

РОЛЯТА НА ТЕСТА ПРИ СЛУШАНЕ И РАЗБИРАНЕ НА НАУЧЕН ТЕКСТ ОТ СТУДЕНТИ ПО МИННО ДЕЛО И ГЕОЛОГИЯ

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РЕЗЮМЕ

Статията има за цел да постави началото на курс, състоящ се от упражнения за слушане и разбиране на научни текстове за студенти по минно дело и геология. Описани са етапите на създаване и организиране на първия тест. Представени са три варианта. Първият вариант е построен на принципа на изречения от текста, за които трябва да се посочи дали са верни или неверни. Вторият вариант е затворен тест, при който студентите избират един верен от три посочени отговора. Третият вариант представлява т.нар. отворен тест, където обучаемите попълват липсващи думи и фрази. Целта на представените варианти на първия тест е да потвърди хипотезата, че основната трудност, която студентите срещат в разбирането на съдържанието на част от научен курс, е откриването на маркерите на дискурса.

ВЪВЕДЕНИЕ

Тестовите по език са изключително важна област в приложната лингвистика. Езиковите тестове са отделна сфера на изучаване, която има своята история и развитие. За съжаление тя не е добре развита в България, особено в онази си част, която проверява разбирането на научни текстове. Това беше причината, поради която решихме, че бихме могли да поставим началото на един по-амбициозен проект, какъвто е развиването на четирите езикови умения - слушане, говорене, четене и писане, на основата на съвременни учебни помагала. В същото време ние осъзнаваме необходимостта да обучаваме нашите студенти как да четат и слушат научни текстове, които са част от техните специалности, като умението да слушат и разбират научен текст несъмнено ще им бъде полезно при повишаване нивото на тяхната професионална квалификация. Поради това една четвърт от учебните ни часове, т.е. последните 30-40 часа, са посветени на развиването на умението да извличат информация от научни текстове. С перспективна ние решихме да съставим кратък курс за развиване на уменията за слушане и разбиране на академични текстове, организирани на тематично-функционална основа, така че да отрази възможната комуникативна употреба на езика на минното дело и геологията. За да осъществим нашия проект, ние избрахме, с помощта на колеги от Геолого-проучвателния факултет, десет кратки текста, които разглеждат важни теми в областта на минното дело и геологията. Друг критерий при подбора на текстовете беше тяхната представителност по отношение на основните реторични функции на езика на науката и технологиите, т.е. описание (на физически обекти и процеси), дефиниция и класификация. За да докажем необходимостта от прилагане на комуникативния метод при обучението на студентите в умението да слушат и разбират научни

текстове, ние сме в процес на разработване на серия от тестове с цел проверка на способността на студентите от факултета по минно дело и геология да извличат специфична информация от тези текстове. Много преподаватели използват материал, записан на касети, при упражнения за слушане и разбиране със студентите. Този метод има редица предимства и недостатъци. Едно от предимствата е, че записаният на касета материал позволява на студентите да чуват множество различни гласове освен този на техния преподавател. Най-често срещаните недостатъци са: трудността всички студенти в аудиторията да чуват еднакво добре записа и да слушат текста с една и съща скорост, която се определя от записа, а не от слушащия. Пени Ър (методист) изтъква, че дискурсът в естествена среда рядко се "повтаря" и затова предлага една от нашите задачи да бъде окуражаването на студентите да извличат колкото е възможно повече необходима информация от едно единствено прослушване на текста. Напълно вярно е, че извличането на обща или специфична информация от едно прослушване е важно умение и затова задачата, която се поставя на студентите при първото слушане на записа, трябва да бъде степенувана по трудност, така че обучаемите постепенно да усвоят умението да слушат ефективно. Ако искаме слушането на записа да има максимално добър резултат за обучаемите, записът трябва да бъде пускан няколко пъти, за да може с всяко следващо прослушване те да се чувстват по-уверени и да разбират по-голяма част от записания текст в сравнение с предишните прослушвания. Трябва да бъде обърнато внимание на реда, в който се дават упражненията според тяхната трудност. Често първото прослушване е за придобиването на обща представа за това какво се говори в текста преди да се премине към различните задачи за усъвършенстване на уменията. Понякога на обучаемите може да бъде поставена задачата още с първото слушане да извлекат

специфична информация от текста. В процеса на подготовка на текстовете за слушане и разбиране, ние стигнахме до извода, че трудността на задачите зависи от организацията на информацията, нейната яснота и достатъчност, популярността на темата и използвания език. Следва описание на етапите при съставянето на първия от поредицата тестове, който се състои от три варианта.

