A	B	C	A	B	A	B	C	A	A	D	C	D	D	D
56	**4818009**	C	B	C	B	A	A	A	C	C	A	B	B	B	D	B	B	C	B	B	A	B	C	A	D	D	A	D	D	D
57	**4818010**	C	B	C	B	A	A	A	C	C	A	B	B	B	D	B	B	D	A	D	A	B	C	A	C	D	A	D	D	A
58	**4818011**	C	B	C	A	A	A	A	D	C	A	B	B	B	D	C	B	B	A	A	A	B	C	A	A	D	A	D	A	D
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67	**4818020**	C	D	C	D	D	A	B	A	B	A	C	C	A	D	D	B	B	D	D	A	D	A	A	A	D	A	C	A	A
68	**4818021**	C	A	C	D	D	A	B	A	B	A	C	C	A	D	C	B	C	C	C	A	D	D	A	A	D	A	B	A	D
69	**4818022**	C	A	C	D	D	A	B	A	B	A	C	C	D	D	C	B	B	B	B	A	C	A	A	A	D	C	C	A	A
70	**4818023**	C	A	C	D	D	A	B	A	D	A	C	C	D	D	C	B	D	D	D	A	D	D	A	A	D	A	B	A	D
71	**4818024**	C	A	C	D	D	A	B	A	D	A	A	C	A	D	D	B	C	D	B	A	C	A	A	A	D	A	B	C	A
72	**4818025**	C	A	C	D	C	A	B	A	D	A	A	A	D	D	D	B	B	B	B	A	A	D	A	D	D	C	B	B	A
73	**4818026**	D	B	D	D	C	A	B	A	D	A	A	A	A	D	D	B	D	D	D	A	D	A	A	D	C	C	C	C	A
74	**4818027**	D	D	C	A	C	A	B	A	D	A	A	A	D	D	D	B	C	A	D	A	C	A	A	A	A	A	B	B	A
75	**4818028**	D	D	C	A	C	A	B	A	D	A	A	C	C	D	D	B	B	A	C	A	A	D	A	D	C	A	B	C	A
76	**4818029**	C	D	C	A	D	A	B	A	C	A	A	C	D	D	C	D	B	A	B	A	C	B	A	A	B	A	B	B	A
77	**4818030**	C	D	C	D	D	A	B	C	C	A	A	A	C	D	C	B	B	D	C	A	D	B	A	A	D	A	A	C	A
78	**4818031**	C	C	C	D	D	A	B	B	B	A	A	A	D	D	C	B	B	C	B	A	C	D	A	D	D	C	A	B	A
79	**4818032**	C	D	C	D	D	A	B	B	B	A	A	A	A	D	C	B	B	D	C	A	D	B	A	D	D	B	A	B	A

80	**4818033**	C	A	C	D	D	A	B	C	C	A	A	A	C	D	C	B	B	C	B	A	C	D	A	D	D	C	A	A	A
81	**3618020**	C	A	C	D	D	A	B	A	C	A	A	A	B	B	B	A	D	A	A	D	B	B	C	D	D	B	C	A	C
82	**3618028**	C	D	C	A	D	A	B	C	C	A	A	A	B	B	B	A	D	A	A	C	B	A	D	D	D	C	C	A	C
83	**3618029**	C	C	C	A	B	A	B	B	C	C	B	A	A	C	D	D	D	A	D	B	D	B	D	D	D	B	C	A	A
84	**3618030**	C	D	C	D	B	A	B	C	A	A	C	A	D	C	D	B	B	A	D	C	D	C	D	D	A	C	B	B	0
85	**3618425**	C	C	C	D	B	A	B	C	D	A	C	A	D	C	D	D	C	A	D	B	D	C	D	D	C	C	B	B	0
86	**3618426**	C	C	C	D	B	A	B	C	D	C	C	A	C	C	C	D	B	A	C	C	A	C	D	D	B	C	C	B	0
87	**3618427**	C	C	C	C	B	A	B	C	C	A	C	A	C	C	C	A	C	A	C	B	A	C	D	D	C	C	B	B	0
88	**3618428**	C	C	C	D	B	A	B	C	C	A	C	C	D	C	C	A	B	A	D	C	D	C	D	A	B	B	C	B	C
89	**3618427**	C	C	C	A	C	A	B	C	C	A	C	C	C	C	C	A	C	A	C	C	D	C	D	A	C	B	B	B	C
90	**3618800**	C	C	C	D	C	A	B	C	C	A	C	C	D	C	A	A	B	A	D	B	B	C	D	A	B	D	C	B	B
91	**3618801**	C	C	C	C	C	A	D	C	C	A	A	C	C	A	A	A	D	A	C	A	B	C	D	A	C	B	B	B	B
92	**3618802**	C	C	C	C	C	A	C	C	C	A	A	C	D	A	A	A	C	A	D	A	B	C	D	A	B	D	C	B	B
93	**3618803**	B	B	B	B	D	A	A	C	B	A	B	B	C	A	B	B	B	D	C	A	B	C	A	B	C	B	B	B	D
94	**3618804**	A	B	A	B	B	A	A	C	B	A	B	B	A	0	B	B	0	B	D	A	B	C	A	B	B	D	D	D	A
95	**3618805**	C	A	C	D	B	A	D	C	C	C	B	C	B	B	A	A	D	C	A	D	B	D	D	B	D	B	D	B	A
96	**3618806**	A	B	A	B	B	A	A	C	C	A	B	B	D	B	B	B	C	B	C	A	0	A	A	B	D	D	D	D	A
97	**3618807**	C	D	C	D	D	A	D	C	C	A	A	A	B	B	B	A	C	C	A	D	B	D	D	B	D	B	D	B	D
98	**3618808**	A	B	A	B	D	A	A	C	C	A	B	B	D	0	B	B	0	B	D	A	B	C	A	B	D	D	D	D	0
99	**3618909**	A	B	D	B	B	A	A	C	C	A	B	B	C	D	B	B	C	C	C	A	B	C	A	B	D	B	D	D	A
100	**3618910**	A	B	A	B	B	A	A	C	C	A	B	B	C	D	B	B	B	B	C	A	B	C	A	B	D	D	D	D	A
101	**3618911**	C	A	C	A	B	A	B	C	C	A	A	A	B	B	B	C	C	C	A	B	B	D	D	B	D	B	D	B	A
102	**3618912**	C	B	A	B	D	A	A	C	D	A	B	B	D	D	B	B	C	B	D	A	B	C	A	B	D	D	D	D	A
103	**3618913**	C	B	C	B	A	A	A	C	D	A	B	D	D	D	B	B	A	D	C	A	B	C	A	B	D	D	D	D	C
104	**3618914**	C	B	C	B	A	A	A	C	C	A	B	A	D	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
105	**3618915**	C	B	C	B	A	A	A	C	C	A	B	C	A	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
106	**3618916**	C	B	C	B	A	A	A	C	C	A	B	C	A	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
107	**3618917**	C	B	C	A	A	A	A	C	C	A	B	D	C	D	B	B	A	A	C	A	B	C	A	B	D	D	D	D	A

