Institute of Technology / SHATRAA

Civil Department

First Year

TECHNICAL ENGLISH LANGUAGE

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2019 – 2018

English sentence

Is a group of words arranged in such away as to give meaning.

These words are called parts of speech.

Nouns: can take these two forms

S' plural

S' possessive

I bought a paper. (=a nespper-c0.)

I bought some paper. material

For

Writing on- unco.

There's a hair in my

Soup.(=one single hair-co.)

She has beautiful hair.(hair on her head)

Some nouns are usually uncountable in English but often countable in other languages.

Accommodation behavior furniture

News scenery trouble advice bread

Information permission traffic

Weather baggage chaos

Luggage progress travel work

These nouns are *uncountable*, so (i) you cannot use a/an

Before them; and (ii) they

Cannot be plural

A-We do not use "the" before noun when we mean something in general

B-We say the…when we mean something in particular.

C-The difference between "something in general"

And

"Something in particular"

Is not always very clear

An adjective describes noun.

This is a nice car.

This is a big house.

An adverb describes a verb.

He came quickly.

He drives carefully.

She speaks perfect English.

She speaks English perfectly.

He is a fast runner.

He runs fast.

He is hard worker.

He works hard.

-We use -"er" for comparison in short adj. &adv.

After comparatives e use "than":

Ali is taller than his brother.

Layla works harder than most of her friends.

Let us go by bus. It is cheaper.

-We use more (not-er) long adj. and adv-ending in ly.

The exam was more difficult than we expected.

She walks more quickly than the others.

-We use –"est" or most to form the superlative of adj. and adv.

Summer is the longest season in Iraq.

She is the most beautiful girl in the class.

-most carefully

Opinion fact

Clever young boy

-a beautiful large old white Iraqi wooden boat.

Big old color from made of

Big blue eyes.

Old Iraqi song.

Large wooden table.

Word order (1) – verb + object; place and time

a) *Verb + object*

The *verb* and the *object* of the verb normally go together. We do *not* usually put other words between them:

	verb	*object*	
I	like	children	very much. (*not* 'I like very much children.')
Did you	see	Norman	yesterday?
Ann often	plays	tennis.	

Here are some more examples. Notice how each time the verb and the object go together:

- Do you clean the house every week-end? (*not* 'Do you clean every week-end the house?')
- Everybody enjoyed the party very much. (*not* 'Everybody enjoyed very much the party.')
- Our guide spoke English fluently. (*not* '... spoke fluently English.')
- I not only lost all my money – I also lost my passport. (*not* 'I lost also my passport.')
- At the end of the street you'll see a supermarket on your left. (*not* '... see on your left a supermarket.')

For the position of words like also and often before the verb, see Unit 106.

b) *Place* and *time*

We usually say the *place* (where?) before the *time* (when? / how often? / how long?):

	place	*time*	
Tom walks	to work	every morning.	(*not* 'Tom walks every morning to work.')
She has been	in Canada	since April.	
We arrived	at the airport	early.	

Here are some more examples:

- I'm going to Paris on Monday. (*not* 'I'm going on Monday to Paris.')
- Don't be late. Make sure you're here by 8 o'clock.
- Why weren't you at home last night?
- You really shouldn't go to bed so late.

It is often possible to put the time at the beginning of the sentence:

- On Monday I'm going to Paris.
- Every morning Tom walks to work.

Note that you *cannot* use early or late at the beginning of the sentence in this way.

There is more information about word order in Unit 106.

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105.1 *In this exercise you have to decide whether the word order is right or wrong. Correct the sentences which are wrong.*

Examples: I like children very much. RIGHT
Tom walks every morning to work. WRONG – to work every morning

1 Jim doesn't like very much football. wrong – like football very much
2 Ann drives every day her car to work. wrong drives her car to work every day
3 When I heard the news, I phoned Tom immediately. right
4 Maria speaks very well English. wrong speak English well
5 After eating quickly my dinner, I went out.
6 You watch all the time television. Can't you do something else? wrong television all the time
7 Jim smokes about 20 cigarettes every day.
8 I think I'll go early to bed tonight. x go to bed early tonight
9 You should go to the dentist every six months.
10 When I heard the alarm, I got immediately out of bed. x got out of bed immediately
11 Did you learn a lot of things at school today?
12 How many people do you know who go on Sundays to church? x go to church on sunday

105.2 *Now you have to put the parts of a sentence in the correct order. The first nine sentences are like those in section a.*

Example: (children / very much / I like) I like children very much

1 (he won / easily / the game) He won the game easily
2 (again / please don't ask / that question) Please don't ask that question again
3 (football / every week-end / does Ken play?) Does Ken play football every week-end?
4 (quietly / the door / I closed) I closed the door quietly
5 (his name / after a few minutes / I remembered) I remembered his name after a few minutes
6 (a letter to her parents / Ann writes / every week) Ann write a letter to her parents every
7 (at the top of the page / your name / please write) please write your name at the top of the page
8 (in the library)
9 (opposite the park / a new hotel / they are building) They are building a new hotel opposite the park

The next six sentences are like those in section b.

10 (to the cafe / every Friday / I go) I go
11 (home / why did you come / so late?) Why did you come home so late
12 (around / I / will / coming) I've been waiting
13 (recently / to the theatre / have you been?) Have you been to the theatre recently
14 (to London / for a few days next week / I'm going) I am going to London for a few days next week
15 (on Saturday night / I didn't see you / at the

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Word order (2) – adverbs with the verb

a) We put some adverbs (for example always, also, probably) with the verb in the middle of a sentence:

- Tom always goes to work by car.
- We were feeling very tired. We were also hungry.
- Your car has probably been stolen.

b) Study these rules for the position of adverbs in the middle of a sentence. (They are only general rules, so there are exceptions.)

i) If the verb is one word (goes, cooked etc.), we usually put the adverb *before* the verb:

	adverb	*verb*	
Tom	always	goes	to work by car.

- I cleaned the house and also cooked the dinner. (*not* 'cooked also')
- Jack hardly ever watches television and rarely reads newspapers.
- She almost fell over as she came down the stairs.

Note that these adverbs (always/often/also etc.) go before have to:

- We always have to wait a long time for the bus.

But adverbs go *after* am/is/are/was/were:

- We were feeling very tired. We were also hungry.
- Why are you always late? You're never on time.
- The traffic isn't usually as bad as it was this morning.

ii) Sometimes a verb is two or more words (can remember, doesn't smoke, has been stolen etc.). We usually put the adverb after the first part of the verb:

	verb 1	*adverb*	*verb 2*	
I	can	never	remember	his name.
Ann	doesn't	usually	smoke.	
	Are you	definitely	going	to the party tomorrow?
Your c...		probably	been	stolen.

- My parents have always lived in London.
- Jack can't cook. He can't even boil an egg.
- The house was only built a year ago and it's already falling down.

In negative sentences probably goes before the negative. So we say:

- I probably won't see you. *or* I will probably not see you.

(*but not* 'I won't probably see you.')

c) We also use all and both in these positions:

- We all felt ill after the meal.
- Jack and Tom have both applied for the job.
- We are all going out for a meal this evening.

teachers.

106.1 *In this exercise you have to decide whether the underlined words are in the right position or not. Correct the sentences which are wrong.*

Examples: Tom goes always to work by car. WRONG — Tom always goes...
I cleaned the house and also cooked the dinner. RIGHT

1 I have a good memory for faces but I always forget names. ✓
2 Those tourists over there probably are American. × ...are probably American
3 Tom gets hardly ever angry. × Tom...hardly ever gets angry
4 We both were astonished when we heard the news. ✓
5 I soon found the keys I had lost. ✓
6 I did some shopping and I went also to the bank. × ...also went
7 Tom has always to hurry in the morning because he gets up so late. × always has to
8 The baby is very good. She seldom cries during the night. ✓
9 I usually am very tired when I get home from work. × I am usually very tired
10 I usually have a bath when I get home from work. ✓

106.2 *This time you have to re-write the sentences to include the word in brackets.*

Example: Ann doesn't smoke. (usually) Ann doesn't usually smoke.

1 Have you been arrested? (ever) Have you ever been arrested?
2 I don't have to work on Saturdays. (usually) I usually don't
3 Does Tom sing when he's in the bath? (always) Does Tom always sing
4 I'll be late home this evening. (probably) I will be probably late
5 We are going away tomorrow. (all) We are all going
6 (Don't take me seriously.) I was joking. (only) I
7 Did you enjoy the party? (both) Do you both enjoy the party
8 (I've got a lot of housework to do.) I must write some letters. (also) I also must write
I

Example: I can't see [illegible]

1 I usually take sugar in my tea. (take / usually)
2 "Where's Jim?" "He probably has gone home early." (gone / has / probably)
3 Ann is always very generous. (is / always)
4 Ann and Tom both were born in Manchester. (both / were / born)
5 Tim is a good pianist. He also can sing very well. (sing / also / can)
6 Our television set often breaks down. (often / breaks)
7 We have always to wait for the bus. (have / always / to wait)
8 My sight isn't very good. I only can read with glasses. (read / can / only)
9 I probably will be leaving early tomorrow. (probably / leaving / will / be)
10 I probably won't be able to come to the party. (probably / be / won't)
11 If we hadn't taken the same train, we never might have met each other. (never / met / might / have)

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SCIENCE AND TECHNOLOGY

P.17

العلم والتكنلوجيا

Before you read:

Try to answer the following questions; if you fail, the answers required can be found in the article that follows the questions:

What is science?

Whatistechnology?

What is physics?

What is chemistry?

What are the main differences between science and technology?

SCIENCE AND TECHNOLOGY

Man is inquisitive. He therefore studies nature. This study offers him knowledge. He arranges this knowledge and calls them science. Thus science is systematic knowledge about nature. Examples of science are physics and chemistry. We apply physics and chemistry in order to increase our comforts. Electric light, good transport and well -built houses are our comforts.

Physics gives us information about forces such as elec tricity and velocity. We apply these forces; when we generate electric light and build buses and trains. Chemistry tell us about materials —the composition of materials. We make bricks and cement to build houses. Therefore, those parts of science which help us to increase our comforts are called applied sciences.

Applied science form the basis of engineering. Engineering involves the productive use of science and is therefore a technology. A physicist studies the force in nature; he is a scientist. He the n applies these forces to produce electricity and transport; he is a technologist. A chemist studies the elements in nature; he is a scientist. Then he applies his science and produces building materials, synthetics and medicines; he is technologist. Techn ology is, therefore, the productive use of the knowledge of energy, forces and materials.

Science and technology complement each other. Science provides a body of knowledge, and technology is an instrument to use that knowledge. Science concerns natural objects and occurrences whereas technology concerns man - made products. Science breaks up the natural world; it is analytical. Technology arranges natural material in a different order; it is synthetical.

GLOSSARY

inquisitive (adj.) = wishing to find new thing

systematic (adj.) = in an order

apply (v.) = make use of

analytical (adj.) : bound to be examined to find the components

COMPREHENSION

I. Read the following statements and choose the correct alternative (according to the mean sage).

1. Science is.....
   a. being inquisitive
   b. study
   c. knowledge about nature
   d. organized knowledge about nature.

2. An example of a science is.....
   a. physics
   b. organized knowledge
   c. a study of nature
   d. technology.

3. We apply sciences in order to.....
   a. learn about natural forces
   b. increase our comforts
   c. learn about materials
   d. arrange our knowledge

4. Those sciences which help us to increase our comforts are.....
   a. electricity and velocity
   b. materials
   c. applied sciences
   d. transport and houses.

5. The basis of engineering is.....
   a. physics
   b. chemistry
   c. technology
   d. the applied sciences

6. Engineering is.....
   a. a technology
   b. electricity
   c. organized knowledge
   d. physics and chemistry

7. Technology is.....
   a. the forces in nature
   b. electricity and transport
   c. the productive use of science
   d. energy forces and materials

8. Science and technology are.....
   a. the same thing
   b. complementary
   c. opposites
   d. energy forces

9. Physics is.....
   a. electricity and velocity
   b. organized information about nature
   c. organized information about materials
   d. building buses and trains.

10. We apply physics when we.....
   a. provide electric light
   b. make cement and bricks
   c. examine the composition of materials
   d. organize our knowledge

11. Chemistry is.....
   a. electricity and velocity
   b. organized information about forces
   c. organized information about materials
   d. manufacturing medicines

12. We apply chemistry when we.....
   a. provide electric light
   b. make cement, bricks and medicine
   c. study the elements in nature
   d. organize knowledge.

II. Answer the following questions:

1. Why does man study nature?

.....

2. What is science?

.....

3. Name some sciences.

.....

4. Why do we apply sciences?

.....

5. What forms the basis of engineering?

.....

6. What is technology?

.....

7. How do science and technology complement each other?

.....

8. What does physics provide information about?

.....

9. What does chemistry provide information about?

.....

10. In what way is technology synthetical?

.....