ЕТАПИ НА СЪСТАВЯНЕТО НА ТЕСТА

Първият етап при създаването на теста беше да определим какви точно умения и способности ще тестваме. В случая ние искахме да определим способността на нашите студенти да идентифицират различните лингвистични изрази в един геоложки текст, които се използват за описание на индивидуални характеристики на магмените, седиментните и метаморфните скали.

Вторият етап при съставянето на теста беше да осигурим разрешение на проблема. Допуснахме, че основната трудност, на която ще се натъкнат студентите, когато се опитват да разберат съдържанието на част от записан на английски език академичен курс, ще бъде определянето на маркерите на дискурса, които свързват разнообразните лингвистични изрази с реторичните функции, представени в дискурсен пример. Намерението на автора на текста е било да опише физичен обект, в конкретния случай тук видове скали на земната кора. За да потвърдим нашата хипотеза, ние подготвихме три варианта на теста.

Вариант 1 е тест, съставен на основата на въпроси, които са верни или неверни. Той е подходящ за студенти с не толкова високо ниво на владеене на английски език. Тестът се състои от две части: оригиналният текст, записан на касета и десет твърдения, за които студентите трябва да решат дали са верни или неверни. Съставянето на теста премина през два етапа: 1. Избор на научен текст. 2. Съставяне на десет изречения, някои от които са верни, а други – неверни.

Вариант 2 е затворен тест, при който студентите избират един верен отговор от три посочени. Той може да се използва при работа със студенти с добро или много добро владеене на езика, които могат да слушат и разбират чужд език. След като са чули текста, студентите избират от посочените думи и фрази онези, които най-точно отговарят на това, което са чули. Следните стъпки бяха извървяни при съставянето на този вид тест: 1. Избор на думи или фрази, разбирането на които да бъде проверено. 2. Избор на две неверни думи или фрази, заедно с които да бъде посочена вярната. 3. Подготовка на ясни инструкции. Този вид тест е с висока надеждност, защото се оценява обективно и има само един правилен отговор.

Третият вариант е отворен тест. Той проверява уменията на студентите да използват езика като система. Студентите получават копия със същия текст, който е записан на касетата, но с липсващи думи и фрази. Студентите разчитат на контекста, за да попълват липсващите думи и фрази. Понастоящем отвореният тип

тест е най-разпространен. Той лесно се подготвя и оценява. Преподавателите също го харесват, тъй като той е интегративен и изисква от студентите да използват компонентите на езика едновременно, подобно на това, което се случва, когато хората комуникират. Стъпките при подготовката на отворен тест са: 1. Избор на подходящ параграф от научен текст. 2. Определяне броя на липсващите думи и фрази. 3. Подготовка на инструкциите и на пример.*

РЕЗУЛТАТИ

Създаден е подробен ключ с отговори към теста, така че резултатите са почти напълно обективни. За всеки верен отговор се дава една точка. Средният резултат е изчислен като общият брой на точките от всеки тест се разделя на общия брой на студентите. За теста, построен на основата на верни и неверни въпроси, средният резултат беше 9, за затворения тест – 7, а за отворения – 14. Следователно нашата хипотеза, че основните трудности при разбирането на дискурсна структура на чут научен текст са в силна зависимост от способността да се разпознават определени маркери на дискурса, беше потвърдена.

ИЗВОДИ

Резултатите, постигнати с този първи тест от подготвяната серия, ни позволяват да направим следните изводи:

1. Трябва да продължаваме да тестваме уменията за слушане и разбиране на нашите студенти чрез използването на текстове, които имат различна дискурсна структура и тестови елементи, подобни на описаните по-горе.

2. Ако получените резултати от първия тест се потвърдят и в следващите, ние със сигурност ще имаме основание да базираме нашия курс упражнения за слушане и разбиране на две основни цели: а) Развиване на уменията за слушане с цел извличането на специфична информация от научни текстове и б) Развиване на комуникативните умения за идентифициране на маркерите на дискурса на реторичните функции, типични за научен дискурс.

И накрая, студентите възприеха теста като добра възможност да проверят не само познанията си по английски език, но също така и познанията си по определена тема от областта на геологията.

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*Приложен е в писмен вид записаният на касета текст както и трите варианта на теста и ключ с отговорите.

ПРИЛОЖЕНИЕ 1

Listen to the following paragraph which describes the rocks of the crust:

The rocks of the crust are classified into three types, (a) igneous, (b) sedimentary, (c) metamorphic.

