Національний університет біоресурсів і природокористування
Кафедра англійської мови для технічних та агробіологічних спеціальностей

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МЕТОДИЧНІ ВКАЗІВКИ З ВИВЧЕННЯ АНГЛІЙСЬКОЇ МОВИ ПО СПЕЦІАЛЬНОСТІ ДЛЯ СТУДЕНТІВ ФАКУЛЬТЕТУ ЕНЕРГЕТИКИ ТА АВТОМАТИКИ

(базова частина)

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Методичні вказівки з вивчення англійської мови по спеціальності для студентів факультету енергетики та автоматики(базова частина) / Укладач: К.Г. Якушко.-Київ: Видавництво, 2010.- 154с.

Методична розробка містить базові теоретичні основні та додаткові ознайомлюючі тексти по спеціальності як матеріал для розвитку усного мовлення для підготовки до складання іспиту з англійської мови і для загального розвитку студентів факультету енергетики та автоматики.

Рекомендовано до друку Вченою радою Природничо – Гуманітарного інституту Національного університету біоресурсів і природокористування України.

Укладач: ЯКУШКО КАТЕРИНА ГРИГОРІВНА - асистент кафедри англійської мови для технічних та агробіологічних спеціальностей

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ЗМІСТ

1. **ВСТУП**

Дана методична розробка пропонує поступове опанування загальним курсом англійської мови, передусім, по спеціальностях 7.091901 «Енергетика сільськогосподарського виробництва» та 6.090600 «Електротехнічні системи електроспоживання».

Розділи розробки включають в себе опрацювання базової лексики як аудиторної групової роботи для детального ознайомлення та переказу, обов'язкові завдання для самостійної роботи під керівництвом викладача по заданому варіанту та додаткові завдання для самостійної роботи під керівництвом викладача за власним вибором студента.

Кожний вид завдання передбачає повторення граматичного матеріалу загального курсу та поєднання його з термінологією по спеціальності або в розмовних кліше у власних висловлюваннях

2. СЛОВНИК БАЗОВИХ ТЕРМІНІВ

ALPHABET

Aa	Hh	Oo	Vv
Bb	Ii	Pp	Ww
Cc	Jj	Qq	Xx
Dd	Kk	Rr	Yy
Ee	Ll	Ss	Zz
Ff	Mm	Tt	
Gg	Nn	Uu	

A

ability-здатність, властивість

absorbed - поглинутий

a.c. –змінний струм

accidental – випадковий, несуттєвий

accelerating force – сила прискорення

accompany - супроводжувати

achievement- досягнення

activity- діяльність, робота

actually-фактично

aid – ціль, мета, спрямування

alternating current- змінний струм

alternator= AC alternator- генератор змінного струму

added- доданий

additional- додатковий

ahead of its time- випереджаючи свій час

air- повітря

air gap —повітряний зазор

amber - бурштин

ammonium chloride- хлорид амлнію

amount- величина, кількість

ampere-turn- ампер-виток

amplify – підсилити *або* обладнати електричним підсилювачем

analogous – аналог, подібний

announce – оголосити

any – будь –який, якийсь

apply- застосовувати

application- застосування, вживання

area- площа, відстань

armature - якір

array – впорядковувати, приводити в готовність, систематизувати

article- стаття

artificial interface – спроба, виклик винахідника

around- навколо

as long as- у відповідності до часових рамок

as well as- так само як

assign –визначати, означити

assist – допомагати, підтримувати

at rest- у стані спокою

apply- застосовувати

application- застосування

approx.- приблизно

attract –притягувати, приваблювати

available- доступний. наявний

avoid- уникати

B

backwards - у зворотньому напрямі

bar magnet- стрижневий магніт

battery –батарейка

before - перед

bell- дзвінок

belt-driven - з приводним ремінем

became the source- став основою(джерелом)

benefits - преваги

between- між

beyond – поза зоною *або* пізніше

boil- кипіти

boiler – кип'ятильник, бойлер *або* ТЕНовий нагрівач

break down- вимкнутися, вийти з робочого стану

broad discipline –дисципліна з багатьма розділами для вивчення

broad utilization- широке застосування

brushless- безпечний

bulb- колба

by varying- шляхом зміни / видозміни

C

calculate – рахувати, проводити математичні підрахунки

call- називати, кликати

called- названий або минула дія від to call- називати

cancel-скасувати. відмінити

cannot do without- не можуть обходитись без

capable-здатний

capacitance— ємність

capasitor- провідник

car battery- акумулятор

care- догляд

carbon rod- вуглецевий стержень

care-догляд

careful- обережний

carrier- носій

case- кожух, бак

cattle barns - приміщення для утримання худоби

cause- спричиняти

c.c.-постійний струм

certain amount- допустима величина

chair – стілець, тут- кафедра

change- змінювати,зміна

charge- заряджати, заряд

chemical action - реакція

circuit-електричне коло,поле. ланцюг

circuit breaker-вимикач

cell-елемент,складова

coil– катушка

collisions-зіткнення,протистояння

common-загальний, загальноприйнятий

combined-cycle gas turbines –турбіни з подвоєнним циклом газоутворення

complicated - ускладнений, багатокомпонентний

compressed air- стиснене повітря

concept- поняття

confusion- зіткнення

connect - поєднувати

connection-з'єднання, підводка

concern- пов'язувати

considerably- важливо

consequence – наслідок, висновок або значення

contribute-вносити, співдіяти

control- управляти

counter-torque - протидіючий обертовий момент

condenser - конденсатор

condition- умова,стан

conductor- провідник

confusion- плутанина

constantly- постійно, неухильно

constitute- складати, утворювати

construct - конструювати, складати. утворювати

contain- містити

continue- продовжувати

continuous current- постійний струм

convenient – зручний, доцільний

conventional- звичайний. традиційний

convert- перетворювати

conveyor- конвейер, транспортер

copper - мідь

c.c. –(continuous current) – постійний струм

core- осердя

corpuscular

corrode-окислювати, спричиняти корозію

cross- section - поперечний переріз

current- поточний (*тут* струм)

cut — перетинати

cut off electricity- вимкнути (вирубити) електрику

complexity - складність, заплутаність

copper – мідь або паяльник

counter - протилежний,протидіючий , проти часової стрілки

concept - поняття

connection- з'єднання

constant- сталий

convert – перетворювати

converter- перетворювач(трансформуючий пристрій)

conversion- конверсія, пертворення

cost- затрати, собівартість або коштувати

create - створити

culminate- досягати апогею (найвищої точки)