III. Fit the appropriate words from column A into the sentences in column B :

A	B
1. A technologist	1. ..... studies nature.
2. A physicist	2. ..... uses science productively.
3. A chemist	3. ..... provides electricity and transport.
4. An applied physicist	4. ..... studies forces.
5. An applied chemist	5. ..... studies materials.
6. Man	6. ..... produces building materials and medicin

VOCABULARY PRACTICE

1. A common way of making new words is by adding some combinations of letters to existing wo either at the beginning (prefixes) or at the end (suffixes):

(i) The suffix (-ist):

A person who studies and applies

technology is a technologist.
..... is a geologist.
biology is a biolg..... .
..... is a chemist.
..... is a physicist.
psychology is a .....

(ii) The suffix (-ian):

A person who studies and applies

mathematics is a .....
statistics is a .....
..... is a theologian.
electricity is an .....

BUT

A person who applies the study of

economics is an economist.
engineering is an engineer.
architecture is an architect.
medicine is a doctor or a physician in (U.S.A.)

II. Make sure you know the meaning of the following words, and then use them in the sentences that follow:

organizes; organized; materials; forces; apply; generate; applied; to increase; composition; productive; complement; knowledge.

1. Science and technology ..... each other.
2. Science is ..... knowledge about nature.
3. Electric light and good transport help ..... our comforts.
4. Chemistry tells us about ..... .
5. ..... sciences form the basis of engineering.
6. Technology is the ..... use of science.
7. Chemistry tells us about the ..... of materials.
8. We ..... physics and chemistry to improve our standard of living.
9. Man ..... knowledge and calls it science.
10. Physics gives us information about ..... such as velocity.
11. Knowledge of physics is applied when we ..... electricity.
12. Man organizes ..... and calls it science.

STRUCTURE STUDY

I. The Simple Present Active:

The main structure in the passage is the simple present tense.
Remember that this tense is used:

(i) for actions in the present which happen usually, habitually or generally.
e.g. He arranges his knowledge and calls it science. (line 2)
(ii) for stating general truths.
e.g. Science provides a body of knowledge. (1.14)
(iii) for describing processes in a general way.
e.g. We apply physics and chemistry to increase our comforts. (1.3).

EXERCISE (a) : Insert the correct form of the verb in brackets:

1. Chemistry (to tell) us about materials.
2. We (to make) bricks and cement to build houses.
3. A statistician (to apply) mathematics in his work.
4. Scientists (to use) a balance to weigh things.
5. Students (to observe) experiments in laboratories.
6. Surveyors (to employ) reliable instruments.

EXERCISE (b) : Read the sentences above in the NEGATIVE FORM:

EXERCISE (c) : Look at this example:

Sameer is a chemist. He works in a laboratory.

Now make sentences similar to the example from each group of words below:

1. My father / technologist / with complex instruments.
2. Zainab and Mujeed / technicians / mechanical workshop.
3. Mustafa / biology lecturer / University of Basrah.
4. Riyadh / electrician / with electronic apparatus.

5. Nadiya / laboratory assistant / test / blood samples.
6. Shakir / architect / design / attractive houses.

II. RELATIVE CLAUSES:

Read the following example:

Example: **Those parts of science** are called the applied sciences.
Those parts of science help us to increase our comforts.

Response: Those parts of science **which** help us to increase our comforts are called the applied sciences.

Now combine the following pairs of sentences by using a relative clause:

1. **Man** finds knowledge. **He** organizes this knowledge and calls it science.
2. Examples are **physics and chemistry**. We apply **physics and chemistry** to improve our standard of living.
3. Physics provides **information about forces**. We apply **this information about forces** when we generate electric light.
4. Chemistry provides **knowledge about materials**. We apply **this knowledge about materials** when we manufacture medicines.
5. Applied sciences form the basis of **engineering**. **Engineering** involves the productive use of science.

III. PURPOSE PHRASES:

Read the following example, and then answer the questions:

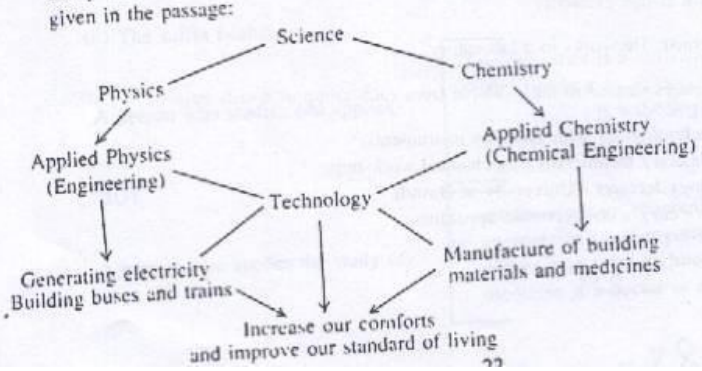
Example: Why do we apply physics and chemistry? (we increase our comforts)

Response: We apply physics and chemistry in order to increase our comforts

1. Why do we study? (We find knowledge).
2. Why do we apply physics? (We produce electricity).
3. Why does man apply chemistry? (He makes medicines).
4. Why do we need technologists? (We increase our comforts).
5. Why does man study physics? (He learns about forces).
6. Why do we make bricks and cement? (We build houses).

ORAL DISCUSSION

Study the diagram below, and construct as many sentences as you can depending on the information given in the passage:



Your first two sentenc
may be like these:
1. Science is systema
knowledge about natu
2. Physics and chemis
are examples of scie

THE ANSWERS:

I. PP.(18-19)

1-d 2-a 3-c 4-c 5-d 6-a 7-c
8-b 9-a 10-a 11-c 12-b

PP. (19-20)

1. He studies nature because he is inquisitive.
2. Science is systematic knowledge about nature.
3. Some sciences are physics &chemistry.
4. We apply sciences in order to increase our comforts.
5. Applied sciences form the basis of engineering.
6. Technology is the productive use of science.
7. Science & technology complement each other; because science provides a body of knowledge & technology is an instrument to use that knowledge.
8. Physics provides information about forces.
9. Chemistry provides information about materi als.
10. Technology is synthetically because it arranges natural materials. Into different order.

II. p. 20

B.

1. Man
2. A technologist
3. An applied physicist
4. A physicist
5. A chemist
6. n applied chemist

VOCABULARY PRACTICE

II. P.21

1.complement	2. organized	3. toincrease
4. materials	5. applied	6.produc ve
7. composi on	8. apply	9. organizes
10. forces	11. generate	12. knowledge

STRUCTURE STUDY

EX. A P.21	EX.B P.21
1. tells	1.doesn't tell
2. make	2.don't make
3. applies	3. doesn't apply
4. use	4. don't use
5. observes	5. doesn't observe
6. employ	6. don't employ

EX. C P.21

1. My father is technologist. He works with complex instruments.
2. Zainab &Majed are technicians. They work in mechanical work shop
3. Mustafa is biology lecturer. He works in University of Basrah.
4. Riyadh is electrician. He works with electronic apparatus.
5. Nadiya is laboratory assistant. She tests blood sample.
6. Shaker is architect. He designs attractive houses.

II RELATIVE CLAUSES P.22

1. Man who finds knowledge organizes this knowledge & calls it sciences.
2. Examples are physic & chemistry which we apply to improve our standards of living.
3. Physics provides information about forces which we apply when e generate electric light.
4. Chemistry provides knowledge about materials which we apply when we manufacture medicines.
5. Applied science form the basis of engineering which involves the productive use of science.

THE LANGUAGE OF MTHEMATICS

Before you read

Try to answer the following questions; if you fail, the answers required can be found in the article that follows the questions:

1. In what way we can consider a mathematic as a language?
2. What is arithmetic?
3. What are the main groups of mathematical numbers?
4. What are the main differences between ordinal &cardinal numbers?
5. Read the following number aloud? 1/2
   ,3/4 , 2 5/6 , 28.673 ,0.21031

THE LANGUAGE OF MATHEMATICS

We use words or sentences for communication in a language. In mathematics, signs, symbols and numbers are used to convey the sense precisely. Certain concepts, definitions, rules, terms and words must be learnt in order to acquire good mathematical knowledge. The more mathematics is studied and applied, the greater becomes its usefulness.

Mathematics is referred to as the language of size and number. The system of numbers is composed of the ten digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. All numbers consist of combinations of these digits. Arithmetic consists of the relations of numbers and the methods of computing with them. The four basic operations of addition, subtraction, multiplication and division form the basis of arithmetic.

In every number each digit has a certain value, and the position of a digit in a number gives the digit its value. From right to left these values are: units, tens, hundreds, thousands and so on. For example, in the four digit number 9645, the digit 5 has a value of 5 units, the 4 is in the tens place and has a value of 4 tens (40 units), and the 6 is in the hundreds place with a value of 6 hundreds (600 units), and the 9 in the thousands place has a value of 9 thousands (9,000 units).

We can classify numbers in two groups in mathematics -- cardinal numbers and ordinal numbers. Cardinal numbers are numbers like 1, 2, 3, etc... while ordinal numbers show order or position like the first, second, third and so on in a series.

We may also classify numbers in a different way: counts or proper numbers, and estimates or common numbers. We count days and persons but estimate areas and expenditure. The proper numbers are used to measure the size of a group. When we say there are 40 students in a class, the meaning is there are 40 boys and girls and not 40.01 or 39.99. The number of 40 stands for something definite. On the other hand, if we say the height of a room is 3 metres and 90 centimetres, we mean it is nearer to 390 cm. mark than to the 391 mark on a measuring rod.

In mathematical language, the statement, 'The area of a floor is calculated by multiplying the length by the breadth', may be written thus:

Area = length × breadth.

This can further be reduced to the form: A = lb. This is a mathematical sentence or equation. A grammatically correct sentence must have a verb that indicates what the noun does. Here A, l, and b are nouns. The sentence has the verb infinitive 'to get'. It is written in the mathematical alphabet = . The signs like × and · are called operators and not verbs by mathematicians. The translation of a mathematical sentence l × b = A runs thus:

'The length is multiplied by the breadth to get the area'.

The rules of mathematical syntax are simpler than those of English syntax. In English, some words are interchangeable, and others are not. The sentence, 'Mr. Saleh is the Dean of the Institute' means the same thing as 'The Dean of the Institute is Mr. Saleh'. Further interchange of words is not possible. All mathematical sentences have the same structure. The two parts of a mathematical sentence are called the two sides of an equation. We may change one side or both sides of the equation simultaneously. The numbers are interchangeable when they are connected by operators like × or +. For instance

$$ab = ba$$

$$4 \times 5 = 20 = 5 \times 4$$

Thus we see that mathematics is a language of signs, symbols and numbers, which is widely used in all scientific and technical writings.

(Adapted from: Mathematics for the Millions By: Lancelot Hogben)

symbol	(n.)	=	a mark that represents something else.	رمز
convey	(v.)	=	carry to	ينقل، يوصل
aspect	(n.)	=	a way of looking at thing	ناحية
similar	(adj.)	=	of the same sort	شبيه
similarly	(adv.)			
concept	(n.)	=	general idea	فكرة، رأي
digits				أرقام تحت العشرة
combination	(n.)	=	two or more numbers joined together	أرقام منضمة في رقم واحد
cardinal numbers				الاعداد الاصلية ١، ٢، ٣، . . . الخ
ordinal numbers				الاعداد الترتيبية
integers				اعداد صحيحة
count	(v.)	=	find the number	يعد
estimate	(v.)	=	calculate size, value etc.	يخمن، يقدر
expenditure	(n.)	=	that which is spent	مصروف، انفاق
definite	(adj.)	=	clear and exact	محدد
rod	(n.)	=	a measure of length equal to $5\frac{1}{2}$ yards	مقياس للطول يساوي ٥½ ياردة
syntax	(n.)	=	arrangement of words in a sentence	بناء الجملة
interchangeable	(adj.)	=	likely to be changed	يمكن استبداله
simultaneously	(adv.)	=	at the same time	في آن واحد

COMPREHENSION

I. Choose the most appropriate answer from those that are given below. Indicate your answer by inserting the appropriate letter in the brackets

( ) 1. Mathemiticians call marks like + and x.....
a) symbols b) counts c) operators d) numbers

( ) 2. We estimate.....
a) banknotes b) technicians c) the area of a floor d) houses

( ) 3. ÷ is the ..... sign.
a) multiplication b) division c) addition d) subtraction

( ) 4. A cardboard is 2 metres long and 5 centimetres broad. What will its area be?
a) 2.5 metres b) 250 sq. centimetres c) 1 sq. metre d) 100 sq. centimetres

( ) 5. Mathematical numbers in an equation are interchangeable when they are connected by operators

( ) 6. The digit 3 in the number 7345 has the value of.....
   a) three units
   b) thirty units
   c) three hundred units
   d) three thousand units

( ) 7. We count.....
   a) The quantity of blood in the body
   b) the weight of a stone
   c) one's knowledge about mathematics
   d) the tools on a shelf.