Igneous rocks have crystallized from magma. They occur either as intrusive (below the surface) bodies or as extrusive (surface) rocks. Intrusive bodies, the contacts of which are parallel to the bedding of the country rock, are called concordant, e.g. sills and laccoliths. Intrusive bodies which cut across the bedding of the intruded rocks are termed discordant, e.g. batholiths, dykes, etc.

Sedimentary rocks have been produced by the weathering of older rocks and the deposition of sediment in water. They can be classified by their mode of origin as clastic and nonclastic. Clastic rocks (conglomerates, breccias, etc.) are composed of rock fragments or mineral grains broken from pre-existing rocks. Nonclastic rocks (limestone, dolomite, etc.) are formed by chemical or biological precipitation and accumulation of organic material.

Metamorphic rocks have been developed from earlier igneous or sedimentary rocks by the action of heat, pressure or chemically active solutions. They can be subdivided into three genetic groups: thermal or contact, regional and dynamic. Metamorphic rocks can also be classified into two textural groups: foliated and nonfoliated. Foliated rocks are produced under the influence of directed pressure and include slate, schist, gneiss, etc. Nonfoliated rocks are produced mainly by increased temperature and include hornfels, marble, quartzite, etc.

Version one: True-false questions

Read the statements and circle T for true or F for false according to the text you have just listened to:

1. The rocks of the crust are classified into igneous, sedimentary and metamorphic. T F

2. Igneous rocks have been produced by the weathering of older rocks. T F

3. Intrusive bodies, the contacts of which are parallel to the bedding of the country rock, are called concordant. T F

4. Dykes are concordant intrusive bodies. T F

5. Sedimentary rocks can be classified by their mode of origin as clastic and nonclastic. T F

6. Clastic rocks are composed of rock fragments or mineral grains broken from pre-existing rocks. T F

7. Nonclastic rocks have been developed from earlier igneous or sedimentary rocks. T F

8. Metamorphic rocks can be divided into three genetic groups: thermal (contact), regional and dynamic. T F

9. Foliated rocks are produced under the influence of directed pressure. T F

10. Nonfoliated rocks include slate, schist, gneiss, etc. T F

Version two: Multiple-choice test

Listen to the text and then read the statements and choose an answer from a, b or c in order to finish them. There is only one correct answer.

1. The rocks of the crust are classified into:

- a). 2 types
- b). 3 types
- c). 4 types

2. Igneous rocks have been produced:

- a). from magma
- b). by weathering of older rocks
- c). by deposition of sediment in water

3. Sedimentary rocks are classified by their mode of origin as:

- a). concordant and discordant
- b). clastic and nonclastic
- c). contact, regional and dynamic

4. Metamorphic rocks have been developed from:

- a). igneous rocks
- b). igneous and sedimentary rocks
- c). sedimentary rocks

5. Batholiths are:

- a). intrusive concordant rocks
- b). extrusive rocks
- c). intrusive discordant rocks

6. Laccoliths are:

- a). intrusive concordant rocks
- b). sedimentary rocks

c).intrusive discordant rocks

Listen to the text and try to fill in each gap with the missing word or phrase.

7.Limestone is:

- a). nonclastic sedimentary rock
- b).clastic sedimentary rock
- c).igneous rock

The rocks of the crust are classified into three types, (a) igneous, (b) sedimentary, (c) (1).

Igneous rocks have crystallized from (2). They occur either as intrusive (below the surface) bodies or as extrusive (surface) rocks. Intrusive bodies, the contacts of which are (3) to the bedding of the country rock, are called concordant, e.g. sills and laccoliths. (4) bodies which cut across the bedding of the intruded rocks are termed (5), e.g. batholiths, dykes, etc.

8.Conglomerates are:

- a).nonclastic sedimentary rocks
- b).metamorphic rocks
- c).clastic sedimentary rocks

Sedimentary rocks have been produced by the (6) and the deposition of sediment in water.They can be classified by their mode of origin as (7) and (8). Clastic rocks (conglomerates, breccias, etc.) are composed of rock fragments or..... (9) broken from pre-existing rocks. Nonclastic rocks (limestone, dolomite, etc.) are formed by (10) or biological (11) and accumulation of (12) material.