curiosity-рідкість, дивина

D

data- дані

d.c.-постійний струм

d.c. generators- генератори постійного струму

DC electric motor- електродвигун з використанням постійного струму

damage- пошкоджувати, неполадка

danger- небезпека

dangerous - небезпечний

darkness- темрява

deal with – мати справу, пов’язуватись

decades-десятиріччя

define - визначати

deliver – постачати

density- густина

depend on- залежати від

degree- ступінь

desired- бажаний

design – проект, розробляти

desired – бажаний

deliver- постачати

density - густина

described- описаний або мин. дія від to describe- описувати

detect- визначати наявність

determine- визначати

develop- розвивати

development- розвиток

device- прилад

devote - присвятити

dielectric- ізолятор, діелектрик

difficulty – трудність

discover- відкривати

discovered – відкритий або мин дія від to discover - робити відкриття

discovery- відкриття

discussion- обговорення

dislodge-зміщувати, витісняти

distinguish- виділяти, розрізняти

distribution - розповсюдження

devices- прилади

dependent-залежний

determine- визначати

different- різноманітні

difference- різниця

direction- напрям

discharge- розряджати

displace- зміщувати розташування

dissimilar - різнорідні

distance- відстань

distributed – розповсюджений, поширений

d.c. (direct current) – постійний струм

directed – спрямований

direction- напрям, спрямування

directly – прямо

distribution- розповсюдження, передача на відстань

doubly-fed- подвійного живлення

draw- креслити, витягати

drift- пересуватись, переміщатись

driven –заведений, запущений в роботу

dry- висушити, позбавити вологи

dry cell- сухий елемент

due to- завдяки

E

e.m.f.- електрорушійна сила

each- кожний

each other- один до одного, взаємодіючи

early days- давні часи

easy to start- легко заводити

educational building - навчальний корпус

effect- явище, вплив

efficiency- ККД (коефіцієнт корисної дії)

electricity- електрика

energy technologies - енерготехнології

essence- сутність екстракт

example- приклад

extract-вилучати або залишок

efficient- ефективний

efforts- намагання, дії

equal- рівний, дорівнювати

equipment- обладнання

elapse- минати

electric current - електричний струм

electrically heated furnace- піч електронагріву

electricity- електрика

electrically heated furnace- піч електронагріву, СВЧ

electrically charged belts-електроприводні ремені

electrolyte- електроліт

electromagnetic induction - електромагнітна індукція

electromagnetic waves - електромагнітні коливання

electromotive force- електрорушійна сила

electronic control –з електронним управлінням

equip –обладнати

equipment – обладнання

end- кінець

engine- двигун

essential-невід'ємний

evolved - розвинутий, розроблений

exact sciences- точні науки

exactly equal – точно . рівно до

example- приклад

exceptionally - винятково

exceed - перевищити

exist around- існувати навколо

explain- пояснити

extended- витягнений, поширений

external- зовнішній, по зовнішньому краю

external circuit- зовнішнє електрополе

experiment- дослід

F

facility- легкість, плавність або обладнання

familiar – знайомий

fatal consequences – фатальні наслідки

farm usage- сільськогосподарське призначення

farther apart- набагато віддаленіший

favor-сприяти

faulty – замикання, технічна несправність

field- поле

field coil-польова катушка

filament- волокно або нитка розжарювання

find- знаходити, винаходити

fix- прикріплювати

fixed polarity- фіксована (унормована) полярність

flame -полум'я (вогню)

flexible – гнучкий, пластичний

floodlight- освітлення прожектором

flow- потік, протікати

flux - потік

flux tube— трубка потока

follow- слідувати

following- наступний

force- сила, змушувати

forward motion- рух вперед

frame - рамка *або* форма для заливки

frequency- частота

frequent - частий

free- вільний, вивільнений

freely suspended – вільно підвішений

friction-тертя

in front – попереду

full- повний, наповнений

furnace - піч

further- надалі

H

hand crank -колінчатий ричаг

handled – керований

handling- регулюючий\ управляючий

harvesting-збирання врожаю

headlight- фара(автомобіля)

heat- нагрівати, тепло

heating- процес нагрівання

heavy- важкий

held-(мин від hold)- утримувати, отримувати

high- високий

high power- з високою напругою\ потужністю

high-current dynamo- високовольтна динамо- машина

high- tention- з високою напругою

higher educational establishments - вищі навчальні заклади

higher level - вищий рівень

highly qualified specialists – високо освічені спеціалісти

hole- отвір

horsepower rating- номінальна потужність

horseshoe magnet - магніт у формі підкови

household fuse – побутовий рубильник

hot - гарячий

however- однак, тим не менш

human intervention – людське втручання

hue- колір, відтінок

G

gain the title - виграти титул

gas dynamics - газова динаміка

gasoline engine- бензиновий двигун

general-загальний

generate- виробляти

generation – вироблення або покоління

generator- генератор

give- надавати

government - уряд

gradient – ухил, градієнт

gravity- гравітація

grid- сітка \ мережа низької напруги

ground- земля, заземляти

I

i.e.- тобто, так званий

imagine- уявляти

imbalance- мневідповідність

immerse- завантажити або заплутати

impossible- неможливо

important-важливий

important way-важливий спосіб

in the scope of –у сфері дії,полі, просторі

incorporate- об'єднання, взаємодія

inefficiency- неефективність

inefficient-неефективнтй

inside- в середині

instead of – замість

internal combustion engine- двигун внутрішнього згоряння

influence - вплив

increase- збільшити, підняти

indicate- показувати, виражати(за допомогою приладів)

induce - виробляти

inductance- індуктивність, самоіндукція

induction- індукція

industry- промисловість

industrial usage- застовування в промисловості

influence- вплив

in order to- для того щоб

in series - послідовно

in this case - у цьому випадку

input- внутрішній, вхідний

ion- іон

ionized-насичений іонами

installed - встановлений

installations - установки

instrument-знаряддя, пристрій

insulate- ізолювати

insulation of power leads – ізоляція кінців провода під напругою

insulator- ізолятор, діелектрик

insulating materials- ізоляційні матеріали

intensity- напруженість

interfere- заважати

invent- винаходити

invention- винахід

invisible- невидимий

iron- залізо, праска

J

join- поєднувати

joint- з'єднаний, під'єднаний

junction- поєднання

K

key branches – ключові галузі

kind- тип, вид

kite- повітряний змій

kva- кіловат

L

latent – латентний, прихований

large amounts of current- висока електропотужність

law - закон

Leyden Jar - Лейденська банка

lead- кінець ,провід *або* свинець

lead- acid cells- елементи окису свинцю

length- довжина

lenses - лінзи

less efficient- менш ефективний

life- *тут* строк дії, *ще* життя

lift- *тут* ліфт, *ще* піднімати

liquid- рідина

limit- обмежувати

limits - межі

line of force - силові лінії

light- світло,освітлювати

light weight- з легкою вагою

load- вантаж, навантаження

low drift velocity- низька швидкість пересування

low current- низька, спадаюча сила струму

M

machinery- обладнання

made up of- виготовлений з , вироблений з

magnetic linkage- потокощеплення

magnetic field- магнітне поле

maintain- підтримувати, обслуговувати

magnetizing force- намагнічуюча сила

magneto-motive force- магніторушійна сила

magnetic field- магнітне поле

magnitude- величина

maintain- підтримувати, забезпечувати

maintenance- технічне обслуговування, ремонт

manufacture- виробляти

many times- багаторазово

mariner's compass – морський компас

matter- речовина

mean- *мут* засіб(*ще* означати)