( ) 8. > and < in mathematics are.....
   a) signs b) symbols c) scales d) numbers

( ) 9. A = lb is a ..... sentence
   a) mathematics b) mathematician c) mathematically d) mathematical

( ) 10. Numbers like 1, 2, 3 are called.....
   a) fractions b) decimals c) ordinal numbers d) cardinal numbers.

II. Answer the following questions:

1. Why is mathematics referred to as a language?
   .....
2. Give examples for the two classes of numbers: counts and estimates.
   .....
3. What is arithmetic?
   .....
4. Name the common arithmetical operations. Using actual numbers, give examples of each:
   .....
5. Rewrite the mathematical language in 'Area = length ×breadth': into ordinary English.
   .....
6. What are the two parts of a mathematical sentence compared to? How?
   .....
7. Arithmetic is one branch of mathematics; Name some other branches.
   .....
8. Why are numbers like fourth, fifth and sixth called 'ordinal numbers'?
   .....
9. Name a) a two-digit integer.
   b) a five-digit integer.
10. It is said that mathematics offers unlimited advantages in respect to mental training. How do you explain such a statement?
    .....

VOCABULARY PRACTICE

I. Learn the following word-groups, and study the sentences given as examples:

i) just as: exactly as

EXAMPLE: Just as we have rules in grammar, we have certain rules in mathematics.

ii) compared to: similar to in some way
EXAMPLE: Mathematics can be compared to the English language in many ways.

EXAMPLE: Mathematics can be compared to the English language in many ways.

iii) on the other hand: on the other side; by means of contrast
EXAMPLE: The top side of the beam is in compression; on the other hand, the bottom side is in tension.

iv) the height of: the elevation of
EXAMPLE: The height of the room is 3 metres and 50 centimetres.
(= The room is 3 metres and 50 centimetres high.)

v) find place: be used
EXAMPLE: Mathematics finds place in almost all scientific and technical writing.

vi) classify in: relate to a group
EXAMPLE: We can classify numbers in two groups.

II. SUFFIXES

(i) Certain words ending in —s are not plural in usage. They are followed by a singular verb.
e.g. means, series news
The news is pleasant.

Write one sentence of your own using each of the above words:
1. ... .
2. .....
3. .....

(ii) The suffix —ly is added to adjectives to form the corresponding adverb:
e.g. precisely, clearly
but scientific ———— scientifically
grammatic ———— grammatically

EXERCISE: Choose one of the words in the list to fill in each of the spaces below:

widely	scientifically	simultaneously
clearly	apolegetically	certainly
unfortunately	probably	frequently

1. Scientific instruments and machines..... need adjustment before they are used.
2. The lathe is ..... one of the most ..... used machines in workshops throughout the world.
3. ....., we don't keep such spare parts in the store.
4. She ..... gave her excuse for the delay.
5. The speech of the President was broadcasted from all the stations ..... .
6. The sentence is ..... correct, but the given information is false.
7. If the method is ..... applied, you will reach the same result.
8. Radio waves can be received more ..... if they are transmitted at a high frequency.

STRUCTURE STUDY

1. Simple Arithmetic

(i) Notice how we read the following:

8 + 8 = 16 eight and eight **are** sixteen.
eight plus eight **is** sixteen.

12 − 3 = 9 twelve minus three **is** nine.

8 × 5 = 40 eight times five **is** forty.
OR: eight multiplied by five **is** forty.

18 ÷ 2 = 9 eighteen divided by two **is** nine.

N.B. Look at the way we say this example:

4 − 4 = 0 four minus four **is** nought.

We usually use the word (nought) in arithmetic. Zero is used when talking about temperature

EXERCISE: Complete the following and read aloud:

1. 23 − 10 = ...
2. 9 + 6 = ...
3. 3 × 7 = ...
4. 15 ÷ 3 = ...
5. 7 × 9 = ...
6. 14 + 4 = ...
7. 22 − 9 = ...
8. 16 ÷ 4 = ...

(ii) Notice how we say the following symbols:

2^2 = two squared
OR two to the power of two.

2^3 = two cubed
OR two to the power of three

2^4 = two to the power of four

$\sqrt{\ }$ = square root

π = Pi

(iii) And this is how fractions are said:

$\frac{1}{2}$ a half
$\frac{1}{4}$ a quarter
$\frac{3}{4}$ three quarters
$\frac{1}{3}$ a third
$\frac{1}{5}$ a fifth
$\frac{3}{5}$ three fifths
$2\frac{1}{2}$ two and a half

Now read these aloud:

$3\frac{2}{3}$. $4\frac{2}{5}$. $1\frac{4}{5}$. $10\frac{1}{4}$. $6\frac{3}{4}$. $4\frac{3}{10}$

(iv) And this is how decimals are read:

0.5 = nought point five
1.75 = one point seven five
3.8 = three point eight
0.644 = nought point six four four

Read the following aloud:
16.791 0.428 10.7 0.999
23.5 1.88 0.445 2.6666

(v) Look at the way we say this example:

1 km = 0.621 miles (one kilometre equals nought point six two one miles.

Read these aloud
a) 1 cm. = 0.39 inches
b) 1 m. = 1.09 yards
c) 1 g. = 0.035 ounces
d) 1 kg. = 2.2 pounds

II. We count days and persons.
We estimate areas and expenditure.

These two sentences can be combined to show the contrast in the use of 'count' and 'estimate'

We count days and persons **but** estimate areas and expenditure.

The word (but) is used to combine two pieces of contrasting information. The subject is the same for both the sentences. It is, therefore, omitted in the combined sentence.

EXERCISE: Make sentences similar to the example above with (but) using the following prompts.

1. learn / theories	perform / experiments
2. spend / money	increase / expenditure
3. swallow / tablets	drink / syrup
4. increase / production	lose / energy
5. use / more steel	strengthen / the beam
6. be good / painting	weak /woodwork
7. appreciate / the new methods	have / some comments
8. applied / scientifically	got / bad results
9. showed / skill	failed / the machine
10. make / efforts	lose / energy

TRANSLATION

Put the following paragraph into Arabic:

Other branches of mathematics such as algebra and geometry are also used in many sciences and even in some areas of philosophy. More specialized extensions such as probability theory and group theory are now applied to an increasing range of activities from economics and the design of experiments to war and politics.

COMPREHENSION

I. PP. (30-31)

(c) 1. (c) 2. (b) 3. (d) 4. (a) 5. (c) 6. (d) 7. (a) 8. (d) 9. (d) 10.

II P. 31

1. It is to as a language because we can use signs, symbols & numbers to convey the sense precisely.
2. Population, student, labour, busses are countable numbers, while blood, water areas, diamentions are estimated numbers.
3. A arithmetic is a branch of mathematic consist of the relations of numbers & the method of computing with them.
4. The common arithme calopera ons: addi on 4+5; subtrac on 17-6; mul plica on 7*8; division 27/3.
5. Area is equal to length multiplied by breadth.
6. They are compared to English sentences when we can interchange the words to get the same meaning.
7. Other branches of mathematics are:

Geometry, Algebra, Descriptive Geometry .

8. They are called so because they show the order or position but not the value.
9. 27, 45, 95 are two digit integer. 12354, 73215, 83172 are of a five digit integer.
10. I can explained that if keep on trying to solve mathematical problems his brain will be capable of solving any other problems because he used to be operated & owned the tools needed.

VOCABULARY PRACTICE

EX. P.32

1. Simultaneously
2. probably widely
3. Unfortunately
4. apologetically
5. frequently
6. certainly
7. scientifically
8. clearly

STRUCTURE STUY

I. EX. P.33

Complete the fooling & read aloud:

1. 23-10=13 twenty three minus ten is thirteen
2. 9+ 6=15 nine & six are fi een

   Or nine plus six is fifteen
3. 3*7=21 three mes 7 is twenty one
4. 15/ 3= 5 fi een divided by three is five
5. 7* 9=63 seven mes nine is sixty three
6. 14+ 4=18 fourteen plus four is eighteen
7. 22- 9=13 twenty two minus nine is thirteen
8. 16/ 4= 4 sixteen divided by four is four

III . p.33 Now read aloud :

32/3 three&twothird 4

2/5 four &two fi h 1 4/5

one &four fi h 101/4

ten&aquarter

63/4 six&three quarters 4

3/10four&threetenth

IV. p.34 Now read aloud :

16.791 sixteen point seven nine one
0.428 nought point four two eight
10.7 ten point seven
0.999 nought point nine nine nine
23.5 twenty three pointfive
1.88 one point eighteight
0.445 nought point four four five
2.6666 two point six six six six

EX. P.34

1. We learn theory but perform experiments.
2. We spend money but increase expenders.
3. We swallow tablets but drink syrup.
4. We increase production but lose energy.

TRANSLATION

ان الفروع الأخرىللد رياضياتكالهند سةوالجبرتستخ دم أعلد في ضاومء ديدة وبع في حتىض المجالات الفلسفيهز وهنكبع ض التخصات الدمثقيقهلن ظر يةالأحتمالات ونظر يةاتستخ لمجاميعدم الأن وبمديات متزايدة في الأنشط ةالأقتصاد يةوتصميم التجارب و في حتىالحروب.

ENGINEERING DRAWINGOFFICE

Before youread

Try to answer the following questions; if you fail, the answers required can be found in the article that follows the questions:

1. What do we call the language of engineers &Why?
2. What are the min instruments used engineering drawing?
3. What are the principles of good draftsmanship?
4. Name the main persons working in drawing office?
5. What are the set of drawings comprised of?
6. What is the different between dyeline print & blue print?

UNIT FIVE

DRAWING OFFICE WORK

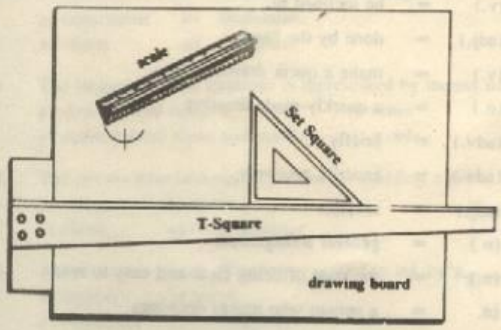
Drawing is the principal means of communication in engineering. It is used to convey information and communicate ideas, designs and construction details to others. It is often referred to as the language of the engineer.

Drawings are made up of lines that represent the surfaces, edges and contour of objects. Symbols, dimensional sizes, and word notes are added to these lines, collectively making a complete description of the designer's thoughts and imagination. There are two methods of writing the graphic language as some people tend to call it: freehand and with instruments. A freehand drawing is done by sketching the lines with no instrument other than pencils and erasers. Most drawings are made with instruments that are used to draw straight lines, circles and curves concisely and accurately.

The selection of instruments and materials for drawing is a matter of importance. With reasonable care, a set of good instruments will last a lifetime while poor ones will be an annoyance from the start and will be worthless after short usage. Correct choice and use of instruments, layout and clarity of views, neatness and legibility of printing are principles of good draftsmanship. Good draftsmanship is obtained by experience and is improved by constant practice.

The main work in a drawing office is done by draftsmen (draughtsmen) who use a pencil, a T-square, a set square, a scale (Fig. 1) to make sketches, designs and finally details or working drawings, from which the contractor can build the structure. The draftsmen, among whom there are women, work under the supervision of a civil engineering designer in charge of their section of work.

The civil engineering designer checks and approves the final drawings made by the draftsmen. Sometimes, depending somewhat upon the size of the engineering organization and somewhat upon the complexity of the design, the engineer undertakes the whole work and makes the final drawings. Very often, the chief of the drawing office, though he may be a highly qualified civil engineer, is called the chief draftsman, though he may be called the chief designer, and this is becoming commoner in civil engineering.



The drawings are made either on transparent paper or on plastic film (which is the most lasting), and prints are taken from the completed drawings. Until about 1950, the blueprint was the commonest type of

print, but this is now becoming unusual, and has been replaced in many countries by the dyline which has dark lines on a white background and is therefore easier to write on. The blueprint has white lines on a dark blue background.

The best drawings are, of course, made in black ink, but this is very much slower than pencil work, and may take up too much of the time of the skilled draftsmen. Therefore, tracers are employed in some offices to trace in ink the drawings made in pencil by the craftsmen or designers.

In a consulting engineer's office, the designers discuss their work directly with the client and obtain his approval for any change in policy. The client is then provided with sets of drawings which generally comprise the following:

1. Architectural drawings which give clear details as regards elevations and finishing details.
2. Construction drawings that make clear the specifications connected with the foundations, roofs, lintels, wall details and columns.
3. Services drawings. These show the systems of heating and air-conditionning or air-cooling, electrical installations and sanitary installations.

