МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«ХАРКІВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»

До друку дозволяю
Проректор проф. Романовський О.Г.

АНГЛІЙСЬКА ЗАГАЛЬНОНАУКОВА ЛЕКСИКА І ФРАЗЕОЛОГІЯ
для аспірантів та здобувачів

Навчальний посібник

Затверджено
редакційно-видавничою
радою університету,

протокол № 1 від 20.01.05.

Харків НТУ “ХПІ” 2006

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Рекомендовано Міністерством освіти і науки України як навчальний посібник для аспірантів та здобувачів вищих навчальних закладів

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У навчальному посібнику подано лексичний мінімум, вправи та тексти, націлені на пасивне і активне засвоєння лексики і фразеології. Означена система вправ і завдання до текстів носять комунікативний характер, мають дидактичне обґрунтування і базується на останніх досягненнях методики викладання іноземних мов.

Призначено для аспірантів та здобувачів усіх факультетів та фахів.

Lexical and phraseological minimum, exercises and texts aimed at mastering the vocabulary both passively and actively are presented in the work. The given exercise system and comprehension tasks to the texts are made up with the focus on communication, they have didactic ground and are based on up-to-date achievements of foreign language teaching techniques.

It has been developed for post-graduates and applicants of all specialities.

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ПЕРЕДМОВА

Одним із аспектів підготовки аспірантів і здобувачів до успішного складання іспиту з іноземної (англійської) мови є навчання їх умінню читати загальнонаукову і наукову літературу, аналізувати та вилучати з неї як первинну, так і вичерпну інформацію, працювати з різноманітними словниками та іншою довідковою літературою.

Обсяг лексики, необхідний для вільного володіння мовленнєвими навичками та уміннями, що вказані вище, надано у першому розділі посібника, а фразеології – у другому розділі.

Ретельно підібрана лексика та фразеологія складається як з корінних слів, до яких надано велику кількість синонімів та антонімів, так і з похідних слів. Їх сукупність утворює єдину семантичну систему загальнонаукової лексики, знання якої і наближає тих, хто її вивчає, до реалізації поставленої мети. Ця мета здійснюється завдяки спеціально розробленій системі лексичних вправ, націлених на засвоєння робочого матеріалу та накопичення його запасу у процесі підготовки до кандидатського іспиту.

Третій розділ посібника – це тексти науково-популярного характеру, на базі яких рекомендовано накопичувати і вивчати лексику та фразеологію, вказану вище. Тексти, що готують до успішного читання літератури за фахом, дібрано з сучасних зарубіжних джерел. Комунікативні завдання до текстів сприяють формуванню первинних навичок ведення наукової дискусії та активізації навичок вільного спілкування.

Автори сподіваються, що цей навчальний посібник допоможе аспірантам та здобувачам усіх спеціальностей краще засвоїти теоретичний та практичний курс англійської мови, досконало оволодіти фаховою термінологією, якісно та різнопланово підготуватися до кандидатського іспиту з англійської мови.

Розділ перший складено Г.Ю. Гребінник та Г.І. Дідович, розділи другий та третій – В.Д. Берловською.

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PART I

VOCABULARY

While working with the texts (Part III) pay attention to the words given below, translate them into your native language. You may write down the translation as in the example. To enrich your vocabulary, try to memorize the derivatives, the synonyms and the antonyms – they are likely to be met with in popular and special texts:

abbreviate, v	*скорочувати*	der.	abbreviation
able, a	*здатний*	der.	ability
		ant.	unable
		syn.	capable
absorb, v		der.	absorption, absorbent, absorptive
abstract, n			
accelerate, v		der.	accelerator, acceleration
		syn.	quicken, speed up
accurate, a		der.	accuracy
		syn.	exact, precise, correct
achieve, v		der.	achievement
acid, n		der.	acidify, acidity
acknowledge, v		der.	acknowledgement
acquire, v		der.	acquisition
act, n, v		der.	action
		syn.	do, make

add, v	der.	addition, additional, additionally, additive
	syn.	join, unite
adjust, v	der.	adjustable, adjustment
	syn.	regulate, set
advance, n, v	der.	advanced
	syn.	modern, new, prospective, modernized, perfect
	syn. n	progress
advantage, n	der.	advantageous
	ant.	disadvantage
affect, v	syn.	influence
agitate, v	der.	agitation
aim, n, v	der.	aimless, aimlessly,
	syn.	goal, objective, purpose, target
air, n, v	der.	airless, aerate(ant. deaerate), aerial, airly
alloy, n, v		
alter, v	der.	alterable, alteration, alternate, alternative, alternatively
	syn.	change, convert, transform
altitude, n	syn.	height
amount, n, v	syn. n	quantity, value
amplify, v	der.	amplifier, amplification
analysis, n (-es)		
analyze, v	der.	analytic (al), analytically, analyst
	syn.	examine
annual, a	der.	annually
annular ,a		
appear, v	der.	appearance
	ant.	disappear
apply, v	der.	appliance(syn. instrument, apparatus), applicant, application, applied

appreciate, v	der.	appreciation, appreciative, estimate,
	syn.	assess, evaluate, judge
approach, v, n	der.	approachable
	syn.	method, technique
area, n	syn.	field, sphere, zone
arrange, v	der.	arrangement
	syn.	structure, compile
arrive, v	der.	arrival
	syn.	come, reach
article, n	syn.	thing ,object, item; paper
artificial, a	syn.	man-made
	ant.	natural
assess, v	der.	assessment
	syn.	estimate, evaluate, judge
assist, v	der.	assistance, assistant
	syn.	help
associate, n, v	der.	association
assume, v	der.	assumption (syn. supposition)
	syn.	suppose, guess
atom, n	der.	atomic
attract, v	der.	attraction (syn. merit, quality, virtue), attractive (syn. prospective, profitable, advantageous, of interest, valuable)
author, n	der.	authority
available, a	der.	availability
avoid, v	der.	avoidable, avoidance
	syn.	escape
axis, n	der.	axial, axially

B

background, n, a	syn. n	basis, foundation
	syn. a	initial, basic, common

base, n, v	der.	basic (syn. initial, common)
basis, n (pl –es)	syn.	foundation
beam, n	syn.	ray, stream
body, n	syn.	frame
boil, v	der.	boiler, boiling
branch, n	syn.	field, sphere
break, n, v	syn. n	ruin, damage, destruction
	syn. v	ruin, destroy, damage, spoil
	ant. v	build, construct, erect
bridge, n, v		
broad, a	der.	broaden, broadly
	syn.	wide
	ant.	narrow
build, v	der.	building
	syn.	erect, construct
	ant.	ruin, destroy, damage, spoil

C

calculate, v	der.	calculation, calculator
	syn.	count, number
candidate, n, a	syn. a	possible, probable, potential, prospective, of interest, sought for
capacity, n	syn.	power, output
carbon, n		
case, n		
cause, n, v	syn. n	reason, ground, motive
	syn. v	induce
cell, n	der.	cellular
certain, a	der.	certainly, certainty
challenge, n, v	der.	challenger (syn. competitor, rival), challenging (syn. urgent, important, prospective)
	syn. v	compete(with), rival

chamber, n	syn.	room
change, n, v	der.	changeable
	syn. v	alter, convert, transform, substitute
charge, n, v	der.	discharge
chief, a	der.	chiefly
	syn.	basic, main, principal
circle, n	syn.	ring
circuit, n		
close, a, v	der.	closely, closeliness
	syn. a	near
	syn. v	shut
coarse, a	der.	coarsely, coarseness
	syn.	rough
column, n		
combine, v, n	der.	combination, combined
	syn. v	connect, join, integrate
combustion, n	der.	combustible
common, a	der.	commonly
	syn.	usual, ordinary
	ant.	unique
compact, a	der.	compactly, compactness
	syn.	tight
compare, v	der.	comparison, comparative, comparable
	syn.	analogous, equal , identical, similar, close, corresponding (to)
compete, a, v	der.	competitor (rival), competition
compile, v	syn.	arrange
complement, n, v	der.	complementary
	syn. v	add
complete, a, v	der.	completely
	syn. v	finish
complex, a	der.	complexity
	syn.	intricate, complicated, difficult
	ant.	simple, easy

component, n	syn.	part, member
concave, a	der.	concavity
	ant.	convex
concept, n	syn.	idea, notion
condense, v	der.	condenser, condensation
condition, n		
conduct,	der.	conductor (ant. non-conductor, insulator), conductive, conductivity, semi-conductor
connect, v	der.	connection, connective
	syn.	join, link; relate
consider, v	der.	consideration, considerable, considerably
	syn.	regard
constant, a	der.	constantly
	syn.	permanent, stable, steady
construct, v	der.	construction, constructive
	syn.	build
	ant.	ruin, destroy
convert, v	der.	conversion, converter
	syn.	alter, change, transform
convex, a	der.	convexity
	ant.	concave
control, n, v	der.	controller, controllable
copper, n		
core, n	ant.	surface
correct, a, v	der.	correctly, correctness
	syn. a	true, right, proper
corrosion, n	der.	corrosive
cost, n, v	der.	costly
	syn. n	price
couple, n, v	der.	coupling
	syn. v	join

cover, v	der.	covering
	syn.	close, embrace
	ant.	discover
create, v	der.	creative, creator, creation, creativity
credit, n, v		
criterion, n (pl -a)		
critic, a	der.	critical (syn. crucial), critically, criticize
crucial, a	der.	crucially
	syn.	important, principal, primary, critical, decisive, essential, necessary
current, n	der.	currently
	syn.	flow, stream
custom, n	der.	customer
cycle, n	syn.	period

D

damage, n, v	syn. n	harm
	syn. v	spoil
danger, n	der.	dangerous, endanger (syn. jeopardize)
deal, n, v		
debt, n		
decide, v	der.	decision, decisive, decisively
decorate, v	der.	decoration, decorative, decorator
decrease, v, n	syn. v	diminish, reduce, drop
	ant.	increase, rise, raise
	syn. n	reduction, drop
define, v	der	definition, definite (ant. indefinite), definitely
	syn.	term
degree, n		

demand, n, v	syn. v	require, need
	syn. n	requirement, need
dense, a	der.	densely, denseness, density
	syn.	thick
depend, v	der.	dependent (ant. independent), dependence (ant. independence)
derive, v	der.	derivative, derivation
design, n, v	der.	designer
destroy ,v	der.	destruction, destructive
	syn.	ruin
	ant.	create, construct
detect, v	der.	detector, detection, detective
	syn.	discover, locate
determine, v	der.	determination
develop, v	der.	development
device, n	syn.	unit, plan, scheme; machine, instrument
differ, v	der.	different (ant. indifferent) difference (ant. indifference)
	syn.	vary
difficult, a	der.	difficulty
	syn.	hard
	ant.	easy
dimension, n	der	dimensional
	syn.	size
diminish, v	syn.	decrease, reduce
	ant.	increase
direct, a, v	der.	direction, director
	ant. a	indirect
	syn. v	lead
discover, v	der.	discovery
	syn.	find out
disperse, v	syn.	pulverize, spray

distance, n	der.	distant (syn. faraway, remote, ant. near, close)
divide, v	der.	divisible, division, subdivide
	syn.	share, separate
double, v, a		
dozen, n		
dramatic, a	der.	dramatically,
	syn.	considerable, substantial, strong, powerful, sharp
dream, n, v	der.	dreamless, dreamer, dreamy
durable, a	der.	durability

E

effect, n, v	der.	effective,
	syn.	influence (cp. affect, v. see, above)
efficient, a	der.	efficiency, efficiently
effort, n	der.	effortless
	syn.	push
electron, n	der.	electronic, electronics
element, n	syn.	ingredient; member
emit, v	syn.	radiate, ray
employ, v	der.	employee, employer, employment (ant. unemployment)
	syn.	use, make use of, utilize; hire, recruit
empty, v, a		
enable, v	der.	enabling
encourage, v	der.	encouragement
	syn.	stimulate, support, foster, trigger, spur
endanger, v	syn.	jeopardize

energy, n	der.	energetic, energetically
	syn.	power
engine, n		
enormous, a	der.	enormously
	syn.	big, huge, tremendous
	ant.	small, minute, tiny
entire, a	der.	entirely
	syn.	whole, total, all
environment, n	der.	environmental, environmentalism, environmentalist
equation, n		
equity, n	syn.	property
equip, v	der.	equipment
era, n	syn.	epoch
escape, n, v	syn. v	avoid
essay, n	der.	essayist
essence, n	der.	essential (syn. important, significant, vital, basic, main, major), essentially
establish, v	der.	establishment
estimate, v	der.	estimation
	syn.	evaluate, appreciate, judge, assess
evaluate, v	der.	evaluation
	syn.	estimate, judge, appreciate, assess
evaporate, v	der.	evaporation, evaporative, evaporator
evident, a	der.	evidently
	syn.	clear, transparent; comprehensive
exact, a	der.	exactly, exactness
	syn.	accurate, correct, precise
examine, v	der.	examination, examiner
	syn.	analyze, study, test
example, n	syn.	instance
exhaust, n, v	der.	exhaustion, exhaustive
exist, v	der.	existence
	syn.	be, live
exit ,n	syn.	outlet, output, exhaust

expand, v	der.	expansion, expanding
	syn.	spread, stretch
explore, v	der.	explorer, exploration
	syn.	investigate, study
external, a	der.	externally,
	syn.	outer
	ant.	internal, inside, inner

F

face, n, v		
fail, v	der.	failure
	syn.	destroy, ruin
fall, v	syn.	decrease, reduce
famous, a	syn.	outstanding, prominent, well-known, notable
faraway, a	syn.	distant, remote
	ant.	near, close
fascinating, a	syn.	interesting, of interest
fast, a	syn.	quick, rapid, swift
fasten, v	der.	fastener, fastening
	syn.	fix, tie, join
favour, n	der.	favorable (syn. good, acceptable, satisfactory), favourably, favoured (syn. definite, characteristic, famous)
feasible, a	der.	feasibility
	syn.	realizable, suitable, achievable
feature, n, v	der.	featureless
	syn. n	characteristic, nature
	syn. v	have, possess; characterize
fee, n, v		
few, a		
fibre , n	der.	fibrous

figure, n	syn.	number
find, v	der.	finding
fine, n, v, a		
fire, n, v		
firm, a, n	der.	firmly
	syn.a	solid, hard
	syn.n	company
fission, n	syn.	splitting, division
	ant.	fusion
fit, v	syn.	suit, match
fix, v	der.	fixed ,fixedly
	syn.	fasten; determine, decide; adjust, set; arrange, organize
flat, a	der.	flatly, flatten
flow, n, v	syn. n	current, stream, jet
fluid, n, a	der.	fluidity, fluidic
follow, v	der.	following
	syn.	go after; derive
force, n, v	der.	forced
	syn. n	power, strength
foretell, v	syn.	predict ,anticipate, predetermine, diagnose
form, n, v	der.	formation, formless
	syn. n	shape, condition, state
former, a	ant.	latter
formula, n(pl.-as,-e)		
fossil, a		
foundation, n	syn.	basis
frame, n, v	der.	frameless
	syn. n	skeleton, structure, body
	syn. v	put together, shape, build up
franchise, n, v	der.	franchiser, franchisee, franchising
fuel, n		
fulfil, v	der.	fulfillment
	syn.	perform, carry out

function, n, v	der.	functional
fundamental, a	syn.	essential, basic, main, major
further, adv	der.	furthermore
fusion, n	ant.	fission

G

gas, n	der.	gaseous, gasify
gasoline, n	syn.	petrol
gear, n	der.	gearing
generate, v	der.	generator, generation
	syn.	produce, create, form, formulate
genius, n		
get, v	syn.	obtain, receive
gold, n	der.	golden
grade, n	syn.	sort, quality
grain, n	der.	grainless
gravitation, n		
grid, n	syn.	net, mesh, lattice
grind, v	der.	grinding, grinder
	syn.	polish
ground, n, v		
grow, v	syn.	develop ,increase; become
guide, n, v	der.	guided
	syn. v	lead

H

hand, n, v		
handle, n, v	syn. v	deal with, treat, control
hard, a	der.	hardly (only just not quite; scarcely)
	syn.	firm, solid; difficult

harm, n, v	der.	harmful (syn. noxious), harmless
	syn.	damage
harness, n, v	syn. v	use, utilize (energy)
head, n, v		
heat, n, v	der.	heater, heating, heated
height, n	der.	heighten
	syn.	altitude
hierarchy, n		
high-speed, a	syn.	speedy, quick
hold, v	syn.	carry on, keep
hole, n	syn.	opening, port
huge, a	syn.	big, enormous, tremendous
	ant.	small, minute, tiny
humanity, n	syn.	mankind
hydrogen, n		

I

idea, n	syn.	concept, notion
impact, n	syn.	influence ,effect
implement, v		
important ,a	der.	importance (syn. stress)
	syn.	significant, vital, essential
improve, v	der.	improvement
incandescent, a		
inch, n		
increase, v, n	syn.	raise, grow
	ant.	decrease, fall, reduce
incredible, a	der.	incredibly, incredibility
	ant.	credible
indicate, v	der.	indication, indicator
	syn.	show, point
induce, v	syn.	cause, provoke
infinite, a	der.	infinitely

influence, n, v	der.	influential
	syn. n	effect, impact
	syn. v	affect
ingredient, n	syn.	element
initial, a	der.	initially
inner, a	syn.	internal, inside
	ant.	outer
input, n, v	syn.	intake
	ant.	output
inside, a	syn.	inner, internal
	ant.	outside
install, v	der.	installation (syn. unit, set up)
instance, n	syn.	a tiny period of time; example
instrument, n	der.	instrumental
	syn.	apparatus
insulate, v	der.	insulator (syn. non- conductor, ant. conductor), insulation
integrate, v	der.	integration
	syn.	combine, join
intercontinental, a		
internal, a	syn.	inner, inside
	ant.	external
interplanetary, a		
interview, n, v	der.	interviewer
introduce, v	der.	introduction, introductory
invent, v	der.	inventor, invention, inventive
invest, v	der.	investor, investment
investigate, v	der.	investigation, investigator
	syn.	examine, study, research
invisible, a	der.	invisibility, invisibly
	ant.	visible
item, n	syn.	article, unit, thing

J

jeopardize, v	syn.	endanger
jet, n	syn.	stream, current
join, v	der.	joint
	syn.	link, connect, combine, integrate
judge, v	der.	judgement
	syn.	evaluate, estimate, assess

K

keep, v	syn.	guard, protect, preserve, safeguard, store
kernel, n	syn.	essence
kerosene, n		
key, n, v	der.	keyboard, re-key
kinetic, a	der.	kinetics

L

laser, n		
lateral, a		
latitude, n	der.	latitudinal
lattice, n	syn.	grid, mesh, net
lead, v	der.	leader, leadership, leading
	syn.	guide, direct
level, n		
lever, n		
lightning, n		
limit, n, v	der.	limiting, limitless
	syn.	measureless, limited
	ant.	unlimited

line, n, v	der.	linear (ant. non-linear), on-line (ant. off-line)
	syn. n	range, row, series
link, n, v	syn. n	joint
	syn. v	join, connect, couple
liquid, n, a		
little, a		
load, n, v	der.	loading, down-load
loan, n, v		
locate, v	der.	location
	syn..	detect, discover
log, v	der.	log in (ant. log out)
long, a	der.	length
longitude, n	der.	longitudinal

M

machine, n, v	der.	machinery
	syn. n	device, unit
magnify, v	der.	magnification, magnifying, magnified
	ant.	minimize
magnitude, n	syn.	size
main, a	der.	mainly
	syn.	major, fundamental, basic, principal
maintain, v	der.	maintenance
major, a	syn.	main, fundamental, basic, principal
	ant.	minor
make, v	syn.	do; produce, manufacture, fabricate
mankind, n	syn.	humanity
man-made, a	syn.	artificial
	ant.	natural
manner, n	syn.	method, mode, way, technique

manufacture, n, v	der.	manufacturer
	syn.	make, produce
margin, n	der.	marginal
market, n, v	der.	marketable, up-market, down market
match, v	syn.	suit, fit
matter, n	syn.	substance; subject
mean, a, n (pl), v	syn. a	average; bad
measure, n, v	der.	measurable, measurably, measureless, measurement
mechanic, n	der.	mechanical, mechanically, mechanics
mechanize, v	der.	mechanization, mechanism
member, n	syn.	part, component, element
mention, n, v	der.	mentioned (e.g. above-mentioned, below-mentioned)
	syn. v	call, name
merge, n, v	der.	merger
method, n	der.	methodical, methodically
	syn.	manner, technique, way
minor, a	ant.	major
minute, a	der.	minutely, minuteless
	syn.	small, tiny (ant. big, enormous, huge, tremendous)
model, n	syn.	pattern, sample, specimen
modern, a	der.	modernize
	syn.	new, up-to-date
	ant.	old, obsolete, out-of-date, ancient
molecule, n	der.	molecular
motion, n	der.	motionless
mount, v	syn.	fix set
move, v	der.	movement, movable,
	syn.	mobile (ant. stationary), moving