measure- вимірювати

measuring instruments - вимірювальні пристрої

melting- процес плавки

mention- взяти до уваги, згадати

mirror- дзеркало

molecule- молекула

moistened - зволожений

mount-монтувати, встановлювати

mostly- переважно

motion- рух

move- рухати, пересувати

moving parts- рухомі деталі

moving electrons- рухомі електрони

muscular requirement- потреба в застосуванні фізичних зусиль

N

name plate- технічний паспорт

namely- а саме, тобто

nature - природа

naval vessels – корабельні судна *або* літаки

necessary- необхідний

necessarily –необхідно

needle - стрілка

network- мережа

no longer used – більше не використовується

normally- як норма, зазвичай

north – північ, у північному напрямку стрілки компаса

not carefully used – недбайлива експлуатація

notice - помічати

nucleus - ядро

number- номер, ряд, певна кількість

numerous - чисельні, багаточисельний

number of turn – кількість/ряд витків

O

obtain- отримати, добути

observe – спостерігати, оглядати

observation- спостереження

only –тільки, лише

operate- вводитись в дію, функціонувати

operating principle – принцип роботи

opposite to- з протилежного боку до

order- порядок, замовляти

output- вихід, вивід, зовнішня сторона

outputs- вихідні величини

overcome- долати

overlapped-частков перекритий

overload capacity- перевантажувальна здатність

outside- поза(чимось*)*

P

particle - частка, частинка

parts – частини *або* деталі

pulsing – періодично з'являчись та зникаючи

pass - проходити

passing through a gas-просуваючись через газ

patch-латка, зароблювати

path- контур, шлях

phase- фаза, фазовий

phenomenon - явище

physical state –фізичний стан

physicist - фізик

per – за

per cent- процент

perform- представляти

performance-виконання, дія

perpendicular- перпендикулярний

permanent – тимчасовий, нестійкий

piece of amber- шмат бурштину

pick up – підбирати

plant- *тут* завод, *ще* рослина, саджати в землю

plates- пластини

plowing-оранка

plug- розетка/ штепсель

point- вказувати, точка, вказане місце відліку

pole- полюс

portable appliances – переносні, розбірні пристосування

potential- потенціал. можливість

potential difference— різниця потенціалів

power-сила, потужність, енергія

power engineering – електрифікація

power rating – номінальна потужність

power moving- перепади напруги або зміщення поля напруги

power output- кінцева напруженість(на виході)

power-producing component-деталь яка виробляє напругу

power station- атомна станція

practically- практично

potential difference – різниця потенціалів

power distribution- енергопостачання

power plant- атомна станція\завод по виробленню електроенергії

power generation- енерговироблення

precisely- безсумнівно

primary –первинний, насамперед

primary winding- первинна обмотка

present- бути в наявності, представляти

produce- виробити

producing-вироблення

prominence- звеличення, піднесення

proper – належний (відповідний до стандартів)

property— властивість, власність

prove- доводити

provide- забезпечувати

purpose- ціль, мета

putting in series- послідовне розміщення

Q

quality- якість

quantity-кількість

quantities- величини або сумарна кількість

R

radiant –випромінюючий

radiation- випромінювання, опромінювання

railway-залізниця

rate- швидкість

rated power- номінальна потужність

rather-достатньо, певним чином

rays- промені

raise labor productivity - підвищити продуктивність праці

rarely – рідко

rated power – номінальна потужність

ratio- коефіцієнт, співвідношення

re- enforcing- відновлене підсилення

reach - досягати

realize-зрозуміти, дійти до висновку

reason- причина

receive- отримувати

reciprocating - recharge-перезаряджати

reduce –знижувати, зменшувати

reduce manual labor - зменшити застосування ручної праці

referred to – пов’язаний з, звернений до

reference-посилання. звернення

require- вимагати

relative- співвідносний до

remember- пам’ятати, згадати

renewable –здатний до заміни старого обладнання\ деталей

resistance- опір

resist corrosion - стійкий до окислення

rotary - обертальний\ рухомий

rotation – зміна станів\ траекторії руху по колу

rotating between the poles- процес обертання між полюсами

rotating machinery – обертальне\обертове обладнання

refer-відносити

refrigerator- холодильник

require- вимагати

regard- звертати увагу. враховувати

regardless- незалежно, безвідносно до

release- вивільняти, випускати

reliability - надійність

relieve- зменшити тиск, розвантажити

reverse-зворотній

revolving – обертовий,поворотний

rotating-обертальний, обертаючи

remarkable result- видатний результат

result- спричинити, мати результатом

resistance—супротив, опір

resistant- стійкий

research- дослідження

retard – уповільнювати

return- повертати, повернутись

reverse- зворотній

role- роль, функція

rotate - обертати

rubber- гума

run-запускатись , діяти

rural utilities - застосування в сільському господарстві *або*
сільські комунальні служби

S

safety devices –прилади- запобіжники

salt-сіль. соляний

science- наука

scientific societies- наукові товариства, гуртки

scientists - вчені

screen - екран

secondary- вторинний

secondary winding - вторинна обмотка

seeds- насіння

self-canceling- самоскорочення, сходження до нуля

selected- вибраний

semiconductor- напівпровідник

sensible –чутливий до впливів

sensory and mental requirement – потреба в застосуванні розумових зусиль та органів чуття