(From: 1. Civil Engineering By John S. Scott
2. The Fundamentals of Engineering Drawing and Graphic Technology By Thomas E. French & Charles J. Vierck)

GLOSSARY

principal	(adj.)	=	chief	رئيسي
referred to	(v.)	=	talked about	يشار لها
contour	(n.)	=	the line that bounds a surface	محيط
collectively	(adv.)	=	all together	جملة، اجمالا
tend	(v.)	=	be inclined to	يميل لـ
freehand	(adj.)	=	done by the hand	يدوي
sketch	(v.)	=	make a qucik drawing	يرسم رسما تخطيطا
sketck	(n.)	=	a quickly-made drawing	رسم تخطيطي
concisely	(adv.)	=	briefly	بايجاز
accurately	(adv.)	=	exactly; precisely	بدقة
reasonable	(adj.)	=	sensible	معقول
layout	(n.)	=	general arrangement	تخطيط عام
legibility	(n.)	=	the state of being clear and easy to read	وضوح
draftsman	(n.	=	a person who makes drawings	رسام
supervision	(n.	=	direction	اشراف
principle	(n.)	=	rule	مبدأ، قاعدة عمل
approve	(v.)	=	agree to	يوافق على
somewhat	(adv.)	=	to some extent	الى حد ما

undertake	(v.)	=	take the responsibility of	يتعهد
complexity	(n.)	=	the state of being difficult to understand	تعقيد
blueprint	(n.)	=	a print made by photography, white on blue paper	الطبعة الزرقاء
dyline	(n.)	=	a print made by contact with a tracing	
tracing	(n.)	=	a drawing copied on to a transparent paper or film	رسم منسوخ
tracer	(n.)	=	a person who copies drawings on to a transparent paper or a plastic film	مستنسخ (رسام)
transparent	(adj.)	=	easily seen through	شفاف
policy	(n.)	=	a plan of action	سياسة
client	(n.)	=	customer	زبون
elevation	(n.)	=	side view; back view	واجهة المبنى
specifications	(n.)	=	detailed statements	مواصفات
sanitary	(adj.)	=	concerning health	صحي

COMPREHENSION

I. Decide which of the four alternatives best completes the meaning of the sentence. On the line to the left of each sentence, write the letter of the correct answer:

EXAMPLE:

b A T-square is.....
a) a tool b) an instrument
c) a machine d) a plastics film

— 1 A circle can be drawn with.....
a) a T-square b) dividers
c) a compass d) a triangle

— 2. The person or body who pays for the building is a.....
a) contractor b) draftsman
c) client d) designer

— 3. The language of the engineer is represented by means of.....
a) sketches and designs b) notes
c) mathematical signs and symbols d) words

— 4. The person who undertakes the task of building a house is.....
a) contractor b) tracer
c) client d) chief designer

— 5. A draftsman's pencil drawing is copied in ink by a.....
a) designer b) tracer
c) consultant d) civil engineer

— 6. Unwanted lines and details are best removed with.....
a) the edge of a blade b) a soft eraser
c) a blotter d) the back of a thumbnail

— The contractor can best build the structure if he depends upon.....
a) his imagination b) the sketches
c) the drafts d) the final drawings

— 8 Details about foundations are accurately stated in the ..... drawings.
a) construction b) architectural
c) services d) sketches

— 9 A pair of dividers is used to.....
a) draw circles and curved lines b) draw horizontal lines
c) divide lines into any number of equal lines d) measure angles.

— 10. A blue print is made.....
a) by dyline b) by photography
c) in black ink d) with a ruling pen

II Answer the following questions:

1. In what way is engineering considered as a language?
.....
2. What are the two fundamental methods of making an engineering drawing?
.....
3. What is the role of a draftsman in a drawing office?
.....
4. Name some of the drawing instruments used by the people whose work is engineering drawing.
.....
5. Why must the draftsmen and tracers have a complete command of the engineering drawing principles?
.....
6. Is the blueprint still common everywhere? What has it been replaced by?
.....
7. Why does a client call at a consulting engineer's office?
.....
8. What are the principles of good draftsmanship?
.....
9. Why are tracers employed in some drawing offices?
.....
10. Who is normally in charge of a drawing office? What is his chief responsibility?
.....

III Look at the pictures and answer the questions:

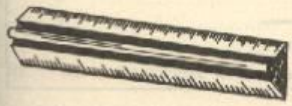
EXAMPLE:

Q: Is this a bottle?
R: No, it isn't a bottle; it's a bucket.

Q: Is this a pencil?
R: .....

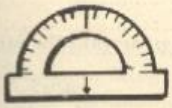
Q: Is this a pair of dividers?
R: .....

Q: Is this a straight line?
R: .....



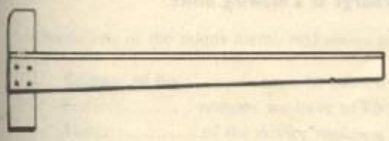
Q: Is this a protractor?
R: .....

Q: Is this a T-square
R: .....

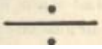


Q: Is this a set square?
R: .....

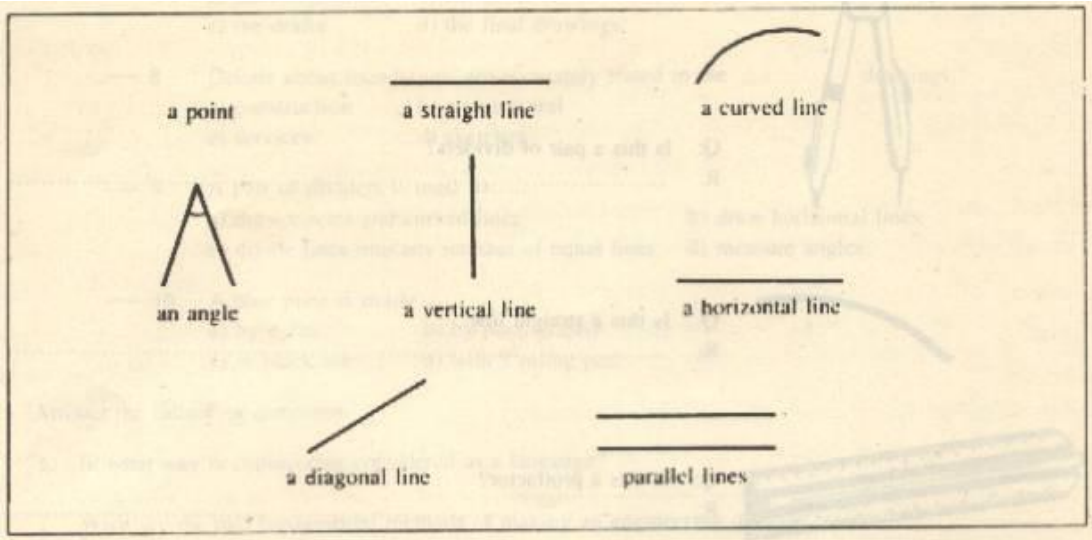
Q: Is this a vertical line?
R: .....



Q: Is this a slide rule?
R: .....



Q: Is this the addition sign?
R: .....



Now read this and complete the sentences below:

The letter 'E' has one vertical line and three horizontal lines. It also has four angles.

1. The letter 'M' has ..... and .....
   It also has .....
2. The letter 'B' has ..... and .....
3. The letter 'C' has .....
4. The letter 'H' has ..... and .....
   It also has .....
5. The letter 'Z' has ..... and .....
6. The letter 'L' has ..... and .....
   It also has .....

II. Learn the following word-groups and study the sentences given as examples:

(i) other than = not more than
EXAMPLE: He completed the painting with **no aids other than** a brush and paint

in charge of: responsible for
EXAMPLE: A civil engineering designer is **in charge of** a drawing office.

EXAMPLE: 1. Sami and Yousif are engineers; **the latter** is a famous architect.

2. A T-square and a compass are drawing instruments; the **latter** is used to draw circles and curved lines.

(iv) either ..... or = one or the other of two
EXAMPLE: Use **either** a pencil **or** a ruling pen.

(v) as regards = regarding; concerning
EXAMPLE: Your drawing set is much better than mine **as regards** quality.

Construct your own sentences, one for each of the above word-groups:

1. .....
2. .....
3. .....
4. .....
5. .....

III. Find in the passage words that give nearly the same meanings as the following:

in a brief way;	at last;
	stand for;
opposite of 'quicker than';	seek the advice of;
something that can remove a written stuff;	finished (adj.)
the length of time that a person lives;	universal;
not curved or crooked;	get;
the end of something;	all together;
choice	

IV. The suffix (ity) or (ty) forms nouns from the corresponding adjectives:

'certain	'certainty
'complex	com'plexity
'legible	legi'bility
'clear	'clarity
'stupid	stu'pidity
'safe	'safety
'simple	sim'plicity
'able	a'bility

Choose one of the nouns mentioned above to fill in each blank below:

1. Because of his ..... , he caused all this trouble.
2. For ..... reasons we have to keep fire-extinguishers in our houses and workshops.
3. The ..... of the device makes it popular among the technicians everywhere.
4. It is a ..... ; you can not deny it.
5. Your article lacks ..... and neatness.
6. Are you sure of your ..... to perform the experiment successfully?
7. .... of printing is one of the principles of good draftsmanship.
8. The .... of the situation will not enable the two parties to reach an agreement.

OBJECT + is / are + CLASS + which + USE

EXAMPLE: Object: T-square

Class: instrument

USE: it is used to draw horizontal lines.

Definition

1. A T-square is an instrument which is used **to draw** horizontal lines.
2. A T-square is an instrument which is used **for drawing** horizontal lines.
3. A T-square is an instrument which **draws** horizontal lines.

EXAMPLE 2

Object: handsaw

Class: tool

Use: It is used to cut wood

Definition

1. A handsaw is a tool which is used **to cut** wood.
2. A handsaw is a tool which is used **for cutting wood.**
3. **A handsaw is a tool which cuts** wood.

EXAMPLE 3

Object: generator

Class: machine

Use: it is used to produce electricity.

Definition

1. A generator is a machine which is used **to produce** electricity.
2. A generator is a machine which is used **for producing** electricity.
3. A generator is a machine which **generates** electricity.

Exercise: Expand the following into full definitions. Write each definition three times i e in each of the patterns given above (1, 2, 3).

	OBJECT	CLASS	USE
1.	a compass	instrument	draw circles and curved lines.
2.	a spanner	tool	tighten or loosen nuts.
3.	a french curve	instrument	draw irregular curves.
4.	a bulldozer	machine	push masses of earth in road making
5.	a protractor	instrument	measure or set out angles.
6.	a theodolite	surveying instrument	measure angles.
7.	a lathe	machine	turn and cut metal.
8.	a barometer	instrument	measure atmospheric pressure
9.	Calipers	mechanical tools	measure the dimensions of small metal objects.
10.	a transformer	apparatus	change voltage.
11.	a pair of dividers	instrument	divide lines into any number of equal lines.
12.	a ruling pen	drawing instrument	ink drawings.

II. NOUN + NOUN

The normal way of describing an object is by putting an adjective in front of it.

hot water
easy question
useful tools

But English allows us very often to put another noun and sometimes two or three in front of an object (noun).

pencil work
engineering drawing
concrete beam

The relation between the two nouns may vary quite a lot, as you can see from these examples:

pencil work	=	work that is done with a pencil
concrete beam	=	a beam that is constructed from c ncrete
metal tubes	=	tubes that are made of metal
oil treatment	=	treatment of oil.

EXERCISE: Expand the following NOUN + NOUN phrases to show their full meanings:

1. steel bar
2. petrol engine
3. energy consumption problems

4. building materials
5. research chemist
6. water supply
7. irrigation canals
8. juss mortar
9. mercury thermometer
10. workshop machinery.

III. SIMPLE PRESENT – ACTIVE & PASSIVE (REVISION)

Put the verbs from the list into the right sentences in their correct form:

(apply; use; fill; milk; show; measure; draw; cause; compose; attract)

1. Atmospheric pressure ..... with a barometer.
2. Water ..... of hydrogen and oxygen.
3. Scientists ..... theories.
4. Circles and curved lines ..... with a compass.
5. The cells of a battery ..... with pure water.
6. Cows ..... every day.
7. Heat ..... expansion.
8. We ..... microscopes to examine very small organisms.
9. Magnets ..... iron and steel.
10. Transparency drawings ..... on an overhead projector.

COMPREHENSION

I. PP.(37-38)

C 1. C 2. A 3. A 4. B 5. B 6. D 7. A 8. C9. B 10.

II P. (38)

1. Engineering is considered as a language by drawings which is used to convey information &communicate ideas, designs &construction details to others.
2. The two fundamentals methods of making an e ngineering drawings are free hand &with instruments.
3. The role of draftsmen in drawing office is to make final drawings.
4. T-square, setsquare, compass, pair of dividers are some of drawing instruments used bythem.
5. They must have it because they are working under the supervision of a civil designer who will check & approve the final work.
6. No, it isn't .It has been replaced by dyeline.
7. Clint call at consulting engineer's office to discuss the work directly with him &to obtain his approval for any change in policy ,then he provided with sets of drawings.
8. The principles of good draftsmanship are correct choice &use of instruments, layout &clarity of views, neatness &legibility of prints.
9. Tracers employed in some drawing offices to trace in ink the drawings made in pencil by the draftsmen or designer.
10. A highly qualified civil engineer is normally in charge of a drawing office .His chief responsibilities is to make designs; check &approve the final drawings made by draftsmen.

iii pp. (38-39)

1. R. No, it isn't a pencil; it is a ruling pen.
2. R. No, it isn't a pair of dividers; it is a compass.
3. R. No, it isn't a straight line; it is a curve R.
4. R. No, it isn't a protractor; it is a scale.
5. R. No, it isn't a T-square; it is The letter a set square
6. R. No, it isn't a setsquare. It is a protractor.
7. R. No, it isn't a vertical line; it is a diagonal line.
8. R. No, it isn't a slide rule; it is a T-square.
9. R. No, it isn't the addition sign; it is division sign.