108	**3618918**	C	B	C	A	A	A	A	C	D	A	B	D	C	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	A
109	**3618919**	C	B	C	A	A	A	A	C	D	A	B	D	C	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	D
110	**3618920**	C	B	C	B	A	A	A	C	D	A	B	D	C	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	D
111	**3618921**	C	B	C	B	A	A	A	C	D	C	A	A	C	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
112	**3618922**	C	B	C	0	A	A	A	C	D	A	B	A	A	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
113	**3618923**	0	B	C	B	A	B	A	C	A	A	B	B	B	A	B	B	A	A	D	A	B	C	A	B	D	A	D	A	A
114	**3618924**	C	B	C	B	B	B	A	C	D	A	B	B	A	A	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
115	**3618925**	C	B	C	B	A	B	A	C	D	A	B	B	A	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
116	**3618926**	C	B	C	B	A	A	A	C	D	A	B	B	A	A	B	B	A	A	D	A	A	C	A	B	D	A	D	D	C
117	**3618927**	C	B	C	B	A	A	A	A	D	A	B	B	A	A	B	B	A	A	C	A	A	C	A	B	D	A	D	D	C
118	**3618928**	C	B	C	B	A	A	A	A	D	A	B	B	A	A	B	B	A	A	D	A	B	C	A	B	D	A	D	A	C
119	**3618929**	C	B	C	B	A	A	A	B	B	A	B	B	A	D	B	B	A	A	C	A	B	C	A	B	D	A	D	C	C
120	**3618930**	C	B	C	B	A	A	A	B	B	A	B	B	A	A	B	B	A	A	D	A	B	C	A	B	D	A	D	C	C
121	**3618518**	C	B	C	B	A	A	A	B	B	A	B	B	A	A	B	B	A	A	C	A	A	C	A	B	D	A	D	D	C
122	**3618519**	C	B	C	B	A	A	A	B	B	A	B	B	A	A	B	B	A	A	D	A	A	C	A	B	D	A	D	D	C
123	**3618520**	C	B	C	B	A	A	A	A	B	C	B	B	A	D	B	B	A	A	0	A	B	C	A	B	D	A	D	D	C
124	**3618521**	C	B	C	B	A	A	A	A	B	C	B	B	D	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
125	**3618522**	C	B	C	B	A	A	A	B	B	C	B	B	D	D	C	B	A	A	C	A	B	C	A	B	D	A	D	D	C
126	**3618523**	C	B	C	A	A	A	A	B	A	C	B	A	D	C	C	D	D	A	D	A	B	C	A	D	D	A	A	A	D
127	**3618524**	C	A	C	A	A	A	A	B	B	A	A	B	B	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
128	**3618525**	C	B	A	B	B	A	A	B	B	C	0	B	A	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
129	**3618526**	C	B	C	B	B	A	A	B	B	A	B	B	A	C	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
130	**3618477**	C	B	C	B	B	A	A	B	B	C	B	B	C	C	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
131	**3618478**	C	B	A	B	A	A	A	A	A	C	B	B	C	0	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
132	**3618479**	C	B	C	B	A	A	A	C	D	A	B	B	D	D	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
133	**3618480**	C	B	C	B	A	A	A	C	D	A	A	B	B	B	B	B	A	A	B	A	B	C	A	B	C	A	C	D	C
134	**3618481**	C	B	C	B	A	A	A	D	D	A	B	B	B	A	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
135	**3618482**	C	B	C	B	A	A	A	D	D	A	B	B	B	A	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C

136	**3618483**	C	B	C	B	A	A	A	D	D	B	D	B	A	D	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
137	**3618484**	C	B	C	B	A	A	A	D	D	B	B	D	D	A	A	B	A	A	D	A	B	C	A	B	D	A	D	D	C
138	**3618485**	C	B	C	B	A	A	A	D	D	B	B	C	B	A	B	B	A	A	A	A	B	C	A	B	D	A	D	D	C
139	**3618486**	C	B	C	A	A	A	A	D	B	B	B	D	B	A	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
140	**3618487**	C	B	C	B	A	A	A	D	D	B	B	C	D	A	A	B	A	A	D	A	A	C	A	B	D	A	D	D	C
141	**3618488**	C	B	C	B	A	A	A	D	D	B	D	B	D	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
142	**3618489**	C	B	C	B	A	A	A	D	D	B	B	D	B	A	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
143	**3618054**	D	D	B	A	D	A	D	A	A	D	B	B	A	A	B	B	D	D	D	D	D	C	D	D	D	A	A	A	C
144	**3618056**	A	D	D	D	A	D	A	C	C	C	A	A	C	D	B	A	D	C	A	A	C	A	C	B	A	C	C	C	C
145	**3618057**	C	D	B	B	C	C	D	D	A	D	D	B	D	A	A	B	D	B	A	B	D	D	A	C	C	D	B	B	A
146	**3618058**	A	A	D	B	D	D	D	D	B	C	C	B	A	C	A	B	D	C	A	B	C	B	A	C	B	C	D	C	A
147	**3618059**	C	B	B	B	C	C	D	C	C	D	D	A	D	B	B	A	D	D	A	D	B	B	A	B	B	B	B	B	A
148	**3618060**	B	B	D	B	C	D	D	D	B	C	C	B	C	B	A	B	C	C	A	C	D	B	A	C	C	C	D	C	B
149	**3618061**	B	B	D	B	A	D	D	D	B	D	D	B	A	B	A	B	C	B	A	D	0	0	A	C	C	B	D	A	B
150	**3618062**	B	B	B	A	C	A	D	B	C	C	B	B	C	B	B	B	D	C	D	C	D	C	D	C	D	A	A	C	B
151	**3618063**	B	B	B	B	B	D	A	B	C	D	C	A	D	B	B	A	C	A	D	D	D	D	C	C	D	A	D	B	C
152	**3618064**	C	B	B	B	B	D	D	B	C	C	D	A	C	B	B	A	A	C	A	C	B	B	A	B	A	B	B	C	B
153	**3618065**	D	D	B	C	B	D	D	B	C	D	C	B	D	B	D	B	D	A	B	B	B	D	A	C	D	B	B	B	B
154	**3618066**	C	B	C	B	B	0	A	B	A	A	D	A	C	D	B	D	C	C	A	D	A	B	A	C	C	A	A	C	C
155	**3618067**	C	B	C	B	B	D	D	D	C	A	C	A	A	B	D	B	A	C	A	C	D	D	D	C	D	A	A	B	C
156	**3618068**	C	B	D	B	A	D	D	D	C	D	B	A	B	D	B	B	D	A	A	D	B	B	C	B	C	B	B	C	C
157	**3618069**	C	B	B	B	A	D	D	D	C	C	B	A	B	D	B	B	C	A	A	C	B	B	B	B	D	B	B	B	C
158	**3618070**	C	B	D	B	A	D	D	D	C	D	B	A	B	D	B	B	D	A	A	B	B	B	C	B	C	B	C	C	C
159	**3618071**	C	C	B	B	A	A	0	0	C	C	B	0	A	B	D	B	C	B	A	C	C	D	A	C	D	D	D	B	A
160	**3618072**	C	B	C	B	A	D	D	C	C	D	D	C	D	B	B	B	D	A	A	B	B	B	C	B	C	C	A	C	C
161	**3618073**	C	B	C	B	D	D	A	A	A	A	C	C	C	D	B	D	C	B	A	C	C	D	A	C	A	A	C	C	C
162	**3618074**	C	B	C	B	A	D	A	C	C	A	D	B	C	D	B	B	A	A	D	A	A	D	C	B	A	C	C	C	C
163	**3618075**	C	B	A	C	A	A	D	A	C	D	C	D	B	B	B	D	D	B	C	A	B	C	A	C	D	C	A	B	A