9.Gneiss is:

- a).nonfoliated metamorphic rock
- b).sedimentary rock
- c).foliated metamorphic rock

Metamorphic rocks have been developed from earlier igneous or sedimentary rocks by the action of heat,..... (13) or chemically active solutions. They can be subdivided into three genetic groups: thermal or (14), regional and dynamic. Metamorphic rocks can also be classified into two textural groups: (15) and (16). Foliated rocks are produced under the influence of (17) pressure and include (18), schist, gneiss, etc. Nonfoliated rocks are produced mainly by (19) temperature and include hornfels, marble, (20), etc.

10. Nonfoliated metamorphic rocks are produced:

- a).by chemical or biological precipitation
- b).under the influence of directed pressure
- c).by increased temperature

Version three: Cloze test

ПРИЛОЖЕНИЕ 2

Key to True-false questions test:

- 1 T
- 2 F
- 3 T
- 4 F
- 5 T
- 6 T
- 7 F
- 8 T
- 9 T
- 10 T

Key to Multiple-choice Test

- 1- b
- 2- a
- 3- b
- 4- b
- 5- c
- 6- a
- 7- a
- 8- c
- 9- c
- 10- c

Key to Cloze test

- 1- metamorphic
- 2- magma
- 3- parallel
- 4- intrusive
- 5- discordant
- 6- weathering of older rocks
- 7- clastic
- 8- nonclastic
- 9- mineral grains
- 10- chemical
- 11- precipitation
- 12- organic
- 13- pressure
- 14- content
- 15- foliated
- 16- nonfoliated
- 17- direct
- 18- slate
- 19- increased
- 20- quartzite

HOW TO TEST LISTENING COMPREHENSION OF STUDENTS IN MINING AND GEOLOGY

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ABSTRACT

The paper argues for organising a course in listening scientific texts to be administered to students of mining and geology. The construction stages and administration of the first test are described. Three test versions (multiple-choice test, cloze test and test based on True and False statements) were administered to three different subgroups in order to validate the hypothesis that the main difficulty students encounter in understanding the information content of an academic piece of discourse is detecting the discourse markers.

INTRODUCTION

Language Testing (LT) is an extremely important area in applied linguistic science. LT is a separate field of study, which has its history of development. Unfortunately it is not well developed area in Bulgaria, especially this part which tests comprehension of scientific texts. This was the reason we thought we could start more ambitious project such as developing the four language skills of listening, speaking, reading and writing on the basis of modern coursebooks. At the same time we are aware of the need to teach our students how to read and listen properly texts which belong to their specialist field of study, as such a listening skill will undoubtedly be much help in raising the level of their future professional qualification. That is why one quarter of our teaching time, i.e. the final 30-40 hours, is allocated to developing the skill of extracting information from scientific texts. With the latter objective in mind, we decided to design a short course of training in the listening of academic texts, organised on a topic-functional basis so as to reflect directly the potential communicative use of the language of mining and geology. To complete our project, we selected, with the help of our colleagues from the geology departments, ten short geology texts dealing with an important geological topic. Another criterion choosing the texts was their representativeness with regard to the main rhetorical functions of the language of science and technology, i.e. description (of physical objects and processes), definition and classification. In order to prove the necessity of applying the communicative approach to teaching the skill of listening scientific texts, we are constructing a series of achievement tests meant to assess the ability of geology students to extract specific information from these texts. Many lecturers use taped materials when they want their students to practise listening skills. This has a number of advantages and disadvantages. One of the advantages is that taped material allows students to

hear a variety of different voices apart from their lecturer's one. The most common disadvantages are the difficulty to ensure that all students in a room can hear equally well and that they have to listen at the same speed, a speed dictated by the tape, not by the listeners. The methodologist Penny Ur points out that in real-life discourse is

rarely "replayed" and suggests, therefore, that one of our tasks is to encourage students to get as much information as is necessary from a single hearing. It is certainly true that extracting general or specific information from one listening is an important skill, so that the kind of task we give students for the first time they hear a tape is absolutely critical in gradually training them to listen effectively. If students are to get the maximum benefit from listening then we should replay the tape two or more times, since with each listening they may feel more secure, and with each listening they will understand more than they did previously. Attention should be paid to the sequence of the exercises which have to be arranged according to their difficulty. Frequently students listen for gist on first hearing before moving on to different task skills; at other times they may listen for specific information straight away. In the process of preparing the listening tests, we found that the difficulty of listening tasks is influenced by the organization of information, the familiarity of the topic, the explicitness and sufficiency of the information and the type of referring expressions used. Here follows a description of the stages in constructing the first test of the series consisted of three versions.