N

name, n, v	der.	nameless, namely
	syn. n	call, point
	syn. v	call, mention
narrow, a, v	der.	narrowly, narrowness
	syn. a	limited, tight
	ant. a	wide, broad
	ant. v	broaden
native, a	der.	nativity
	syn.	home, own
	ant.	strange, foreign
nature, n	der.	natural (ant. artificial, man-made), naturally, naturalist, naturalization
	syn.	feature, character
near, a, adv, prep.	der.	nearly, nearness
	syn. a	close, similar, prep. – next to
	ant. a	far, distant, removed
necessary, a	der.	necessarily, necessity, necessitate
	syn.	needful, useful
	ant.	unnecessary, needless, useless
need, n, v	der.	needful, needless, needy
	syn. n	necessity
neglect, n, v	der.	neglectful, negligence, negligent, negligible
	syn. n,v	disregard
	ant. n	care, anxiety
	ant: v	care
negotiate, v	der.	negotiable, negotiant, negotiation, negotiator
net, n	syn.	grid, lattice
neutral, a	der.	neutrality, neutralize, neutralization, neutron
	syn.	mean, average; indefinite

never, adv.	der.	nevermore, nevertheless
	ant.	always
nitrogen, n	der.	nitrogenous
noise, n	der.	noiseless (- ly), noisy
	syn.	fuss, racket, row
	ant.	quiet, stillness, peace, silence
notice, v	der.	noticeable (- ly)
	syn.	pay attention; mention; note
notion, n	der.	notional
	syn.	idea, concept; opinion
noxious, a	der.	noxiousness
	syn.	harmful, dangerous, poisonous
	ant.	useful, favourable
nozzle, n	syn.	outlet, exit, output
nucleus, n, pl. nuclei	der.	nuclear
number, n, v	der.	numberless
	syn. n	amount, quantity; sum, figure
	syn. v	count, calculate, numerate
numerate, v	der.	numeral, numerable, numeration, numerical (- ly), numerous
	syn.	count, number, calculate

O

object, n, v	der.	objection, objective, objectless
	syn. n	thing, item, article
	syn. v	protest, rejoin
	ant. v	agree
objective, n, a	der.	objectivity, objectivism
	syn. n	aim, purpose; target
	syn. a	real, actual
observe, v	der.	observance, observer, observation, observatory
	syn.	watch, look on

obsolete, a	der.	obsolescence, obsolescent
	syn.	old, ancient, out-of-date
	ant.	new, modern, up-to-date
obtain, v	der.	obtainable
	syn.	get, receive
obvious, a	der.	obviously
	syn.	evident, clear
	ant.	vague, hidden
occupy, v	der.	occupation, occupational
	syn.	take, capture, seize
occur, v	der.	occurrence
	syn.	take place, happen
offer, n, v	der.	offering
	syn. n	suggestion, proposal, proposition
	syn. v	suggest, propose
oil, n, v	der.	oiler, oily
	syn. n	fat, lubrication
	syn. v	lubricate, grease; fuel
operate, v	der.	operation, operator, operative, operativeness
	syn.	work, run, act
opportunity, n	syn.	chance, possibility
opposite, a	der.	opposition
	syn.	contrary
order, n, v	der.	orderly, disorder
	syn. n	command; arrangement; decoration
	syn. v	command; arrange, settle
ordinary, a	der.	ordinarily
	syn.	common, usual
	ant.	unusual, strange
ore, n		
organize, v	der.	organization, organizer
	syn.	arrange, establish, set up

origin, n	der.	original (- ly), originate, origination
	syn.	source, beginning
oscillate, v	der.	oscillation, oscillator, oscillatory
	syn.	vibrate, swing
outer, a	syn.	external, outside
	ant.	internal, inside, inner
output, n	syn.	power, capacity
	ant.	input, intake
outset, n	syn.	beginning, start
outside, a	der.	outsider
	syn.	external, outward, outer
	ant.	internal, inside, inner
outstanding, a	syn.	well-known, famous, prominent, notable
	ant.	unknown
overcome, v	syn.	get over; conquer, win
own, a, v	der.	owner, ownerless, ownership
	syn. v	possess
	syn. a	personal
oxygen, n	der.	oxygenous, oxygenate, oxygenation

P

pace, n, v	syn. n	step; rate, speed
pair, n	syn.	couple, twin
panel, n, v	der.	panelling
part, n, v	der.	particle, particular (- ly), partly
	syn. n	share, piece; item, article, workpiece, member
	syn. v	divide, share
participate, v	der.	participation, participator, participant
	syn.	take part

particular, a	der.	particularly, particularity
	syn.	special, peculiar; definite, certain
pass, n, v	der.	passage, passer
	syn. v	go by, cross
path, n	der.	pathless
	syn.	way, road
pattern, n	syn.	model, sample
pendulum, n	der.	pendulous
penetrate, v	der.	penetration, penetrative
	syn.	pass through; realize, understand
per cent, n	der.	percentage
	syn.	interest (econ.)
perfect, v, a	der.	perfectly, perfection
	syn. a	ideal, absolute; exact; real, true
	ant. a	imperfect
	syn. v	improve; finish, complete
perform, v	der.	performance, performer
	syn.	do, carry out, fulfil
period, n	der.	periodic (- ly), periodicity
	syn.	interval; epoch; cycle, circle
permanent, a	der.	permanently
	syn.	constant, invariable
	ant.	variable, changeable, unsteady
physical, a	der.	physically, physics, physicist, physician
phenomenon, n, pl. phenomena	der.	phenomenal
piece, n, v	syn. n	part, element
	syn. v	combine, integrate, join, merge
pipe, n	der.	piping
	syn.	tube
place, n, v	der.	displacement, replacement
	syn. n	seat; dwelling; position
	syn. v	locate, put

plane, n, v, a	syn. n	aircraft; a flat piece of ground or smth. else
	syn. a	flat, even, smooth
	syn.v	even, smooth out
plate, n, v	der.	platen, plater
	syn. n	a sheet; a strip of metal; sheet iron
	syn. v	flatten out the metal, forge out into sheets; cover with metal
plenty, n, adv.	der.	plentiful
	syn. n	abundance, quantity
	syn. adv.	enough, rather
point, n	der.	pointer; pointless
pole, n	der.	polarity, polarize, polarization
polish, n, v	der.	polishing
	syn. n	grinding
	syn. v	grind
pollute, v	der.	pollution, pollutant
	ant.	purify, clean
port, n	der.	portal, portage
	syn.	opening, hole
position, n, v	syn. n	place; post
	syn. v	put, place; locate
positive, a	der.	positively
	ant.	negative
possible, a	der.	possibly, possibility
	syn.	probable, potential
	ant.	impossible
potential, n, a	der.	potentially, potentiality
	syn. n	possibility; voltage
	syn. a	possible, probable
power, n	der.	powerful, powerless
	syn. n	state; strength, might; energy, force; capacity, output
power-plant, n	syn.	power-station

practice, n	der.	practical (- ly)
	syn.	training, experience
practise, v	syn:	experience, train
precede, v	der.	precedent, precedence
	syn.	anticipate
precise, a	der.	precisely, precision
	syn.	exact, definite, accurate; clear; thorough, careful
	ant.	inaccurate, careless
precious, a	syn.	valuable
predict, v	der.	prediction, predictive, predictor
	syn.	diagnose, predetermine; foretell, anticipate
prefer, v	der.	preferable (– ly), preference
prepare, v	der.	preparation, preparative, preparatory
present, n, a, v	der.	presentable, presentation, presently
	syn. n	gift
	syn. a	modern, up -to- date; available
	syn. v	give
preserve, v	der.	preservation
	syn.	safeguard, keep
press, n, v	der.	pressure
	syn. v	stress, squeeze
prevent, v	der.	prevention, preventive
	syn.	preclude
previous, a	der.	previously
principal, a	der.	principally
	syn.	basic, main, chief, major
principle, n	syn.	rule, law; source, reason
process, n, v	der.	processor, processing
	syn. n	flow, movement; technological way, method
	syn. v	treat, machine, handle
product, n	syn.	goods, output

produce, v	der.	producer, product, production, productive, productivity
	syn.	make, put out, manufacture; generate
profit, n	der.	profitable (- ly), profitability
	syn.	gain
progress, n, v	der.	progression, progressive
	syn. n	development, advance
	syn. v	develop, go ahead
	ant. n	depression, stagnation
prominent, a	syn.	famous, outstanding, well-known
promote, v	der.	promoter, promotion
	syn.	help, support, speed up, urge; spur, stimulate, advance; develop, foster
proper, a	der.	properly
	syn.	right, true
property, n	syn.	quality; equity; ownership
proportion, n, v	der.	proportional (-ly), proportionality
	syn. n	ratio
propose, v	der.	proposal, proposition
	syn.	suggest, suppose, offer
propulsion, n	der.	propulsive
	syn.	advancement, push
prospect, n, v	der.	prospective, prospector, prospectus
	syn. n	view; pl. plans, hope
	syn. v	investigate, research
prosper, v	der.	prosperity, prosperous
	syn.	succeed in
	ant.	decay
protect, v	der.	protection, protective, protector
	syn.	defend
proton, n		
prove, v	der.	provement
	syn.	testify, certify; try, test

provide, v	der.	provider, provision, provisional, provided, providing
	syn.	supply, store up
provoke, v	der.	provocation, provocative, provoking
	syn.	agitate, cause, induce
publish, v	der.	publisher, publishment
	syn.	bring out
pulse, n, v	der.	pulsate, pulsation, pulsatory
	syn. n	beat, impulse, rhythm, stroke
pure, a	der.	purely, purify, purification, purity
	syn.	real, without impurity
	ant.	impure
purpose, n, v	der.	purposely, purposeful, purposefulness, purposeless
	syn. n	intention; aim, objective, target, goal
	syn. v	intend, want
pursue, v	der.	pursuer
	syn.	follow; continue
push, n, v	der.	pusher, pushing
	syn. n	impact, propulsion; effort
	syn. v	press, stress
put, v	syn.	place

Q

qualify, v	der.	qualification
	syn.	determine, define
quality, n	der.	qualitative (- ly)
	syn.	sort, grade; peculiarity, feature; property
quantity, n	der.	quantitative (- ly)
	syn.	number, amount; value; size
quantum, n, pl. quanta		

quark, n		
question, n, v	der.	questioner, questionless, questionnaire
	syn. n	problem, matter
	syn. v	investigate; doubt
quick, a	der.	quicken (syn. accelerate, speed up), quickly, quickness
	syn.	fast, rapid, swift
	ant.	slow
quite, adv.	syn.	absolutely, fully, perfectly

R

radiate, v	der.	radiation, radiator
	syn.	emit, ray
radioactive, a	der.	radioactivity
radius, n, pl. radii		
raise, n, v	syn. n	increase, growth
	syn. v	increase, grow, go up
range, n, v	der.	ranger
	syn. n	row, line; direction; field, area; stretch
	syn. v	classify; line
rapid, a	der.	rapidly, rapidity
	syn.	fast, swift, quick
	ant.	slow
rare, a	der.	rarely, rarity
	syn.	excellent, exceptional, unique
	ant.	usual, ordinary
rate, n, v	der.	rating
	syn. n	standard, tariff; level, coefficient; price; quota, share; speed, velocity
	syn. v	estimate, assess
ratio, n		

raw, a	der.	rawness
ray, n, v	syn. n	beam
	syn. v	radiate, emit
reach, v	syn.	stretch; get, arrive
react, v	der.	reaction, reactive, reactivity, reactor
	syn.	respond
reagent, n		
real, a	der.	really, realism, realist, reality
	syn.	true
	ant.	unreal, imaginary
realize, v	der.	realization
	syn.	imagine, understand; carry out
reason, n	der.	reasonable (- ly)
	syn.	cause, ground, motive
receive, v	der.	receiver
	syn.	get, obtain, acquire
recognize, v	der.	recognition, recognizable
record, n, v	der.	recorder
	syn. n	entry, report
	syn. v	register, list, put down, note
reduce, v	der.	reduction
	syn.	decrease, diminish
refer, v	der.	referable, reference, referee
refine, v	der.	refinement, refinery
	syn.	purify; improve
	ant.	pollute
reflect, v	der.	reflection, reflective, reflector
	ant.	absorb
refract, v	der.	refraction, refractional, refractive, refractor
regard, n, v	der.	regardful, regardless, regarding
	syn. n	respect; view
	syn. v	take into account, consider

region, n	der.	regional
	syn.	field, sphere, area
relate, v	der.	relation (- ship), relative (- ly), relativity
	syn.	connect; concern
release, n, v	syn. v	let out, set free; disengage
	ant. v	confine, limit, trap
rely (upon), v	der.	reliable, reliability
	syn.	be sure, trust
remark, n, v	der.	remarkable (- ly)
	syn. n	note
	syn. v	notice; watch
remote, a	syn.	distant, faraway
	ant.	near, close
report, n, v	syn. n	announcement
	syn. v	inform, announce
research, n, v	der.	researcher
	syn. n	investigation, study
	syn. v	investigate, study, search
resemble, v	der.	resemblance
	syn.	look alike, have similarity with smth. (smb.)
	ant.	differ, vary
resist, v	der.	resistance, resistant, resistor, resistless
	syn.	withstand
	ant.	yield
resource, n	der.	resourceful, resourceless, resourcefulness
	syn.	stock, supply, potential (pl.)
restrict, v	der.	restriction, restrictive
	syn.	limit, confine
resume, v	der.	resume, resumption, resumptive
	syn:	summarize, sum up

result, n, v	der.	resultant
reverse, a, v	der.	reversion, reversible
	syn. a	opposite
	syn. v	turn back; change; cancel, abolish
review, n, v	der.	reviewer
	syn. v	look through, survey;
		examine, check up
revolve, v	der.	revolver, revolving, revolution
	syn.	rotate
ring, n, v		
rise, n, v	der.	rising
	syn. n	origin, beginning; increase, growth
		originate, begin; increase, grow, go up
	syn. v	
room, n	der.	roomless, roomy
	syn.	space; flat, chamber
rough, a	der.	roughen, roughness
	syn.	coarse
	ant.	smooth, even
row, n	der.	rowdy
	syn.	line; noise
ruin, v	der.	ruinous
	syn.	destroy, demolish, break
	ant.	create, construct, build
rush, n, v	syn. n	movement; attack, pressure
	syn. v	dash

S

same, a	der.	sameness
	syn.	identical, equal, similar
	ant.	different, various
sample, n	syn.	model, pattern, specimen

satisfy, v	der.	satisfaction, satisfactory
	syn.	meet, content
	ant.	dissatisfy
saturate, v	der.	saturation
save, v	der.	saving
	syn.	economize; get rid of, prevent
	ant.	waste
scale, n, v		
scan, n, v	der. n	scanner, scanning
scheme, n, v	syn. n	plan; system; programme
	syn. v	plan, project
science, n	der.	scientific, scientifically, scientist
screen, n, v		
search, n, v	syn. n	investigation, research, study
	syn. v	look for, investigate
section, n, v	der.	sectional
	syn. n	profile; segment, part, share
	syn. v	divide, separate, share
select, v, a	der.	selection, selective, selector
	syn. v	choose, pick out, single out; elect
	syn. a	exceptional
sensitive, a	der.	sensitiveness, sensitivity
	syn.	precise, accurate; susceptible
separate, v, a	der.	separable, separation, separator
	syn. v	divide, share
	syn. a	individual; different
serve, v	der.	service, serviceable, servant
set, n, v	der.	setting, setup
	syn. n	group, collection; unit, apparatus, device, instrument
	syn. v	put, place, insert; mount, adjust
shaft, n		
shake, n, v	der.	shaker, shaky
	syn. n	vibration; crack, split
	syn. v	push; vibrate

shape, n, v	der.	shapeless
	syn. n	form; contour, outline
	syn. v	form
share, n, v	syn. n	part, quantum (lat.)
	syn. v	divide, separate
short, a	der.	shortage, shorten, shortly
	ant.	long
show, n, v	der.	shower
	syn. n	presentation, exhibition; display, demonstration
	syn. v	demonstrate, display, present, picture
side, n	syn.	aspect
signify, v	der.	significance, significant (syn. vital, urgent, important)
	syn.	mean, identify
silence, n	der.	silent
	syn.	peace, stillness, quiet
	ant.	noise
silver, n, v, a	der.	silvery
similar, a	der.	similarity, similarly, similitude
	syn.	resembling, like, same
	ant.	unlike, different
simple, a	der.	simply, simplicity, simplify, simplification
	syn.	plain, elementary
	ant.	intricate, complicated
simulate, v	der.	simulation
	syn.	imitate, model
single, a, v	syn. a	sole, solitary
singular, a	der.	singularity
	syn.	unusual, strange, odd; specific, exceptional
	ant.	common, usual
situation, n	syn.	place, position, location

size, n	der.	sizable
	syn.	dimension, value; volume
slight, a	der.	slightly
	syn.	negligible; delicate
slow, a	der.	slowly
	syn.	gradual, quiet
	ant.	quick, fast, rapid, swift
soft, a	der.	soften
	syn.	pleasant; tender, weak
	ant.	strong, hard, rigid
solar	der.	solarize, solarium
solid, n, a	der.	solidify, solidity, solidarity
	syn. a	hard, strong; firm, durable; stable
solve, v	der.	solvable, solvability, solvent, solution
	syn.	decide
sound, n, v, a	der.	soundless
	syn. n	signal, noise
	syn. a	healthy
source, n	syn.	origin, beginning
space	der.	spacious, spaceless
	syn.	room; area, place
spark, n, v	syn. n	flash
	syn. v	flash up
special, a	der.	specialist, specially, specialize, speciality, specialization
	syn.	peculiar, particular
specimen, n	syn.	sample, model, pattern
speed, n	der.	speedy
	syn.	velocity, rate
spend, v	der.	spender
	syn.	waste
sphere, n	der.	spheral, spherical, spheroid
	syn.	sky, planet; field, branch, area

split, n, v	der.	splitter
	syn. n	crack, break; fission
	ant. n	fusion
spoil, v	der.	spoilage (syn. damage)
spray, n, v	der.	sprayer
	syn. v	pulverize, disperse
spread, n, v	der.	spreader
	syn. n	stretch, expansion
	syn. v	stretch, expand
stable, a	der.	stability, stabilization, stabilizer
	syn.	solid, steady
stage, n	syn.	phase, period
start, n, v	der.	starter
	syn. n	beginning, setting up
	syn. v	begin; open, establish; set up
	ant. v	finish, complete, stop
state, n, v	der.	statement
	syn. n	condition; form, structure; country
	syn. v	inform, declare
stationary, a	syn.	fixed, immovable
	ant.	mobile
steady, a	der.	steadiness
	syn.	stable, constant; uniform
	ant.	unsteady, unstable
steam, n	der.	steamy
	syn.	vapour
steel, n, v	der.	steely, steelification
stimulate, v	der.	stimulant, stimulation, stimulus
	syn.	encourage, foster, further, trigger, spur
stop, v	der.	stoppage, stopping, stopper
	syn.	delay, hold up, interrupt
	ant.	launch, start, begin

store, n, v	der.	storage, storehouse
	syn. n	stock, supply, abundance; big amount of smth.
	syn. v	provide, save up, keep
strain, n	der.	strainer, straining
	syn.	stress; deformation
stream, n, v	der.	streamy
	syn. n	flow, jet, current; school, trend
	syn. v	pour, flow
strength, n	der.	strengthen, strengthening
	syn.	force, power; firmness, solidity; resistance
	ant.	weakness
stress, n, v	syn. n	pressure, push, strain; accent, importance
	syn. v	emphasize; press
strike, n, v	der.	striker, striking
	syn. n	stroke
stroke, n	syn.	movement, pitch
strong, a	syn.	powerful; healthy
	ant.	weak
structure, n	der.	structural
	syn.	building, construction; arrangement
study, n, v	syn. n	research, investigation; a room for studying
	syn. v	investigate, research; learn
subject, n, v	der.	subjective, subjectivity
	syn. n	topic; discipline
	syn. v	subordinate; influence, undergo
subordinate, n, v, a	der.	subordination
	syn. v	subject to
substance, n	der.	substantial, substantiate
	syn.	matter
substitute, n, v	der.	substitution
	syn. v	replace, change

subterranean, a	syn.	underground
succeed, v	syn.	follow (after); be a success
	ant.	fail
success, n	der.	successful (- ly)
	syn.	fortune
suffer, v	der.	sufferance, sufferer, suffering
	syn.	experience, undergo
suffice, v	der.	sufficiency, sufficient
	syn.	satisfy; abound, be enough
	ant.	lack, need, run short
suit, v	der.	suitable
	syn.	meet, fit, match
supply, n, v	der.	supplier
	syn. n	delivery; stock
	syn. v	deliver, provide; store
support, n, v	der.	supporter
	syn. n	sustain; help, back up
suppose, v	der.	supposition (- al)
	syn.	assume, guess
surface, n	ant.	core
surround, v	der.	surroundings
synthesis, n, pl. syntheses	der.	synthetic (- al), synthetics, synthesize
system, n	der.	systematic (- ally), systematize
	syn.	organism, network