164	**3618076**	C	B	C	B	A	D	A	A	C	A	D	B	C	D	B	B	A	A	D	A	A	D	D	B	A	C	C	D	C
165	**3618077**	C	B	C	B	A	A	A	A	C	C	B	B	B	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
166	**3618078**	C	B	C	D	A	A	A	A	C	D	B	B	B	D	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
167	**3618079**	C	0	C	0	A	A	A	A	B	C	B	B	B	D	D	B	A	A	C	A	B	C	A	B	D	A	D	D	C
168	**3618080**	C	B	C	B	A	A	A	A	B	D	B	B	B	D	C	B	A	A	B	A	B	C	A	B	D	A	D	D	C
169	**3618081**	C	B	D	B	0	A	A	A	C	D	B	B	B	D	B	B	A	A	C	A	B	C	A	B	D	A	D	A	D
170	**3618082**	C	B	C	B	A	A	A	A	B	D	B	B	B	C	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
171	**3618083**	C	B	C	B	A	A	A	A	C	D	B	B	B	B	C	D	A	A	C	A	B	C	A	B	D	A	D	D	C
172	**3618084**	C	B	C	B	A	A	A	A	B	D	B	B	B	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
173	**3618085**	C	B	C	B	A	A	A	A	C	D	B	B	B	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
174	**3618086**	C	B	C	B	A	A	A	A	B	D	B	B	B	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
175	**3618087**	C	B	C	A	D	D	B	A	C	D	D	A	D	B	C	B	B	D	C	A	A	C	D	C	D	A	A	D	A
176	**3618088**	C	B	C	D	C	D	B	A	C	D	C	D	C	B	C	B	C	C	B	A	D	C	C	A	D	A	D	D	D
177	**3618089**	C	B	C	A	D	D	B	A	B	D	D	A	D	B	C	B	B	D	B	A	B	C	B	D	D	A	D	D	B
178	**3618090**	C	B	C	D	C	D	B	A	A	D	C	D	C	B	C	B	A	C	B	A	D	A	C	C	D	A	C	D	B
179	**3618091**	C	B	C	A	D	A	B	A	A	D	D	A	D	B	D	B	C	D	B	A	B	C	A	B	A	A	B	D	B
180	**3618092**	C	B	C	D	C	D	B	A	C	D	C	D	C	B	D	B	B	C	B	A	B	C	A	B	C	A	C	D	B
181	**4918001**	C	B	C	D	D	C	B	A	D	D	D	D	C	B	B	B	C	D	B	A	B	C	A	D	D	C	B	D	C
182	**4918002**	C	B	C	D	C	C	B	A	D	D	C	D	C	B	D	B	B	C	B	A	B	C	A	C	D	D	C	D	C
183	**4918003**	C	B	C	D	D	C	B	A	D	D	D	D	C	B	D	B	B	D	D	A	B	C	A	D	D	C	B	D	C
184	**4918004**	C	B	C	D	C	B	B	A	D	D	C	D	C	D	D	B	B	C	C	A	B	C	A	C	D	D	C	D	A
185	**4918005**	C	B	B	D	D	C	B	D	D	D	D	D	C	C	B	B	D	D	D	A	B	D	D	B	D	A	B	D	D
186	**4918109**	A	B	C	B	C	B	A	A	A	D	D	B	B	C	B	B	C	A	A	A	B	C	A	B	C	A	C	A	B
187	**4918067**	C	B	B	A	D	C	D	C	C	D	C	D	C	A	B	B	D	C	B	A	B	D	D	B	D	A	C	D	B
188	**4918068**	C	B	C	B	A	A	A	D	A	A	D	D	B	A	D	B	C	D	C	C	B	C	A	B	D	D	A	A	C
189	**4918069**	C	B	C	C	A	A	A	C	C	A	C	D	B	A	D	B	D	C	B	B	A	D	D	A	D	A	D	C	B
190	**4918070**	C	B	C	B	A	A	A	C	A	A	D	D	B	A	A	A	C	C	C	C	D	C	A	B	D	C	A	C	C
191	**4918071**	C	B	B	D	D	B	D	D	B	D	C	D	C	A	B	B	D	C	B	A	B	D	C	B	D	A	C	D	B