VOCABULARY PRACTICE

I. p. 40

1- The letter M has two vertical lines &to diagonal lines. It also has three angles.

2- The letter B has one vertical line &two curve lines. 3- The

letter C has one curve line.

4- The letter H has two vertical lines &one horizontal line. It also has four angles.

5- The letter Z has two horizontal lines &one diagonal line.

6- The letter L has one vertical line &one horizontal line. It also has one angle.

iii. p.41 Find in the passage words that give nearly the same meanings:

1. Concisely
2. slower than
3. erasers
4. life time
5. straight
6. edge
7. select
8. finally
9. approve
10. consult
11. completed
12. in many countries
13. obtain
14. collectively

iv p.41

1. Stupidity 2. Safely 3. Simplicity 4. Certainty 5. clarity
6. ability 7. Legibility 8 . complexity

DEFINITIONS P.43

1. A compass is an instrument which is used to draw circles and curved lines.
   A compass is an instrument which is used for drawing circles and curved lines.

   A compass is an instrument which draws circles and curved lines

3. A French curve is an instrument which is used to drawirregular curves.

A French curve is an instrument which is used o for drawing irregular curves.

. A French curve is an instrument which draws irregular curves.

Iii p. 44

1-is measured 2-composes 3- apply 4- are drawn 5-is filled
6-are milked 7-causes 8- use 9-a rct 10- are showed

معهد التكنولوجيا - بغداد
القسم المدني
الفرع : جميع الفروع

الصف: الاول
الزمن : ساعتان

امتحان الشهر الاول لمادة اللغة الانكليزية التقنية للعام ٢٠٠٨\٢٠٠٩

Q1) Define five of the following:-

1- Science 2- Technology 3-Client 4- Tracer 5- Compass

6- Engineering Drawings 7- Construction Drawing s .

(15 D)

Q2) Answer FIVE of the following :-

1- What forms the bases of engineering ?

2- What are the main differences between Science and Technology ?
3- In what way Technology is synthtical ?
4- What are the different types of straight lines ?
5-What are the principles of good draftsman ship ?
6- Name some of the drawing instruments used in engineering drawing office ?

(15 D)

Q3) A- Give from text the OPPOSITE of the following :-
1- Blue print 2- Slower than 3- Curve 4- Natural 5- Vertical line

B- Give from text the meaning of the following :-
1- At last 2- All together 3- seek of advice 4- Responsible for 5-Produce

(30 D)

Q4) Use a suitable suffix to :-
A- Name a person who studies and applies the followings :-
1- Technology 2-statistics 3- Architecture 4- Economy 5- Electricity.

B- Form nouns from the corresponding adjective :-

1- Able 2-Complex 3- safe 4- Simple 5- Legible.

(20 D)

(Q5) A – Put the following sentences in a negative form .

1- Scince provides a body of knowledge.

2- Students observe experiment in laboratories.

3- The building has been constructed since 1956.

B – Expand the following into full definitions use (Used to) and (Used for) for each object

Object	Class	USe
Abuldozer	machine	Push masses of earth in road making.
A rulling pen	drawing instrument	Ink drawing

(20 D)

With Best Wishes of Success

E. R. Kadhim

Dr. I Yousif

CONCRETE

Before you read:

Try to answer the following questions; if you fail, the answers required can be found in the article that follows the questions:

1. **When was Portland cement invented?**
2. **What are the uses of cement?**
3. **What are the uses of concrete?**
4. **What are the main components of concrete?**
5. **What are the main specifications of aggregates?**
6. **On what does concrete strength depend on?**
7. **How can w keep concrete moist and at favorable temperature?**
8. **Why should we reinforce concrete?**

CONCRETE

Concrete has been used as a building material for centuries: The Romans, for example, used 'natural cement' for building domes and other works, some of which still exist. In the eighteenth century, the English engineer, John Smeaton, used 'natural cement' for building the 'Eddystone Lighthouse'. In the early nineteenth century, artificial portland cement was invented and this is now the material most commonly used for a variety of purposes — as a foundation and structural material, as a walling material, and as a lightweight material for insulation. It is used for the construction of roads, airfields, buildings, water-retaining structures, docks, harbours and sea-defences.

Concrete is a rocklike material and can be considered to be made of two components: aggregates and paste. Aggregates are usually classified into two groups: fine and coarse. Fine aggregates consist of natural or manufactured sand with particle sizes smaller than 1/4 inch; coarse aggregates are those with particle sizes greater than 1/4 inch. The paste is composed of powdered cement, water and entrained air. The cement paste ordinarily constitutes 25 to 40 percent of the total volume of concrete. Since aggregates make up about 60 to 80 percent of the concrete, its selection is a matter of importance. They should consist of particles having adequate strength and resistance to exposure conditions. They should, by no means, contain any impurities that might interfere with the setting of concrete or have injurious effects. They should be clean so that there is nothing to prevent the cement paste from sticking to the surface. The cement paste covers the surface of sand and gravel and grips them firmly forming a strong, dense mass.

The strength of concrete depends on the quality of the stones and sand (the aggregates) in the mixture, the amount of cement used, the quality of the cement paste, and on the age of the concrete. The quality of the cement paste, in turn, depends on the ratio of water to cement used; and the extent of curing the cementing properties of the paste are due to the chemical reactions, between cement and water. These reactions, called HYDRATION, take place very rapidly at first, and then more and more slowly for a long time under favourable conditions.

Two conditions are inevitable to improve the properties of concrete and allow hydration to continue for an indefinite period: a) the presence of moisture. b) a favourable temperature. Excessive evaporation of water from newly placed concrete can retard the cement hydration process at an early age. Loss of water causes concrete to shrink, thus creating stresses at the drying surface. If these stresses develop before the concrete has attained adequate strength, surface cracking may result.

The amount of cement used in the mixture depends on the use to which the concrete is to be put — in general, the greater the strength and durability needed, the greater the proportion of cement is. The mixture used for most buildings is one part by volume of cement, two of sand and four of stones (expressed by the ratio 1 :2 : 4). For large mass concrete foundations, the mixture is generally 1 : 3 : 6; for structures containing liquids it is 1 : $1\frac{1}{2}$: 3 and for very strong columns and large span bridges it may be as rich as 1 : 1 : 2.

Concrete increases in strength with age as long as drying of the concrete is prevented. When the concrete is allowed to dry, the chemical reactions slow down or stop. It is, therefore, desirable to keep concrete continually moist as long as possible. Concrete can be kept moist, and, in some cases at a favourable temperature by a number of curing methods that may be classified as follows:

a) Methods that supply additional moisture to the surface of the concrete during the early hardening period. These include ponding, sprinkling and using wet coverings.

b) Methods that prevent loss of moisture from the concrete by sealing the surface. This may be done by means of waterproof paper and plastic sheets.

c) Methods that increase strength gain by supplying heat and moisture to the concrete by the action of steam.

One of the disadvantages of concrete is that it has low tensile strength. That is to say, it is not able to resist forces tending to pull it apart. Therefore, it needs to be reinforced with steel bars to improve its strucural properties. The efficient use of steel bars in concrete depends on the ability of concrete to grip the steel tightly enough to prevent it from pulling out. This interaction between steel and concrete is called 'bond', and the designer must check his calculations to ensure that the bond strength is sufficient. Bond may be reduced if the steel bars have loose scale, loose rust or oil on the surface when they are embedded in the concrete.

Reference:

Engineering Bulletin
Eleventh Edition
(Design & Control of Concrete Mixtures)

GLOSSARY

artificial	(adj.)	: not natural	اصطناعي
foundation	(n.)	: the part of a building which is under the ground	اساس
insulation	(n.)	: preventing the passage of electricity, heat or sound	عزل، مادة عازلة
component	(n.)	: a part helping to make a whole	جزء
classify	(v.)	: put into groups	يصنف
coarse	(adj.)	: not fine or small	خشن
particle	(n.)	: the smallest possible amount	جسيم
selection	(n.)	: choice	اختيار
constitute	(v.)	: make up; form	يشكل، يؤلف
adequate	(adj.)	: suitable; enough for	ملائم وكاف
exposure	(n.)	: showing	كشف
by no means		: certainly not	قطعا لا
impurities	(n.)	: dirty things	شوائب
interfere with	(v.)	: hinder; prevent	يتداخل مع، يعيق
setting	(n.)	the frame in which something is fixed	خلفية
injurious	(adj.)	: harmful	مخدش
[illegible]	(v.)	: become fixed	يلتصق بـ

reaction	(n.)	: action in which one substance starts in another	تفاعل
favourable	(adj.)	: suitable	مناسب
inevitable	(adj.)	: that can not be avoided	لا مفر منه
indefinite	(adj.)	: not exactly stated	غير محدد
hardening	(adj.)	: becoming hard	متيبس
excessive	(adj.)	: too much	زائد
shrink	(v.)	: become smaller	ينكمش
stress	(n.)	: pressure; strain	جهد
attain	(v.)	: arrive at; reach	يصل، يبلغ الى
durable	(adj.)	: lasting a long time	متيناً
span	(n.)	: the distance between two supports	فسحة
moist	(adj.)	: slightly wet	رطب
seal	(v.)	: close up	يختم، يغلف
grip	(v.)	: hold	يمسك بإحكام

COMPREHENSION

I. Listen to the first two paragraphs read to you and answer the questions:

1. What are the four things that are used to make concrete?
.....
2. When was the artificial portland cement invented?
.....
3. What is the main difference between fine and coarse aggregates?
.....
4. Why is the selection of aggregates a matter of importance?
.....
5. What are the two kinds of cement mentioned in the passage?
.....
6. What grips the sand and gravel together into a rocklike material?
.....
7. Mention five uses of concrete.
.....

II. Complete the following sentences using suitable words in the blanks:

1. The quality of the cement paste depends upon the ..... of water to cement used.
2. Hydration means the ..... reactions between ..... and ..... .
3. Hydration may continue for a ..... period.
4. Concrete increases in strength with ..... as long as drying of the concrete is prevented.
5. Concrete is a ..... material.
6. The cement paste covers the surface of sand and gravel and grips them ..... .
7. Concrete should be protected so that ..... is not lost during the early ..... period.

8. One of the disadvantages of concrete is its low .....
9. Concrete may exapnd and contract with changes in .....
10. 'Bond' is the ..... between ..... and .....

III. Answer the following questions.

1. What are the two main components of concrete?
.....
2. What does the strength of concrete depend on?
.....
3. What may retard the cement hydration process at an early age?
.....
4. In what constructions is the ratio 1 : 1 : 2 advised?
.....
5. Why does it become necessary for the engineer to check his calculatio
.....

VOCABULARY PRACTICE

1. Learn the following word-groups and study the sentences given as examp

(i) is composed of = consists of

EXAMPLE: Air **is composed of** 21% oxygen, about 79% ni other gases.

(ii) by no means = certainly not

thing OR person + be + , by no means, + adjective OR the 'doer' of...

EXAMPLE: 1. That instrument is, **by no means**, useful.
2. He is, **by no means**, the inventor of the wireless.

(iii) due to (adj.) = caused by

thing + be + due to + thing

EXAMPLE: The failure of the structure was **due to** careless

(iv) due to (conj.) = because of

phrase	clause
due to + thing	subject + verb + ...

EXAMPLE: **Due to** carelessness, the structure failed.

(i) **take place** = happen

EXAMPLE: Hydration **takes place** very rapidly at first.

Write your own sentences, one for each of the above word-groups:

1. .....
2. .....
3. .....
4. .....
5. .....

II. Find in the passage words that represent the opposites to those listed in GROUP A; Then list them in GROUP B:

GROUP A	GROUP B
1. natural	1. .....
2. heavy-weight	2. .....
3. fine	3. .....
4. not suitable	4. .....
5. by all means	5. .....
6. definite	6. .....
7. lightly	7. .....
8. continue	8. .....
9. not enough	9. .....
10. destroy	10. .....