separated- розділений

serious fire – значне загоряння

serve- слугувати

set –набір ,ряд

several uses- декілька способів використання

significant-значний

similarity- подібність

singly-fed- живлений з одного джерела

shadow- тінь, відблиск

shape - форма

short circuit- коротке замикання

similarity- схожість, подібність

single-phase- однофазний

size- розмір

skills –вміння, навички

solid- твердий, безперервний

solution- *тут* хімічний розчин, *ще* рішення

somewhat- певним чином

sound –звук

source – джерело

south- північ, у південному напрямку стрілки компаса

space – простір

speed-швидкість

spinning-оминання,обтікання

stand- установка

stationary- нерухомий. безперервний

steady- постійний

steam engine-паровий двигун

step after - послідувати, піти по стопах

step-down- знижувати

step- up- підвищувати

store- накопичувати, зберігати,запас

store battery- акумулятор

stream - потік

strength –сила, міць

strength of the field – напруженість поля

stress- напруженість, наголос, навантаження

studying- вчення

slip rings-кільця з меншим числом обертів

small amount – невелика кількість

steady- постійний

stationary-нерухомий,постійний, сталий

steam –пара

steam engine- паровий двигун

structure- структура, будова

state –держава

success- успіх

subsequent- наступний

substantial-кріпкий, суттєвий

survive- вижити, залишитись всупереч прогнозам

synchronous- синхронний

subjects – предмети

substance- речовина

substation – підстанція

subway- метрополітен

sulpharic acid- сірчана кислота

sum- сума

supervisory controller – перевіряючий, наглядаючий пристрій(контролер)

supply- підтримувати, постачати

surround- оточувати

surrounded- *тут* оточений

switch on-вмикати

switch off- вимикати

T

tangent - дотичний

teaching staff - викладацький склад

temporarily- тимчасово

tend- мати тенденцію до, схилятись до

term- термін. поняття

terminal- вивідна клема

terminal velocity- гранична швидкість

thermal (heat)- термальний, нагрівальний

thermocouple- термопара

thickest pin – наймасивніший болт, місце з'єднання *або* кнопка

through – через

time- час, раз

tinge-надавати відтінок

tools – інструменти, знаряддя

torque – обертовий момент

train - поїзд або готувати(підготовлювати)

tram-трамвай

transformation- перетворення

transformer- трансформатор

transmit- передавати на відстані

transmission lines – лінії електропередач

transmission circuits – передаючі ланцюги ліній едектропередач

try- намагатися

therefore- тому і

tube – труба, шланг

tungsten-вольфрам

turn- оберт, виток

TV-set- телемережа

type- різновид

V

vacuum cleaner- пилосос

variation- розмаїття

variable – різнорідний, придатний до видозміни

vehicle- транспортний засіб

velocity- швидкість

visible – видимий

voltaic pile- гальванічна батарея

voltage- напруга

W

was found- був винайдений

washing machine- пральна машина

water falling - водоспад

water pump- водонасос

waste heating- зайве тепло,з непередбаченим перегрівом

waveform - хвилеподібний , у формі кривої(графіку)

way- шлях, спосіб

when properly selected and installed –при правильному попередньому підборі та установці

wheel - колесо

while- в той час, коли

well able to – добре придатний до

wick- фітиль

widely- широко

wind- вітер

winding— обмотка

within –в межах

without the use – без використання

without damage – без пошкоджень, без виведення з ладу

wire - провід (дріт)

wire electric lines - лінії електропередач

wireless telegraph- бездротовий телеграф

without- без

within the conductor - по провіднику

workshop - майстерня

wound-rotor- ваунд- ротор

whenever- будь коли ,коли

U

undergo- випробовувати або підпадати під випробування

underneath - донизу

understand- розуміти

understood- розумів

unidirectional- унормований у напрямі пересування

uniquely – унікально, без подібних варіантів

unit- одиниця (штука).певний об’єм

up-to-date machinery

urban resident- міський житель

usage - використання

use- використовувати

used to- звик, давно використовується як

utility- корисність або комунальне підприємство

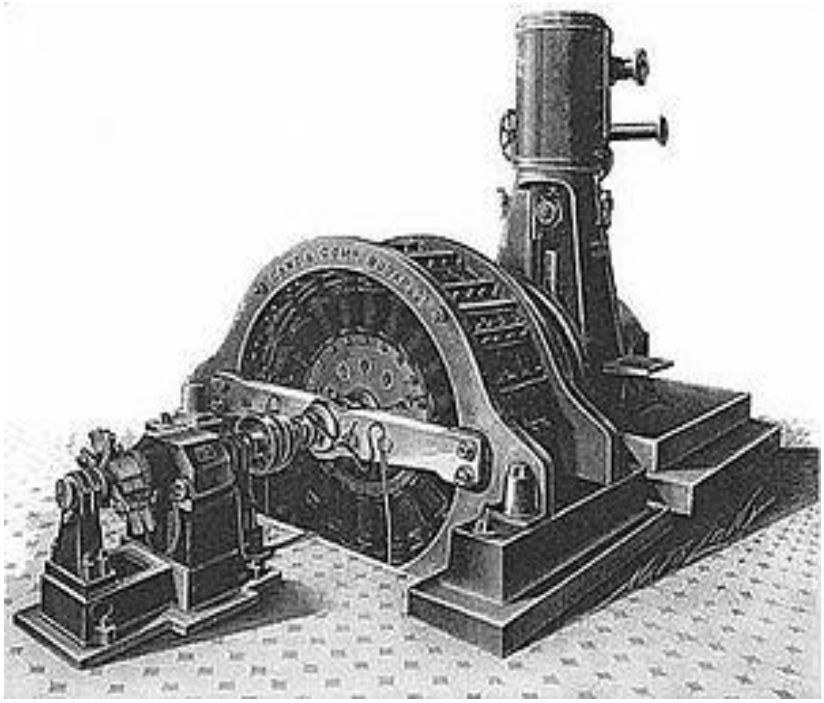
Z

zero – нуль, вихідна точка

zinc casing- цинкове покриття

3.ЧАСТИНА 1

БАЗОВА ЛЕКСИКА (АУДИТОРНА ГРУПОВА РОБОТА)



Science is the nourishment of youth.

M.Lermontov

3.1. Text 1. MY SPECIALTY AND FACULTY

Вправа 1. Перекладіть наступні слова , складіть з ними власні речення у простому теперішньому часі (Present Simple Active/Passive), підкресливши вжиті дієслова : *key branches, control systems, to introduce, agricultural production, broad utilization, to reduce manual labor, to raise labor productivity, higher level, to operate up-to-date machinery, highly qualified specialists, efforts, capable, to develop skills, power engineer, installations, opportunity, to develop aptitudes, exact sciences, to order way of thinking, subjects, necessary, grounds, resistance, to devote, scientific societies, research, numerous, faculty, to train, chairs, teaching staff , maintenance, proper, cattle barns, importance, to apply, to construct, wire electric lines and substations, to mount, complicated, electric devices, as well as.*

Вправа 2. Випишіть дієслова тексту та віднесіть їх до певної часової категорії та стану.

Вправа 3. Прочитайте, перекладіть текст:

Agriculture is one of the key branches of our national economy. New and new types of machines, electric and electronic devices with automatic and computer control systems are being introduced into agricultural production. The broad utilization of machinery reduced manual labor and raises labor productivity to a higher level. To operate up-to-date machinery our collective farms need highly qualified specialists. The efforts of electricians capable of designing, operating, controlling end adapting any form of electric energy to farm needs are wanted by modern agriculture too.