192	**4918072**	C	B	C	C	D	D	C	C	B	D	D	D	C	A	B	B	D	D	C	A	B	D	D	B	D	A	C	D	A
193	**4918073**	C	B	C	B	A	A	A	C	A	A	C	D	B	A	A	A	C	C	B	B	C	C	A	B	D	B	C	C	C
194	**4918074**	C	B	A	D	D	D	C	C	D	D	D	A	A	A	B	B	C	C	C	A	B	D	C	B	D	A	C	D	A
195	**4918075**	C	B	C	B	A	A	A	D	A	A	C	D	B	A	A	A	C	D	B	C	D	C	A	B	D	D	B	C	C
196	**4918076**	C	B	C	C	D	D	C	C	D	A	D	A	A	C	D	B	D	C	C	A	B	C	A	B	C	A	B	D	D
197	**4918077**	C	B	C	B	A	A	A	D	C	D	C	D	D	C	A	B	C	C	B	A	B	C	A	B	C	A	C	D	D
198	**4918078**	C	B	C	B	A	A	A	B	D	C	D	A	B	B	D	D	D	C	C	B	D	C	A	B	D	C	B	B	C
199	**4918079**	A	A	C	B	D	D	A	B	C	B	C	D	D	C	B	D	C	A	B	A	0	C	A	B	D	A	D	D	B
200	**4918034**	C	D	C	D	D	D	A	D	D	C	B	A	D	B	B	B	0	0	C	A	0	C	A	B	D	A	D	D	B
201	**4918035**	C	B	C	B	A	A	A	D	C	C	B	B	C	D	B	D	A	A	B	A	B	D	A	B	D	B	D	D	C
202	**4918036**	C	B	C	B	A	A	A	D	D	C	B	B	C	D	B	D	A	A	C	C	B	A	A	B	D	B	D	D	C
203	**4918037**	C	B	C	B	A	A	A	D	C	D	B	B	C	D	B	A	A	A	B	A	B	D	A	B	D	B	D	D	C
204	**4918038**	C	B	C	B	A	A	A	D	D	C	B	A	A	C	B	A	A	A	C	C	B	B	A	B	D	C	D	D	A
205	**4918039**	C	B	C	D	A	A	A	D	C	D	B	B	D	D	A	A	A	A	B	A	B	D	A	B	D	B	D	C	D
206	**4918040**	C	B	C	B	A	A	A	D	D	C	B	B	C	D	B	B	A	A	C	A	B	B	A	B	D	B	D	D	C
207	**4918041**	C	B	C	B	A	A	A	D	D	D	B	B	D	D	B	B	A	A	B	A	B	B	A	B	D	D	D	D	C
208	**4918042**	C	B	C	B	A	A	A	A	C	C	B	B	C	D	B	B	A	A	C	A	B	B	A	B	D	C	D	D	C
209	**4918043**	C	B	C	C	A	A	A	A	D	D	B	B	B	D	B	B	A	A	B	A	B	B	D	D	A	D	A	A	A
210	**4918044**	C	B	C	B	A	A	A	A	C	C	B	B	D	D	A	A	A	A	C	A	B	C	A	C	B	C	D	D	C
211	**5218044**	C	D	C	B	A	A	A	A	A	A	B	D	C	D	B	B	A	C	A	A	B	A	A	B	D	D	D	D	C
212	**5218045**	D	D	D	B	B	A	A	A	C	A	D	C	D	D	B	A	B	C	A	B	B	A	A	B	D	C	C	D	C
213	**5218046**	C	B	C	B	A	A	A	A	C	A	B	B	C	D	B	B	A	A	C	D	B	A	A	B	D	A	D	D	C
214	**5218047**	C	B	C	B	A	A	A	A	C	A	B	B	D	D	A	A	A	A	D	A	B	C	A	D	C	D	D	D	C
215	**5218048**	D	A	D	B	D	A	A	B	C	A	D	D	C	D	B	A	B	C	A	C	B	A	A	B	D	C	B	D	C
216	**5218049**	D	A	C	B	A	A	A	B	C	A	B	C	B	D	B	B	A	B	A	A	A	C	A	B	D	C	D	D	C
217	**5218050**	C	A	C	B	A	A	A	C	C	A	B	D	B	D	B	B	A	B	A	A	D	C	A	B	D	C	D	D	C
218	**5218051**	C	A	A	B	A	A	A	B	C	A	B	C	D	D	B	B	A	B	A	A	C	A	A	B	D	C	B	D	C
219	**5218052**	C	B	C	B	A	A	A	C	C	A	B	D	C	D	B	B	A	B	A	A	D	A	A	B	D	B	B	D	C

220	**5218053**	C	B	C	D	A	A	A	B	C	A	B	C	D	D	B	B	A	B	A	A	C	A	A	B	D	D	B	D	C
221	**5218054**	C	D	A	B	A	A	A	C	C	A	B	D	C	D	B	B	A	C	A	A	D	A	A	B	D	C	B	D	C
222	**5218055**	C	D	A	B	D	A	A	B	C	A	A	C	D	D	B	A	B	D	A	C	B	A	A	B	D	D	C	D	C
223	**5218056**	C	D	A	B	A	A	A	C	C	A	B	D	C	D	B	B	A	C	A	A	A	A	A	B	D	C	C	D	C
224	**5218057**	C	B	A	B	A	D	A	B	C	D	B	C	D	D	B	B	0	D	C	A	B	A	D	B	D	D	C	D	C
225	**5218058**	C	B	A	B	A	0	A	C	C	0	B	D	C	D	B	B	0	C	C	A	B	A	0	B	D	C	C	D	D
226	**5218059**	C	D	A	B	D	A	A	B	C	A	A	C	D	D	B	A	B	D	A	C	B	A	A	B	D	D	C	D	C
227	**5218060**	C	D	A	B	B	A	A	C	C	A	A	D	C	D	B	A	B	C	A	C	B	A	A	B	D	C	C	D	C
228	**5218061**	C	B	D	B	A	D	A	B	D	D	B	C	A	D	B	B	A	D	D	A	B	A	0	B	C	D	C	D	C
229	**5218062**	C	B	D	B	A	0	A	C	D	0	B	D	A	B	B	B	0	C	D	A	B	A	0	B	D	C	C	D	C
230	**5218063**	C	B	D	B	D	D	A	B	D	D	B	C	A	B	B	B	A	D	B	A	B	A	A	B	D	D	A	D	C
231	**5218064**	C	B	A	B	D	D	A	C	D	D	B	D	A	C	B	B	B	C	B	A	B	A	A	B	D	C	C	D	C
232	**5218300**	A	A	A	C	D	A	D	D	D	D	D	C	A	D	B	A	B	A	A	D	A	A	D	A	C	D	B	A	D
233	**5218301**	D	A	B	C	D	A	D	D	D	D	D	D	A	C	B	A	C	A	A	C	D	A	C	D	C	C	C	D	B
234	**5218302**	C	B	C	C	D	D	D	D	D	D	D	C	A	D	A	A	D	D	B	A	B	B	D	C	C	D	B	D	C
235	**5218303**	C	A	B	C	D	A	D	D	D	C	D	D	A	B	B	A	C	A	A	D	C	B	C	D	B	C	C	D	B
236	**5218304**	C	A	B	C	D	A	D	D	D	D	D	C	A	B	B	A	D	A	A	D	D	D	D	C	B	D	B	D	C
237	**5218305**	C	A	B	C	D	A	C	D	D	C	D	A	A	B	B	A	C	A	A	C	C	B	C	C	B	C	C	D	C
238	**5218306**	C	A	B	C	D	A	D	D	D	D	D	A	A	B	B	A	C	A	A	D	A	B	D	C	C	D	B	D	D
239	**5218307**	C	A	A	C	C	A	C	D	C	D	D	A	D	B	B	A	C	A	A	C	A	B	C	C	B	C	C	D	B
240	**5218308**	C	B	C	C	C	C	D	B	D	C	A	A	C	D	D	A	C	D	B	A	B	B	B	C	C	C	B	D	C
241	**5218309**	C	D	C	C	D	A	D	B	A	D	D	B	B	B	D	A	C	A	A	D	B	C	B	C	D	C	C	C	D
242	**5218310**	C	B	C	B	A	A	C	B	A	C	A	B	B	B	B	A	C	A	A	C	B	B	C	C	D	C	B	C	A
243	**5218311**	C	D	A	C	D	A	D	D	D	D	D	A	D	B	B	A	C	A	A	D	A	B	D	D	B	C	C	D	C
244	**5218312**	C	D	D	C	B	A	C	D	D	C	A	A	C	B	B	A	C	A	A	C	D	B	C	D	C	C	C	D	A
245	**5218313**	C	B	A	C	D	A	D	D	C	D	D	A	D	B	B	A	C	A	A	D	C	B	C	D	B	C	C	A	A
246	**5218314**	C	C	D	A	B	A	C	D	D	D	A	A	C	B	B	A	C	A	A	C	D	B	C	C	C	C	C	D	A
247	**5218315**	C	A	A	D	D	A	D	D	C	D	D	A	D	B	B	A	C	A	A	D	C	A	C	D	B	C	C	D	C