T

table, n, v	der.	tableful
	syn. n	list, schedule
tackle, n	syn.	tool, equipment, rigging
take, v	der.	takeover
target, n	syn.	purpose, aim, goal, objective; plan, task
task, n	syn.	aim, target; assignment

technique, n	syn.	method, way, approach
technology, n	der.	technologist, technological (- ly)
temperature, n		
tend, v	der.	tendency
	syn.	direct; try
term, n, v	der.	terminal, terminology
	syn. n	semester; period; clause; limit
	syn. v	express; define
test, n, v	der.	tester, testify, testimony
	syn. n	examination
	syn. v	try, check; experiment
theory, n	der.	theoretical (- ly), theoretician, theorize
	syn.	hypothesis
	ant.	practice
thermal, a	syn.	hot
	ant.	cold
thermonuclear, a		
thick, a	der.	thickly, thickness, thicken
	syn.	fat, abundant
	ant.	thin
thin, a	syn.	slim, dilute
	ant.	thick, fat
thing, n	syn.	object, item; fact, matter
think, v	der.	thinkable, thinker, thinking
	syn.	believe, suppose, reckon
throw, v	syn..	cast, toss
tide, n	der.	tidal
	syn.	wave
tight, a	der.	tighten, tightly
	syn.	compact, compressed, dense
time, n, v	der.	timely, timeless, timer, timing
tiny, a	syn.	small, minute
tire, v	der.	tired, tiredness, tireless
ton, n	der.	tonnage

tool, n	der.	tooling
	syn.	instrument, lathe, cutter
total, v, a	der.	totality, totalize, totalizer
	syn. a	whole, entire, absolute
	syn. v	sum up, summarize
trace, n, v	der.	tracer
	syn. n	path, line, way
	syn. v	watch, spy on
track, n	syn.	way
train, n, v	der.	trainee, trainer, training
	syn. n	succession; chain of related objects, events or thoughts
	syn: v	teach, instruct
transform, v	der.	transformation, transformer
	syn.	convert, change, alter
transistor, n		
transit, n, v	der.	transition, transitional, transitory
transmit, v	der.	transmission, transmissible, transmitter
	syn.	transfer, send
transparent, a	der.	transparency
	syn.	clear, evident
transport, n, v	der.	transportable, transportation, transporter
	syn. n	vehicles
	syn. v	transfer, convey, handle
travel, n, v	der.	traveller, travelling
	syn. n	journey, trip; movement, stroke
	syn. v	move, spread
traverse, n, v	syn. v	cross
treat, v	der.	treatment
	syn.	handle, machine
tremendous, a	der.	tremendously
	syn.	big, huge; vast, enormous, great
	ant.	small, fine, minute

trend, n, v	syn. n	tendency
trigger, n, v	syn. v	set in motion; encourage, foster, stimulate, spur
trouble, n,v	der.	troublesome, troubless, troubled; troubleshooting
true, a	der.	truly, truth, truthful
	syn.	correct, right; real
	ant.	false
tube, n	syn :	pipe ;vacuum lamp
tune, n, v	der.	tuneful, tuneless, tuner
	syn. n	melody; tone; harmony
	syn. v	adapt; repair, adjust
turbine, n		
turn, n, v	der.	turner, turnover
	syn. n	rotation, revolution
	syn. v	rotate, revolve
twist, n	syn.	bend
type, n, v	der.	typify, typical, typing, typist
tyre, n	syn. n	sample; kind, sort

U

ultimate, a	der.	ultimately, ultimatum
	syn.	last, final
unable, a	syn.	incapable
	ant.	able, capable
understand, v	syn.	comprehend, realize
	der.	understanding
undergo, v	syn.	withstand, try, experience
undertake, v	der.	undertaker
unfit, a	der.	unfitness
	syn.	unsuitable, wrong, worthless
	ant.	right, suitable, fit

unique, a	syn.	unusual, extraordinary, rare
	ant.	common, ordinary, usual
unit, n	der.	unity
	syn.	element, section, block; installation, plant, setup
universe, n	der.	universal (- ly)
	syn.	world, space
urgent, a	syn.	essential, important, vital
use, n, v	der.	usage, useful, useless, user
	syn. n	utilization, application
	syn. v	apply, utilize, employ
usual, a	der.	usually
	syn.	ordinary, common
	ant.	unusual, unique, rare
utilize, v	der.	utilization, utility, utilizer
	syn.	use, apply, employ

V

vacuum, n, pl. vacua	der.	vacuous (syn. empty)
	syn.	emptiness
valid, a	der.	validate, validity
value, n, v	der.	valuable, valuation, valueless, evaluate
	syn. n	cost, price; importance
	syn. v	estimate, assess
vapour, n	der.	vaporizer, vaporize, vaporization
	syn.	steam; mist, fog
valve, n	der.	valvular
vane, n	syn.	blade
vary, v	der.	variable, various, variation, variety
	syn.	change, transform; differ
velocity, n	syn.	speed, quickness

verify, v	der.	verification
	syn.	check, test; confirm
vessel, n		
vibrate, v	der.	vibration, vibratory, vibrator
	syn.	oscillate
view, n, v	der.	viewer, viewless
	syn. n	opinion, standpoint; observation
	syn. v	observe, watch
vehicle, n	syn.	transport
visible, a	der.	visibly, visibility
	syn.	evident, obvious
	ant.	invisible, hidden
vital, a	der.	vitality
	syn.	essential, live, important, urgent
volume, n	der.	volumetric
	syn.	capacity; mass

W

wall, n		
warm, a, v	der.	warmth
	syn. v	heat
	ant. a	cold
waste, n, v, a	der.	wasteful, wasteless
	syn. n	loss, damage ; spoilage
	syn. a	unnecessary
watch, n, v	der.	watcher, watchful
	syn. n	clock
	syn. v	observe, look on
water, n, v	der.	waterless, waterproof, waterfall
watt, n		
wave, n, v	syn.	tide
way, n	syn.	method, means, technique; road; direction

weak, a	der.	weaken, weakness
	syn.	delicate; loose; poor
	ant.	strong
weapon, n	der.	weaponless
wear, n, v	syn. n	deterioration
weigh, v	der.	weight, weightless (- ness)
	syn.	estimate
whole, a	der.	wholesale
	syn.	entire, all
wide, a	der.	widen, widely, width
	syn.	broad
	ant.	narrow
wind, v [ai]	der.	winding
	syn. v	turn
wire, n	der.	wireless
withstand, v	syn.	resist; bear
	ant.	give in, yield
world, n	syn.	universe

X

X-ray(s), n, v

Y

year, n	der.	yearly
yet, adv.		
yield, v	syn.	produce, give; give in
	ant.	withstand

Z

zero, n, pl. zeros		
zinc, n	der.	zinciferous

zip, v	der.	zipper
zone, n, v	syn.	area, field, region

Practice Section

1. Find the words with the same (a) root, (b) suffix or (c) prefix among the words given below and define their meaning:

a) compare, mislead, divisible, independence, incomparable, depend, leading, subdivide, indivisible, dependent, comparative, leadership, divide, comparison, lead, division, leader, comparable, dependence;

reduce, tendency, thinker, place, structure, thinkable, reduction, tend, proper, displacement, properly, selective, structural, selector, reconstruct;

reactivity, unit, provement, rarely, physics, pollutant, oily, reaction, value, prove, reactor, rare, unity, oiler, physicist, noisy, physician, noise, pollute, valuable;

b) radiate, enormous, achievement, decorate, development, gaseous, evaporate, element, dangerous, estimate, equipment, stimulate, advantageous, arrangement, evaluate;

investigation, useful, remarkable, relation, regardful, tremendous, assignment, progressive, oscillator, operative, owner, operator, oxygenous, outsider;

yearly, future, development, homeless, nearly, nature, realism, reachless, stillness, negligible, steadiness, technologist, flexible, weakness, measurement, biologist;

c) indifferent, outstanding, unusual, inside, ingredient, outer, unable, indefinite, output, unit, increase, indicate, unknown, outside, instrument, indirect, unlimited, infinite, invisible;

unusual, immovable, misunderstand, impossible, undiscovered, misfortune, unsteady, insufficient, mislead, disagree, ineffective, disarmament, incorrect, unprepared;

international, cooperation, outside, subsoil, outstanding, interplanetary, outhouse, co-existence, overload, reconstruct, prewar, submarine, remake, minicar, reread, overweigh, rewrite, pre-revolutionary.

2. Form nouns with the help of the suffix -er (-or) (*e.g. to design – designer, to compute – computer*), arrange them according to the meaning:

1. *Person* – doer of an action or name of profession.

2. *Instrument or thing* – doer of an action (*e.g. 1. designer, 2. computer*):

to conduct, to invent, to calculate, to construct, to accelerate, to control, to create, to decorate, to manufacture, to lead, to indicate, to detect, to generate, to explore, to grind, to heat, to perform, to operate, to use, to transmit, to receive, to transform, to revolve, to produce, to scan.

3. Form as many derivatives as you can and translate them into your native language:

a) form, add, gas, close, lead, compare, act, limit, favour, appear, calculate, direct, conduct, detect, define, divide, acquire.

b) purpose, thick, nature, oscillate, transmit, origin, wide, perfect, theory, similar, physics, numerate, advertise, employ.

4. Form derivatives and fill in the blanks with the proper ones :

1) Apply

1. The designer must _____ engineering tables and formulas in his work.
2. The pure scientist is to work in the area of _____ science.
3. There were several _____ for this position.
4. In our household we use different _____ , such as washing – machines, refrigerators, etc.
5. We made an _____ to the manager for an interview.

2) Exhaust

1. Cars with less toxic _____ gases will be used.
2. Solar energy is an _____ source of power.
3. Our scientists made an _____ inquiry.
4. They were in a state of _____ after climbing the mountain.

3) Calculate

1. A computer can do many kinds of _____ quickly and accurately.
2. A computer can _____ numbers much faster than a manual _____.
3. _____ are machines used for processing facts and figures at great speed and with high reliability.

4) Alternate

1. Sandwich courses are courses in which students _____ studies with practical work in industry.

2. You have the _____ of working hard and succeeding or of not working and being unsuccessful.

3. The punishment was: a fine of 5 pounds or _____ six weeks imprisonment.

5) Science

1. The aim of the conference was to discuss the impact of _____ activity on technology.

2. It can be said that _____ is a cumulative body of knowledge about the natural world obtained by the application of a peculiar method practised by the _____.

3. This discovery was _____ proved later.

6) Success

1. Over a hundred papers were presented _____ at that conference.

2. The _____ of the discussion on protein structure exceeded all expectations.

3. The years to come promise to be at least revolutionary and _____ as the ten years gone by.

7) Produce

1. To be more _____ a tiny heart stimulator uses atomic energy instead of electricity.

2. A special team is to go off into space to clean up the mess of artificial _____ which endanger the spaceship flights.

3. They _____ only three grams of pure metal during the experiment.

4. This French company is the main _____ of special space travel equipment.

5. The enterprise is also concerned with the middle-size turbine _____.

8) Subject

1. The idea was _____ to severe criticism and rejected.

2. This is a highly complicated and interesting _____.

3. The agreement presented to support this _____ point of view fails to convince me.

5. Find (a) synonyms or (b) antonyms among the words:

a) accelerate, coarse, come, quantity, exact, transparent, speed up, arrive, rough, evident, accurate, amount, correct, quicken, precise, clear;

observe, perform, separate, carry out, watch, divide, undergo, trend, vibrate, experience, tendency, oscillate;

neutral, happen, region, prove, solid, area, sole, occur, indefinite, firm, single, theory, rely, trust, hypothesis, native;

b) create, internal, fusion, major, destroy, broad, fission, narrow, famous, close, faraway, external, minor, unknown, ruin;

save, pollute, small, waste, refine, enormous, narrow, ordinary, wide, rare, peculiar, usual;

obvious, noxious, transit, hidden, thick, useful, soft, thermal, yield, thin, withstand, noise, significant, rigid, silence, travel.

6. Write two other words which mean the same as:

e. g. huge	*gigantic*	*enormous*
1) produce	…..	…..
tiny	…..	…..
accurate	…..	…..
aim	…..	…..
assess	…..	…..
chief	…..	…..
current (a)	…..	…..
employ	…..	…..
2) entire	…..	…..
explore	…..	…..
fundamental	…..	…..
impact	…..	…..
increase (v)	…..	…..
lead (v)	…..	…..
link (v)	…..	…..
famous	…..	…..
3) unit	…..	…..
special	…..	…..
neutral	…..	…..

zone	…..	…..
shape (v)	…..	…..
velocity	…..	…..
use (v)	…..	…..
transform	…..	…..
4) reduce	…..	…..
undergo	…..	…..
stock	…..	…..
obtain	…..	…..
period	…..	…..
vital	…..	…..
region	…..	…..
rapid	…..	…..

7. Write two words which mean the opposite of:

e. g. *big*	*small*	*tiny*
1) complex	…..	…..
construct	…..	…..
minute (a)	…..	…..
natural	…..	…..
decrease (v)	…..	…..
external	…..	…..
modern	…..	…..
2) unique	…..	…..
plane (a)	…..	…..
release	…..	…..
stop	…..	…..
pollute	…..	…..
3) tremendous	…..	…..
slow	…..	…..
real	…..	…..
rare	…..	…..
unfit	…..	…..

8. Find the (a) synonym, (b) antonym to the first word in the row:

a) accelerate – translate – accept – quicken;
basis – floor – foundation – occupation;
change – alter – attract – expect;
common – entire – ordinary – strange;
damage – strike – improve – spoil;
disperse – discharge – spray – open;
think – test – solve – thin – believe – point;
perfect – soft – absorb – perform – slight – absolute;
revolve – pass – reserve – cross – rotate – tend;
satisfy – reach – meet – reflect – serve – select;

b) distant – evident – close – identical;
huge – tiny – excellent – capable;
increase – reduce – install – occupy;
construct – develop – fix – ruin;
broad – narrow – thick – simple;
necessary – notional – needless – precise – referable – rawness;

9. Complete the following sentences with words opposite in meaning to the word in italics:

Able 1. The student was _____ to answer the question.
Sufficient 2. The strength of this alloy is _____.
Advantages 3. They discussed _____ of a new theory.
Known 4. This writer is _____ to me.
Direct 5. He is an _____ descendant of the Duke of Kent.
Appear 6. Let's hope our difficulties will soon _____.
Visible 7. The eclipse will be _____ to observers in Western Europe.
Effective 8. This method is _____.
Same 9. Tremendous success has been achieved by our scientists in _____ branches of physics.
Poor 10. The ideas of ancient philosophers about the nature of the matter were realized by the _______research of the 20th century.
Weak 11. You cannot see atoms, for every atom is too small to be seen even with a _____ microscope.

Organic 12. Living organisms have some _____ constituents, such as sodium ions, phosphate ions, carbonate ions, etc.

Unique 13. A chemical element is a substance that cannot by any _____ means be separated into two or more different substances.

10. Fill in the table:

1.**VERB**	**NOUN**	**ADJECTIVE**
analyze	*analysis*	*analytical*
a) act	. . . . .	. . . . .
. . . . .	. . . . .	attractive
. . . . .	boiler	. . . . .
. . . . .	comparison	. . . . .
connect	. . . . .	. . . . .
. . . . .	. . . . .	considerable
create	. . . . .	. . . . .
. . . . .	decision	. . . . .
b) define	. . . . .	. . . . .
. . . . .	. . . . .	detective
. . . . .	difference	. . . . .
direct	. . . . .	. . . . .
. . . . .	. . . . .	divisible
expand	. . . . .	. . . . .
. . . . .	introduction	. . . . .
. . . . .	leader	. . . . .
magnify	. . . . .	. . . . .
c)	. . . . .	transportable
react	. . . . .	. . . . .
. . . . .	protection	. . . . .
. . . . .	. . . . .	occupational
numerate	. . . . .	. . . . .
. . . . .	. . . . .	systematic
recognize	. . . . .	. . . . .
. . . . .	. . . . .	theoretical

2.**<u>VERB</u>**	**<u>NOUN</u>** (concept)	**<u>NOUN</u>** (if possible) (agent)
own	ownership	owner
provide	. . . . .	. . . . .
survive	. . . . .	. . . . .
secure	. . . . .	. . . . .
produce	. . . . .	. . . . .
operate	. . . . .	. . . . .
perform	. . . . .	. . . . .
receive	. . . . .	. . . . .
prosper	. . . . .	. . . . .

11. Circle the odd word out:

a) article, thing, line, object, billet;
complex, continuous, difficult, intricate, complicated;
fit, tie, fix, join, fasten;
common, usual, ordinary, obvious;
demand, need, determine, require.

b) class, category, state, group, type, sort;
device, material, instrument, mechanism, tool, unit;
work, produce, make, operate, manufacture, increase, perform;
process, method, way, means, mode;
sphere, area, object, region, field, zone.

12. Find the word with generalizing meaning in each line:

a) length, width, height, dimensions;
carbon, copper, element, hydrogen;
device, computer, detector, calculator;
petrol, gasoline, fuel, coal, gas, kerosene;
density, quality, viscosity, brittleness.

b) copper, aluminum, zinc, iron, metal, lead;
drilling, boring, shaping, polishing, operation, forging;

robot, machine-tool, equipment, manipulator, instrument;
efficiency, productivity, feature, quality, limit, dimension;
science, research, invention, study, discovery, creation.

13. Match nouns with the proper adjectives:

a) atomic	measurement
fossil	energy
direct	surface
effective	aim
hard	substance
gaseous	fuel
harmful	current
flat	measures
accurate	alloy
chief	effect

b) complete	production
drilling	absence
composite	alloys
radical	industry
efficient	tools
treatable	engineer
research	materials
processing	changes

c) electric	casting
melting	operation
productive	microscope
formable	plant
boiling	object
metallurgical	temperature
high- quality	point
ultraviolet	furnace

14.1. Match the word and its definition:

a) annual	come, go after
beam	splitting or division
matter	ray or stream of light
follow	coming or happening every year
improve	make or become better
fission	substance(s) of which a physical thing is made
accelerate	increase the speed of; fasten or happen earlier; cause to move

b) heat	join together
alloy	device that converts energy into power or motion
axis	make or become hot
combine	going on all the time
coarse	line around which a turning object spins
constant	mixture of metals
double	not fine and small, rough
engine	make or become twice as great

c) casting	a cumulative body of knowledge about the natural world
science	searching without knowing what you are going to find
computer	forecast the future development
sphere	controlling
management	contributing to fundamental knowledge
predict	a wide range of disciplines
research	a process of forming metal objects
study	a machine designed to process electronically special pieces of data

14.2. Say in one word:

- material for producing heat or energy;
- the mixture of gases that surrounds the Earth and which we breathe;
- break to pieces;
- not easy;
- particle of matter, smaller than an atom, having a negative electric charge;
- to make prognosis;
- to meet needs;
- to work out a problem;
- to be like smth., smb.;
- to witness smth.;
- to realize necessity;
- to confirm the idea;
- to experience changes.

15. Choose the proper word in brackets (change the word form, if necessary) :

a) 1. The appointment of a new Minister will _____ the department's policy (affect, effect).

2. The door opens _____ (easy, easily).

3. This is a _____ village (far away, faraway).

4. He could _____ believe his eyes (hard, hardly).

5. The girl has lovely _____ hair (gold, golden).

6. What a flash of _____ (lightening, lightning)!

7. Young scientists could _____ this complicated task very quickly (decide, solve).

8. He is of medium _____ (altitude, height).

b) 1. Many of _____ plants and shops had been expanded and reconstructed before we began manufacturing this kind of machines (absolute, obsolete).

2. Materials which are widely used in machine-building _____ in their properties (vary, very).

3. Provided the laboratory continued the experiment with the _____, it would take them three years to complete it (simple, sample).

4. Super plasticity is detected in a _____ number of metals and alloys (great, greatly).

5. If the _____ of the process changed, the robot could adapt to its new job without expensive retooling (party, part).

6. Specialized enterprises are aimed at the production of industrial robots not by _____, but complete systems and complex instruments (piece, peace).

7. This special _____ occupied by semiconductors in modern physics and engineering are due to their peculiarities which are not found in other materials (place, pace).

8. Modern weather forecast means can be fully _____ upon (reply, rely).

16.1. Substitute the underlined word with its synonym:

I

1. Trace elements are also found, but these are of such minute quantities that they are disregarded.

2. Exact sciences are mathematical sciences, whose results are precise and quantitative.

3. During the last 40 years great progress has been achieved in the field of space research.

4. Water can be transformed into steam by boiling.

5. Scientists try to evaluate new results against the background of known facts.

6. This plant has already made a new turbine.

7. The Earth has the form of a ball.

II

1. We use a lot of artificial materials in everyday life.

2. Scientists observe distant cosmic bodies by means of telescopes.

3. We can get oxygen from water.

4. These problems are chiefly of chemical character.

5. It was very difficult to detect the target.

6. Steam is obtained from water by means of increasing temperature.

7. Advance in electronic technique results from scientific research in the field of electronics.

III

1. There is a machine that allows people to stay at home and work with a computer in the office.

2. In business the computer is known to be a means increasing administrative efficiency, data processing, sales, etc.

3. Specialists consider that convenience, strength and beauty are the basic factors of architecture.

4. It takes both workforce and equipment to transfer goods from one means of transportation to another.

5. In the early Middle Ages, city location was determined primarily by the needs of defense.

6. The basic materials used here are the photographs, negatives or diapositives of various types.

7. Some organic substances, e. g. plastics, may show fluid properties at some stage of their manufacture.

16.2. Substitute the underlined word with its antonym:

I

1. The reaction of fission is accompanied with great energy.
2. He connected the two ends of a conductor.
3. Natural materials are widely used in modern construction.
4. This lens is convex.
5. Her house is faraway.
6. In their research they used modern methods and ideas.
7. The bridge was constructed after the war.