To develop such skills I entered National University of Life and Environmental Sciences of Ukraine in 2010. I chose to study at the Farm Power Engineering Faculty (the Department of Energetics and Automation). I stepped after my father. I am going to become power engineer(specialist in automation/

specialist in energetics/ specialist in electric installations) .I consider my specialty to be one of most important. Now I am a first - year student. I am a full-time student.

I have a good opportunity to develop my aptitudes in exact sciences. They come easy to me and train order in the way of thinking, At our University we study a lot of subjects necessary for our future work: Physics, Mathematics, Chemistry, Theoretical Grounds of Electrical Engineering, Resistance of Materials, Electrical Machines and Apparatus, Technology of Animal Husbandry, Technology of Crop Growing and others.

Many of us devote much time and energy to students' scientific societies. The scientific and research work carried out by our University is of great importance for the development of agriculture in our country.

Our faculty was organized in 1932. It is one of the most numerous faculties at the NAU situated at the educational building number 8. Farm Power Engineering faculty has trained more than 10000 specialists since its foundation. Now the dean of our college is I.P Radko. The faculty trains electrical engineers for agriculture and engineers in the field of automation of agricultural processes. The faculty includes 7 chairs, 40 laboratories, many workshops and classrooms. The faculty is justly proud of such well – known scientists as Martynenko I. I., member of the Academy of Sciences of the Ukraine, prof.Sinkov V. M., prof. Droganov B. H., prof. Mishin B. I.

The teaching staff includes 8 professors, 40 candidates of science and 98 assistants. They work on the problems of maintenance of proper microclimate in the cattle barns, the problem of gas dynamics of heat engines, the usage of electrical installations, etc.

To become qualified specialists we must learn to apply our theoretical knowledge in our work. For their practices students go to experimental stations and fields to collective and state farms, they help to construct wire electric lines and substations and to mount complicated electric devices as well as automatic systems.

Many students go in for sports, many of them have gained the title of Master of

Sports. All take an active part in the social life of the University.

Вправа 4 . Дайте усні відповіді на запитання:

1. What is the role of modern farm devices ?
2. What engineers are needed on farms?
3. What college do you study at?
4. When and why did you enter NULES?
5. What subjects do you study at your college?
6. Who is the dean of your faculty?
7. When was your faculty organized?
8. What are the main problems to be in the view of the teaching staff?
9. What do students do on their practices?
10. Do students of your college take part in social life?

Вправа 5. Доповніть речення, спростивши /перефразувавши текст:

1 .....are being introduced into agricultural production.

2 To operate up-to-date machinery....

3 I entered NULES to develop skills in...

4 We study such subjects as....

5 Our faculty....

6 The teaching staff of our faculty works...

7.. On their practice our students....

3.2. Text 2. ELECTRICITY

Вправа 1. Перекладіть наступні слова, складіть з ними власні речення у простому минулому часі (Past Simple Active/Passive), підкресливши вжиті дієслова : *types, electricity, at rest, in motion, electric current, charges, charged particles, flows, used to, to light , to boil, nucleus, particles, surrounded, directed, direct, mechanical action, batteries thermocouples lighting, heating, cooling units, matter conductor, electromagnetic induction, sources, alternators, friction, bell, iron, subway, railway, electrically heated furnaces, thermocouples, plants, circuit breakers, complicated measuring instruments, d.c., e.m.f., voltage.*

Вправа 2. Випишіть дієслова тексту та віднесіть їх до певної часової категорії та стану.

Вправа 3. Прочитайте, перекладіть текст:

There are two types of electricity ,namely, electricity at rest (static) and electricity in motion (electric current).Static charges are being at rest while electric current flows and does work.

Today the atom is regarded as an electrical system. There is a nucleus containing positively charged particles. These particles are called protons. The nucleus is surrounded by lighter negatively charged units - electrons. So each matter is made up of electrically charged particles.

Electric current is a directed flow of electrons through the conductor. The main kinds of electric current are direct and alternating currents. The main sources of electricity are d.c.generators, alternators, batteries and thermocouples. Electricity may be released as a result of electromagnetic induction, friction, chemical action and heating. Electromagnetic induction is the most important way to induce e.m.f. Electric energy may be transformed into mechanical action, lighting, heating, cooling primary due to electrical engines.

Electric devices reduced manual labor and raised labor productivity. That is why electric current is very important and useful for people. Electric current finds its wide application everywhere in everyday life and industry. Modern people can not do without electricity. It serves us in a thousand ways. The main electrical devices are electrical lamp, electric bell, washing machine, vacuum cleaner, iron, refrigerator, lift, radio and TV – sets, electric lines in subway, railway, tram and trolley-bus. The example of industrial using of electricity is electrically heated furnaces on plants, circuit breakers, complicated measuring instruments. We can not imagine modern civilization without electricity.

Thus, electricity is a general term that encompasses a variety of phenomena resulting from the presence and flow of electric charge. The main concepts to be studied within electricity are

- **Electric charge** – a property of some subatomic particles, which determines their electromagnetic interactions. Electrically charged matter is influenced by, and produces, electromagnetic fields.
- **Electric field** – an influence produced by an electric charge on other charges in its vicinity.
- **Electric potential** – the capacity of an electric field to do work on an electric charge, typically measured in volts.
- **Electromagnetism** – a fundamental interaction between the magnetic field and the presence and motion of an electric charge.

Вправа 4. Дайте письмові відповіді на запитання:

1.What are two types of electricity?

2. What is electric current?

3. What are two kinds of electric current?

4. What are proton and electrons?

5. What are the main sources of electricity?

6. What are the most important ways to produce electricity?

7. Into what may electricity be transformed?

8. How does electric current serve people in everyday life and industry?

9. What are the main concepts of electricity?

10.What is the most suitable definition of your favorite electrical concept?

Вправа 5 . Підставте правильний варіант замість пропуску:

1. There are two types of electricity :....

A... electric current and electricity in motion.

B ...electricity at rest and electricity in motion.

C ...electricity at rest and static electricity.

D... c.c. and d.c.

2. Today the atom is regarded as...

A ...an electrical system.

B ...nucleus.

C ...protons.

D ...electrons.

3. Protons are....

A ...negatively charged particles around the nucleus.

B negatively charged particles in the nucleus

C positively charged particles around the nucleus

D positively charged particles in the nucleus

4. Electrons are....

A ...negatively charged particles around the nucleus.

B ...negatively charged particles in the nucleus.

C ...positively charged particles around the nucleus.

D ...positively charged particles in the nucleus.