248	**5218316**	C	B	C	B	B	A	A	D	D	D	B	B	B	D	B	B	C	C	B	C	A	A	C	C	D	A	C	A	A
249	**5218319**	C	B	C	B	D	A	A	D	A	A	B	A	D	B	C	B	A	A	B	A	B	C	A	B	D	A	C	D	C
250	**5218350**	D	D	C	A	B	A	D	B	C	D	D	D	C	B	D	A	C	A	B	D	B	A	C	D	D	A	C	A	C
251	**5218351**	B	C	C	A	D	A	B	D	D	A	D	C	D	B	A	A	C	A	D	C	B	A	C	D	D	C	B	A	C
252	**5218352**	D	D	C	A	D	A	B	D	A	C	B	B	B	C	A	A	C	A	C	D	B	A	C	C	D	A	B	B	C
253	**5218353**	B	C	C	B	A	A	B	C	A	C	D	A	D	D	D	A	C	A	D	C	B	A	C	D	D	A	B	B	C
254	**5218354**	D	D	C	A	A	A	B	D	A	C	D	C	C	C	A	C	C	A	C	D	B	A	C	D	D	A	C	B	C
255	**5218355**	B	B	C	B	A	A	A	C	A	C	C	B	A	D	D	B	A	A	D	C	B	C	A	A	C	D	D	D	A
256	**5218356**	D	B	C	B	A	A	A	C	A	C	B	A	A	A	A	C	D	D	C	D	D	A	C	B	D	C	C	A	D
257	**5218357**	C	B	C	B	A	A	A	D	A	A	B	B	B	D	B	B	A	A	A	A	B	C	A	B	D	A	D	D	C
258	**5218358**	C	B	C	B	A	A	A	D	D	A	B	B	B	D	B	B	A	A	A	A	B	C	A	B	C	B	C	A	B
259	**5218359**	C	B	C	B	A	A	A	D	D	A	B	B	B	D	B	B	A	A	A	A	B	C	A	B	D	A	C	A	B
260	**5218360**	C	B	C	B	A	A	A	D	B	A	A	B	B	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
261	**5218361**	C	B	C	B	A	A	A	D	D	A	B	B	B	D	B	B	A	A	A	A	B	C	A	B	D	A	D	D	C
262	**5218362**	C	B	C	B	A	A	A	D	C	C	B	B	B	D	B	B	A	A	A	A	D	C	A	B	D	A	D	D	C
263	**5218363**	C	B	C	B	A	B	A	D	C	C	B	B	B	D	B	B	A	A	A	A	B	C	A	A	D	A	D	D	C
264	**5218364**	C	B	C	B	A	A	A	D	B	A	B	B	B	D	B	B	A	A	D	A	B	C	A	B	D	C	D	D	A
265	**5218365**	C	A	A	B	A	A	A	A	C	A	B	B	B	D	B	A	D	A	C	A	B	C	A	B	D	C	D	A	A
266	**5218366**	C	B	C	B	A	A	B	D	B	B	B	D	B	C	B	B	A	A	D	C	B	A	A	A	D	C	D	B	C
267	**5218367**	C	B	C	B	A	A	D	D	C	B	B	D	B	C	B	B	A	A	D	D	B	A	A	B	C	A	D	D	C
268	**5218368**	C	B	C	B	A	A	D	D	B	A	B	C	B	C	B	B	A	A	C	C	B	A	A	D	D	C	D	B	C
269	**5218001**	C	B	C	B	A	A	C	D	C	A	B	D	B	C	B	B	A	A	D	D	B	A	A	D	D	C	D	B	C
270	**5218002**	C	B	C	B	A	A	D	D	B	A	B	C	B	C	B	B	A	A	D	D	B	A	A	D	D	C	D	D	C
271	**5218003**	C	B	C	B	A	A	C	D	C	D	B	D	B	C	B	B	A	A	A	A	B	A	A	D	D	C	D	B	C
272	**5218004**	C	B	C	B	A	A	C	D	B	A	B	C	B	C	B	B	A	A	A	A	B	A	A	D	D	C	D	D	C
273	**5218005**	C	B	C	B	A	A	C	D	C	A	B	D	B	C	B	B	A	A	D	C	B	A	A	D	D	C	D	D	B
274	**5218006**	C	B	C	B	A	A	C	D	B	A	B	C	B	C	B	B	A	A	D	C	B	A	A	D	D	B	D	B	C
275	**5218007**	C	B	C	B	A	A	B	D	C	A	B	D	B	C	B	B	A	A	D	C	B	A	A	C	D	C	D	D	B