II

1. The engineering procedure establishing the line and grade of railroads is essentially different from that for highways.

2. The microcomputer is the smallest and the oldest member of the computer family.

3. Since Britain has the highest density of traffic in the world, traffic jams during rush hours and holiday times are fairly unusual.

4. We know that electrons flow out of the semiconductor easily under special conditions.

5. Transistors constructed of solid material are weaker and more unreliable than tubes of corresponding electrical performance.

6. Robots appeared on the scene with their high danger and reliability level.

7. Single robot is effective, unless it is introduced within a robotized simple system.

17. Complete the sentences using the words given below:

a) 1. Albert Einstein compared the _____ of atomic energy with the _____ of fire.

2. Science opens _____ opportunities for the development of the country's productive force.

3. The role of science increases in all _____ of our life.

4. Not long ago physicists spoke about three states of _____.

5. All objects surrounding us in nature are composed of _____ substances.

6. The scientists are looking for ways to use solar _____.

(Matter, energy, spheres, discovery, broad, different).

b) 1. The correlation of economic and ecological interests is extremely _____ if mankind wants to survive.

2. An international _____ of students grows from year to year and has already become a common practice.

3. The population outflow from rural areas and industrial activity leads to the _____ of natural wealth.

4. The _____ of future production technology give prominence to the tendency towards the development of automated factories.

5. The extensive consumption of electricity and its key role in developing the _____ forces is accounted for by its high efficiency.

(Trends, productive, important, destruction, exchange).

c) 1. Scientists in many countries are now working on the problem of controlled thermonuclear _____.

2. Heat absorbed by a liquid causes the liquid to _____.

3. To run an electric power plant with a _____ of 1 million kilowatts for one day we need 750 tons of coal.

4. Today an increasingly greater number of people is using TV-sets and other electric _____.

5. In this paper the author will _____ different kinds of energy.

6. Our scientists and technologists have _____ many new materials.

7. The user who knows how to programme and code a computer is aware of its limitations and also its _____ over other machines.

(Consider, advantages, fusion, capacity, devices, evaporate, created).

d) 1. The heavy lasers _____ in power from a few kilowatts to a few tens of kilowatts.

2. The development of wasteless and resource-saving technologies presents an _____ economic problem to our country.

3. Our institute trains engineers and gives them the most _____ theoretical and practical knowledge at the highest level.

4. The technique of the scientific testing of materials is very _____ .

5. The work modules have been designed and built with _____ features for special machining operations.

(Urgent, range, standard, up-to-date, reliable).

18. Fill in the blanks with the proper words given in the boxes. Use them in the necessary form:

1. _____ protection is a task requiring the joint _____ of governments, public organization and individual members of society.

The conflict between man and nature can be avoided by _____ a scientific ecological education, _____ all people to take an active part in nature _____.

effort	environmental	protection
encourage	foster	

2. Our planet, the Earth, is a _____ phenomenon in the Universe. So far it is known to be the only planet where life exists. Space flights of earthen have proved that we all belong to one family, _____, living on a _____ island in the _____ Universe.

infinite	tiny
mankind	unique

3. Minerals, like everything else, are made of _____ substances called _____. the smallest part of an element is an _____ of that element.

Atoms are far too small to be seen even with the most powerful _____, but scientists know that they exist. Scientists can weigh and _____ atoms and find out how they _____ with each other.

atom	element	microscope
certain	measure	react

4. Water is one of the most _____ of all chemical _____. It is a _____ constituent of living _____ and of the _____ in which we live. That is why water resources must be _____ and _____.

environment	major	preserve
substance		
important	matter	protect

5. There is no sharp _____ between solids, _____ and _____. Increasing in temperature increases the _____ energy of all _____. So the _____ of a liquid into the _____ or solid states depends upon the kinetic energy of the molecules.

change	gaseous	line
gas	kinetic	liquid

6. A laser is a device for making and concentrating light waves into a very intense _____.

The word "laser" is an _______ for Light Amplification by Stimulated Emission of Radiation. The light made by a laser is much more intense than ordinary _____.

With ordinary light all the light waves are of _____ lengths. With lasers, all the light waves are of the same _____, and this _____ the intensity.

abbreviation	different	length
beam	increase	light

19. Choose one of the variants which can substitute the underlined word.

I

1. He is a <u>well – known</u> writer.

a) prolific c) good
b) famous d) talented

2. Having <u>received</u> the telegram, they packed and left for Glasgow.

a) got c) written
b) sent d) read

3. They managed to grow new crystals <u>varied</u> in form and colour.

a) interesting c) different
b) attractive d) curious

4. It is, however, easy <u>to estimate</u> that the Earth's shadow is much larger than the diameter of the Moon.

a) to think c) to measure
b) to understand d) to evaluate

5. This particular matter can be registered <u>far outside</u> the terrestrial atmosphere.

a) close to c) between
b) inside d) beyond the limits of

II

1. There are <u>some</u> pictures in this book.

a) several c) few
b) many d) a lot of

2. Heat <u>changes</u> water into steam.

a) produces c) transforms
b) takes place d) subjects

3.The operator added some heat and the temperature of steam <u>evaluated</u> by 50 °C.

a) increased c) changed
b) diminished d) decreased

4.Electrons move outside the nucleus.

a) inside c) under

b) in d) around

III

1. As I like physics and mathematics I entered the National Polytechnic University.

a) thanks to c) just

b) since d) that's why

2. A. S. Popov designed the first radio transmitter in the world.

a) studied c) tested

b) examined d) constructed

3. The Earth and other planets of the solar system revolve around the Sun.

a) turn c) contain

b) convert d) achieve

4. The sun rays may be used for producing electric energy.

a) power generation c) purification

b) steam generation d) magnification

5. Researchers have been engaged in the study of the environmental effects of human activities in space for a long period of time.

a) investigation c) usage

b) exploitation d) transformation

PART II
PHRASEOLOGY

While working with the texts (part III) find set expressions there, Translate them, put down the translation into part II And try to memorize these expressions

A

a few (cp: few)	
a great deal of	syn. a lot of, many, much
a kind of	syn. in a sense
a little (cp: little)	
a lot of	syn. many, much, a great deal of
a matter of opinion	syn. it depends
a number of	syn. a series of
above all (else)	syn. first of all; on the top of
according to	syn. in accordance with
account for	
all in all	syn. on balance; summing up, in short
all over the world	syn. throughout the world
along with	syn. apart from, in addition to
and so on	syn. and so forth, and the like, etc.
apart from	syn. in addition to, along with
apply to (for)	
approve of	
as….. as…..	cp. not so as
as a matter of fact	syn. in fact
as a result	
as a rule	
as compared to	syn. in comparison with
as early as	syn. as far back as
as far as	
as for	syn. as to

as if	syn. as though
as to	syn. as for
as well	syn. too
as well as	
at a time	
at any rate	
at first	ant. at last, in the end
at last	ant. at first
at least	
at once	syn. immediately, in no time, on the spot, right away
at one's disposal	
at present	syn. now
at the age of	cp. at an early age
at the beginning (end) of	
at the cost of	syn. due to, owing to, thanks to, because of, at the expense of
at the head of	
at the same time	cp. at that time
at the turn of	

B

back up	syn. support
base upon	cp. be based upon
be a reality	
be a success	syn. succeed
be about	syn. be going to
be at one's best	
be awarded	
be aware of	syn. know
be careful	
be concerned at (for, about)	syn. to worry about
be concerned in	syn. deal with; be interested in

be concerned with	syn. be about
be fascinated	cp. become fascinated
be fond of	syn. like
be in common use	
be interested in	cp. be crazy about;
ant. loose interest in	
be involved in	
be likely	
be made up of	syn. consist of; be combined of
be of great (some, certain, etc.) importance	syn. be important
be of opinion	syn. think, believe
be optimistic about	
be over	syn. finish; come to an end
be popular with	
be responsible for	syn. be in charge of
be sure	cp. make sure
be under design	(/re/construction, etc.)
be underway	syn. be in progress, go on
bear in mind	syn. keep in mind; think
because of	syn. due to; owing to; thanks to; at the cost of; at the expense of
believe in	
belong to	
benefit from	cp. for the benefit of
become used to	
betwixt and between	syn. 50 : 50
both… and…	
but for	
by means of	syn. by virtue of
by all means	ant. by no means
by far	syn. much more

C

call for	
care for	syn. to look after
carry on	cp. carry out, fulfill
carry out	syn. to fulfill
combine with	
come across	syn. face, meet
compare with	cp. in comparison with; as compared to
consist of (ant.: make up),	syn. be combined of; be made up of
cope with	
correspond with (to)	syn. write to smb.; be like, be in agreement with

D

deal with	syn. be concerned in, see above
depend / upon	
devote oneself to	syn. dedicate to
dispense with	syn. do without
distinguish oneself in smth.	
do one 's best	
do without	syn. dispense with
draw on	syn. come from ; base /upon
due to	syn. owing to; thanks to; because of, at the cost of, see above
dwell /upon	

E

each other	cp. one another
either… or…	cp. neither … nor…
even if	syn. even though

even though	syn. even if

F

far beyond	
first of all	
focus on	syn. concentrate on, emphasize
for example (abr. e.g.)	syn. for instance
for the benefit of	syn. for the sake of; cp. for one ‘s own sake
for the first time	
for the purpose	syn. for the reason
for the sake of	syn. for the benefit of
for years	
from one’s point view	syn. in view of
from time to time	

G

gain a worldwide fame (reputation, recognition)	
get down to	
get rid of	
give way to	
go in for	
go down	syn. fall, drop, decrease, reduce ant. go up, rise, raise, increase
go on	
graduate from	syn. finish

H

half as much as	ant. twice as much as
have got	syn. have

have much in common with	ant. have nothing to do with
high-grade	syn. of high quality
higher education	cp. secondary education

I

in a sense	syn. a kind of
in accordance with	syn. according to
in addition (to)	syn. apart from, see above
in advance	
in case of	
in comparison with	syn. as compared to, see above
in due time	
in fact	
in front of	
in general	
in honour of	
in no time	syn. immediately; on the spot; right away; at once
in one's opinion	syn. to one's mind
in order to	
in other words	
in spite of	syn. nevertheless; none of the less; though, but, however
in terms of	
in the field of	syn. in the sphere of; in the area of; in the branch of
in the frame of	syn. within the frame(s) of, within the range of
in the end	syn. at last ant. at first
in the middle of	
in this manner	
in time	

in turn	
in view of	
instead of	
it depends	syn. a matter of opinion, see above
it is (was)… that (who)…	
it is clear	
it is doubtful (ant.: it is doubtless)	
it is important	
it is /im/possible	
it is likely	
it is necessary	
it is not the (that) case with (in)	
it is obvious	
it is probable	
it is worth wile	
it was not until … that	syn. beginning from, since

J

just now

K

keep in mind	syn. remember
keep records	syn. write down, put down, note, record, log

L

lay one's hand on	
lay the basis (foundation) of (for)	
look after	syn. care for
look for	syn. search for
look forward to	

look like	
look through /over	
loose interest in	ant. be interested in

M

make a contribution to smth.	syn. contribute
make up	ant. consist of
make up one's mind	syn. decide; come to a conclusion
make use of	syn. use, utilize
meet the demands	syn. meet the requirements, meet the need, meet the standards, meet the criteria cp. meet the data
more or less	
much more	syn. by far ant. much less

N

named after	
neither… nor.	cp.: either … or…
next to	syn. close to, beside
no doubt	syn. certainly
no less (more) than	
not only … but also…	
not so … as …	cp. as … as …, see above
not until	syn. since

O

of course	syn. certainly
on balance	syn. sum up

on one hand	ant. on the other hand
on the basis of	
on the contrary	
on the spot	syn. immediately, etc. see above
on the tip of the pen	syn. theoretically
on the top of	syn. first of all
owing to	syn. due to ,etc. see above

P

pay attention to	cp. draw attention to, turn attention to
per cent	
per second (minute, hour, etc.)	
play part	
point of view	
point out	syn. indicate
put an end to	syn. stop from happening
put a stop to smth.	syn. stop
put down	syn. write down, etc., see above
put down to	syn. attribute; refer to
put forward	syn: set forth
put into operation	syn. put into use
put off	syn. postpone
put on	syn. dress
put into use	syn. implement; put into operation
put up with	
put smb up	syn. suggest for a job
put smth. up	syn. build, raise into position; supply or lend money needed

Q

quite right

R

refer to	syn. put down to, see above
rather than	
rely /up/on	
report on (to)	
result in	syn. bring to smth.
	ant. result from
right away	syn. immediately, etc. see above

S

secondary education	cp. higher education
set forth	syn. put forward, see above
set up	syn. install; installation, unit
side by side	
slow down	ant. speed up
so called	
so far	
so that	
succeed in	syn. be a success
such as	syn. for example, for instance
sum up	syn. on balance, see above

T

take a chance	
take after	syn. be like smb, resemble
take care	
take for granted	
take into account (consideration)	
take off	
take part	

take place	syn. occur
take up	syn. raise, lift
thanks to	syn. due to, etc. see above
that is	syn. id est (Lat.) abr.: i.e.
that is (was) not the case	syn. it is / was not the case
that is why	
the… the…	
the case is	syn. the thing is
the following	syn. next
the former… the latter	
the only	cp. only
the same	cp. some
the very	cp. very
throughout the world	syn. all over the world
to one's mind	syn. in one's opinion
to some (a considerable , a large) degree	
to some (a great, a considerable) extent	
trace back to	syn. watch
train of thoughts	
turn in/on	syn. switch on ant. turn off, switch off
turn into	syn. become
turn to	syn. go to for help, advice, etc.; begin to work; switch over to
turn out	syn. happen to be; be found to be
twice as much as	ant. half as much as

U

under conditions / temperature, etc.	
under one's guidance	
until now	syn. up to now
used to	syn. would

V

very much
vice versa

W

way of life	
way of thinking	
way out	syn. exit
weak point	ant. strong point
within the borders (frames)	
within the power(s)	
with regard to	syn. with respect to, as to
with the exception of	
work at, on	
worth while	

Y

year-in-year-out	syn. annually
yield results	

Practice Section

1. Translate the sentences paying attention to set expressions.

I

1. Modern people have become used to TV and radio, computers and lasers and many other wonderful achievements of science and technology.
2. If' we take a close look at our everyday life, we shall see tremendous changes which have taken place in the 20^{th} century.
3. A lot of scientists all over the world are responsible for these innovations.
4. A number of countries have made their contribution to the world science.
5. Science always meets the demands of life and determines its future.

II

1. On the basis of experiments scientists architecture their theoretical ideas.
2. For instance it was on the basis of experiments that Franklin proved that lightning is a form of electricity.
3. It is thanks to Franklin who inverted the lightning rod that our houses nowadays are protected from lightning.
4. Edison not only invented the incandescent lamp but also backed it up with the creation of entire electric generating system.
5. Edison's light bulbs could be turned on and off individually.

III

1. The transistor was invented in 1948 drawing on quantum theory and photoelectric phenomenon.
2. In its turn transistors lay the foundation of modern electronic and computer technology.
3. As a result of implementation of integrated circuits book-sized computers of the 80-s substituted room-sized computers of the 60-s.
4. Both computer speed and memory depend on word length and the number of bits a computer can handle at a time.
5. Interactive graphics hardware configuration contains terminals, entry devices, hardcopy outputs, and workstation which, in turn, consist of a primary processor and associated memory, a graphic display system, as well as software.

IV

1. Since its very origin the United States encouraged scientific creativity of its citizens.
2. A number of American farmers educated themselves in Latin in order to read the scientific works of Sir Isaac Newton.
3. At first American science dealt only with the needs of everyday life.
4. That was not the case with European science where scientists preferred to pursue knowledge for its own sake.
5. It was not until 1930 that an American scientist won a Nobel Prize.

V

1. At secondary school Ernest Rutherford was interested in watches and cameras.
2. At Nelson College he distinguished himself in physics, mathematics, English, French and Latin.
3. At the age of 19 he finished the College and entered the only New Zealand University.
4. Rutherford's famous book "The Scattering of α & β Particles of Matter and the Structure of the Atom" deals with so called atom models.
5. According to those models the atom is pictured as composed of central charge surrounded by a sphere of electrification of equal but opposite charge.

VI

1. By 1914 Albert Einstein had gained world recognition and fame for his theory of relativity.
2. By his Periodic System D. Mendeleyev made a great contribution to science.
3. Mendelevium, one of the transuranium elements (No. 101), was named in honour of the great Russian scientist.
4. Numerous Tsiolkovsky's engineering ideas have been put to use.
5. Academician Joffe started on their path a lot of distinguished scientists who in turn founded their own scientific schools.

VII

1. Nuclear physics drew Kurchatov's attention in 1933.
2. His theoretical thoughts were embodied in the world's first APP put into practice in Obninsk in 1954.
3. In 1956 at Harwell, Britain, Academician Kurchatov made a famous report at the work being carried out in his country in the sphere of controlled thermonuclear fusion.
4. Kurchatov clearly saw that the development of such a big field of science as the physics of hot plasma was not within the powers of scientists of one country.

5. He convinced scientists that it was necessary to carry on wide-scale international cooperation in the field.

VIII

1. In his opinion, only through cooperation, could the solution of the problem of controlled thermonuclear fusion be ensured in the foreseeable future.
2. The British press gave wide coverage to this speech.
3. The Daily Express, for example, wrote that the Russians had already completed experiments which in Harwell were just at the planning stage.
4. Cooperation on thermonuclear problems was developing successfully between the USSR and the USA throughout the seventies. At first scientists of these two countries as well as those of west Europe and Japan were carrying their investigations on installations like Soviet TOKAMAKs.
5. Since 1980 they have been working on the design of INTOR (international TOKAMAK).

IX

1. All substances or compounds are made up of elements.
2. Scientists discover the innumerable elements which make up the world.
3. For instance one of them is carbon.
4. In fact carbon is so important, that there is a whole branch of chemistry, organic chemistry, which studies only carbon and its compounds.
5. It is carbon that is essential to life itself because every living cell in the world has carbon in some form or the other. In fact, all living world is termed organic.

X

1. Even if all the world's hydropower resources were fully utilized, this would not meet more than five per cent of the world's energy requirements .
2. Though in the 70-ies coal began to give way to oil and gas as an energy source, however, coal still plays an enormous part in economy.
3. Brown coal accounts for 40 per cent of the world's coal reserves.

4. From coal, the integrated plant will extract all the components useful from the technical point of view.

5. It appears reasonable to widely utilize coals because of their exceptionally high economic factors with regard to mining operations.

XI

1. The theoretical model of Brouwers and Li (1994) is applied to the experiments and extended to take walls effects into account.

2. In order to determine whether evaporative cooling offers any prospects the analysis will be made assuming that the frictional term is negligible.

3. On the other hand, obtaining solutions with fine grids requires relatively extensive computational effort.

4. Only a very light soluble oil film was deposited on several stages of blades at the compressor inlet in spite of the necessary exclusion of a compressor-intake filter.

5. Let us further presume that accelerator can operate either as a pre-acting or delayed-action element.

XII

1. In the case of the highly stressed last stages of the low-pressure disks there is a possibility of brittle fracture.

2. It has the longest blades with regard to the diameter with a large meridianal opening which results in distinct twisting of the blades.

3. Recirculation flow occurs in case of part loads of the machine, i. e., both at the root and at the tip of the blade.

4. The form of the viscosity-dependent terms was largely determined by reference to these data and the very similar work of Klebanoff.

5. For the first time, both parallel and normal gust components of the forcing function are considered. This is accomplished by a series of experiments.

XIII

1. In these days of energy crisis the distillation is subject to a criticism owing to its large consumption of energy.

2. In order to moderate this disadvantage of distillation it is undertaken to introduce several energy-saving schemes.

3. Such a liquid mixing will result in more or less deterioration in the overall column efficiency.

4. If the liquid replacement is carried out in an ideal fashion, no mixing will take place.

5. In addition the initiation of the liquid flow on each stage is not well synchronized from one tray to another.

XIV

1. Credit sophisticated electronics for making the instruments not only more versatile, but easier to use as well.

2. The only remaining hurdle to be overcome is its limited penetration at high sensing frequencies.

3. In this case the Q factor is lower due to the increased resistivity.

4. This quality depends on the chemistry.

5. The chemistry of the samples is the same except for manganese content.

XV

1. According to Romtec sales of Windows-based application software topped DOS-based software for the first time in the UK in November 1992.

2. So far, it has only required competition in terminal equipment and data services and not in basic voice telephony.

3. Not only does this reduce the speed and richness of the telecom dialogues, it also costs more and is unreliable.

4. For instance, the bank might operate a payment service out of six branches in London area, but wants to concentrate the processing in just one of them.

5. Customers, on the other hand, should not have to be told to redial if they call their branch query.

XVI

1. Over-stringent control can lead to disruption in production and it in its turn can cause a vicious circle where the loss of customer good will finally leads to loss of sales and results once again in stringent cost controls.