5. The main sources of electricity are....

A ...chemical actions, batteries and thermocouples.

B ...generators, transformers, electric lamps, plugs.

C... d.c.generators, alternators, batteries and thermocouples.

D ...electric lamps, plugs, d.c.generators, alternators,

6. The important ways to produce electricity are....

A ...mechanical action, lighting, heating, cooling.

B ...electromagnetic induction, friction, chemical action and heating.

C ...electromagnetic induction, friction, mechanical action, lighting.

D ...heating, cooling, friction, chemical action.

7. Electricity may be transformed into...

A ...electromagnetic induction, friction, chemical action and heating.

B... electromagnetic induction, friction, mechanical action, lighting.

C ...heating, cooling, friction, chemical action.

D ...mechanical action, lighting, heating, cooling.

8. The example of industrial using of electricity is ...

A... irons, bells, subways, lamps

B... electrically heated furnaces on plants, circuit breakers, complicated measuring instruments.

C... irons, bells, complicated measuring instruments.

D ...irons, bells, circuit breakers.

3.3. Text 3. ENERGY FORMS AND ENERGETICS

Вправа 1. Перекладіть наступні слова, складіть з ними власні речення у простому майбутньому часі (Future Simple Active/Passive), підкресливши вжиті дієслова: *activity, ability, to perform, to assign, consequence, physical state, to define, thermal (heat), radiant , light , nuclear, sound , sensible, latent, to increase, internal, quantity, available, chemical substance, to undergo, absorbed , evolved, reference, zero, separated, relative, equal, electromagnetic waves, to calculate, visible, invisible, utility, plants , naval vessels, broad discipline, applied , to deliver , uniquely.*

Вправа 2. Випишіть дієслова тексту та віднесіть їх до певної часової категорії та стану.

Вправа 3. Прочитайте, перекладіть текст:

Energy (from Greek ἐνέργεια - *energeia*, "activity, operation") is the ability to perform work. It can be assigned to any particle, object, or system of objects as a consequence of its physical state. In the context of physical sciences, several forms of energy have been defined. These include:

- Thermal energy popularly known as heat energy
- Chemical energy
- Electrical energy
- Radiant energy commonly known as light energy
- Nuclear energy
- Magnetic energy
- Elastic energy
- Sound Energy
- Mechanical energy

Some basic textbooks lump all these forms into two main groups; kinetic energy and potential energy. Energy in a system may be transformed between any of these forms.

Thermal energy is the sum of sensible and latent energy. It is the energy of a body that increases with its temperature. Energy transfer is driven by a temperature difference. Many sources prefer to continue to refer to the internal quantity as thermal energy.

Chemical energy is available as a driving force for chemical reactions.It is the potential of a chemical substance to undergo a transformation through a chemical reaction or to transform other chemical substances. Such energy, may be either absorbed or evolved from a chemical system.

Electric potential energy, or **electrostatic potential energy**, is a potential energy associated with the system of point charges. Electrostatic potential energy is preferred here because it seems less likely to be misunderstood. The reference zero is usually taken to be a state in which the individual point charges are very well separated ("are at infinite separation") and are at rest. The electrostatic potential energy of the system (U_E), relative to this zero, is equal to the total work W that must be done by a hypothetical external agent in order to bring the charges slowly, one by one, from infinite separation to the desired system configuration.

Radiant energy is the energy of electromagnetic waves. The quantity of radiant energy may be calculated by integrating radiant flux (or power) with respect to time and, like all forms of energy, its SI unit is the joule. The term is used particularly when radiation is emitted by a source into the surrounding environment. Radiant energy may be visible or invisible to the human eye

Nuclear power is produced by controlled (i.e., non-explosive) nuclear reactions. Commercial and utility plants currently use nuclear fission reactions to heat water to produce steam, which is then used to generate electricity. In 2009, 13-14% of the world's electricity came from nuclear power. Also, more than 150 naval vessels using nuclear propulsion have been built.

Energetics is a very broad discipline, encompassing thermodynamics,

chemistry, biological energetics, biochemistry and ecological energetics.It is the scientific study of energy under transformation. Energetics. When the science of thermodynamics deals with energy exchanging of all types, it can be called energetics.

Applied Energetics delivers uniquely capable high power systems of unsurpassed quality to fulfill customer requirements. For example, Energetics proposes Ultra Short Pulse Laser systems with high average power and high pulse energy, solid state high voltage and particle accelerator systems that are fault tolerant and compact.

Вправа 4. Дайте усні відповіді на запитання:

1.What is energy?

2.What are the main forms of energy?

3.What is thermal energy?

4. What is chemical energy?

5.What is electric potential energy?

6.What is radiant energy?

7.What is nuclear energy?

8.Are magnetic, elastic and sound energy within other forms of energy too?

9.What is Energetics ?

10.What is an example of Applied Energetics?

Вправа 5. Доповніть речення, спростивши /перефразувавши текст:

1.Energy is....

2.The types of energy in general are....

3.Thermal energy is...

4.Chemical energy....

5.Electric potential energy...

6.Nuclear power...

7. Applied Energetics....

3.4. Text 4. AUTOMATION AND ELECTRIFICATION

Вправа 1. Перекладіть наступні слова, складіть з ними власні речення часах групи Continuous (Present/ Past / Future / Active+Passive), підкресливши вжиті дієслова : *programmable, applications, aid, human intervention, in the scope of, beyond, to assist , muscular requirements, sensory and mental requirements, tools, artificial interface, distributed, supervisory controller, referred to, achievements, household , rural utilities, to wire, to equip, to provide, to amplify, means*

Вправа 2. Випишіть дієслова тексту та віднесіть їх до певної часової категорії та стану.

Вправа 3. Прочитайте, перекладіть текст:

Automation is the use of control systems (such as numerical control, programmable logic control and other industrial control systems), in concert with other applications of information technology (such as computer-aided technologies [CAD, CAM, CAx]), to control industrial machinery and processes, reducing the need for human intervention. In the scope of industrialization, automation is a step beyond mechanization. Whereas *mechanization* provided human operators with machinery to assist them with the *muscular* requirements of work, *automation* greatly reduces the need for human *sensory* and *mental* requirements as well. Processes and systems can also be automated.

Different types of automation tools exist:

- ANN - Artificial neural network
- DCS - Distributed Control System
- HMI - Human Machine Interface
- SCADA - Supervisory Control and Data Acquisition
- PLC - Programmable Logic Controller

- PAC - Programmable Automation Controller
- Instrumentation
- Motion control
- Robotics

Electrification is originally referred to the build out of the electrical generating and distribution systems.