276	**5218008**	C	B	C	B	A	A	B	D	B	A	B	C	B	C	B	B	A	A	C	C	B	A	A	D	D	D	D	D	C
277	**5218009**	C	B	C	D	D	D	B	D	C	D	B	D	A	C	B	A	A	A	A	A	C	C	A	A	D	A	A	D	A
278	**5218010**	D	B	C	C	D	C	B	D	B	A	B	B	D	C	D	A	C	B	D	A	B	D	D	B	D	A	A	D	B
279	**5218011**	B	B	C	D	C	D	B	D	C	A	B	B	A	C	C	A	C	D	A	A	B	B	C	B	D	A	A	D	B
280	**5218012**	D	B	C	C	D	C	D	D	C	A	B	B	D	C	D	A	C	B	D	A	B	D	D	B	D	A	B	D	B
281	**5218013**	B	B	C	D	C	D	D	D	C	A	B	B	A	C	C	A	D	D	A	A	B	B	C	B	D	A	B	D	B
282	**5218014**	B	B	C	C	D	C	D	D	C	A	B	B	D	C	D	A	C	D	D	A	B	D	D	B	D	A	B	D	B
283	**5218015**	A	B	C	D	C	D	B	D	C	A	B	B	A	C	C	A	A	B	A	A	B	B	C	B	D	A	B	D	B
284	**5218016**	C	B	C	C	D	B	D	D	C	D	B	B	A	C	B	A	A	A	A	A	B	C	A	B	D	A	C	D	B
285	**5218017**	A	B	C	D	C	D	B	D	C	C	B	B	A	B	A	C	A	B	B	A	B	D	D	B	D	B	C	D	B
286	**5218018**	C	B	C	B	D	A	A	D	C	D	C	B	A	D	B	B	A	A	B	D	B	C	A	B	A	C	A	D	B
287	**5218019**	C	B	C	B	C	A	A	D	C	C	D	B	A	B	B	D	A	D	B	C	B	C	D	B	A	D	D	A	B
288	**5218020**	A	B	C	B	D	A	A	D	C	D	C	B	A	B	B	D	A	C	B	D	D	C	C	B	A	B	D	A	B
289	**5218021**	C	B	C	B	C	A	A	D	C	C	D	B	A	B	B	D	A	D	B	C	C	C	D	C	A	C	D	C	B
290	**5218022**	C	B	C	A	D	A	A	D	C	D	C	B	A	B	B	D	A	C	B	D	D	C	C	D	A	D	A	B	D
291	**5218023**	C	B	C	B	C	A	A	D	C	D	D	B	A	B	B	D	A	D	B	C	C	C	C	C	A	B	D	C	B
292	**5218024**	C	B	C	A	D	A	A	D	C	D	C	B	A	B	B	D	A	D	B	D	A	C	A	D	A	D	A	B	D
293	**5218025**	C	B	C	A	C	A	A	D	D	D	D	B	B	D	B	B	A	D	B	C	A	A	D	D	D	A	A	D	A
294	**5218026**	C	B	C	A	D	D	A	D	C	D	B	B	B	D	B	B	A	A	B	A	B	C	A	B	D	D	D	D	C
295	**5218027**	C	B	C	A	C	C	A	D	D	D	B	B	D	D	B	B	A	A	B	A	B	C	A	B	D	D	B	D	C
296	**5818150**	C	B	C	A	D	D	A	D	C	D	B	B	D	D	B	B	A	A	D	A	B	C	A	B	D	C	D	D	C
297	**5818151**	C	B	C	A	C	C	A	D	D	D	B	B	B	D	B	B	A	A	C	A	B	C	A	B	D	D	D	D	C
298	**5818152**	C	B	C	D	D	D	A	D	C	D	B	B	D	D	B	B	A	A	D	A	B	C	A	B	D	C	D	D	C
299	**5818153**	C	B	C	C	C	C	A	D	D	D	B	B	B	D	B	B	A	A	C	A	B	C	A	B	D	B	D	D	C
300	**5818154**	C	B	C	D	D	D	A	D	C	D	A	B	D	D	B	B	A	A	D	D	B	C	A	B	D	B	D	D	C
301	**5818155**	C	B	C	C	D	C	A	D	D	C	B	B	B	D	B	B	A	A	C	A	B	C	A	B	D	B	D	D	C
302	**5818156**	C	B	C	D	D	D	A	D	C	D	B	B	D	D	B	B	A	A	D	A	B	C	A	B	D	B	D	D	C
303	**5818157**	C	B	C	C	D	C	B	D	D	C	B	B	B	A	B	C	A	A	A	A	B	C	A	B	D	A	D	D	D

304	**5818158**	C	B	C	A	D	D	D	D	C	D	B	B	D	A	B	C	A	A	A	A	B	C	A	B	D	A	D	D	A
305	**5818159**	C	B	A	B	A	C	B	A	A	A	A	B	B	C	C	B	C	A	C	A	B	C	A	B	D	B	C	D	D
306	**5818160**	C	B	A	B	A	D	A	A	B	B	A	B	A	C	B	C	C	A	C	A	B	C	A	B	D	B	B	C	A
307	**5818161**	C	B	A	B	A	B	A	A	B	C	A	B	A	C	B	C	C	A	C	A	B	C	A	B	D	B	B	D	D
308	**5818162**	C	B	D	B	A	B	A	A	B	C	A	B	A	C	B	C	C	A	C	A	B	C	A	B	D	B	C	B	A
309	**5818163**	C	B	C	B	A	B	A	B	A	C	A	B	B	C	B	C	C	A	C	A	B	C	A	B	D	B	D	B	D
310	**5818164**	C	B	A	B	A	B	A	B	A	C	A	B	A	C	B	C	C	A	C	A	B	C	A	B	D	B	B	D	A
311	**5818078**	C	B	D	B	A	B	A	A	B	C	A	B	A	C	B	C	C	A	C	A	B	C	A	B	D	B	C	B	D
312	**5818079**	C	B	A	B	A	B	A	B	A	C	A	B	A	C	B	C	C	A	C	A	B	C	A	B	D	B	B	D	A
313	**5818080**	C	B	C	B	A	A	A	B	B	C	B	B	A	C	B	B	C	A	A	A	C	C	A	B	C	A	D	B	D
314	**5818081**	C	B	C	B	A	A	A	D	A	A	B	B	A	D	B	B	A	A	C	C	B	C	A	B	D	C	D	D	A
315	**5818082**	C	B	C	D	D	D	D	D	D	D	B	B	D	A	B	C	A	A	A	A	B	C	A	C	D	A	C	D	D
316	**5818083**	C	B	C	B	A	A	A	C	A	B	B	B	D	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
317	**5818084**	C	B	C	B	A	A	A	B	C	D	B	B	B	D	B	B	A	A	C	A	B	C	A	B	D	A	C	C	C
318	**5818085**	C	B	A	B	A	A	A	C	D	A	B	B	A	D	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
319	**5818086**	C	B	C	B	A	A	A	C	C	D	B	B	B	A	B	B	A	A	C	A	B	C	A	B	D	A	D	D	C
320	**5818087**	C	B	C	B	A	B	A	C	D	C	B	B	B	D	B	B	A	A	C	A	D	C	A	B	D	A	B	D	B
321	**6118046**	C	B	C	B	A	B	D	C	C	B	B	B	B	D	B	B	A	A	C	A	C	D	A	B	A	A	D	D	B
322	**6118047**	C	B	D	C	A	A	A	C	D	B	B	C	B	C	B	B	A	A	C	A	C	C	A	B	D	A	B	D	B
323	**6118047**	C	B	C	B	A	A	A	C	C	B	B	B	B	C	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
324	**6118048**	C	B	C	B	A	A	A	C	D	A	B	B	C	D	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
325	**6118049**	C	B	C	B	A	A	A	C	D	D	B	B	B	D	B	B	A	A	D	A	B	C	A	B	D	A	B	B	C
326	**6118050**	C	B	C	B	A	A	A	C	D	C	B	B	B	C	B	B	A	A	D	A	B	C	A	B	D	A	D	D	C
327	**6118209**	C	D	C	D	D	A	D	C	D	B	A	B	B	A	D	B	D	D	C	A	A	C	A	A	A	D	A	A	B
328	**6118210**	B	C	C	C	D	A	C	C	D	A	A	C	B	A	C	C	D	A	A	D	B	C	D	A	D	C	B	C	B
329	**6118211**	C	D	A	D	C	C	D	C	D	D	B	C	A	C	B	B	C	B	A	C	D	D	A	C	A	D	B	A	B
330	**6118212**	B	C	C	C	D	A	C	C	C	A	A	C	B	B	D	C	D	A	A	D	B	D	D	C	D	C	B	D	B
331	**6118213**	A	D	C	D	C	A	D	C	D	A	A	C	B	C	C	C	C	A	A	C	B	D	D	C	D	D	B	D	B