2. The just-in-time philosophy, developed in Japan, is aimed at reconciling the conflicting interests and keeping inventory costs to a minimum.

3. On the debtor side, working capital is required to finance the gap between payment due to suppliers and payment owed by customers.

4. Again a balance must be achieved between getting and giving good credit terms in order to attract customers and maintain positive relationships with suppliers on the one hand, and minimizing cash outlay on the other hand.

5. Adequate cast is always available for meeting the company's day-to-day debts.

XVII

1. Warping found on the outer edges of the inner lowered portion of the combustion-liner cap assembly, resulted in linear modifications on both gas turbines.

2. On the other hand, obtaining solutions with fine grids require relatively extensive computational effort.

3. Neither speed nor load seems to have a considerable influence on this reduction.

4. In addition the algorithm is readily adaptable to parallel processor architectures with little or no penalty.

5. The accurate solution of many problems of current interest results in systems with more than a quarter of a million equations.

XVIII

1. Pesselmann in order to assess the efficiency of the heat pump cycle, defined a reference cycle and studied the heat ratio as a function of the thermal properties of the working substance.

2. It can be furthermore assumed as a working hypothesis that in future every application of a heat pump in industry will call for a special optimized design requiring selection of a specific mixture of working media as well as a specific

system configuration, i. e. to some degree tailor-made machines may have to be supplied in many cases.

3. As early as 1824, Sidi Carrot first used a thermodynamic "cycle" to describe a thermodynamic process.

4. For a 2400 kW heating capacity, turned out to be the optimum size of the gas motor-driven heat when using a cogeneration plant.

5. Heat transformers on the other hand seem to open up a great market within industrial applications.

XIX

1. It is the creation of a civil society that guarantees individual human rights and protects the freedoms and equality of an open society.

2. At present, wherever the Security Council requires armed forces might carry out its decisions, the force must be scraped together, often with considerable delay.

3. In addition, a unique experiment in preventive deployment is being conducted in the former Yugoslav Republic of Macedonia.

4. As far as market needs changes the employees must change as well.

5. The longer and more diffuse business letters are, the longer the writer of them has to wait for an answer.

XX

1. Because of its low starting line weight, the car had demonstrated that it has a power-to-weight ratio at least equal to those of its opponents.

2. There are few people, if any, who will pay more for a car simply because it is small, in fact, they expect to pay less.

3. If trouble is experienced with either the tank or dash unit , replacement of the unit is the only remedy.

4. Instead of considering the specific heats of a gas, it is more convenient to deal with the heat energy or internal energy.

5. In addition to the above we have to take into account the fact that no spark-ignition engine operates strictly on the constant volume cycle, for neither is combustion instantaneous nor is expansion carried to the very end of the stroke,

for in order to empty the cylinder in the time available, the exhaust valve must be opened well before the end of the stroke.

2. Give synonyms to the underlined words and expressions:

I

1. Mixing and/or diffusion through the interface of the leaving and entering liquid will occur on each stage.
2. The separate accumulation of the reflux according to the composition change is realized at the cost of increase in the reflux ratio and of mixing the liquid dropped from different stages.
3. In this case the Q factor is lower due to the increased receptivity .
4. However, by far more complicated conditions exist with low-pressure moving wheels of large steam turbines.
5. Over-stringent control can cause disruption in the pipeline.

II

1. This discovery has been made purely theoretically.
2. It is certainly possible for some of the benefits of the environment to be obtained without ' buying up ' a local company.
3. Most significant for our purpose is the observation that a reduction in stagnation temperature (i. e., cooling of the gas flow) tends to increase the stagnation pressure.
4. For instance, in economic theory we find that the allocation of factor of production between different uses is determined by the price mechanism..
5. All in all we may see a successful marriage of computers and telecommunications.

III

1. As for customers, they have an increased requirement for access to on-line data.
2. Pyotr Kapitsa was awarded a Nobel Prize for his great contribution to world science in 1978.

3. We can picture the flow of an alternating current by virtue of graph.

4. Owing to the rapidity of the expansion, the steam has no time to condense but remount into an unnaturally dry or superheated state.

5. As we know, the steam turbine is now used instead of the old reciprocating steam engine.

IV

1. NGO (Non- Governmental Organizations) are playing a significant role in the transition of Ukrainian society. For example, they are giving direct support to those who are left unprotected in this transition.

2. They provide support to invalids and help veterans and large families too.

3. The growth of these organizations testifies to the number of Ukrainian citizens who are willing to contribute to the state building process.

4. On balance these organizations are beginning to play an important part in the country's life.

5. The eyes of the world were focused on the twin towers.

V

1. The unit, which began an early periodic outgage Aug., 28 due to broken low-pressure turbine blades, is scheduled to return to service Oct. 20.

2. All new programs all reorganizations can't change an organization in a fundamental way if the men and women who make up the organization don't change.

3. Apart from it, efforts are underway at the plant to limit the amount of low-level waste generated.

4. The groups also discussed features that represent customer value to them.

5. That was owing to growing trade deficits with Japan and other industrialized countries seeking to boost exports of manufactured goods to pay their higher oil bills and American's own elevated oil import costs.

VI

1. Some manufacturers have converted from dry cylinder to wet to obtain as this a cylinder jacket was practicable.

2. The centrifugal force may cause lateral instability.

3. In the compression-ignition engine the fuel is not all feed in immediately, but is spread over a definite period.

4. We know about this fact.

5. All machines and mechanisms consist of many parts.

3. Match the words/expressions on the left with those on the right to get equivalent pairs:

a)

1 due to	a to decide
2 to continue	b as for
3 to make up one's mind	c to know
4 as to	d to be made up of
5 to fulfil	e owing to
6 to be aware of	f summing up
7 to consist of	g a series of
8 all in all	h to carry out
9 now	i at present
10 a number of	j to go on

b)

1 to be responsible for	a as to
2 at the cost of	b e. g.
3 in fact	c to attribute
4 as for	d to indicate
5 for instance	e to happen to be
6 that is	f to be in charge of
7 to put down to	g to dress
8 to turn out	h i.e.
9 to point out	i as a matter of fact
10 to put on	j because of

c)

1 on balance	a 50:50
2 in no time	b of high quality
3 betwixt and between	c nevertheless
4 to look for	d immediately
5 high-grade	e to note
6 in view of	f to switch on
7 in spite of	g to search for
8 to put down	h up to now
9 to turn in	i from smb.'s point of view
10 until now	j all in all

d)

1 a lot of	a due to
2 to turn out	b to utilize
3 to turn off	c by far
4 thanks to	d to meet the requirement
5 to put forward	e in no time
6 to make use of	f many
7 much more	g to dispense with
8 right away	h to happen to be
9 to do without	i to set forth
10 to meet the demand	j to switch off

e)

1 to be interested in	a to care for
2 to come across	b to explain
3 to look after	c to handle
4 to put off	d a series of
5 to be fond of	e to meet
6 to deal with	f to be crazy about
7 to put across	g to come to an end
8 a number of	h in addition to
9 to be over	i to like
10 apart from	j to postpone

4. Match the words/expressions on the left with an appropriate word combination on the right to make an idiomatic phrase:

a)

1 a number of	1 in 1954
2 much more	2 to solve the problem
3 as early as	3 …theory…practice
4 due to	4 papers
5 to be about	5 an interesting event
6 both…and	6 an idea
7 the … the…	7 important
8 …took place	8 one's mind
9 to put forward	9 … more… better
10 to make up	10 this advantage

b)

1 to be of…opinion	1 these facts
2 due to	2 the light
3 turn in	3 some drawbacks
4 to carry on	4 the victory
5 to turn to	5 some difficulties
6 to get rid of	6 the same
7 in spite of	7 achieving good results
8 to look forward to	8 some information
9 to be interested in	9 new work
10 to put down	10 an experiment

c)

1 both…and…	1 to know…
2 to become used to	2 magazines
3 it is necessary	3 some interesting information
4 it is worth wile	4 wonders of science
5 to look through	5 1905
6 the weak point	6 it is right
7 to come across	7 saying

8 as far back as…	8 of this work is…
9 even if	9 to this
10 in addition	10 men…women

d)

1 not only …but also…	1 new data
2 to consist of	2 you
3 owing to	3 we learned
4 at the turn of	4 your friends
5 but for	5 of 7
6 to be responsible for	6 theory … practice
7 it was not until	7 in this experiment
8 take part	8 some pages
9 rely upon	9 this work
10 at the age	10 two centuries

e)

1 a few	1 leaving
2 at the beginning of	2 to mention
3 to base upon	3 conclusion
4 to be at the point of	4 the process
5 it is important	5 words
6 the only	6 the century
7 apart from	7 revolutions
8 …per minute	8 reading
9 go on	9 this
10 at the head of	10 the facts

5. Make up sentences using the phrases received.

6. Finish the sentences given below:

a)

1. From my point of view…
2. At any rate…

3. Taking into consideration…
4. Later on he turned to be…
5. We have become used to…
6. You can rely upon…
7. I am optimistic about…
8. This accident put a stop to…
9. You must pay attention to…
10. I am keeping records…

b)

1. Thanks to this investigation…
2. It is doubtful that …
3. The reporter put forward …
4. Top managers are responsible for…
5. It is necessary to say that…
6. This work lay the foundation…
7. One must take into account…
8. Your work must meet all the demands…
9. On the one hand…
10. All in all…

c)

1. Are yon aware of…?
2. I am interested in…
3. Bear in mind that…
4. In addition…
5. This man distinguished himself in ..
6. Even if this is right…
7. It was not unit the beginning of the 20th century…
8. In view of these events…
9. Every day I look through…
10. The discovery of X-rays resulted in…

d)

1. I have made up my mind…
2. You must be very careful about…
3. It is possible that…
4. Take into consideration…
5. A group of scientists was awarded…
6. At the age of 17…
7. As early as 1997…
8. We became used to…
9. You must be sure that…
10. This work is made up of…

e)

1. First of all I must say that…
2. At present…
3. But for all difficulties…
4. One can dispense with…
5. You should pay your attention to …
6. As far as I know…
7. In order to do this…
8. The results of my research depend upon…
9. At least some facts…
10. On balance we can say…

7. Fill in the blanks picking up the suitable set expression from the boxes given below.

a)

1. A pilot flying over unknown territory must have some instrument… which to hold to a true course.

2. A metal consists of… positive ions immersed in a cloud of electrons.

3. It should be noted that a rocket does not… the atmosphere for its propulsion.

4. Motion means change of place or position… the position of some other object that we assure as being at rest.

5. … the law of the conservation of energy, the useful work to be done by a machine is less than the total work performed by it.

with respect to, depend on, by means of, according to, a number of

b)

1. … the ohms, amperes, volts, and watts the electric measurements would be impossible.
2. A two-winding transformer is known … two coils.
3. … he… his friends objected to taking part in this experiment.
4. …higher the temperature .. quicker do the molecules move.
5. …its usefulness this system has one great disadvantage.

to consist of, both…and…, but for, in spite of, the…the…

c)

1. Potential is really…a force…a pressure.
2. Fundamental particles are … electrons and protons… nitrous, mesons and others.
3. … momentum … impulse, unlike energy and work, are vector qualities.
4. This method is…interesting…the previous one.
5. …more we know…more we forget

Both...and…, as…as, the…the, not only…but also…, neither… nor…

d)

1. Science and engineering must … of modern life.
2. Top managers are…making strategic decisions.
3. A new era in information processing systems is … unfold.
4. A single disc, …, can hold all the text and graphics from a 21 volume encyclopedia set.
5. Interaction between a brain and a computer is possible… the advance of electro-encephalography or EEC.

responsible for, about to, for example, thanks to, meet the demands

e)

1. When business letters are exchanged between people who know each other, the language often becomes… less formal than in ordinary business letters.
2. … longer and more diffuse a letter is, … longer the writer often has to wait for an answer.
3. …employers … employees must observe some rules.
4. … managers… employees must be responsible for their work.
5. The process of privatization has not been finished…

Not only…but also, the…the…, a great deal, both…and…, so far

8. Give synonyms to:

a)	b)
to take place	in no tine
due to	in spite of
first of all	as a matter of fact
apart from	to be about
to make up one’s mind	to be of opinion
all over the world	to be responsible for
as early as	to bear in mind
to meet the demand	to put down
by virtue of	to look through
to look after	to turn into

9. Give antonyms to:

a)	b)
at first	the latter
to consist of	on the one hand
to go on	a few
to turn in	much less
at the beginning of	first of all
either ..or …	to make up
much more	to be crazy about
to a great extent	by all means

to result in half as much as
to slow down far more

10. Fill in the blanks picking up the matching set expressions from boxes given below. Change the forms of the words, if necessary.

I

Secretaries do … work. … offices receive … correspondence, which they usually … .
They also draft letters and memoranda for their bosses, … organize their diaries and work schedules.
They also take telephone calls and handle travel and hotel bookings.
… that, they … buying office supplies.

for example, to deal with, a lot of, a great deal of, in addition to, to be responsible for, as well as

II

When a person … make a serious decision he must not do it … … he must get … information on the subject…possible .
He must… all this information, …. to all details. Further on he … analyze all the data available and only then, … this analysis he should…..

to have to, to came to a conclusion, on the spot, first of all, to take into account, to pay attention to, on the basis of, to be going to, as much as

III

It is not so easy … to science. First than doing it scientists pass through years of routine everyday work.
They have to … … scientific literature on the subject they… .This literature must be … of periodic … non-periodic character … what has been done in this field of science ... .
Then they … … their own experiments, analyse them and evaluate their results. And … only then … they will be able to say a new word in science, if they are lucky enough.

it is… that…, to have to, to make a contribution, both…and…, to look through, to carry on, a lot of, a number of, to be interested in, to account for, all over the world

IV

The idea of machine translation … an electronic computer originated … in the late 1940 in England and the USA. The main activity started in … country and the first authentic translation was produced in 1954 by Garvin and Dostert of Georgetown . … in a society … translation most work is becoming computer-based. Computer technology and electronic networks have slowly been infiltrating the schools … … the widespread and growing use of such technology in … the home … the workplace, computer equipment is unlikely to end up in closets or even to sit idle most of the time.

both…and…, at present, by means of, as well, the latter, as early as, because of, not only… but also

V

Hypercycles as a class have distinctive dynamical characteristics. A competition among hypercycles can be analyzed topologically in … way as a competition among quasispecies. It … that all trajectories lead to the vertex of the area of the unit simplex in which the competition began. …, any competition among hypercycles leads to the survival of only one hypercycle. A hypercycle, once established, cannot be displaced by a competitor … the competitor is more efficient. This reflects that the fact the selective value of a hypercycle … its population … with Darwinian systems. Hypercycles can evolve linkages … of replacements, insertions and deletions in the information-carrying molecules.

As a result, to depend on, to turn out, it is not the case, the same, even if, in other words

11. Complete the expression with *take* or *put*.

Example ***take*** drugs

1. ________ a risk
2. _________ place
3. _________ a plan into practice
4. _________ one's advice
5. _________ smb in charge of
6. _________ pressure on smb
7. _________ one's arm round smb
8. _________ responsibility for smth

12. Complete the sentences with a word or expression from the box and the correct form of *take* or *put*.

drugs, no notice, for granted, work first, ages, part

Example ***I've*** never ***taken drugs*** in my life.

1. My boss doesn't appreciate what I do for the company. She just_______ me_________ .
2. The hotel was supposed to be easy to find, but it _______ us _______ to get there.
3. It's a shame that people have so little time to relax. They always have to ______________.
4. I tried to get the barman's attention, but he ____________ and served someone else first.
5. My brother is a real loner. He hates ____________ in group activities.

13. Complete the sentences with a phrasal verb from the box. Put a pronoun in the correct place where necessary.

look after, give up, run out of, get over, look up, pick up, turn on, not take off, bring up

Example My mother worked when I was young so my aunt ***looked after*** me.

1. Can you go to the supermarket because we _____________ bread?
2. I was worried about learning Spanish but I ______________ really quickly.
3. I _______just __________his number in the phone book but I can’t find it.
4. We’re going to be late because the plane _________________ yet.
5. My favourite programme is on TV. Can you _____________?
6. My parents travelled a lot so my sister _________ me _________.
7. He must be very strong. He _________ already ____________ his accident.
8. I didn’t enjoy learning French so I _____________.

14. Complete the sentences with the correct form of the phrasal verbs from the box. Some of the verbs are in the passive. Not all the verbs are used.

put on, take off, take after, take out, put off, take back, put out, put away, put down, put up with, take over

Example She ***puts on*** make-up twice a day.

1. My new computer didn’t work so I _________ it _______to the shop.
2. My memory is hopeless. I have to_______ everything _________ in my diary.
3. They’re worried about their company ______________ next month.
4. I won’t ______ any rudeness from the children.
5. Start your homework now! ___________ it _______ until later!
6. There’s no danger now as the fire _______________.
7. After a lot of financial difficulty, her business suddenly _______ last year.
8. You should help me tidy up the house. I’m fed up with _______ everything _______ myself.

15. Complete the sentences using the set expressions from the box.

As well, dealt with, was interested in, according to, distinguished himself in, not only…but also…, took an active part in, paid attention to, a number of, the only.

While studying at secondary school Earnest Rutherford … watches and cameras. At Nelson College he… physics, mathematics, English, French and Latin. He … chemistry… . Chemistry was not an obligatory subject but Earnest was… pupil who studied it. At the University Rutherford… studied… took part in sport competitions. He also… the work of the University scientific Society. Much later in his famous scientific work he… so called 'atom model'. … Rutherford atom is composed of a central charge surrounded by a sphere of electrification of equal but opposite charge. This model resembles the solar system, with a central nucleus and… electrons revolving around it.

16. Fill in the blanks with the matching set expression.

Vacuum devices.

Festo offers a variety of vacuum devices which are particularly suitable for use in pneumatic systems. The vacuum generators operate _______ the venturi principle. Compressed air is lead through the generator and a vacuum is generated at a result of air expanding through an orifice.

_______ a vacuum pump, these devices work very efficiently – especially when a continuous vacuum is not required, ___ repositioning of parts from a magazine to a mechanism.

Several types of vacuum generators __________ all of which can be equipped with various types of suction cup. Single solenoid operation for vacuum on/off function. Double solenoid for vacuum on/off function, plus a separatively controlled ejector pulse, for the safe ejection of workpieces. Double solenoid operation, with additional vacuum switch for sensing vacuum build-up.

Vacuum gripper or suction cup.

__________ a vacuum gripper or suction cup, workpieces can be picked-up and transported.

__________ obtain the indicated values for suction force, the surface of the workpieces has to be clean and even - otherwise the values are reduced ___________ the quality of the surface.

There are vacuum suction cups for plane surfaces, ___ bellows suction cups for curved surfaces.

For vacuum suction cups that are __________ a piston rod of a cylinder there are adapters, which are also called length adapters. This length adapter prevents the piston force from directly having an effect on the vacuum suction cup.

Vacuum switch/sensor.

Vacuum switches work like a sensor and monitor whether or not a vacuum has been achieved.

They are connected between vacuum generator and vacuum suction cup. If there is no workpiece on the suction cup, a vacuum cannot be achieved ________ air flowing in the line. Only if a workpiece blocks the suction cup, can a vacuum exist and the vacuum switch activated. When the switch is activated, it emits a signal.