STAGES IN TEST CONSTRUCTION

The first stage in constructing our test was to determine what particular abilities were to be tested. In this case we wanted to measure the ability of our students to identify the different linguistic expressions in a geology text which are used to describe individual characteristics of igneous, sedimentary and metamorphic rocks.

The second stage in constructing our test was to provide a solution to the problem. We hypothesized that the main

difficulty students encounter when trying to understand the information content of an academic piece of discourse taped in English is detecting the discourse markers which relate the various linguistic expressions to the respective rhetorical functions present in that discourse sample. The intention of the text's writer was to describe a physical object, in this particular case types of rocks of the crust. In order to validate our hypothesis, we prepared three test versions.

Version one is a test based on True-false questions. It is suitable for students with not that high level of proficiency in English. The test contains two test items: the original test taped on a cassette and ten statements for which students have to decide whether they are true or false. Three steps were followed in preparing the test: 1. Select a scientific text. 2. Choose ten statement some of which are true, the others – false.

Version two is a Multiple-choice test. It can be used with students of intermediate level of English who are able to listen and understand a foreign language. After listening to the text the students look at the group of words or phrases and choose which one best completes what they have heard. In constructing this type of test the following steps were taken: 1. Select the words/phrases to be tested. 2. Choose two wrong words/phrases to put the right word with. 3. Prepare clear and simple instructions. This type of test has high reliability because it is objectively marked and each item has only one correct answer.

Version three is a Cloze test. It is checking students' skills of using the language as a system. Students receive copies on which the taped text is written with some words/phrases that have been deleted. The students rely on the context in order to supply the missing words/phrases. At the present time, no single test format is more popular than the cloze procedure. It is easy to prepare and rather easy to score. Lecturers like it too because it is integrative-that is, it requires students to process the components of language simultaneously, much like what happens when people communicate. The steps in preparing a close test are simple: 1. Select an appropriate passage from a scientific text. 2. Decide on the ratio of words/phrases to take out. 3. Write the instructions and prepare an example. *

RESULTS

A detailed key was constructed so that the scoring was almost entirely objective. We devised a simple scoring

procedure. Each correct answer, was given one point. The average score is calculated by dividing the total number of points of each test by the number of students. For the True-false questions test the average score was 9, for the Multiple-choice test – 7, for the Cloze test- 14. Therefore our hypothesis that the main difficulties in understanding the discourse structure of a heard scientific text are closely related to the ability to recognise certain discourse markers, was validated.

CONCLUSIONS

The results obtained from this first test of the series allow us to make the following conclusions:

1. We should continue to test the listening comprehension of our students by using texts which have varied discourse structures and test items similar to the ones described above.

2. If the results obtained from the first test are confirmed in the subsequent ones, then we certainly have a strong case in support of basing our listening course on two main objectives: a).developing the skill of listening for specific information of scientific texts and b).developing the underlying communicative skill of identifying the discourse markers of rhetorical functions typical of scientific discourse.

Finally, students accepted the tests as a good opportunity to check not only their knowledge of English but also their knowledge on special geological topic.

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*In the appendix the taped text is enclosed as a written paragraph together with the three versions of the test and a key for the presented test versions.

APPENDIX 1

Listen to the following paragraph which describes the rocks of the crust:

The rocks of the crust are classified into three types, (a) igneous, (b) sedimentary, (c) metamorphic.

Igneous rocks have crystallized from magma. They occur either as intrusive (below the surface) bodies or as extrusive (surface) rocks. Intrusive bodies, the contacts of which are parallel to the bedding of the country rock, are called concordant, e.g. sills and laccoliths. Intrusive bodies which cut across the bedding of the intruded rocks are termed discordant, e.g. batholiths, dykes, etc.

Sedimentary rocks have been produced by the weathering of older rocks and the deposition of sediment in water. They can be classified by their mode of origin as clastic and nonclastic. Clastic rocks (conglomerates, breccias, etc.) are composed of rock fragments or mineral grains broken from pre-existing rocks. Nonclastic rocks (limestone, dolomite, etc.) are formed by chemical or biological precipitation and accumulation of organic material.

Metamorphic rocks have been developed from earlier igneous or sedimentary rocks by the action of heat, pressure or chemically active solutions. They can be subdivided into three genetic groups: thermal or contact, regional and dynamic. Metamorphic rocks can also be classified into two textural groups: foliated and nonfoliated. Foliated rocks are produced under the influence of directed pressure and include slate, schist, gneiss, etc. Nonfoliated rocks are produced mainly by increased temperature and include hornfels, marble, quartzite, etc.