III. (i) Underline the following word-groups in the text; study the sentences in which they occur, and then write your own sentences using each of them.

depend upon
make up
use in
protect against
consist of
use for
allow to
result from
pull apart
prevent from
loss of
interfere with

(ii) Choose the correct word or phrase from those given in the list to fill in each blank:

(failure; width; responsibility; variety; make certain; artificial; provided that; effect)

1. The ..... of a crack is fearful.
2. What is the ..... of chemicals upon a concrete mix?
3. It is necessary to ..... that concrete has become strong enough to withstand cracks.
4. Surveys are made for a ..... of purposes.
5. Is this an ..... object?
6. The ..... of the structure is the ..... of the architect?
7. Concrete becomes harder and stronger ..... the temperature and moisture conditions are suitable.

IV. (i) The use of numbers with mathematical symbols is common to the language used for communicating technical ideas accurately:

Read the following expressions:

1 : 3 : 6 50 kg. 20 mm.
210 kg/cm^2 2 cu. ft. 10.5% 4 $^5/_8$ 0.08

ABBREVIATIONS

l. = length	ft. = foot / feet
b. = breadth	cm. = centimetre
h. height	sq. ft. = square foot/feet
a. = area	$ft.^2$ = square foot/feet
v. = volume	cu. ft. cubic foot / feet
	ft^3 = cubic foot / feet

STRUCTURAL STUDY

Allow, permit, enable

These words show that something is likely to happen, that it can happen, or that it happened. They are all used in one pattern:

S	V	O	Complement
	allow permit enable	noun noun group pronoun	to-infinitive.

EXAMPLE: Two conditions allow hydration to continue. (paragraph 4)

Construct similar sentences with the following prompts using the verb given in brackets:

1. Technical Institutes / students / become / technicians. (enable)
2. A microscope / scientists / examine / very small objects. (enable)
3. Freezers / people / keep / things cold. (allow)
4. A laboratory / the students / perform experiments. (enable)
5. The Government / technicians and engineers / work / in industry. (permit)
6. A computer / us / work out / complex problems. (allow)

II. IT IS + ADJECTIVE + TO-INFINITIVE

Sometimes, the word 'it' is used to complete the pattern of a sentence and not as the real subject

e.g. **It is desirable to keep** concrete moist as long as possible.

Certain adjectives follow the same pattern. (paragraph 6)

EXERCISE: Construct as many sentences as you can from the following table:

Filler	V	adjective	to-infinitive
It	is seems becomes	possible impossible necessary essential probable usual useful good common difficult undesirable safe easy	to use wet coverings. to produce concrete. to complete the circuit. to repair the machine. to solve the problem. to perform the experiment. to record your observations. to increase the strength of the beam. to examine the building materials. to examine very small objects.

III. THE PASSIVE (PART II):

In Unit Three, you were told that all passives are formed by some part of the verb (be) plus the past participle. The passives of the other tenses other than the simple present look like these:

The Simple Past Passive	was / were	+	P.P.	
The Passive of the Modals	will / can / may / should / etc.	+	be + P.P.	
The Perfect Passive	has / have	+	been + P.P.	
The Continuous Passive	is / are / was / were	+	being + P.P.	

EXAMPLES:

ACTIVE	PASSIVE
— We use concrete for several purposes.	Concrete is used for several purposes.
— Architects design houses.	Houses are designed by architects.
— The man sharpened the blades.	The blades were sharpened.
— They treated it with care.	It was treated with care.
— They will start the work soon.	The work will be started soon.
— We must study it seriously.	It must be studied seriously.
— People have used concrete for centuries.	Concrete has been used for centuries.
— The worker has just switched off the lights.	The lights have just been switched off.
— They are developing new methods.	New methods are being developed.
— They are constructing a power station.	A power station is being constructed.

Put the following sentences in the passive form:—

1. They are performing their duties according to the instructions.

.....

2. Electricians repair electrical appliances.

.....

3. People invented artificial portland cement in the early nineteenth century.

.....

4. I will ask the students to submit reports.

.....

5. You ought to follow the same technique.

.....

6. People call 'mathematics' the language of science.'

.....

7. You should prevent drying of the concrete.

.....

8. We use water for bathing, washing dishes and clothes and for many other domestic purposes.

.....

COMPOSITION

I. Develop the following hints into a short paragraph:
concrete — rocklike — water — cement — sand — stones — chemical reactions — harden — strong mass.

II. Sum up the advantages and the disadvantages of concrete

N.B. The teachers and the students are requested to look up in some references for information in addition to the ideas given in the text.

COMPREHENSION

I .P.65

1. The four things that are used to make concrete are :gravel ; sand ; cement &water
2. The ar ficial Portland cement is invented in the early 19th.Century
3. The main difference between fine &coarse aggregates is that fine aggregates have grains sizes smaller than 1/4 inch.
4. The selec on of aggregates is a ma er of importance since they make up 60- 80% of the total volume of concrete.
5. The two kinds of cement men oned in the passage are natural &ar ficial cement.
6. Cement paste grips the sand &gravel together into a rocklike material.
7. It is used for the construc on of road; airfields; buildings; water- retaining structures & docks.

II PP.(65-66)

1. ratio
2. chemical sand & water
3. an indefinite
4. strength
5. a rocklike
6. together
7. moist hardening
8. tensile
9. forces
10. interaction steel concrete

III p.66

1. The two main components of concrete are cement paste & aggregates.
2. The strength of concrete depends on the quality of the stones & sand (aggregates) in the mixture, the amount of cement used, the quality of the cement paste & on the age of concrete.
3. Excessive evaporation of water from newly placed concrete can retard the cement hydration process at an early age.
4. The ra o 1:1:2 is advised for very strong columns & large span bridges.
5. It becomes necessary for the engineer to check his calculations to ensure that the bond strength between concrete & steel is sufficient to prevent steel from pulling out.

Vocabulary practice

II P.65

1. ar ficial 2.light weight 3.coarse 4.suitable 5. by no means

6. Indefinite 7. ghtly 8. Stop 9.sufficient 10. Build

II p. 67 Choose the correct word:

1. width 2. effect 3. make certain 4. variety 5. ar ficial 6.failure

----responsibility 7.provided that

STRUCTURAL STUDY

I . p.68

Allow, Permit, Enable

1. Technical institutes enable student to become technicians .
2. A microscope enables scientists to examine very small objects.
3. Freezers allow people to keep things cold.
4. A laboratory enables the students to perform experiments
5. The government permits technicians &engineers to work in Industry.
6. A computer allows us to work out complex problem.

III p.69 The passive

1. Their duties are being performed according to the instruction.
2. Electrical appliances are repaired.
3. Ar ficial Portland cement was invented in the early 19th. Century.
4. The students will be asked to submit reports.
5. The same technique ought to be followed.
6. Mathematic is called the language of science.
7. Drying of concrete should be prevented.
8. Water is used for bathing, washing dishes &clothes &for many other domestic purposes.

SURVYING

Before you read

Try to answer the following questions; if you fail, the answers required can be found in the article that follows the questions:

1. What do we mean by surveying?
2. What do surveyors measure during surveying?
3. How many kinds are their?
4. What are the instruments used in surveying &what are the functions of each of them?
5. When &where do we need surveying?
6. What do we mean by a Geological survey & why should civil engineers make them?

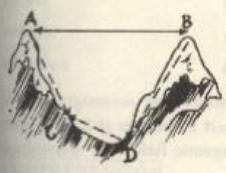
SURVEYING

Surveying means measuring — and recording by means of maps — the earth's surface with the greatest degree of accuracy. The measurements in a survey include distances, elevations, boundaries, directions, angles and any other characteristics of the site.

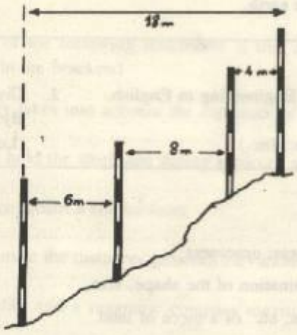
There are two kinds of surveying: Plane and Geodetic. Plane surveying is the measurement of the earth's surface as if it were a plane (or flat) surface without curvature. Within areas of about 20 square kilometres, the earth's surface does not produce any significant errors in a plane survey. For larger areas, however, a geodetic survey, must be made as this takes into account the curvature of the earth.

An area of land without hills or many buildings can be accurately surveyed with nothing but a good steel tape, but this is hard when the land has many more sides than four, or when its sides are longer than 1000 m. A small area with many obstacles to the lines of sight across it can not be properly surveyed with a tape, and some instrument that measures angles will then be needed. The instrument for measuring angles is called a theodolite. A simpler and quicker but much less accurate instrument is the magnetic compass.

The men who hold the steel tape during a survey are usually called chainmen. The indicated length of a steel tape is, in fact, exactly accurate only at a temperature of 20° centigrade, so temperature readings are often taken during a survey to correct distances by allowing for expansion or contraction of the tape.



Distances between elevations are measured in a horizontal plane. In the diagram alongside, the distance between the two hills is measured from points A to B rather than from points A to C to D to B. When distances are being measured on a slope, a procedure called BREAKING CHAIN is followed. This means that measurements are taken with less than the full lengths of the tape..



Heights or elevations are determined by means of a level, a kind of telescope with a bubble-levelling device parallel to the telescope. A bubble level is a tube containing a fluid that has an air bubble in it. When the bubble is centred in the middle of the tube, the device is in level. The surveyor sights a rule called a level rod through the telescope. The rod is marked off to show units of measure in large clear

numbers. The spaces between the marks are alternately black and white in order to increase visibility. The number that the surveyor reads on his or her instrument, is the vertical elevation.

Heights are given in relation to other heights. On maps, for example, the usual procedure is to give the elevation, usually referred to as mean sea level. Mean sea level can be determined only after taking the average height of the tides in a given area over a definite period. A survey carried out by level and rod often gives the elevation in relation to a previously measured point that is called **a bench mark.**

Two more pieces of surveying equipment should be mentioned, **the plane table** and **the tacheometer.** The plane table is a drawing board on a tripod, (a three-legged support), carried round and laid at different points in the field. The mapping is done while the lengths and angles are measured. The tacheometer is an ordinary theodolite with two horizontal lines in the telescope which are used to measure horizontal and vertical distances.

In all land surveying, the survey is built up from a series of connected triangles. The whole area should be covered by well-conditioned triangles, i.e. those with angles of 60° but not less than about 30° nor more than about 100°. Because the area must be covered by triangles, an area surveyed by tape must be free of obstacles to sight; otherwise not all the sides of the triangles will be measurable. With a theodolite or a compass it is possible to obtain the lengths of the unmeasured sides from the known angles of the triangle and the measured side.

In addition to measuring surfaces for civil engineering projects, it is often necessary to make a geological survey. This involves determining the composition of the soil and rock that underlie the surface of the construction site. Three factors help civil engineers to determine the type and size of the structural foundations or the weight of the structures that can rest on them:

a) the nature of the soil
b) the depth at which bed rock is located; and
c) the existence of faults or underground streams.

The devices that are used in geological surveys are gravimeters, magnetometers and seismographs. The gravimeter measures the earth's gravitational pull; heavier rocks like granite exert a stronger pull than lighter ones like limestone. The magnetometer measures the strength of the earth's magnetic field. The seismograph measures vibrations or seismic waves within the earth.

REFERENCES:

1. The Language of Civil Engineering in English.
   By: Eugene J. Hall.
   (Regents Publishing Co., Inc.)

2. Civil Engineering
   By: John S. Scott.
   (Longman)

GLOSSARY

accuracy	(n.)	: preciseness; exactness	دقة
survey	(n.)	: an examination of the shape, size, position, etc. of a piece of land.	مسح الاراضي
elevation	(n.)	: height	علو، ارتفاع
boundaries	(n.)	: dividing lines	حدود
characteristics	(n.)	: special qualities	خواص، ميزات
physical	(adj.)	: natural	طبيعي

curvature	(n.)	: the state of being curved.	تقويس، انحناء
significant	(adj.)	: important	مهم
error	(n.)	: mistake	خطأ
obstacles	(n.)	: hindrances	عوائق
indicated	(adj.)	: shown; pointed	مبين، مؤشر عليه
slope	(n.)	: a surface having one end or side at a higher level than the other.	منحدر
procedure	(n.)	: way of performing an action	اجراء
parallel	(adj.)	: never meeting because always at the same distance from each other	موازي
fluid	(n.)	: a substance that flows	سائل
sight	(v.)	: observe	يرقب، يلاحظ
rule	(n.)	: a straight piece of wood or metal marked in inches, centimetres, etc.	مسطرة
alternately	(adv.)	: first one and then the other	بالتناوب
visibility	(n.)	: the state of being visible	رؤية
average	(n.)	: what is usual	معدل
previously	(adv.)	: before; at an earlier time	من قبل
project	(n.)	: plan; scheme	مشروع
underlie	(v.)	: lie under	يقع تحت
vibrations	(n.)	: rapid movements to and fro	اهتزازات، ذبذبات

COMPREHENSION

I. Say whether each of the following statements is true or false; if it is false, provide the correct statement. (Put T or F in the brackets)

( ) 1. A plane survey takes into account the curvature of the earth.

.....

( ) 2. The men who hold the steel tape during a survey are usually called surveyors

.....

( ) 3. A plane surface means a flat surface.

.....