The main achievements through electrification are:

-Development of dynamos and generators

-Electric lighting

-Development of DC motors

-Alternating current versus direct current

-Development of AC motors

-Electric motors in industry

-Household electrification

-Rural electrification

-Electric utilities

To electrify is

- to produce electric charge on or in (a conductor).
- to wire or equip (a building, for example) for the use of electric power.
- to provide with electric power.
- to amplify (music) by electronic means.
- to provide source of energy for the set of applications which include transport, heating, lighting, communications, and computation.

In no- scientific speech it is to thrill, startle greatly, or shock: a powerful performance that electrified the audience.

Вправа 4. Дайте усні відповіді на запитання:

1.What is automation?

2.What is difference between mechanization and automation?

3.What are automation tools?

4. What is electrification referred to?

5. What are achievements of electrification?

6. How to electrify?

Вправа 5. Доповніть речення, спростивши /перефразувавши текст:

1.Automation is...

2.The types of automation tools are....

3.Mechanization assists...

4.Automation greatly reduces the need for human...

5.Electrification is originally referred to....

6. To electrify is to ....

3.5. Text 5 TROM THE HISTORY OF ELECTRICITY

Вправа 1. Перекладіть наступні слова, складіть з ними власні речення часах групи Perfect (Present/ Past / Future / Active+Passive), підкресливши вжиті дієслова: *to notice , phenomenon , to observe, to discover, piece of amber, rubbed with fur, to attract , light, elapse, dissimilar substances, nature, lighting rod, semiconductor, to carry on experiments, due to, term, to announce, to invent, voltaic pile , copper, zinc plates, salt, moistened , to connect, d.c. source, to remember, to mean batteries, to supply, to discover, driven*

Вправа 2. Випишіть дієслова тексту та віднесіть їх до певної часової категорії та стану.

Вправа 3. Прочитайте, перекладіть текст:

Static electricity cannot be used to light lamps or to boil water because it is very high in voltage . But static electricity was the first among kinds of electricity to be noticed. For a long time it was the only electrical phenomenon to be observed by men. The Greeks knew how to get electricity at least 2500 years ago. As much as I know, the first observation on electricity was made by Greek philosopher Phales. He discovered that a piece of amber rubbed with fur attracted light objects. However, he could not know that amber was charged with electricity due to the process of rubbing.

Twenty two centuries elapsed before there was any progress. Then Gilbert, the English physicist began the first systematic observation on electrical phenomena. He discovered that any two dissimilar substances could be electrified. It was he who gave name „electricity" to the phenomenon he was studying. Gilbert got this word from the Greek „electrum" meaning amber.

During the past century the idea of the nature of electricity was revolutionized. In 1753 B. Franklin announced that unlike charges (positive and negative) were produced due to rubbing dissimilar object. That American

inventor developed studying about positive and negative charges .Also he invented lighting rod and many electrical terms like battery, semiconductor etc.

Russian academician V. Petrov was the first to carry on experiments on electrified metals by rubbing them one against other.

1800 is a date to be remembered : for the first time in the world's history a continuous current was generated by Italian physicist Alessandro Volta after whom the unit of electric pressure, the volt, was named. He invented the d.c source of electricity. It was voltaic pile consisted of a copper and zinc layers separated with salt moistened flannel. The wire was connected to the first disk of copper and to the last disk of zinc.

Faraday's experiments of August 29, 1831, gave us the principle of the electric transformer, without which the later discoveries of that fateful year could have little real practical application. For to convey electric current over long distances, say to supply a town, or feed an electric railway, it is necessary to generate it at a very high voltage, or force. So the two related discoveries of 1831 provided making electricity easily and cheaply without any cumbersome batteries, but also the way of using it in a safe and practical way In 1833 Michael Faraday was the first to discover how to make an electric motor and to build the first generator driven by the gasoline engine and to announce the laws of electrolysis.

As the results of Faraday's work Morse was able to invent the electromagnetic telegraph, Bell - the telephone and Edison - the electric light. Now modern people cannot do without electric current.

Вправа 4. Дайте усні відповіді на запитання:

1. Why can not static electricity be used to light lamps?
2. Who started the first observation of electricity and with what matters?
3. Who invented the term electricity?
4. What does the word Electricity mean (in its Greek origin) ?
5. What studying did Franklin develop and invent?
6. What did A.Volta generate at the first time in 1800?

7. Who invented power transformer, electric motor and generator driven by gasoline engine ?

8. Did Bell or Edison invent electric light?

Вправа 5 . Підставте правильний варіант замість пропуску:

1 Static electricity ...be used to light lamps or to boil water because it is ....

A... cannot ...very high in voltage.

B....can.....electric current

C... cannot .....not discovered.

D....can.....the only suitable form of energy.

2. Greek philosopher Phales discovered that a piece of amber rubbed with fur ....

A. ...pushed off light objects.

B ...pushed off heavy subject.s

C ....attracted all subjects in the neighborhood.

D ....attracted light objects.

3.....began the first systematic observation on electrical phenomena and invented the term «electricity».

A Greek philosopher Phales...

B. Gilbert, the English physicist ...

C B. Franklin , the American inventor...

D A. Volta, Italian physicist...

4... developed studying about positive and negative charges and invented terms like semiconductor.

A Greek philosopher Phales...

B Gilbert, the English physicist ....

C B. Franklin , the American inventor....

D A. Volta, Italian physicist....

5. In.... A. Volta invented...

A.... 1753....lighting rod.

B... 1800.... the first d.c. source.

C... 1831.... electric transformer.

D...1833..... electric motor.

6. In... Faradey invented....

A.... 1753....lighting rod.

B... 1800.... the first d.c. source.

C... 1831.... electric transformer.

D...1831.... electric motor.

7. Faradey's new inventions provided making electricity easily and cheaply ....cumbersome batteries.

A... with all...

B ... using ...

C ...without any...

D... applying....

8. Russian academician V. Petrov was the first to ...

A ...invent electromagnetic telegraph.

B ...invent the telephone.

C ...discover lighting rod.

D ...carry experiments with rubbing materials.

4. ЧАСТИНА 2

ОБОВ’ЯЗКОВІ ЗАВДАННЯ ДЛЯ САМОСТІЙНОЇ РОБОТИ ПІД КЕРІВНИЦТВОМ ВИКЛАДАЧА ПО ВАРІАНТАХ

Give me but one firm spot on which to stand,
and I will move the earth

Archimedas

4.1. ВАРІАНТ 1

ELECTRIC CURRENT

Вправа 1. Знайдіть інформацію про модальні дієслова, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення з модальними дієсловами: *define, flow, at rest, charges, magnitude, influence, solution, move, cross- section, liquid, continuous current , sum of the quantities , mention, voltaic pile, invention, electrical science.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

We define an electric current as a flow of electrons through a conductor. This stream (flow) of moving electrons is one form of electric current. Static electricity is concerned with electricity at rest, current electricity dealing with electric charges in motion. The magnitude of the current is the quantity of electric charge carried by the electrons in a unit of time through any cross-section of the conductor. The conductors being a solution, say, of salt are ionized, both positive and negative ions moving under the influence of the electric field. In this case the sum of the quantities of positive and negative electricity, carried by the ions in a unit of time through any cross-section of the liquid, constitutes the electric current.