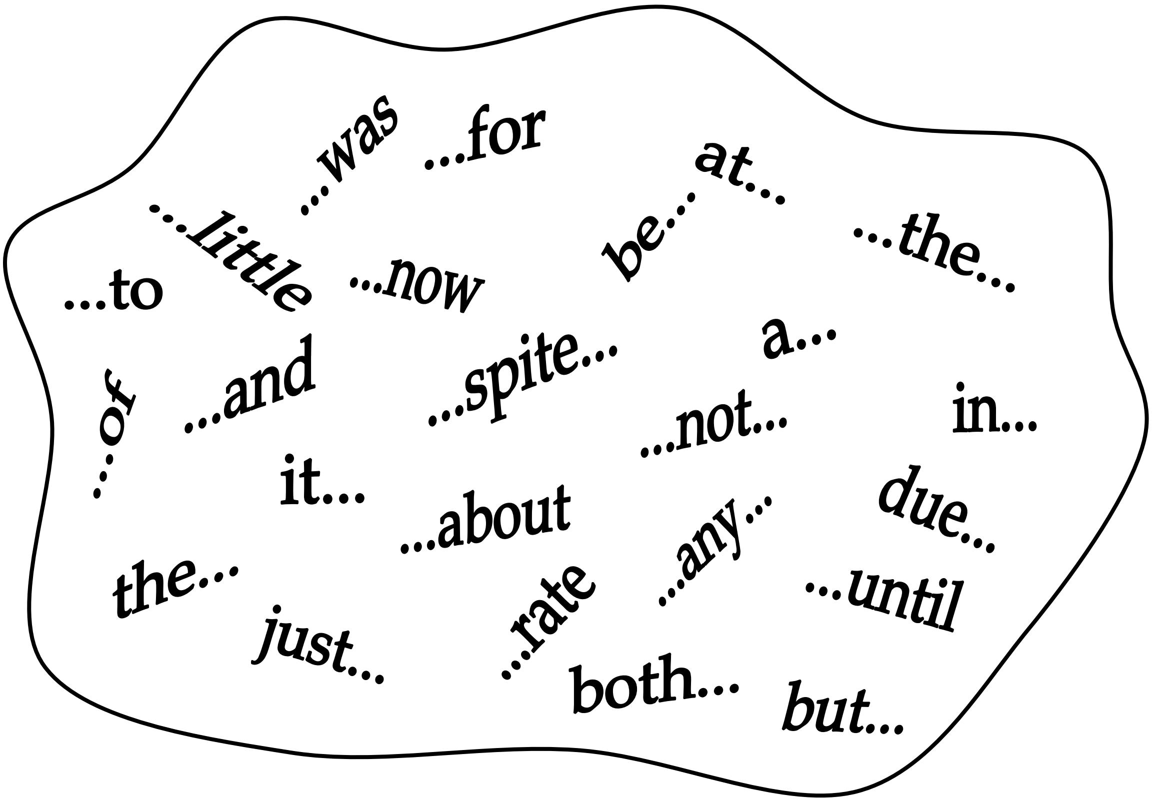
I Q –Test

17. Find the set expression which is odd in the row:

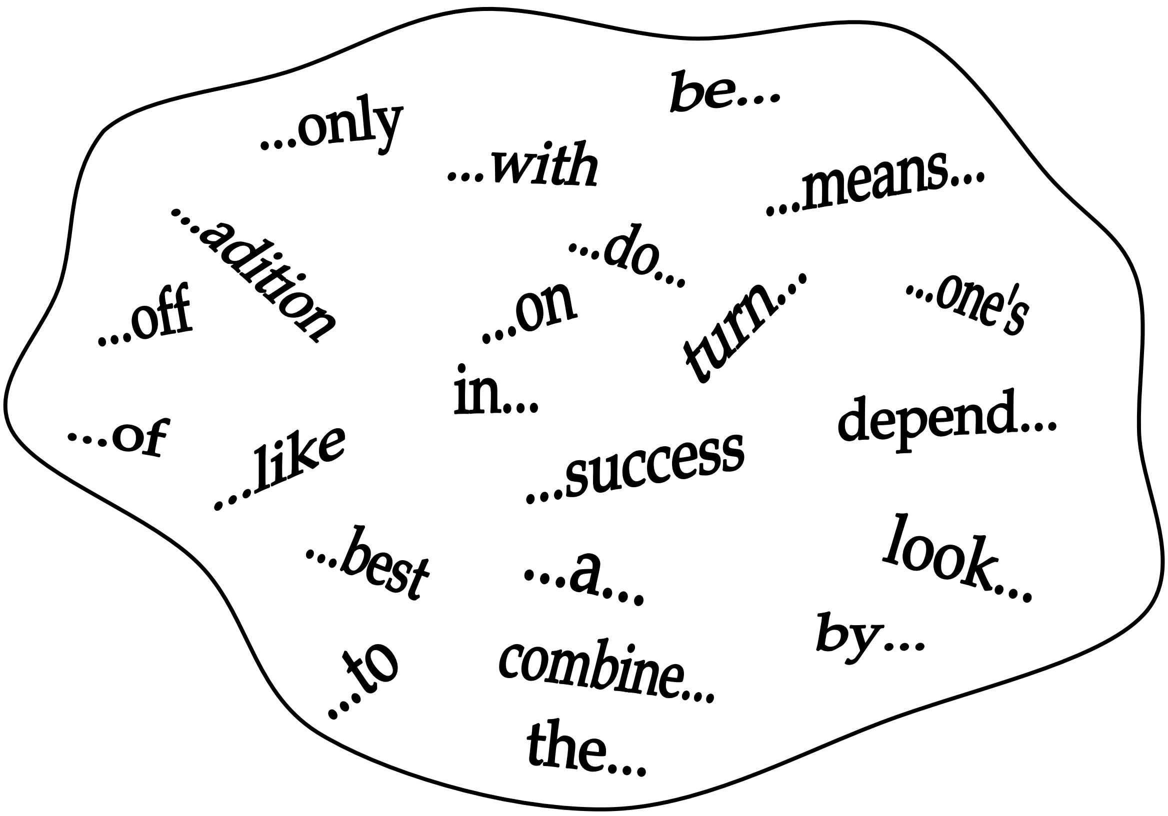
1) due to, owing to, back up, thanks to, because of;
2) at last, all in all, on balance, at least, summing up;
3) apart from, along with, in addition to, at any rate;
4) above all, as a result, first of all, on top of;
5) at any rate, at once, but for, at least, at the turn of;
6) in spite of, in order to, due to, be aware of, by means of;
7) at the beginning of, as early as, at present, at the head of, at the turn of;
8) as well as, cope with, even if, go in for, in advance;
9) both…and…, not only… but also…, but for, either…or…, neither…nor.
10) in the middle of, in the field of, in the sphere of, in the area of, in the branch of.

18. Find 10 set expressions among the fragments given below:

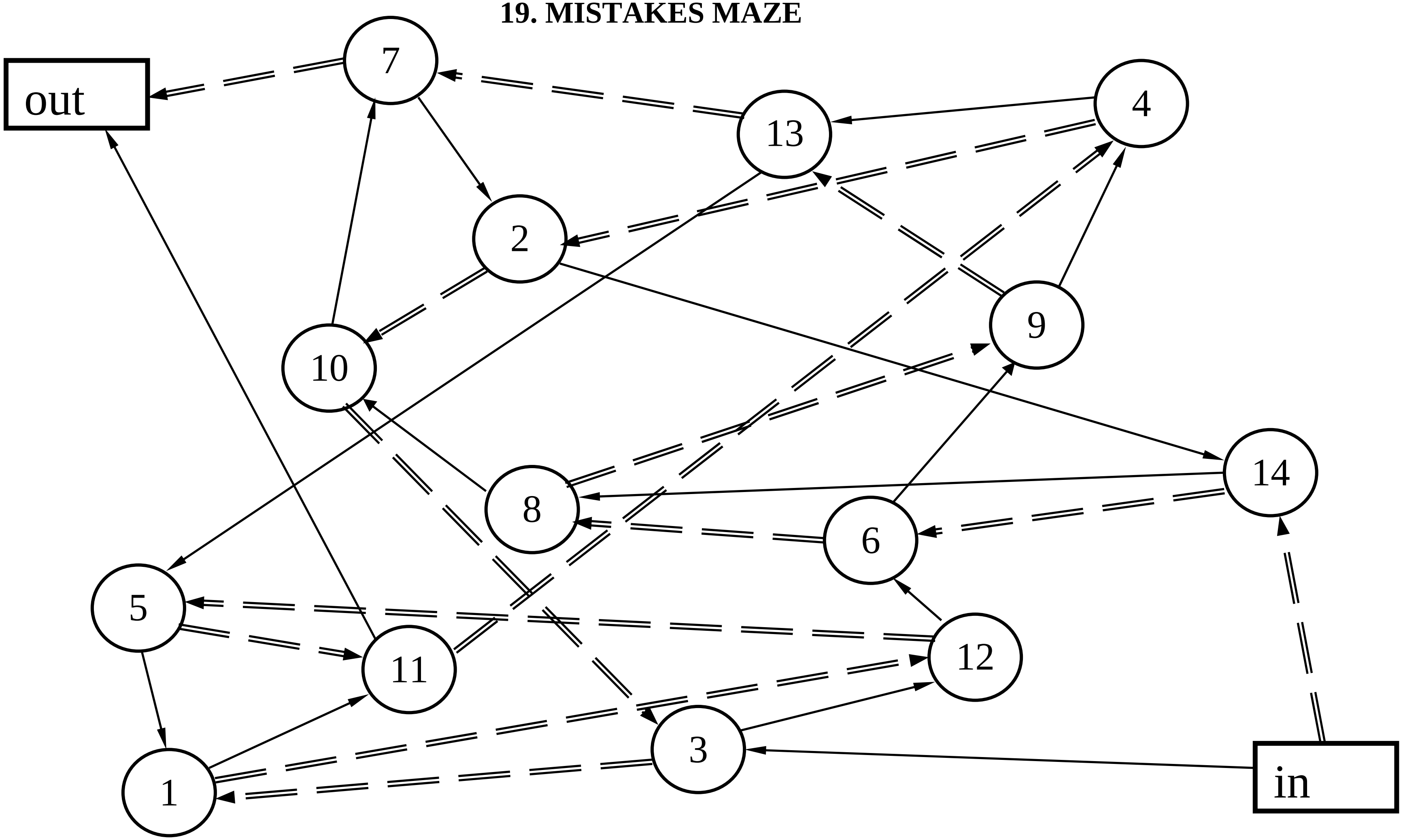
a)



b)



19. MISTAKES MAZE



Follow ——— line, if the sentence is correct;

═ ═ line , if there is a mistake in the sentence.

To find the way out of this maze it is necessary to know a lot.

1) The more set expressions you know, the better.
2) One can move on only by means to analyzing each sentence carefully.
3) If you find a mistake in these sentences you have to move along the crossed lines.
4) It is not only difficult but also time taking.
5) In fact you must be very attentive.
6) Your mistake will result for a wrong way.
7) In spite of all difficulties you should be optimistic about your work.
8) Now you underway.
9) You must make up your mind as to which way to take.
10) It is probably that you should find the right way at once.
11) At last you'll say "All is well that ends well".
12) Your steps must to meet the demands of the maze.
13) Sometimes you have to return to same sentence again to understand that you were wrong.
14) The only advice is to pay attention by each word.

20. Using as many set expressions as possible
a) make your own sentences dealing with your work and studies
b) write an essay about your research work

PART III
Reading Section
Read the following texts and do the task.

Text 1
20th CENTURY AND SCIENCE

I

We live in the age of swift engineering progress, and of amasing scientific discoveries and breakthroughs. We have become used to supersonic airliners, to TV programmes broadcast over vast distances through communication satellites, to the most varied manmade materials - from nylon and synthetic furs to super-hard artificial diamonds - and to many other things besides. If we take a close look at the pattern of our everyday life, we shall see the tremendous changes that have taken place in the last decades, and we may say with every confidence that all are fruits of scientific progress. The importance of science in the life of society grows unbelievably quickly. This could be summed up briefly thus: science favourably transforms the world today, determining in many ways its future.

Modern science is international. Its main trends which revolutionize our life and determine the standards (level) of engineering progress are being developed by scientists in many countries. The scientists of the USA, France, Japan, Germany, Czech, Poland and a number of other countries have all made major contributions to world science.

Comprehension

1. Find the sentence defining the main idea of the text.

II

Scientific research in our country is done on an enormous scale, and along the entire broad front of modern science. The achievements of Russian and Ukrainian mathematics and physics have had a great affect upon the acceleration of the scientific and engineering revolution in the whole modern world.

The high level of nuclear physics research made it possible for the country to master, in a brief period of time, the energy of the atomic nucleus and to become the first country to start using nuclear energy for peaceful purposes. Our scientists have contributed much to the physics of the plasma and to research into transistors. They have built new sources of electromagnetic radiation - quantum generators, lasers and masers. A wonderful property of the beam of light produced by such a generator is the insignificant expansion of the beam: for all practical purposes the rays remain parallel to each other even when projected over extremely great distances. This property also makes it possible to focus the beam into a spot considerably smaller than point of a needle, and, consequently, a colossal amount of energy is contracted in the focus. The laser can be used to cut and weld refractory metals, and to drill and shape the hardest materials. The laser provides the surgeon with a bloodless knife, a most delicate and unique instrument which is already used in operations on human internal organs. Experimental wireless telephone lines are already operating with the help of lasers. Lasers and masers will in the near future no doubt cause a virtual revolution in the field of radio - transmission, electronics and in new principles of the design of computers.

Comprehension

1. Enumerate the fields of the science developed in the 20th century.
2. Reproduce the text in your own words.

Text 2
SCIENCE AND TECHOLOGY: AN AMERICAN RECORD

REPUBLIC OF SCIENCE

No country has a monopoly on inventive genius. Any given scientific discovery is likely to be based on the ideas of people from different nations and different times. However, countries can encourage or discourage scientific inquiry and technological development. From its emergence as an independent nation in the 18th century, the United States has encouraged science and invention. It has done this by promoting a free flow of ideas, by encouraging the growth of useful knowledge, and by welcoming creative people from all over the world.

The United States Constitution itself reflects the desire to encourage scientific Creativity. It gives Congress the power "to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries." This clause formed the basis for the patent and copyright systems, which ensured that inventions and other creative works could not be copied or used without paying some kind of fee to the creator.

The United States of America was born during what is known in Western culture as the Age of Enlightenment. During that period of human history (usually considered to extend from 1680 to 1800), writers, philosophers and statesmen struggled to create 'perfect societies' based on reason and logic.

Enlightenment thinkers rejected the superstitions, prejudices and restrictions of the past. They argued that by the use of individual reason, unlimited improvements could be made in human capacities and human happiness. They believed that government was justified only when it served the well - being of the governed. In time, they predicted, a free people would, through the use of reason and logic, wipe out ignorance, poverty, crime and war.

Above all else, Enlightenment philosophers urged the advancement of science – the understanding and use of nature's powers – to improve the human condition. They talked about an ideal 'republic of science'. In such a republic, reason and logic would reign supreme, ideas would be freely examined and exchanged and useful knowledge would be advanced to benefit all people.

Comprehension

1. Define statements which can be attributed to science today.

Text 3
FRANKLIN AND JEFFERSON

Many of the leaders of America's struggle for independence from Britain were strongly influenced by Enlightenment ideas and endorsed the 'republic of science' notion. A number of Colonial American farmers educated themselves in Latin - not in order to read ancient Roman or early Church writers – but to read the scientific works of Sir Isaac Newton (1642-1727). Newton was very popular in Colonial America and many Americans were very optimistic about the role of science in a free society. These included Benjamin Franklin (1706-1790) and Thomas Jefferson (1743-1826), who throughout their lives, participated in and encouraged scientific studies.

From the 1740-s on, Franklin knew most of the scientists in the American colonies. He was, in a sense, the unofficial leader of the American scientific community. He also corresponded with many of Western Europe’s leading scientists. In this manner, he served as a bridge for scientific information between the Old World and the New World.

By encouraging naturalists to compile information about North America's unique plant and animal life, Franklin encouraged European scientific interest in the continent. Thanks to Franklin, the findings of Pennsylvania botanists John Bartram (1699-1777) and his son William (1739-1823) were acclaimed by European scientific societies.

To promote scientific research in America and to spread the word of the latest scientific developments in Europe, Franklin helped organize the American Philosophical Society in 1743. This was the first of many societies that have helped advance science and learning in America.

However, Franklin was also a man of action, and in the 1740s he conducted a series of experiments to advance the understanding of electricity. Franklin attended two lecture - demonstrations on electricity in the early 1740s and he became fascinated by the subject. He read about electricity in various European journals, then bought and borrowed some electrical apparatuses.

After many experiments, Franklin concluded that electricity is a power that flows through some substances – conductors and not through others – resistors. He also pointed out that some conductors permit a freer flow of electricity than others and if given a choice the electric flow will follow the path of least resistance.

On the basis of experiments and observations, Franklin claimed that lightning is a form of electricity. This had been suggested before, but Franklin was the first to prove it.

Franklin described his experiments in a series of letters to British scientist Peter Collinson. Later these letters were published as a book ***Experiments and Observations on Electricity***, made at Philadelphia in America, which was considered a major contribution to theoretical science at the time.

Based on the knowledge he acquired of electrical discharge paths, Franklin invented the lightning rod as a protective device for homes and public buildings, and he urged members of the Philosophical Society to promote useful knowledge for the benefit of the people. He contributed many useful inventions, including the Pennsylvania stove, bifocal glasses and a four-pane lamp for street lighting. From the beginning then, American science has always had a practical side.

Jefferson also stressed the practical aspects of science. For years, Jefferson and William Bartram exchanged seeds, plants and botanical information in an effort to improve American farming. On his diplomatic trips, Jefferson collected seeds and information about crops in other countries. Then he studied the feasibility of introducing those crops to parts of the United States. He introduced various types of rice, olives and grasses.

Comprehension

1. Make up the plan of the text.

Text 4
SCIENCE IN A NEW NATION

With Franklin and Jefferson, the dividing line between science and technology was often blurred. That was usually not the case in Europe at the time. There, scientists or natural philosophers, as they preferred to call themselves, pursued knowledge for its own sake. They often talked about ‘true science’ as something apart from the concerns of everyday life. They usually left the application of science to mechanics and tradesmen. But there was a wide knowledge gap between the two groups and little effort was made to bridge it.

Early science in America could not afford such luxury. American scientists were very much involved in everyday affairs. They were also mindful of Franklin's advice to promote useful knowledge.

Most American scientists of the late 18th century were involved in the struggle to win American independence and forge a new nation. These scientists included the astronomer David Rittenhouse (1732-1796), the medical scientist Benjamin Rush (1745-1813) the botanist Benjamin Smith Barton (1766-1815) and the natural historian Charles Willson Peale (1741-1827).

During the American Revolution, Rittenhouse helped design the defences of Philadelphia and built telescopes and navigation instruments for the United States military services. After the war Rittenhouse helped write Pennsylvania's constitution. He also designed road and canal systems for the state. Finally he returned to studying the stars and planets and gained a world- wide reputation in that field.

As Surgeon General, Benjamin Rush saved countless lives of soldiers during the Revolutionary War, by promoting hygiene and public health practices. By pioneering new medical treatments, he also made the Pennsylvania Hospital in Philadelphia an example of medical enlightenment for the whole world. After his military service, he established the first free clinic in the U.S.

Though Charles Willson Peale is now best remembered as an artist, he was also a renowned natural historian, inventor, educator and politician. He kept a record of new inventions in America and wrote about them in a series of letters to Thomas Jefferson. He also created Peal's Museum, which housed the young nation's only large collection of North American natural history specimens. Peale excavated the bones of an ancient woolly elephant or mammoth, near West Point, New York. Along with members of his immediate family, he spent three months assembling the skeleton. When it was finished, he devoted a special Mammoth Room to it in his museum.

Peale’s Museum was extremely popular with scientists, students and people in general. The museum fostered a broad interest in the plants, animals, gems and minerals of North America. It also started an American tradition of making the knowledge of science interesting and available to the general public. This tradition is still very much alive. There are hundreds of natural history, science, technology and engineering museums in the United States today. The most prominent is the Smithsonian Institution in Washington D.C., established by Congress in 1838, with funds willed to the young United States by an English chemist, James Smithson.

Comprehension

1. Find the paragraph describing different ways of science development in Europe and America and translate it in writing. Discuss the reasons in background.

Text 5
WELCOMING SHORES

Near the end of the 18th century, science in the newly created United States was imbued with a pioneering or frontier spirit. It was also isolated by the broad expanse of the Atlantic Ocean from the mainstreams of scientific thought and research in Europe. Science books and equipment were in short supply in America. American scientists often ‘invented’ products and processes that already existed in Europe.

In addition, the United States was a relatively poor nation. There were neither public nor private funds available for large-scale scientific research and leisurely study. Two American universities - the University of Pennsylvania and Harvard University in Massachusetts - had several distinguished scientists on their faculties, but they were not in a position to compete with the long-established, well-endowed universities in Europe.

Despite all that, America had certain advantages and attractions for scientists from other lands. American science was closely linked with the needs and feelings of the people. It was also democratic and free from the restrictive traditions of Europe. Many of the leaders of the new nation were enthusiastic about science and warmly welcomed scientists and technologists from other lands.

One of the first to come was the British chemist, Joseph Priestley (1755-1804). Though Priestley was one of the leading scientists of his day, his work was frequently ridiculed in Britain because his political opinions were at odds with those of the government. So Priestley came to America for, as he put it, ‘the sake of pursuing our common studies without molestation.’

Later, Priestley wrote that the United States government ‘by encouraging all kinds of talents, is far more favourable toward the sciences and the arts than any monarchical government has ever been’. He added, ‘A free people will in due time produce anything useful to mankind’.

Priestley was the first of thousands of world-renowned scientists that have come to the United States in search of a free, creative environment. Many, like Priestley, came to escape prejudice and persecution. Their numbers have included the theoretical physicist Albert Einstein (1879-1955), the mathematician Theodore von Karman (1881-1963), Enrico Fermi (1901-1954) producer of the world’s first self-sustaining nuclear chain reaction and Vladimir K. Zworykin (1889-1982), the inventor of the electronic television camera.

Other scientists came to the United States to share in the nation's rapid growth and the opportunity to apply new scientific ideas to practical uses. Alexander Graham Bell (1847-1922) moved down from Canada to patent and commercially develop the telephone and also to work on related inventions. Charles P. Steinmetz (1865-1923) came to America for the opportunity to develop new alternating current electrical systems at General Electric (Steinmetz was also a refugee from persecution.) Later, other scientists came to share in the nation’s new, outstanding research facilities. In the early decades of the 20th century, financial resources for the support of scientific research were plentiful and scientists working in the United States could hope for considerable material, as well as intellectual, rewards.

Comprehension

1. Speak of the problem presented in the text and express your opinion on the problem.

Text 6
PRACTICAL AMERICANS

No scientific development occurs in a vacuum. Scientists are drawn to centers of scientific achievement. There, new ideas breed more new ideas.