( ) 4. Surveyors measure the distances between elevations in a vertical plane.

.....

( ) 5. Both a theodolite and a magnetic compass measure angles; the latter is more accurate than the former.

.....

( ) 6. Granite and limestone are two surveying instruments.

.....

( ) 7. Heights are measured by means of a level.

.....

( ) 8. To determine types of soil and rock beneath the surface of the earth, a geological survey should be made.

( ) 9. A magnetometer is the device that measures the earth's gravitational pull.

( ) 10. A bench mark is a point whose elevation has been determined and can be used as a basis for other measurements.

Answer the following questions:

1. What does surveying mean?
2. For what purpose is a plane survey made? How large can an area be covered by this kind of survey without any significant error?
3. Where can a steel tape be sufficient for a survey?
4. Why is it necessary to take temperature readings when a steel tape is used?
5. What is a level? Why is it provided with a bubble level?
6. How do surveyors measure distances between elevations?
7. What procedures do surveyors use when measuring distances on a slope?
8. How is sea level determined in a given area?
9. What is a level rod? How does a surveyor make use of it?
10. What is the function of a magnetometer?

II. Match the expressions on the left with their suitable meanings on the right by inserting the appropriate letters within the brackets:

1. Geodetic surveying	( ) a)	An instrument used for viewing distant objects.
2. Theodolite	( ) b)	Men who hold the steel tape.
3. Bench mark	( ) c)	A device that measures the vibrations within the earth
4. Rod	( ) d)	A theodolite with two horizontal hair lines in its eyepiece.
5. Seismograph	( ) e)	Measuring the earth's surface taking into account its curvature.
6. Sea Level	( ) f)	A drawing board used for rapidly drawing a map in the field.
7. Breaking Chain	( ) g	A point whose elevation has already been determined and marked, so it can be used as a basis for other measurements.

8. Chainmen	( ) h	Measuring distances with less than the full length of the tape.
9. Telescope	( ) i	A point that is determined after averaging the tides in a given area.
10. Plane Table	( ) j	A rule with measurements marked at fixed distances.
11. Tachometer	( ) k	An instrument which measures horizontal and vertical angles.

VOCABULARY PRACTICE

I. Learn the following words and phrases and study the sentences given as examples.

(i) otherwise = or else
EXAMPLE: Use a tape; **otherwise** the measurement will not be accurate.

(ii) in relation to = with relation to; in connection with
EXAMPLE: Heights are generally determined **in relation** to the mean sea level

(iii) alongside = at or by the side of
EXAMPLE: Draw a diagram **alongside** the definition.

(iv) as if = as though
EXAMPLE: He is holding the pen **as if** he were a tracer.

(v) parallel to = never meeting because always at the same distance from each other
EXAMPLE: The two streets run **parallel** to each other for about a mile.

(vi) exert = put forth
EXAMPLE: The weight of the beam **exerts** a pressure on the walls.

Write your own sentences using each of the words and phrases given above:

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

(i) The suffix — able (ible):

This suffix is added to verbs or nouns to form **adjectives:**
e.g.: measur**able** = which can be measured
visible = which can be seen

Give the corresponding adjectives from the following verbs:

Verb	Adjective
compare	.....
reason	.....
sense	.....
consider	.....

avoid .....
vary .....
value .....
break .....
depend .....

(ii) **The suffix —ly:**
Remember that this common suffix forms adverbs from corresponding adjectives:

e.g. accurately (from the adjective accurate)

EXERCISE: Pick out further examples of adverbs ending in (-ly) appearing in this and in the previous two units, and identify the adjectives from which they have been formed.

(iii) By adding (-un) as a prefix, we can make new words (opposites)

e.g.	measured	**unmeasured**
	changed	**unchanged**

Give some more words with the prefix (-un).

(iv) Note carefully how the past and past participle is formed by adding (d) to the word ending in «e»:

e.g.	indicate	indicated
	measure	measured

Give other examples of the same type:

infinitive	**Past & Past Participle**
..... e	..... d
..... e	..... d
..... e	..... d
..... e	..... d

III. **Choose the correct word from those between brackets:**

1. (In; within; at) areas of about 20 kilometres square, the earth's surface does not produce (any; no; so; many) significant errors.
2. The curvature of the earth must be taken (in; with; into; on) account.
3. A piece of land can not be (properly; probably) surveyed without a tape.
4. A theodolite is an instrument for (measure, measurement; measuring) angles.
5. The distance (of; between; within) the two hills are measured in a horizontal plane.
6. The number read on the level rod is (little; less; least) than the mark shown on the surveyor's instrument.
7. The area which is to be measured must be free (of; for; with) obstacles.
8. (How much; How many; How high) is the hill?
9. A small area of land can be (accuracy; accurately; accurate) surveyed with nothing but a good steel tape.
10. Electricity and (magnetise; magnetism; magnetic) are (close; closely) connected.

STRUCTURE STUDY

I. HOW THINGS ARE(CAN) BE DONE:

Study the following example, and then make sentences describing what can be done with the following instruments:

Example: Horizontal lines { are / can be / may be } drawn { by means of / by using / with } a T-square.

PURPOSE	INSTRUMENT
for measuring distances	a steel tape
for viewing distant objects	a telescope
for determining heights or elevations	a level
for measuring temperature	a thermometer
for measuring the earth's gravitational pull	a gravimeter
for viewing small objects	a microscope
for weighing substances	a balance
for measuring angles	a theodolite
for measuring the earth's magnetic field	a magnetometer
for drawing circles and curved lines	a compass
for measuring vibrations within the earth	a seismograph

II. (i) Questions with HOW

Complete the following table depending on the information given in (I) above:

How	is	horizontal lines	drawn? ..... ?
		.....	..... ?
		.....	..... ?
		.....	..... ?
	are	.....	..... ?
		.....	..... ?
		.....	..... ?
		.....	..... ?
		.....	..... ?

(ii) Questions with WHAT

Ask and answer questions fromthe following table:

What is	a telescope a theodolite a barometer a level a balance a magnetic compass a magnetometer	used for?

What is	a T-square a theodolite a thermometer a seismograph a compass a gravimeter a steel tape	used for?

III. MEASUREMENTS (1) BASIC METRIC UNITS

Scientist all over the world measure distances by the metric system. The following units and their abbreviations are in use:

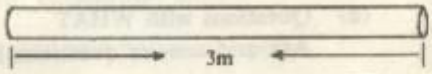
UNIT	ABBREVIATION
kilometre	km.
metre	m.
decimetre	dm.
centimetre	cm.
millimetre	mm.
square metre	m^2
cubic metre (metre cubed)	m^3
micrometre	Mm. «micron»
10 millimetres	= 1 centimetre
10 centimetres	= 1 decimetre
100 centimetres	= 1 metre
1000 metres	= 1 kilometre
1000 kilometres	= 1 megametre
1000 megametres	= 1 gigametre

Note: metre (usually English)
meter (usually American)

Study the diagrams and memorize the examples:

(1) LENGTH

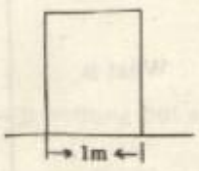
We can describe the length of this bar in four ways:



a) The bar is three metres long.
(b) The bar is three metres **in length.**
c) The bar has **a length of** three metres.
d) **The length of** the bar is three metres.

(2) WIDTH OR BREADTH

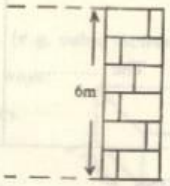
We can describe the width or breadth of this door in four ways:



a) The door is one metre **wide/broad.**
b) The door is one metre **in width/breadth.**
c) The door has **a width/a breadth of** one metre.
d) **The width/breadth of** the door is one metre.

(3) HEIGHT

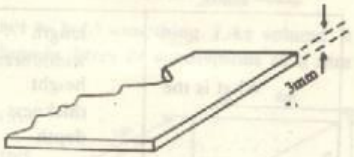
We can describe the height of this wall in four ways:



a) The wall is six metres **high.**
b) The wall is six metres **in height.**
c) The wall has **a height of** six metres.
d) **The height of** the wall is six metres.

(4) THICKNESS

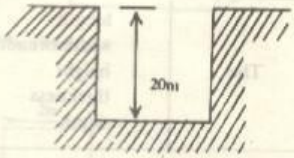
We can describe the thickness of this steel plate in three ways:



a) The plate is three millimetres **thick.**
b) The plate has **a thickness of** three millimetres.
c) **The thickness of** the plate is three millimetres.

(5) DEPTH

We can describe the depth of this well in four ways:



a) The well is twenty metres **deep.**
b) The well is twenty metres **in depth.**
c) The well has **a depth of** twenty metres.
d) **The depth of** the well is twenty metres.

EXERCISES:

(I) Keep a list of the adjectives and their corresponding nouns in the table below (words that deal with measures):

ADJECTIVE	NOUN
LONG	LENGTH
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

(II) Study the following tables, and note how we ask and answer questions about measurements:

TYPE I
QUESTIONS

How	long	IS	the iron bar?
	wide / broad		the door?
	high		the wall?
	thick		the steel plate?
	deep		the well?

ANSWERS

The	is	..... long. wide/broad. high. thick. deep.

TYPE 2 QUESTIONS

What is the	length width/breadth height thickness depth	of	.....

ANSWERS

The	length width/breadth height thickness depth	of	is .....

OR

The	.....	is	in length. width/breadth height. depth.

OR

The	.....	has	a length width/breadth height thickness depth	of .....

IV. MEASUREMENTS (2) DERIVED METRIC UNITS

These units are produced of the basic units.

Study the diagrams and memorize the examples:

(1) AREA — Area is measured in square units (e.g.: square metres -m^2)

We can describe the area of this room in three ways:

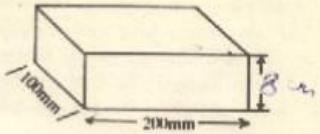
a) The room has an area of twenty square metres.

b) The room is twenty square metres.

c) The area of the room is twenty square metres.

(2) VOLUME – Volume is measured in cubed units. (e.g. cubic metres m^3).

We can describe the volume of this brick in three ways:



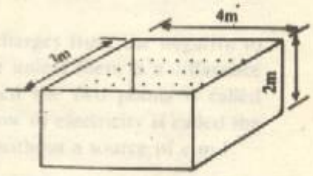
a) The brick has a volume of 1600 cubic centimetres.

b) The brick is 1600 cubic centimetres in volume.

c) The volume of the brick is 1600 cubic centimetres.

(3) CAPACITY – Capacity is the ability of a container to hold something. Like volume, it is measured in cubed units. For liquids, litres or subdivisions of a litre may be used.

We can describe the capacity of this tank in three ways:

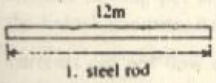


a) The tank has a capacity of twenty-four cubic metres.

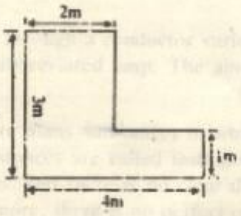
b) The tank is twenty-four cubic metres in capacity.

c) The capacity of the tank is twenty-four cubic metres.

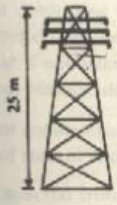
EXERCISE: Describe the following objects in as many ways as you can:



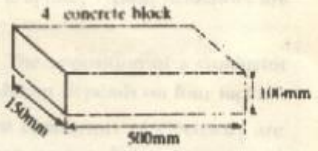
1. steel rod

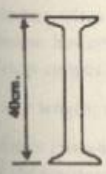


2. steel plate

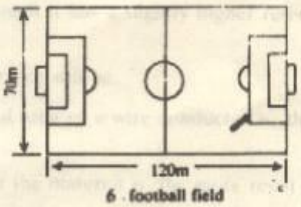


3. electricity pylon

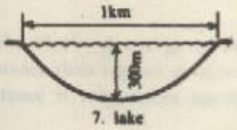




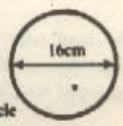
5. beam



6. football field



7. lake



8. circle

COPREHENSION

I pp. (73-74)

(F) 1. A geode c surveying takes into account the curvature of the earth.

(F) 2. The men ho hold the steel tape during survey re usually called chainmen.

(T) 3.

(F) 4. Surveyors measure the distances between eleva ons in a Horizontal plane.

(F) 5. Both a magne c compass & theodolite measure angles the later is more accurate than the former.

(F) 6. Granite And limestone are to kinds of rock.

(T) 7.

(T) 8.

(F) 9. A gravimeter is the device that measures the earth's gravita onal pull.

(T) 10.