332	**6118214**	C	C	C	C	D	A	C	A	D	B	A	B	B	B	D	B	D	B	C	A	D	C	A	C	A	C	B	C	B
333	**6118215**	C	D	C	C	C	A	D	B	D	B	A	B	B	C	C	B	C	B	C	A	D	C	A	C	A	D	B	C	B
334	**6118216**	B	C	C	C	D	A	A	D	C	A	A	C	B	B	D	C	D	A	C	D	B	C	D	C	D	0	B	0	B
335	**6118217**	C	D	A	D	C	A	D	B	D	A	A	C	C	C	C	C	C	A	A	C	D	C	D	C	D	B	B	D	B
336	**6118219**	D	C	A	C	D	A	C	B	C	B	A	B	B	B	D	B	D	B	D	A	D	C	A	C	D	D	B	C	B
337	**6118220**	A	D	C	D	C	A	D	B	D	B	A	B	B	C	C	B	C	B	B	A	D	C	A	C	D	D	B	C	B
338	**6118221**	C	B	C	C	D	D	A	B	B	B	B	B	D	D	B	B	A	A	D	A	B	C	A	B	D	D	D	D	C
339	**6118222**	C	B	C	B	A	C	A	D	C	A	B	B	C	D	B	B	A	A	B	A	B	C	A	B	D	C	D	D	C
340	**6118223**	C	B	C	C	D	D	A	D	C	C	B	B	D	D	B	B	A	A	D	A	B	C	A	B	D	B	D	D	C
341	**6118224**	C	B	C	C	C	C	A	D	C	D	B	B	C	D	B	B	A	A	B	A	B	C	A	B	D	B	D	D	C
342	**6118225**	C	B	C	C	D	C	A	D	C	C	B	B	D	D	B	B	A	A	B	A	A	C	A	B	D	A	D	D	C
343	**6118226**	C	B	C	C	C	C	A	D	C	D	B	B	C	D	B	B	A	A	B	A	B	C	A	B	D	D	D	D	C
344	**6118227**	C	B	C	B	A	A	A	D	C	A	B	B	B	D	B	B	B	A	B	A	B	C	A	B	D	D	D	D	A
345	**6118228**	C	B	C	B	A	A	A	D	A	C	B	B	B	D	B	B	A	B	A	A	B	C	A	B	A	A	D	A	C
346	**6118229**	C	B	C	B	A	A	A	D	A	A	B	B	B	D	B	B	A	A	A	A	B	C	A	C	C	C	C	C	C
347	**6118230**	C	B	C	A	A	A	A	D	C	A	B	B	B	D	B	B	A	A	B	A	B	C	A	B	D	A	D	D	C
348	**6118231**	C	B	C	B	A	A	A	D	C	A	B	B	B	D	A	B	A	A	A	A	B	C	A	B	C	C	C	D	C
349	**6118232**	C	A	C	B	A	A	A	B	A	A	B	A	B	D	A	A	A	A	B	A	B	C	A	B	C	C	C	D	C
350	**6118233**	C	B	C	D	D	D	A	B	A	B	B	B	A	D	B	B	A	A	B	A	D	C	A	B	D	C	D	D	C
351	**6118234**	C	B	C	C	C	D	A	B	B	B	B	B	A	D	B	B	A	A	B	A	D	C	A	B	D	C	D	D	C
352	**6118236**	A	D	B	B	D	A	A	B	A	A	D	C	A	D	B	D	D	D	A	A	B	A	A	B	D	C	C	D	C
353	**6118237**	C	B	C	B	A	A	A	B	B	A	B	B	A	D	B	B	A	A	D	D	B	D	A	B	D	A	D	D	C
354	**6118238**	C	B	C	B	A	A	A	C	B	A	B	B	B	D	B	B	A	A	C	A	B	D	A	B	D	A	D	D	C
355	**6118239**	A	A	A	B	B	A	A	A	D	A	A	A	A	D	B	C	B	D	A	A	B	B	A	B	D	A	A	D	C
356	**5918001**	C	B	C	B	A	A	A	D	D	A	B	B	A	D	B	B	A	A	A	D	B	B	A	B	D	A	D	D	C
357	**5918002**	C	B	C	B	A	A	A	C	D	A	B	B	A	D	B	B	A	A	C	D	B	B	A	B	D	A	D	D	C
358	**5918003**	C	A	B	B	A	A	A	A	D	A	C	C	A	D	B	B	A	D	A	A	A	B	A	B	D	D	A	D	C
359	**5918004**	C	A	B	B	A	A	A	C	D	D	B	B	A	D	B	B	A	A	C	D	D	C	A	B	D	C	D	D	C