Throughout the 19th century Britain, France and Germany were the leading sources of new ideas in science and mathematics. These new ideas included: Dalton’s atomic theory; Humphrey Davy’s electrochemistry discoveries; Darwin’s theory of biological evolution; Joule's theory of the conservation of energy; Kelvin's relationships between heat and electricity; Rutherford's theory of the atomic nucleus; Lagrange’s celestial mechanics formulas; Marie and Pierre Curie’s studies of radioactivity; Roentgen’s discovery of X-rays; and Mendel’s ideas on heredity.

The period from 1810 through 1910 was a glorious 100 years for science in Western Europe. Major breakthroughs were made in understanding and, in some cases, controlling events and systems in nature – from the structure of atoms to the movement of stars.

Scientific achievements in the United States during the same period seem pale in comparison to European developments. However, American scientists and technologists were far from idle. Thousands of products that make life easier, safer and more enjoyable for people were developed by Americans during the 19th century.

In the early part of the century, many developments–particularly in tool-making, agriculture and construction–were made with little reliance on scientific knowledge and methods.

Many later developments, particularly those involving electricity, magnetism, chemistry, biology and structural mechanics required a basic understanding of scientific discoveries and principles. This linking of scientific understanding and technological know-how led to a type of applied science for which Americans became renowned.

The most outstanding American applied scientist of the 19th century was Thomas Alva Edison (1897-1931), who is credited with more than a thousand original inventions.

Edison investigated numerous scientific discoveries to see if those discoveries could be put to practical use. In the tradition of Franklin and Jefferson, Edison's primary goal was the adaptation of science to benefit people. Though Joseph Swan built an incandescent electric lamp before Edison, Edison's design was more practical. Both inventors used carbon filaments in a high vacuum; however. Swan's low-resistance filament didn't last nearly so long as Edison's high resistance filaments. Furthermore, Edison's light bulbs could be turned on and off individually while Swan's bulbs could only be used in a system where several lights are turned on or off at the same time.

Edison backed up his incandescent lamp development with the creation of entire electrical generating systems. Within 30 years, his developments put electric lighting into millions of homes.

Another landmark application of scientific ideas to practical uses was provided by the Wright brothers of Dayton, Ohio. In their small bicycle shop, they became fascinated with descriptions of the glider experiments of a German inventor named Otto Lilienthal. Though a leading American scientist of the day said it was impossible, Wilbur and Orville Wright resolved to build a powered flying machine.

The brothers did not just start building a machine. They read everything they could lay their hands on about gliding. They also built a wind tunnel and several glider models to gain a knowledge of air motion and pressure around the plane surfaces. They gained knowledge of the lift and drag of various wing shapes. They studied all aspects of motion in three dimension–pitch, up and down motion of a craft’s nose; roll, a banking movement around the craft's axis; and yaw, a left or right movement of the craft. They also studied ways to control these motions and came up with a wing warping system.

Combining scientific knowledge and mechanical skills, the Wright brothers built and flew several gliders. Then on December 17, 1903, they flew a powered, controlled heavier - than- air flying machine.

An even more classic example of applying abstract scientific principles to create a new field of technology was provided by three American physicists in the 20th century.

Drawing on Max Planck’s quantum theory and Albert Einstein’s explanation of photoelectric phenomena, John Bardeen, William Shockley and Walter Brittain of Bell Laboratories invented the transistor in 1948. The transistor – a solid-state replacement for the vacuum tube – revolutionized electronics.

When it was invented, the transistor was smaller and required less power than a vacuum tube. But that was just a beginning. With the invention of the integrated circuit in 1958, the pace of electronic and computer technology was greatly increased. Today, thousands – even millions – of integrated circuits can be placed on silicon chips no bigger than postage stamps. This means that tremendous amounts of electronic circuitry can be packed into small packages. As a result, book-sized computers of the 1980s have outperformed room-sized computers of the 1960s.

An American invention that was barely noticed in 1948 has created the computer age. And the progress of that age is changing the way millions of people work study, conduct business transactions and engage in research.

Computers are products of science and technology that are, in turn, having an enormous impact on science and technology. Mathematical computations and information-processing operations that once required weeks can be performed in minutes through the use of computers. All aspects of basic research, experimentation data gathering, testing and analysis have been improved by computer use.

Beyond the laboratory, computers are streamlining and quickening the operations of factories, farms, foundries, schools, stores libraries and hospitals. Computers are being used increasingly to aid in medical diagnosis and record keeping. Computers are also revolutionizing the design, manufacture, testing and marketing of new products. Computer-controlled robots are performing more and more production functions. Entire computer-controlled factories, distribution centers and communication networks have already appeared. Scientists are exploring the development of advanced thinking machines or artificial intelligence.

Not only are computers being used to develop and manufacture numerous products, they are also increasingly being incorporated into the products. Most cars, trains, ships, appliances, machine tools, weapons, communications equipment, cash registers, toll booths, assembly systems, etc. contain computer circuits.

Comprehension

1. Find and sound one more statement concerning modern science.
2. Reproduce the text in short.

Text 7
AMERICAN SCIENCE COMES OF AGE

As in the case of transistor and computer development, Americans have an outstanding record of applied science and technology achievements. From zippers to lasers, Americans have produced more successful inventions than any other people on Earth. But until the second half of the 20th century, Americans were considered far behind Europeans in terms of ‘pure’ science discoveries, concepts and theories.

In terms of basic science achievements, nations are usually judged by the numbers of Nobel Prizes won by their scientists in physics, chemistry and physiology/medicine. The will of Alfred Bernhard Nobel (1833-1896), a Swedish scientist, called for the prizes to be awarded each year for outstanding work in physics, chemistry, physiology/medicine literature and the promotion of peace. (Economics was added to the list in 1969.)

The first Nobel Prizes were awarded in 1901. In that year and for several subsequent years, the winners in the three science categories were Europeans. The first American scientist to win a Nobel Prize was Albert Abraham Michelson (1852-1931). Michelson, who was born and educated in Europe, won the 1909 prize in physics for determining the speed of light.

Five years passed before another American received a Nobel Prize in science. Theodore W. Richards (1868-1928) won the 1914 chemistry prize for determining the atomic weights of many chemical elements.

It was not until 1930 that an American scientist won a Nobel Prize in physiology/medicine. In that year Karl Landsteiner (1868-1943) was awarded a prize for his discovery of human blood groups.

During the first half century of Nobel Prizes – from 1901 through 1950 – Americans were in a definite minority in all three science categories. This pattern started to change in physics by the late 1930s and in the other two science categories by the late 1940s. From 1950 through 1985 more American scientists have won Nobel Prizes than the scientists of all other nations combined.

Comprehension

1. Comment on the information in the text.

Text 8
NUCLEAR ENERGY

Going into the second half of the 20th century, the strong United States lead in applied science and technology was broadened to encompass many areas of theoretical science. These include nuclear physics, genetics, space exploration and the manipulation of light.

One of the most spectacular – and controversial – achievements of United States science and technology has been the harnessing of nuclear energy. This achievement was based on scientific concepts developed since the beginning of the 20th century. The concepts were provided by scientists of many lands. But the scientific and technological effort needed to turn abstract ideas into the reality of nuclear fission was provided in the United States during the early 1940s. Nuclear fission is the generation of energy by splitting the nuclei of certain atoms.

The idea of nuclear fission can be traced back to the work of Lord Rutherford and Frederick Soddy between 1901 and 1906. The two British scientists studied the makeup of the atomic nucleus and concluded that a great store of energy was locked in each nucleus. Soddy suggested that someday that enormous energy might be released.

Fear that such an atomic war might occur swept through the international scientific community in 1938. Word leaked out that German scientists Otto Hahn and Fritz Strassmann had split a uranium nucleus by bombarding it with subatomic particles. Other nuclear physicists soon realized the significance of this event. Albert Einstein, Enrico Fermi and Leo Szilard concluded that a nuclear chain reaction was achievable. In such a reaction, the splitting of each nucleus would release particles to split other nuclei. The result would be a tremendous release of energy.

Einstein (German/Jewish) Fermi (Italian) and Szilard (Hungarian) had fled to the United States to escape persecution in National Socialist Germany and Fascist Italy. And they feared that the Nazis would develop an atomic bomb. In August 1939 Einstein wrote to President Franklin D. Roosevelt explaining that he element uranium might be turned into a great source of energy. He warned that ‘extremely powerful bombs of a new type may thus be constructed’.

This warning led to the Manhattan Project — the United States effort to build an atomic bomb. Milestones in this effort included achievement of the world's first self-sustaining nuclear chain reaction by Enrico Fermi at the University of Chicago in December 1942. Another milestone was the explosion of the first atomic bomb at Trinity Site, New Mexico on July 16, 1945.

Various successes in developing peaceful uses of the atom – nuclear power, nuclear medicine and a new understanding of physics – have demonstrated man's creative use of this scientific breakthrough, which offers a message of hope to balance against our shared anxiety about the destructive potential of nuclear weapons.

Comprehension

1. Speak on the problem in the text adding to it what you know about the same problem in your country.

Text 9
CONTROLLING ENERGY

New developments in science and technology often trigger opposition. The introduction of labor-saving machines in early 19th-century England touched off the Luddite movement. The Luddites were workers who systematically smashed new weaving and knitting machines. The Luddites blamed the machines for a rise in unemployment and a lowering of wages.

Americans have generally been receptive to new technology. Some new developments and ideas, however, have triggered resentment and resistance from some Americans. The introduction of steam and later the introduction of electric lighting provoked some fear and hostility. But the opposition to these technologies was brief and never widespread.

Opposition to nuclear power has been a very different story. The first commercial atomic power plant started operation in Illinois in 1956. At that time it was widely predicted that nuclear power plants would supply nearly all of the nation's electricity by the 1980s. That did not happen. Opposition to the construction of nuclear plants has tended to increase rather than decrease. Safety and environmental considerations have kept construction costs high. As a result, nuclear power has not been able effectively to compete with other power sources in the United States. During the 1970s and 1980s plans for several power plants were cancelled. Some plants under construction were abandoned and a few existing plants were closed. Much of the American opposition to nuclear power is based on environmental and personal safety concerns. Also Americans have several other more economical sources of energy. On top of that, Americans emotionally link nuclear power to nuclear weapons and to the great scientific effort that produced them both.

Since World War II, Americans have debated the benefits of scientific progress. On the one hand science and technology have given Americans a high standard of living, greater longevity than ever before and exciting achievements in space exploration. On the other hand, science and technology have produced the dangers of radioactivity, toxic wastes, environmental disruptions and the threat of nuclear weapons.

Americans are responding to these concerns on a variety of fronts, including international arms control negotiations, environmental protection laws, development of long-term disposal sites in remote areas for nuclear wastes and creation of a 'Superfund' program to clean up dangerous chemical waste sites that threaten health.

Comprehension

1. Discuss the problem focusing on its pros and cons.

Text 10
TOWARD THE FUTURE

Each new idea, each new development in science leads to many others. The pace of scientific and technological progress appears to speed up all the time. New inventions appear and quickly make hundreds of existing devices and procedures obsolete. An example is the laser - light amplification by stimulated emission of radiation.

Thirty years ago the laser was an idea in the mind of Charles H. Townes as he sat on a park bench in Washington, D.C. Today, the intense, directional, coherent (not scrambled) energy of a laser beam is used to cut through diamonds and steel. As surgical tools, lasers are used to repair damaged eyes and cut away brain tumors. By focusing enormous energy on a very small area, lasers can trigger unusual chemical reactions. Because laser light does not spread and scatter like 'ordinary' light, laser beams can carry information over tremendous distances. Laser light has been beamed from the earth to the moon and back again. Laser devices are revolutionizing image making printing, copying and the recording and playing of music. Studies are underway to use lasers as the ultimate defence against a missile attack.

Two of the most exciting current scientific developments are the human genome project and the superconducting super collider. The human genome project, which will take at least 15 years and cost $3 billion, is an attempt to construct a genetic map of humans by analyzing the chemical composition of each of the 50,000 to 100,000 genes that make up the human body. But even while this enormous undertaking is in progress, scientists are using knowledge about human genes to treat diseases, such as cancer. Scientists hope that additional knowledge about human genes will lead to more effective treatments for many diseases.

The Superconducting Super Collider is an attempt to learn more about the building blocks that make up atoms. Scientists use machines called accelerators to speed protons or electrons (parts of atoms) close to the speed of light. When these particles collide, the scientists study their interactions. The Super Collider, which is expected to be in operation in the late 1990s, will achieve speeds 20 times higher than those possible today. Scientists hope it will allow them to learn more about the composition of the smallest particles of atoms – particles known as ‘quarks’.

New developments can also have dangerous side effects. The development of nuclear power, pesticides and the plastics industry introduced serious hazards into the environment that must be treated. American scientists, policymakers and concerned citizens are now aware that new developments can have hidden dangers. Therefore, part of any scientific effort to develop new products includes an effort to detect, prevent or control any hazards.

Science and technology today, in the United States and throughout the world, are creating new worlds. And it is the responsibility of all people, as well as scientists, to make sure that these new worlds represent a genuine improvement in the quality of life for human beings everywhere.

Comprehension

1. List the trends in the 20 th century science.
2. Pattern new trends of science development in the current century.

Text 11
ERNEST RUTHERFORD
(1871-1937)

Ernest Rutherford was born on August 30, 1871, in South Island, New Zealand, in the family of English settlers.

In 1861 gold was found in New Zealand and many foreigners came to live there. Industry began to develop, the country began to increase its export.

Ernest’s father earned his 1iving by bridge-building and other construction work required in the country at that time. At the same time he carried on small-scale farming.

When James Rutherford, the father of the future great scientist, was 26 he became friends with Miss Tompson, a teacher of an English school. The young people fell in love and in 1866 they married.

Little Ernest was the fourth child in the family. When the boy was five he was sent to primary school. He was one of the best pupils there. After finishing primary school he went to the secondary school. He liked to read at school very much. His favourite writer was Charles Dickens. He made models of different machines. Especially he was interested in watches and cameras. He liked to take photos and constructed a camera himself. At ‘Nelson College’ (that was the name of the school) Ernest distinguished himself in physics, mathematics, English, French and Latin. He became the best pupil at school. He paid much attention to chemistry, too. Chemistry was not obligatory but Rutherford was the only pupil to study chemistry at Nelson College. At the age of 19 he finished school and entered the only New Zealand University, called Canterbury College. The University was founded in 1870. When Rutherford entered the University there were only 150 students and 7 professors there. At the University Ernest Rutherford was one of the most talented students. He studied much but took an active part in sport competitions. He also took an active part in the work of the Scientific Society at the University. At one or the meetings of this Society he made his scientific report ‘The Evolution or Elements’. At the same time he began his research work. For his talented scientific research work he got a prize. Later Rutherford went to Cambridge where he continued his researches.

About ten years Ernest Rutherford lived and worked in Canada. There he occupied a research chair in physics at the University in Montreal. Then he lectured in leading Universities in the United States and England, from 1907 till 1919. He worked at the University of Manchester.

Rutherford’s famous work is ***The Scattering of Alpha and Beta Particles of Matter and the Structure of the Atom***. The book deals with so-called “atom models”, according to which the atom is pictured as composed of a central charge surrounded by a sphere of electrification of equal but opposite charge.

The atoms had always been regarded as the smallest indivisible units of which matter was composed. Further research showed that the atom was made up of smaller parts and that its structure was very complex. It resembled the solar system, with a central nucleus and a number of electrons very much smaller than the nucleus and revolving around it. It was shown by Rutherford that the atom could be bombarded so that the electrons could be thrown off, and the nucleus itself could be broken in the process or splitting the nucleus, matter was converted into energy which for the scientists of the 19th century seemed to be impossible.

The splitting of the atom has opened to man a new and enormous source of energy. The most important results have been obtained by splitting the atom of uranium.

At present we are only at the beginning of the application of atomic energy and all its possible uses for peaceful purposes in power engineering, medicine and agriculture.

Ernest Rutherford paid much attention to his young pupils. After 1920 he did not make great discoveries in science but taught young scientists in the field of atomic research work.

Comprehension

1. Characterize Rutherford as a scientist.
2. Introduce yourself as a young scientist paying attention to the richness of your vocabulary and phraseology.

Text 12
ENERGY SENSE MAKES FUTURE SENSE
I

The world is running out of oil, and energy experts believe that there could be serious shortages in ten years' time. Not only is each individual using more oil than ever before, as the standard of living in industrialised countries rises, but the population explosion means that each year many more people will be using oil in some form or other. Until recently we took oil for granted: it seemed it would never stop flowing It was so cheap and plentiful that the whole world came to depend on it. Governments neglected other sources of energy: electricity was generated from oil and power stations were fired by it. It found its way into many of the products of light industry. Many people are surprised when they learn how many items in their homes contain oil.

The increase in the price of oil has brought the world to its senses Governments are searching for a suitable alternative, but so far in vain. They are considering how they can make better use of the two other major fuels, coal and natural gas, but they have found that neither can take the place of oil in their economies. In recent years there has been a growing concern for the environment and coal is not a popular fuel with environmentalists. Coal mines are ugly, and their development has a serious effect on animal and plant life: coal itself is a heavy pollutant Natural gas, the purest of the three fuels, is also the most limited in supply.

The answer would seem to lie in nuclear power stations. They need very little fuel to produce enormous amounts of power and they do not pollute the atmosphere. Their dangers, however, are so great and the cost of building them so high that some governments are unwilling to invest in them. Not only could one accident in a single nuclear power station spread as much radio-activity as a thousand Hiroshima atom bombs, but the radio-active waste from these stations is extremely dangerous - for one hundred thousand years. So, is there no possible alternative to nuclear power?

Comprehension

1. What 3 main reasons are given for the shortage of oil?

2. Does the writer blame anything or anyone for the shortage of oil? How do you know?

II

Well, there are several alternatives to oil but none of them seems likely to satisfy future world energy demands. Scientists have recently turned their attention to natural sources of 2-5 energy: the sun, the sea, the wind and hot springs. Of these the sun seems the most promising source for the future. Houses have already been built which are heated entirely by solar energy. However, solar energy can only be collected during daylight hours, and in countries where the weather is unreliable, an alternative heating system has to be included.

Experiments are being carried out at the University of Arizona on ways of storing solar energy on a large scale. To satisfy a large part of the energy needs of a country like America, huge power stations covering 5,000 square miles would have to be built and one wonders whether this would be acceptable to environmentalists. While experiments in generating energy from the sea and the wind are interesting, neither can be considered an obvious solution to a future energy crisis; the first because a lot of energy is needed to generate energy from the sea, and the second because the amount of energy generated from wind would satisfy only a small percentage of the nation's needs.

Another source of energy which could be more widely used is that generated by hot water or steam from under the earth (geothermal energy as it is called). This form of energy is already being used in New Zealand, Iceland, the Soviet Union and very successfully in Italy, where it generates a quarter of the nation's electricity.

Many scientists are optimistic that new ways of generating large amounts of energy will be developed successfully, but at the same time they fear the consequences. If the world population goes on increasing at its present rate, and each individual continues to use more energy every year, we may, in fifty years' time, be burning up so much energy that we would damage the earth's atmosphere. By raising the temperature of the atmosphere, we could melt the Arctic and Antarctic ice-caps and change the pattern of vegetable and animal life throughout the world – a frightening possibility.

These dangers will have to be kept in mind as scientists continue with their experiments. In the meantime, we can all help to protect the environment by not wasting energy. This means driving more carefully (if you have to use a car – it's healthier and cheaper to ride a bike) and turning off unnecessary lighting and heating in the home In these small ways we can all help to make the world a cleaner, healthier place for future generations.

Comprehension

1. Why, according to the article, is the use of too much energy a frightening possibility?

2. What do you know about the writer after reading this text?

3. Rewrite the title in your own words. Make sure that you don't change the meaning.

Text 13
OIL

There are three main groups of oils: animal, vegetable and mineral. Huge amounts of animal oil come from whales, those enormous beasts of, the sea, the largest remaining animals in the world. The whale is covered with a thick covering of fat called blubber. When the whale is killed, the blubber is taken off and cooked. It produces a large amount of oil for human consumption.

Vegetable oil has been known since ancient times. It is used for cooking. Soap is made from vegetable and animal oils.

To most people, one kind of oil is just as important as another But when politicians or engineers talk about oil they almost always mean mineral oil. This is the oil that drives tanks, airplanes, cars and engines. This is the oil that has changed our lives. This kind of oil comes out of the earth. It is better than coal because it burns well. It is used in lamps because it burns brightly.

What was the origin of the oil that drives our automobiles and airplanes? Scientists think that oil came from living things in the sea. Billions of tiny sea creatures lived at the bottom of the sea. They were covered with mud. Chemistry, pressure and temperature, and a long period of time changed these creatures into oil.

Geologists, scientists who study rocks, show us the best places to drill for oil. Sometimes oil comes out of the ground without drilling When there is some oil on the surface, there are probably huge amounts under the surface.

There is a lot of luck in drilling for oil The drill may miss the oil that is right near it. Great sums of money have been spent on looking for oil. Sometimes little or none is found. When we buy a few liters of gasoline for our cars, we also pay for the search for oil that is always continuing.

There are four main areas of the world where oil has appeared in large amounts. The first is the Middle East, and includes the Caspian Sea, the Black Sea, the Red Sea and the Persian Gulf. Another is the area between North and South America. The third is between Australia, and the fourth area is near the North Pole.