II p.74

1. Surveying means measuring-& recording by means of maps –the earth surface with the greatest degree of accuracy.
2. A plane survey is made for measuring distances, elevations, boundaries, direction, angles &any other characteristics of the site before starting any project, then to tra nsmit the plan of any project to the site & during the construc on of the project. It can cover an area of about 20 square kilometer.
3. A steel tape can be sufficient for a survey for an area of land without hills or many buildings.
4. It is necessary to take temperature readings when a steel tape is used because the indicated length of a steel tape is, in fact accurate only at a temperature of 20 degree cen grade, so to correct distances readings due to steel expansion 0r contrac on we must have temperatur e readings.
5. A level is a kind of telescope used for determining heights or elevations. It is provided with bauble level because when the bauble is centered in the containing tube the device will be leveled.
6. Surveyors' measure distances between elevations in a horizontal plane.
7. Surveyor's measuring distances on aslop by applying a procedure called "BREAKING CHAIN".
8. Sea level is determined in a given area after taking average of tides over a definite period.
9. A level rod is a rod marked off to show units of measure in large clear numbers, the spaces between the marks are alternately black &white in order to increase visibility. The surveyor sight the level rod through the telescope. The number that surveyor read is the vertical elevation.
10. A magnetometer is a geological survey device used to measure the strength of the earth's magnetic field.

III pp. (74-75)

1-(e) 2-(k) 3-(g) 4-(j) 5-© 6-(i) 7-(h) 8-(b)

9-(a) 10-(f) 11-(d)

VOCABULARY PRACTICE

I pp. (75-76)

Comparable avoidable dependable

Reasonable variable

Sensible valuable

Considerable breakable

III p.76

1. Within any

2. into 3.Properly 4. measuring 5. between

6.less 7. of 8. How high 9. accurately

10-magnetism closely

STRUCTURE STUDY

I p. 77

1. Distances are measured by means of a steel tape.
   Distances can be measured by means of a steel tape.

   Distances may be measured by means of a steel tape.

   Distances are measured by using a steel tape.

   Distances can be measured by using a steel tape.

   Distances may be measured by using a steel tape.

   Distances are measured with a steel tape.

   Distances can be measured with a steel tape.

   Distances may be measured with a steel tape.

2. Angles are measured by means of a theodolite. Angles can be measured by means of a theodolite. Angles may be measured by means of a theodolite.

   Angles are measured by using of a theodolite. Angles can be measured by using of a theodolite.

Angles may be measured by using of a theodolite.

Angles are measured with of a theodolite.

Angles can be measured with of a theodolite.

Angles may be measured with of a theodolite.

II p. 77

How are distances measured?

How are distant objects viewed?

How are heights or elevations determined? How is earth's gravitational pull measured? How are small object viewed?

How are substances weighted?

How is earth's magnetic field measured? How are circles & curved lines drawn?

How are vibrations within the earth measured?

EX. P.79

Long	length
wide	width
broad	breadth
high	height
thick	thickness
deep	depth

EX. P.81

1. Steel rod is 12 meters long.
Steel rod is 12 meters length.

Steel rod has a length of 12 meters. The

length of steel rod is 12 meters.

2. Steel plate has an area of eight square meters. Steel plate is eight square meters.

The area of steel plate is eight square meters.

3. The electricity pylon is twenty five meters high.
The electricity pylon is twenty five meters in height. The

electricity pylon has a height of twenty five meters. The height

of electricity pylon is twenty five meters.

4. The concrete block has a volume 7500 cubic cen meters. The
concrete block is 7500 cubic centimeters in volume.

The volume of concrete block is 7500 cubic cen meters.

5. I beam is forty centimeters high.
I beam is forty centimeters in height.

I beam has a height of forty centimeters. The

height of I beam is forty centimeters.

6. The foot ball has an area of 8400 square meters. The
foot ball field is 8400 square meters.

The area of foot ball field is 8400 square meters.

7. The lake is one km. wide& 300 m. deep.
The lake is one km. in width &300 m. in depth. The lake

has a width of one km. &300 m. depth. The width of lake

is one km. &its depth is 300 m.

8. The circle has n area of 201 square cen meters. The
circle is 201 square cen meters.

The area of the circle is 201 square cen meters.

OR

The circle has a diameter of 16 cen meters. The

circle is 16 cen meters in a diameter.

The diameter of a circle is 16 cen meters.

nstitute Of Technology /Baghdad

Subject;-Technical English language

Civil Department
First year /All branches

Time :- 2 hours
2nd month

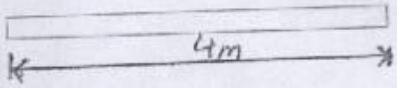
A:- Define FIVE of the following:-
1- Surveying 2- Tacheometer 3- Bench Mark 4- Gravimeter
5- Concrete 6- Hydration 7- Fine aggregate
(15 mark)

- Translate the following paragraph into ARABIC.

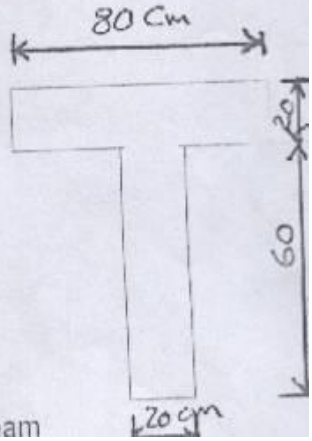
" Three factors help Civil Engineers to determine the type and size of structural foundations or the weight of the structures that can rest on them :-
1- The nature of the soil.
2- The depth at which bed rock is located.
3- The existence of faults or underground streams.
(10 mark)

)))A:- Fill TEN (10) blanks with suitable word (s) .
1- the _____of tank is one cubic meter.
2- The abbreviation of kilometer is _____ .
3- the _____of well is 30 meter .
4- A theodolite is an _____ used for measuring _____ and ____angl
5- _____is the wall ?
6- The quality of cement paste depends on the _____of water to ___used.
7- One of the disadvantages of concrete is its low _____ .
8- Artificial Portland cement was _____ in the early_____ century.
9-Concrete mixture of _____ is used for most buildings.
10- In all land surveying, the survey is build up from a series of _____ .
(20 mark

3:- Describe the following figures in TWO ways.



4m
Steel Bar



T Beam

Q3)) A:- Give the alternative meaning of FIVE of the following words and put them in a suitable sentences .

1- Durable 2- In relation to 3- By no means 4- Elevation
5- Parallel to 6- Vibrations.

(15 Mark)

B:- Give the opposite of FIVE of the following words or expressions.

1- Contraction 2- Plan surveying. 3- Construct 4-Hight
5- Natural 6- Light weight 7- Fine

(10 Mark)

Q4)) A:- Put the following active sentences into a passive form :-

1- We must help our friends.

2-People develop new products every day.

3-We are employing technicians to operate the equipment.

4-The worker has just switched off the lights .

5- I have written three letters .

(15 mark)

B:- Give the corresponding adjectives from the following verbs :-

1- Compare . 2- Consider . 3- avoid 4- depend. 5- vary.

(5 Mark)

WITH ALL THE BEST OF SUCCESS

E.R. KADHIM
Lecturer

Dr. I. YOUSIF
Lecturer

M. Abdul sahib
Head of
DEPT.

ALABORATORY REPORTWRITING

Report writing is a specialized form of written communication .communication is the transmission or ideas from one mind to other minds. Like any other type of communica on, report should have (1) specific purposes and (2) specific readers. It should be carefully planned and constructed to fit both purposes.

A report is a document in which a given problem is examined for the purpose of conveying information and ideas accurately and efficiently. To reach this end the report should be:

1. as clear as possible
2. as brief as possible
3. as easy as to understand as possible
4. as accurate as possible.

Clarity, brevity, simplicity and accuracy are the principles of good technical writing. If at the same time; the report can be made striking and well -presented, all well and good

There are different kinds of reports. The most preliminary kind a student is trained to write is the laboratory report .Such a report serves as an evidence of the work he has performed in the classroom. It is, at the same time, the essential record of that work; it affords him the opportunity to study the elements at his leisure or at a suitable moment. Furthermore, laboratory report prepares a student for writing the report that might be demanded of him latter while he is working in industry or in a research laboratory.

A technical student must use his knowledge and his ability of English in order to be accurate in his technical writing. However, before he starts writing a report, a student should ask himself those questions:

Can I observe?

Can I think about what I have observed?

Can I draw the right conclusion from my thinking?

Only if he can do these things will he be able to record and describe his observations and conclusions accurately. A technical student must have the power to observe, to thing and to reason for himself. A conclusion that based on opinion or guess is of no value in science or in technology.

The laboratory report presents the observed information in an organized form under different headings for quick reference and logical thinking. It normally gives the object of the experiment, the equipment which is used, the procedure which is followed, the results which are obtained, and the conclusions.

GLOSSARY

Specific	(adj.)	= certain	معين أو خاص
document	(n.)	= something written or printed that gives information and can be used as evidence.	وثيقه
efficiently	(adv.)	= with the ability to produce result	بصوره فعاله
brief	(adj.)	= short	موجز
principle	(n.)	= a general rule	قاعده
preliminary	(adj.)	= coming at first	تمهيدي
evidence	(n.)	= proof	دليل
essential	(adj.)	= necessary	ضروري
afford	(v.)	= give	يعطي
element	(n.)	= a necessary feature	صفه
leisure	(n.)	= time when one is free from work	وقت فراغ
guess	(n.)	= an opinion made without having much knowledge	تخمين
procedure	(n.)	= the way of performing an action	أجراء

COMPREHENSION

1. Choose the most correct answer to each of the statements, and indicate your choice by inserting the appropriate letter in the spaces provided on the left side:

— 1. Report writing is a specialized form of.....

a) conversation
b) dialogue
c) written communication
d) spoken communication.

— 2. A report is.....

a) a test
b) an application
c) an experiment
d) a recorded document.

— 3. One of the four principles of good report writing mentioned in the pussage is.. ..

a) reporting
b) giving details
c) clarity
d) complexity.

— 4. The opposite of complexity is.....

a) accuracy
b) brevity
c) simplicity
d) evidence

— 5. A good report is organized to.....

a) satisfy the readers
b) amuse the readers
c) excite the readers
d) communicate with the readers.

SAMPLES OF LABORATORY REPORTS

SAMPLE ONE:

Read the followng piece of information, and see how it is organized in the form of a report:

INFORMATION

One method of determining the workability of concrete on site, where accurate measurements can not be taken, is to carry out the slump test. By means of this test, the consistency i.e. the ease of flow of the concrete can be measured: this depends on the proportion of water to cement and the size of the aggregate.

The equipment needed consists of a metal container in the shape of a truncated cone, a flat plate, a 16 mm diameter rod and a rule. The container has a diameter of 100 mm at the closed end, 200 mm at the other end and a height of 300 mm.

Freshly mixed concrete made with aggregate of less than 50 mm diameter is put into the cone in three layers. Each layer is compacted 25 times with the rod before the next layer is added. The cone is inverted over the plate and removed. The amount that the concrete settles or slumps shows its consistency.

This test is often used on building sites to give an approximate measure of consistency. It can be done quickly, it is easy to teach and it can be done without expensive equipment.

Portion of structure	Consistency slump (in mm)	
	Maximum	Minimum
Reinforced foundation walls and footings	125	50
Building columns	150	75
Pavements	75	50

Chart of the max/min/ permitted slump for different structural purposes

From: Nucleus
English for Science & Technology.
By: Tony Budley-Evans

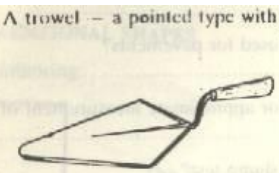
THE REPORT

TITLE: The Slump Test

OBJECT: To determine the «consistency slump value» of a freshly mixed concrete sample as regards its ability for building columns.

EQUIPMENT: 1. A truncated cone-shaped container
2. A steel rod 600mm long, and 16mm diameter, rounded at one end

5. A trowel – a pointed type with 200 mm steel blade.



a trowel

a rod

PROCEDURE: The freshly mixed concrete sample was put into the slump cone in three layers. Each layer was compacted 25 times with the steel rod before the next layer was added. The surface of the concrete was levelled off with a trowel leaving the slump cone exactly filled. Then, after the correct time lapse, the cone was inverted over the plate. The cone was removed and the slump of the sample was measured. The amount that the concrete settled or slumped showed its consistency.

RESULTS:

Test number	1	2	3	4	5
Slump in mm	110	115	120	112	108
Average	113mm				

CONCLUSIONS: The specimen showed an average of 113mm slump. For building columns, the maximum slump is 150, the minimum is 75. The test showed that the concrete mixture is proper for constructing building columns from the point of view of its consistency and workability.

GLOSSARY

workability	(n.)	= the ease with which concrete can be placed	صلاحية للعمل، امكانية التشغيل
consistency	(n.)	= the ease of the flow of concrete	قوام، تماسك
ease	(n.)	= absence of difficulty	سهولة
truncated cone		= cone with the end cut off	وعاء مخروطي مقطوع الطرف
rod	(n.)	= a straight piece of metal	عصا
specimen	(n.)	= sample; a thing taken as an example	عيّنة

COMPREHENSION

Answer the following questions:

1. Is the slump test the only method of determining the rate of flow of concrete?

.....

2. What could the concrete mixture, tested in the experiment, be used for? Why?

.....