Version one: True-false questions

Read the statements and circle T for true or F for false according to the text you have just listened to:

1. The rocks of the crust are classified into igneous, sedimentary and metamorphic. T F

2. Igneous rocks have been produced by the weathering of older rocks. T F

3. Intrusive bodies, the contacts of which are parallel to the bedding of the country rock, are called concordant. T F

4. Dykes are concordant intrusive bodies. T F

5. Sedimentary rocks can be classified by their mode of origin as clastic and nonclastic. T F

6. Clastic rocks are composed of rock fragments or mineral grains broken from pre-existing rocks. T F

7. Nonclastic rocks have been developed from earlier igneous or sedimentary rocks. T F

8. Metamorphic rocks can be divided into three genetic groups: thermal (contact), regional and dynamic. T F

9. Foliated rocks are produced under the influence of directed pressure. T F

10. Nonfoliated rocks include slate, schist, gneiss, etc. T F

Version two: Multiple-choice test

Listen to the text and then read the statements and choose an answer from a, b or c in order to finish them. There is only one correct answer.

1. The rocks of the crust are classified into:

- a). 2 types
- b). 3 types
- c). 4 types

2. Igneous rocks have been produced:

- a). from magma
- b). by weathering of older rocks
- c). by deposition of sediment in water

3. Sedimentary rocks are classified by their mode of origin as:

- a). concordant and discordant
- b). clastic and nonclastic
- c). contact, regional and dynamic

4. Metamorphic rocks have been developed from:

- a). igneous rocks
- b). igneous and sedimentary rocks
- c). sedimentary rocks

5. Batholiths are:

- a). intrusive concordant rocks
- b). extrusive rocks
- c). intrusive discordant rocks

6. Laccoliths are:

- a). intrusive concordant rocks
- b). sedimentary rocks
- c). intrusive discordant rocks

7. Limestone is:

- a). nonclastic sedimentary rock
- b). clastic sedimentary rock
- c). igneous rock

8. Conglomerates are:

- a). nonclastic sedimentary rocks
- b). metamorphic rocks
- c). clastic sedimentary rocks

9. Gneiss is:

- a). nonfoliated metamorphic rock
- b). sedimentary rock
- c). foliated metamorphic rock

10. Nonfoliated metamorphic rocks are produced:

- a). by chemical or biological precipitation
- b). under the influence of directed pressure
- c). by increased temperature

Version three: Cloze test

Listen to the text and try to fill in each gap with the missing word or phrase.

The rocks of the crust are classified into three types, (a) igneous, (b) sedimentary, (c) (1).

Igneous rocks have crystallized from (2). They occur either as intrusive (below the surface) bodies or as extrusive (surface) rocks. Intrusive bodies, the contacts of which are (3) to the bedding of the country rock, are called concordant, e.g. sills and laccoliths (4) bodies which cut across the bedding of the intruded rocks are termed (5), e.g. batholiths, dykes, etc.

Sedimentary rocks have been produced by the (6) and the deposition of sediment in water. They can be classified by their mode of origin as (7) and (8). Clastic rocks (conglomerates, breccias, etc.) are composed of rock fragments or (9) broken from pre-existing rocks. Nonclastic rocks (limestone, dolomite, etc.) are formed by (10) or biological (11) and accumulation of (12) material.

Metamorphic rocks have been developed from earlier igneous or sedimentary rocks by the action of heat, (13) or chemically active solutions. They can be subdivided into three genetic groups: thermal or (14), regional and dynamic. Metamorphic rocks can also be classified into two textural groups: (15) and (16). Foliated rocks are produced under the influence of (17) pressure and include (18), schist, gneiss, etc. Nonfoliated rocks are produced mainly by (19) temperature and include hornfels, marble, (20), etc.

APPENDIX 2

Key to True-false questions test:

- 1 T
- 2 F
- 3 T
- 4 F
- 5 T
- 6 T
- 7 F
- 8 T
- 9 T
- 10 T

Key to Multiple-choice Test

- 11- b
- 12- a
- 13- b
- 14- b
- 15- c
- 16- a
- 17- a
- 18- c
- 19- c
- 20- c

Key to Cloze test

- 21- metamorphic
- 22- magma
- 23- parallel
- 24- intrusive
- 25- discordant
- 26- weathering of older rocks
- 27- clastic
- 28- nonclastic
- 29- mineral grains
- 30- chemical
- 31- precipitation
- 32- organic
- 33- pressure
- 34- content
- 35- foliated
- 36- nonfoliated
- 37- direct
- 38- slate
- 39- increased
- 40- quartzite