Comprehension

1. Oil has changed our lives beyond recognition. Suppose it disappears one day. Describe what the world would be without this product.

Text 14
SATELLITE COMMUNICATIONS

The Intercontinental Highway

Satellite communications were first used in Britain in 1962, when the space communications radio station, owned and operated by BT at Goonhilly Downs, in Cornwall, took a leading part in the first international experiments in communications using artificial satellites. Since then there has been a rapid growth of satellite technology for the provision of international telecommunications services. Most transatlantic traffic to and from Britain is carried by undersea cables, but a substantial amount of intercontinental traffic is also handled by satellite.

International satellite organizations

Because of the high-risk cost involved in establishing global satellite communications on an individual basis, governments formed the three major consortia - Intelsat, Inmarsat and Eutelsat - to handle intercontinental satellite communications. BT is designated by the British Government to act as the signatory to each consortium and represents British interests at consortia management board meetings. Britain is by far the largest investor in Eutelsat with 21.6 per cent; it has the second largest share in Intelsat with 9 per cent and in Inmarsat with 8 per cent. BT fully supports the move to privatise all three consortia to bring the delivery of telecommunications support to IT applications on to a more commercial footing.

Comprehension

1. State the commercial view on the problem.

Text 15
TELEVISION AND THE PUBLIC

For many people in the U.S.A., television has become a way of life: first the children of the family come home from school and sit down in front of the television, then the older members of the family take over after dinner and watch their favorite programs. Many men in the U.S.A. do not go to football matches any more but are happy to stay at home and watch them on television. In fact, in the U.S.A. you are now able to sit by the television set without interruption – because American technology has now produced ‘TV dinners’, which the housewife can put into the oven and then serve to her family, who are all seated around the television set. Both the preparation and the eating of these dinners do not require you to take your eyes off the set for more than a few seconds.

American television has a terrible appetite. There are three national stations that broadcast about 18 hours a day, seven days a week. This means about 20.000 hours of programming every year. In addition, there are a number of smaller, independent stations. Twenty thousand hours is equivalent to perhaps 12.000 movies, and even in its best days Hollywood turned out only five or six hundred films a year.

Another reason for the low level of so much of the television material is that it has to be ‘safe’. Almost all television is paid for by advertising; the company that pays for the advertising wants programs that do not cause arguments or disagreements. (A side effect of advertising is that the frequent interruptions for advertising in the middle of the programs make many people angry with television).

Television is at its best when it is an eye on the world – that is, when it is showing real events as they are actually happening. Television enabled everybody in the world who was within sight of a set to watch the first men on the moon as they were taking their momentous steps. Whether we like it or not, television is here to stay. Like the automobile, it is too much of a convenience for the public to give it up.

Comprehension

1. The writer connects the TV and the automobile. In your opinion, other than convenience, what else might the two have in common?

Text 16
CABLE TELEVISION, TELEPHONY AND MULTIMEDIA

An investment in the future.

The development of cable television in Britain began at the end of 1983, when the Government awarded 11 pilot franchises for operators to deliver cable television programmes and other telecommunications services over local broadband cable networks.

Since then cable companies have invested massive sums in the development of the cable infrastructure. During the early development period, subscription numbers for television services from cable companies were disappointing by comparison with the take-up rate of the leading satellite television operators, principally BSkyB. Subsequently, the uptake of cable telephony services occurred at a faster rate, outstripping that of television during 1995. By October 1998, 134 cable franchises, operated mainly by five leading companies, had developed a cable network entirely financed through private investment, passing more than 11.6 million homes.

In 2000, the total investment made by the cable companies amounted to more than £12 billion, representing a scale of operations that outweighs the construction of the Channel Tunnel. The amount of cable already laid in Britain would stretch from London to Sydney, Australia and back again with enough spare to trace the entire British coastline at least once. The network is due for completion when it will reach over 18 million homes, schools and businesses.

The technology and the marketplace

A single strand of broadband fibre-optic cable, the thickness of a human hair, can carry up to 32,000 telephone calls or hundreds of television channels simultaneously. From just one cable link, customers can connect to a highly competitive telephone service as well as to a huge range of television channels, multimedia applications and information sources. Cable is distributed directly from a central receiving station which receives satellite and terrestrial transmissions. The station processes and amplifies these transmissions and distributes them to subscribers via the cable network. This includes a return signal path, enabling the introduction of new interactive multimedia applications. Indeed, of the three main broadcasting channels (cable, terrestrial and satellite), cable is the most suitable for exploring opportunities in interactive television.

Cable TV networks are a good platform for high data rate transmissions using cable modems. A cable connection differs from a standard telephone line connection because it links one supplier to many connected consumers rather than being a one-to-one connection. This means that the data rates that can be supported depend on the volume of traffic on the network. Speeds of up to 10 Mbps (200 times faster than a normal phone line) may be possible using cable modems. Cable modems are likely to become a rapid growth area within Britain for this reason.

With such advanced services afforded by fibre-optic cable, Britain's cable infrastructure has become a platform for strong growth. The take-up of both television and telephony services is advancing rapidly, so that in January 1999 there were almost four million subscribers to either or both cable TV or telephony services out of the total of 11.6 million homes passed. One in ten of all UK households now take their television service through broadband cable and the figure is set to increase dramatically by the time the cable network is complete.

In this more promising cable environment, the leading cable operators make up a highly developed and competitive market, well positioned to offer an unprecedented choice of television and advanced communications services throughout Britain. The investment and development programme has also spawned an industry which has unrivalled world-wide expertise in terrestrial cable-laying, equipment manufacture, related telecommunications software, installation and maintenance, and advanced technologies such as 'self-healing' cable systems.

New developments

Digital television has only recently been launched in Britain and is bound to revolutionise not only the range and availability of television programmes, but will also radically change the way people use televisions in homes. Digital Cable Television (DCT) operates via a set-top box which incorporates a cable modem and runs over a 'future-proofed' cable network. DCT not only offers a greater choice of films and a wider range of home shopping, but also interactive services and access to the Internet on TV. In January 1999 NTL, one of the largest cable operators, launched its first TV-Internet service, in conjunction with Network Computer Inc., which provided the enabling technology. The software automatically scales and displays the Internet content within the screen, allowing television programmes to run simultaneously.

Digital television sets incorporate highly sophisticated software, an indication that the electronics industry is joining the path of convergence that is already well under way between telecommunications, IT, and content industries as we enter the 21^{st} century.

Comprehension

1. Briefly summarise the information contained in the 3 passages of the text.

Text 17
NEW ERA OF GLOBAL NETWORKS

The UNION of computers and communications is a marriage made in heaven. Yet while the banns have been read many times over the past two decades, consummation has been a slow process.

The reasons are both cultural and technical, but today there is renewed optimism that a new era in information processing systems is about to unfold as a result of the convergence of the two most powerful modern technologies.

Computers and digital (computer language) communications lie at the heart of information technology; computers realise their full potential only when connected in networks; telecommunications systems based on digital technology are infinitely more flexible and powerful than their analogue cousins.

Together, they are a powerful driver of globalisation, enabling companies to capture economies of scale by eliminating barriers of time and space.

The telecom and computer industries, however, have separate origins and history. Telecoms stretches back into the last century; the industry grew up with traditions of regulation, monopoly power and a duty to maintain and protect the network.

The computer industry grew out of research into scientific calculation and, in the 1950s, it was grafted onto the mature office equipment business which it then proceeded to cannibalise.

Telecom companies and computer companies have often been seen as competitors rather than allies, In the 1980s, AT&T, the US telecommunications giant, and International Business Machines, the world's largest computer manufacturer, seemed set for a battle royal as AT&T established a computer division and IBM bought Rolm, a promising telecoms manufacturer.

Comprehension

1. State, whether the phrases: “a marriage made in heaven” and “a powerful driver of globalisation” in the text refer to the same thing or not.

2. Characterize the relations between the two parts of the alliance. Explain the commercial reasons of these relations.

3. Give a brief description of modern mass media and comment the problem from the point of view of your science.

Text 18
MARKETING IN THE NETWORK ECONOMY

As the twenty-first century dawns, marketing is poised for revolutionary changes in its organizational context, as well as in its relationship with customers. Driven by a dynamic and knowledge-rich environment, the hierarchical organizations of the twentieth century are disaggregating into a variety of network forms, including *internal networks, vertical networks, intermarket networks,* and *opportunity networks*. The role of marketing in each network is changing in profound ways. Marketing increasingly will be responsible for creating and managing new marketing knowledge, education, real-time market information systems, intrafirm integration, conflict resolution technology forecasting, risk and investment analysis, transfer pricing of tangibles and intangibles, and the coordination of the network's economic and social activities. It will explore new frontiers in multilateral marketing; reshape markets through technology convergence and electronic commerce, organize consumer communities, and aggregate consumer information and demand into saleable business assets. The most radical implication for marketing is the shift from being an agent of the seller to being an agent of the buyer, from being a marketer of goods and services to being a customer consultant and manager of his or her saleable consumption assets.

Comprehension

1. Translate in writing and practise back translation with your partner in turns.

2. Show your vision of marketing in the network economy.

3. Speak about the trends and peculiarities in development of your science.

Text 19
SOME THOUGHTS ON THE EUROPEAN COMMON MARKET

The European countries are heading towards a decade of strong unification and competitiveness. The coupling of two such contradictory concepts may seem strange but we all know that Europe is becoming a large 'merger area' of both economies and people, through an explosion of industrial and financial competition among the individual countries, business systems and regions.

Thus the contradiction is only apparent. But there is no doubt that the co-existence of merger and competition causes great cultural difficulties and ambiguities: on the one hand, we must create a common culture for ourselves– in language and information, business, consumption patterns – while on the other hand, we must emphasize those distinctive cultural traits that, by making us different, permit us to follow competitive and original strategies– in organization, commerce and technology.

This cultural ambiguity is seen in the ways in which we think of the European labour market, of the professional skills and levels it will require and of the educational policies it will generate. In these three fields everything must be viewed from two sides: a tendency towards uniformity and unification and a tendency to stress diversity.

In the first area, the one devoted to unification, there are highly important processes operating almost simultaneously. These include an advanced degree of unification in the labour market at the levels of lower responsibility: a tendency towards uniformity in average consumption and entertainment; a tendency toward unification in language to (traditional linguistics and new forms of communication such as computers and television), and unification of certain areas of education and training.

In my view as a researcher more attune to diversity among peoples we must, in order to accommodate unification in Europe, also leave specific room for the diversity of national cultures. If we do not, they will return, some time hence, in forms perhaps more irrational, rancorous and fundamentalist.

Comprehension

1. This text was published several years ago. Say what the situation is like today.

Text 20
UKRAINE RANKS 38th IN THE TOP 100 INNOVATION LIST

To invent a perpetual engine does not necessarily mean to earn a profit. Even though Ukrainian scientist generate countless interesting inventions, according to the report by the Economic Intelligence Unit analytical bureau, which appears on the Web site wahprofile org, Ukraine ranks 38th among 100 nations in terms of the innovation index. The innovation index characterizes the level of cooperation between science and business and the time it takes to introduce inventions into the economy. This list is topped by the US, Taiwan, Finland, Sweden, and Japan. Leaders among the post-Soviet nations are Latvia in 26th place and Russia in 34th place.

Japan is an undisputed leader when is comes to patents, with 124,000 patents issued in 2001, followed by the US with 83,000 patents and South Korea with 34,000 patents. According to the State Department for Intellectual Property, since 1992 Ukraine has registered a mere 129,000 so-called right protection documents, 72,855 of which were repeat registrations of inventor's certificates, 3,026 utility patents, and 9,376 industrial patents. Traditionally, Ukraine's most innovation-intensive sectors are Pharmaceuticals, food, and chemicals industries.

Not surprisingly, Ukrainian science cannot develop for lack of funding. Sweden, for example, allocates 3.6% of its GDP for science, Finland 3.4%, Iceland 3.1%, while Ukraine a mere 1.7%. "In the nearest future the world will be divided into those who can develop science and those who cannot afford to do so," says Vitaly Kordium, academician and doctor of biology, adding: "The latter will survive, but will only smelt steel or grow grain." To quote Kordium, investing in science is a long-term process, while Ukrainians want, so to speak, to invest money in the morning and reap a profit in the evening. For our science to yield a profit we must have a developed infrastructure. "If, for example, you want to manufacture a new pharmaceutical product, you need to find a company to market it. But so far nobody in Ukraine is interested in such business, as we have many other opportunities to earn a quick buck," says Kordium.

The financial aspect is directly linked with the problem of personnel, i.e., the infamous brain drain. Talented Ukrainian scientists are tempted by paying jobs overseas. Yet not many of them accept such proposals, but instead decide against joining the orab dollars, and work for the benefit of their homeland. Meanwhile, it is much more difficult to put up with the absence of necessary equipment. "I know many scientists who were reluctant to leave, but were forced to do so," Kordium says. New equipment is .needed to create conditions for work, while new equipment comes at a price. Western scientists some times try to send their Ukrainian colleagues hand-me-down equipment that is considered obsolete in the West. But even this proves hard to accomplish, as clearing such equipment through the customs requires the payment of taxes and masses of paperwork. Another problem is the lack of certificates. Even if our scientists decide to buy equipment overseas, they will have to go through a long and costly certification procedure.

Ukraine's science is still alive and kicking. Meanwhile experts claim that Ukrainian scientists are among the world's most talented and have enough scientific potential to ensure the country's development. Now it only remains to increase funding. Incidentally, the 2005 draft budget provides for 40% higher allocations for science.

Comprehension

1. Present your point of view on scientific potential in Ukraine.
2. Make up and deliver a report on prospects of science development (including technological, economic, social, political and philosophical aspects of the problem).

Text 21
PLASTIC REAPS A GRIM HARVEST IN THE OCEAN OF THE WORLD
I

A number of scientists believe that plastic is the most far-reaching, man-made threat facing many marine species, annually killing or maiming tens of thousands of seabirds, seals, sea lions and hundreds of whales, dolphins and sea turtles. "You can go to an oil spill or a toxic chemical spill and see animals struggling to survive," says David Laist senior policy and program analyst for the U.S. Marine Mammal Commission. "But those dangers are concentrated in one place. With plastic pollution, it's a different situation. Plastics are like individual mines floating around the ocean just waiting for victims".

Tony Amos, an oceanographer at the University of Texas; Marine Science Institute, is one of a growing number of scientists who are documenting plastic pollution of the ocean and its perils for the creatures that live there.

The vast amount of plastic objects like bottles, bags, gloves, ropes, egg carton, Bic lighters, disposable diapers, tampon applicators that Amos logs in during every sweep of Mustang Island's beach represent a tiny fraction of the debris floating a few miles of the Texas shore. They are washed ashore, and tourist beaches along the Gulf of Mexico, a body of water that shelters a busy international port and hosts extensive offshore oil activities, look like cluttered landfills. But the problem extends far beyond the Gulf. Throughout the world, important water bodies - especially the oceans - have become virtual waste bins for the tons of plastic products dumped daily by commercial fishermen, military vessels, merchant ships, passenger liners, pleasure boats, offshore oil and gas drilling operations, the plastics industry and sewage treatment plants.

No one knows how much plastic pollutes the seas. In 1975 the National Academy of Sciences estimated that more than seven million ton of garbage are dumped into the world's oceans every year. There was no overall breakdown for plastics, but the academy itemized trash from several specific sources. Measured in terms of weight, less than 1 per cent of that litter was categorized as plastic. But some experts believe such findings greatly understate the problem because plastic is so much lighter than other debris. The production of this artificial material has more than doubled since 1975. Plastic soft drink bottles, for instance, were not introduced until the late 70s. This dramatic increase is reflected in more recent studies of marine debris. A 1995 report estimated that merchant ships dump 450.000 plastic containers each day into international waters.

Comprehension

1. State the size of the problem. Why does it exist and grow?
2. "Some experts believe that such findings understate the problem". What does 'such findings' refer to?
3. How is the problem of plastics measured?

II

Until only recently, no laws have specifically prohibited ocean disposal and dumping of plastics. As a result, vessels worldwide have made the ocean their home – and their dumping grounds, disposing of wastes with wantonness that never would be permitted on land. Joe Cox, of the American Institute of Merchant Shipping, explained the rationale for dumping: "You go weeks without seeing any other people and you begin to think there's an awful lot of water out there. Taking it down to the baseline of human behavior, it's just easier to do it".

It is one of the sad ironies of modern times that the synthetic developed by Man and outperformed products made from natural materials is ravaging nature in the process. Since the exigencies of World War II spurred large-scale production of plastic as a substitute for scarce resources, it has become the favoured American material – more durable than wood and rubber, lighter than metals, safer that glass and less expensive than leather. It is present in virtually every product line from Army helmets to artificial hearts and Styrofoam cups.

Comprehension

1. Is the final paragraph optimistic or pessimistic? How do you know?
2. Find your own methods to solve the plastics problem and discuss them with your partner\group.

Text 22
DYING PALM TREES

Coconut palms are a natural part or the landscape in the Bahamas, Mexico, Florida and Texas. At least, they were, until 1986, when, after having lost a two year battle, they completely vanished. The reason was a disease known as lethal yellowing which is caused by deadly microbes called MLOs. Unfortunately, the disease appears undeterred by such natural barriers as open seas. Scientists calculate that on land, the disease spreads as fast as 1.3 miles a month.

The dead organisms are carried from tree to tree by insects called planthoppers. When the planthoppers feed on palm leaves, they inject MLOs into the tree's food-carrying veins, much as a mosquito injects malaria-causing parasites into a human victim.

Lethal yellowing generally kills a tree within five months after symptoms appear. First the immature coconuts begin to drop, then the flower buds wither, after which the leaves turn yellow and the tree's crown falls to earth. The barren trunk stands like a warped telephone pole until it too rots and collapses. Researchers have found that infected palms can be treated, though not permanently cured, by injecting an antibiotic directly into a diseased tree. This treatment can suppress the symptoms indefinitely, but as soon as the treatment is discontinued, the symptoms recur, and the tree eventually dies. Such treatment, therefore, is impractical for plantations numbering in the tens of thousands of trees.

As in all wars, human misery is the final product. The ‘tree of life’, as the coconut palm is called, is valued not only for its tropical beauty but also for the millions of dollars it yields annually in products such as copra (dried coconut meat), coconut oil for soaps and detergents, and even coconut-shell charcoal used In air-purification systems. In certain areas, islanders build thatched roofs with the leaves of the palm. The trees are crucial for providing shade for animals and crops as well as for cooling the houses of island residents. Tourism is also affected as the few uninformed, misfortunate vacationers lie in the searing sun without hope of shade.

As long as one infected planthopper remains alive, prospects for the immediate future remain bleak. Despite extreme measures such as quarantines and felling of diseased trees, millions of producing coconut palms will die before the epidemic runs its course.

Comprehension

1. Has palm trees dying affected people’s lives only in those countries where they grow? Explain why.

Text 23
OVERAMPLIFICATION

The young are not listening to their elders and perhaps they never have. But now it appears that with many of them, the reason may be medical. The young aren’t listening because they can’t hear. Just as nagging parents have long suspected, otologists (hearing specialists) now report that youngsters are going deaf as a result of blasting their eardrums with electronically amplified music.

The hearing specialists used to worry about loud noise as a cause of partial deafness only in industrial and military situations .They knew that eight hours of daily exposure of the worker, year in and year out, to the noise of heavy machinery would eventually result in permanent, irreversible hearing loss. Riveters were particularly susceptible. Then they learned that the same thing happened to aviators. After the advent of the jets, the hazard applied to ground crews at airports and flight-deck personnel aboard aircraft carriers — hence the introduction of insulated, noise-absorbing plastic earmuffs.

In discotheques the trouble is not so much in the instruments themselves, or the close quarters. The blame goes to the electronic amplifiers. An old-fashioned military ban playing a march in Central Park generated as much sound. But the sound was not amplified, and was dissipated in the open air. The trombonist sitting in front of a tuba player might be a bit deaf for an hour or so after a concert; then his hearing returned to normal. One microphone hooked up to a public address system did not appreciably increase the hearing hazard. What did was multiple mikes and speakers, and the installation of internal mikes in guitars and other musical instruments.

The man who had the problem closest to home and studied it there, was George Singleton, an ear, nose and throat doctor at the University of Florida. He had noticed that when he picked up his teenage daughter after a dance, she couldn't hear what he said in the car on the way home. Dr. Singleton recruited a research team and tested the hearing of ten teenagers an hour before a dance. Then the investigators went to the dance hall and found the average sound intensity to be very high in the middle of the dance floor. Directly in front of the band it peaked to a very high level. The test crew had to move forty feet outside the building before the level dropped to a safe but still uncomfortable level. After the dance, the teenagers' hearing was tested again. Despite the youthful resiliency of their inner ears, all had suffered at least temporary hearing impairment.

Why do the youngsters immerse themselves in noise that is so uncomfortable to their elders? A Florida teenager explained: “The sounds embalm you. They numb you. You don’t want to hear others talk. You don’t want to talk. You don’t know what to say to each other, anyway.” So, why listen? And, eventually, how?

Comprehension

1. Give your point of view on the problem described in the text. Can we oppose this increasing sound level in the modern world?

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