360	**5918005**	C	A	C	A	D	D	D	D	D	A	B	A	A	A	B	B	0	0	C	A	0	C	A	B	D	A	D	D	D
361	**5918006**	A	A	C	B	A	A	A	A	A	D	A	D	A	C	B	D	B	A	C	A	0	0	A	D	D	A	D	D	C
362	**5918007**	C	B	C	B	0	D	A	A	C	C	C	C	A	A	B	0	0	A	C	A	B	C	A	B	D	A	D	D	0
363	**5918008**	C	A	C	A	D	D	D	C	A	B	D	C	B	C	A	D	B	B	C	A	B	C	A	B	D	A	D	D	D
364	**5918009**	C	B	C	B	A	A	A	B	B	C	B	B	B	D	B	B	A	B	A	A	D	C	A	B	D	D	A	A	C
365	**5918010**	C	B	C	A	A	A	A	C	C	B	B	B	C	D	B	D	A	B	A	A	D	C	A	B	D	C	D	D	C
366	**5918011**	C	B	C	A	A	A	A	D	B	C	B	B	D	D	B	D	A	B	A	A	A	C	A	B	D	D	D	D	C
367	**5918012**	C	B	C	A	A	A	A	C	B	C	B	B	C	D	B	C	A	B	A	A	D	C	A	B	D	A	D	D	C
368	**5918013**	C	B	C	B	A	A	A	D	B	C	B	A	D	D	B	B	A	B	A	A	A	C	A	B	D	A	D	D	C
369	**5918014**	C	B	C	B	A	A	A	C	B	C	B	D	C	A	A	B	C	A	B	A	B	D	A	B	D	B	D	D	B
370	**5918015**	C	B	C	A	A	A	A	D	B	B	B	B	D	D	D	D	A	A	B	A	B	A	A	B	D	A	A	D	D
371	**5918016**	C	B	C	B	A	A	A	C	B	C	B	A	C	D	B	B	A	B	A	A	C	C	A	B	D	A	D	D	C
372	**5918017**	C	B	C	B	A	A	A	D	B	B	B	D	B	D	B	B	A	A	A	A	A	C	A	B	D	A	D	D	C
373	**5918018**	C	B	C	A	D	D	A	C	B	C	B	B	A	D	B	B	A	A	D	A	B	C	A	B	D	A	D	A	D
374	**5918019**	C	B	C	B	A	A	A	D	A	A	B	B	A	D	B	B	A	A	D	A	B	C	A	B	D	B	D	D	A
375	**5918020**	C	A	D	B	A	A	A	D	B	A	B	B	B	D	B	D	C	A	D	A	B	C	A	B	D	D	D	D	C
376	**5918021**	C	B	C	B	A	A	A	D	B	A	B	B	B	D	B	B	A	A	D	A	B	C	A	B	D	B	D	D	D
377	**5918022**	C	B	C	B	A	A	A	D	B	A	B	B	B	D	B	B	A	A	D	A	B	C	A	B	D	B	B	D	C
378	**5918023**	C	B	C	B	A	A	A	D	D	A	B	B	B	D	B	B	A	A	D	A	B	C	A	B	D	B	B	D	D

APPENDIX H

Candidates' Responses on 2018 Mathematics Basic Education Certificate Examination (BECE) in Funtua Education Zone

Number of Items From 30 - 60

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
D	B	A	A	D	B	A	A	D	C	A	C	B	D	D	D	B	C	A	B	C	D	C	B	C	B	A	B	C	C	A
D	B	D	C	C	D	A	A	D	B	A	A	B	D	D	A	B	A	A	B	C	D	D	B	A	B	A	A	C	C	C
D	B	C	D	B	C	A	A	D	D	A	D	D	D	D	C	B	D	A	B	C	D	A	B	D	B	A	B	C	C	D
D	B	B	C	C	D	A	A	D	B	A	B	C	D	D	B	B	B	A	B	C	D	D	B	A	B	A	B	C	C	C
D	B	C	B	B	D	A	A	D	D	A	B	D	D	D	C	B	B	A	B	C	D	A	B	D	B	A	B	C	C	C
D	B	B	B	A	C	A	A	D	B	A	B	B	D	D	B	B	B	A	B	C	D	D	B	D	B	A	B	C	C	C
D	B	C	B	C	D	A	A	D	D	A	B	A	D	D	C	B	A	A	B	C	D	A	B	D	B	A	B	C	C	C
D	B	C	C	B	C	D	A	D	B	A	B	B	D	D	B	B	A	A	B	C	D	D	B	C	A	D	B	C	C	C
D	B	C	B	C	D	A	A	D	D	A	C	B	D	D	C	B	A	A	B	C	D	A	B	D	B	A	B	C	C	C
D	B	D	C	A	C	A	A	D	D	A	D	D	D	D	B	B	D	A	B	C	D	D	B	D	B	A	B	C	C	C
D	B	C	B	A	D	A	D	A	D	A	B	D	D	A	C	B	B	A	B	C	D	D	B	D	B	A	B	C	C	C
D	B	C	C	A	D	A	A	D	B	A	D	B	D	D	B	A	B	A	B	C	D	A	B	D	B	A	B	C	C	C
B	A	D	B	B	B	C	D	A	B	D	B	C	C	C	C	A	B	B	A	A	A	A	D	D	D	D	D	A	A	C
B	B	A	C	C	B	B	D	D	B	C	D	C	C	B	B	A	A	B	B	D	C	D	D	D	C	C	C	C	A	C
B	B	D	C	D	D	B	A	A	B	B	B	B	C	C	C	A	C	B	A	A	B	D	D	D	D	D	D	A	A	C
A	B	C	C	D	C	B	A	B	B	C	D	B	C	B	B	A	C	B	A	D	A	A	D	D	C	C	C	D	A	C
C	A	A	C	C	B	C	A	D	B	B	C	C	C	C	D	B	C	A	B	D	C	D	C	D	D	D	D	D	C	C
D	C	C	A	B	D	B	A	B	B	C	C	C	C	B	D	A	A	C	B	A	B	A	B	D	C	C	C	C	A	C
D	D	C	D	D	C	B	A	B	B	A	D	C	C	D	D	A	A	C	A	A	C	A	B	A	D	D	B	C	A	C
A	C	C	C	C	B	B	D	B	B	B	B	B	C	D	C	B	C	A	A	A	B	D	D	D	C	A	A	A	A	C
C	B	C	A	B	B	A	A	D	C	C	C	D	D	D	D	D	C	A	A	A	D	C	C	A	B	A	B	C	A	C
C	D	A	D	B	C	C	D	B	B	D	D	D	D	C	C	C	A	A	D	A	C	A	D	C	D	A	A	C	A	C
C	C	A	A	D	D	A	A	D	C	A	C	B	D	D	C	D	C	A	D	C	D	C	B	A	B	A	B	B	C	C
D	B	A	A	A	B	C	D	D	B	A	C	B	D	D	C	B	B	A	B	C	D	C	B	C	B	A	A	C	C	C

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