Such a current is usually accompanied by a chemical action. Electric current passing through a gas, the molecules or the gas are ionized. Here again, both the negative and the positive ions or electrons move under the influence of the electric field, the sum of the quantities of positive and negative electricity carried by the ions in a unit of time through any cross-section of the gas constituting the electric current.

Speaking of electricity in motion, we must mention Volta, professor of natural history, at the University of Pavia, Italy / 1745-1827/. In 1800, having constructed the first source of steady, continuous current- the voltaic pile- he transformed chemical

energy into electrical energy. The voltaic pile was the first battery transforming chemical energy into electrical one. It is to this invention that we owe development of modern electrical science and industry.

Вправа 4. Дайте відповіді на запитання:

1.What is electric current?

2.What is quantity of electric current?

3.How does electric current constitute?

4.Under what influence do the electron move?

5. Can the gas be ionized?

6. What did Volta invent?

7. What was the occupation of Volta?

8. What energy was transformed in voltaic pile?

Вправа 5. Підставте правильний варіант замість пропуску:

1. Electric current is the...

A... static electricity .

B ...flow of conductor.

C ...sum of the quantities.

D ...stream of moving electrons.

2. The quantity of electric charge is....

A... electrons.

B... magnitude of the current.

C ...cross-section.

D... carries of energy.

3. ... constitutes the electric current.

A Cross-section of the liquid...

B Ions in a unit of time...

C Sum of the quantities of positive and negative electricity...

D Unit of time...

4. Electric current is ....accompanied by a chemical action

A ... seldom....

B .... usually....

C ...never ...

D ...ionized...

5. Electric current passing through a gas, the molecules or the gas ...

A... are ionized .

B... are moved.

C ... disappear.

D... produce electricity.

6. A.Volta constructed the .....

A... first source of c.c. - voltaic pile.

B... first source of c.c. - voltaic pile.

C ...static electricity.

D... chemical source.

7. Volta was the professor of....

A... physics at the University of Italy.

B ...mathematics at the University of Greece.

C... natural history at the University of Italy.

D ...chemistry at the University of Greece.

8. In the voltaic pile ...

A ...chemical energy was transformed into electrical one .

B... electrical energy was transformed into chemical one.

C... heating was transformed into lighting.

D ...heating was transformed into cooling.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те , як електричний струм буде стосуватись Вашої майбутньої роботи, використавши модальні дієслова та слова тексту.

4.2. ВАРІАНТ 2

BATTERIES

Вправа 1. Знайдіть інформацію про умовний спосіб дієслів, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення в умовному способі : *cell, uses, producing, store, contain, semi- solid, primary, secondary, to recharge, carbon rod, zinc, casing, lead- acid, possible, anode, cathode.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

Electrolytic cells have several uses. Some cells are used for producing an electric current. They store an electrical charge in the electrolyte. Batteries contain this type of cell. Some batteries contain primary cells and other contain secondary cells.

Primary cells do not have a long life. It is impossible to recharge them. The primary cells are called dry cells. These do not contain a liquid. The electrolyte is semi- solid. New cells produce approx. 1,5V each. That electrolyte generally consists of an ammonium chloride electrolyte(NH4Cl), a carbon rod and a zinc casing. The rod is the anode and the casing is the cathode. The zinc casing corrodes with use and the cells do not usually produce a current for more than twenty four hours.

It is possible to recharge a secondary cell many times. With careful use, secondary cells have a long life. These generally contain six lead- acid cells. These normally consist of a sulphuric acid electrolyte, lead electrodes and plastic casing. The plastic casing does not normally corrode. Each cell produces 2 V. Therefore a car battery normally produces 12V. However, lead- acid batteries do not always consist of six cells. Some only have three. It is also possible to

manufacture batteries with more than six cells for large vehicles.

Вправа 3. Дайте відповіді на запитання:

1.What is example of electrolytic cells usage?

2. What kind of cells do the batteries contain?

3. Is it possible to recharge primary cells?

4. Do primary cells contain liquid ?

5. What is anode?

6 . What is cathode?

7. Must lead- acid batteries always contain six cells?

8. How many volts do normally electrolytic cells produce?

Вправа 4. Підставте правильний варіант замість пропуску:

1. Some cells are used for .... of electric current.

A ...no electrolyte ...

B... insulating...

C... producing ...

D ...transforming...

2. Every battery contains....

A ....both primary and secondary cells.

B ...one kind of cells.

C ...only secondary cells.

D... only primary cells.

3. It is ...to recharge primary cells.

A ...normal...

B ...used...

C... possible...

D ...impossible...

4. Primary cells.... a liquid.

A ...absorb ...

B ...do not contain...

C.... contain ...

D ...produce...

5. Anode is a part of electrolyte as well as...

A ...NH4Cl.

B ...carbon rod and zinc casing.

C ...carbon rod and NH4Cl.

D ...zinc casing and NH4Cl.

6. Cathode is a part of electrolyte as well as...

A... NH4Cl .

B ...carbon rod and zinc casing .

C ...carbon rod and NH4Cl .

D ...zinc casing and NH4Cl .

7. It is .... to manufacture batteries with more than six cells for large vehicles.

A ...possible...

B... impossible ...

C ...a problem....

D ...a law...

8. As usual primary cells produce...., secondary cells produce.....

A... 2 V.... 1,5V.

B... 1,5V....2 V.

C... 12V....6V.

D... 6V.....12V.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те , як батарейки будуть стосуватись Вашої майбутньої роботи, використавши умовний спосіб дієслів та слова тексту.

4.3. ВАРІАНТ 3

TRANSMISSION OF ELECTRIC ENERGY

Вправа 1. Знайдіть інформацію про всі розряди займенників, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення з різними типами займенників : *mean, supplying energy, increasing, performing, efficient, available, be converted, frequencies, stresses, to receive, cut off, carriers, considerable, amount, leads, voltage*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

Electricity as a mean of supplying energy has come into general farm usage. There are many reasons for the great increasing of electric energy for performing agricultural operations.

Electric energy is generated in large efficient power stations and distributed over great areas by transmission lines which serve individual farms. This energy is available at any time and can be converted by rather simple machines to heat, light and mechanical energy. Practically all transmission systems are three-phase and most of them are 50 cycles, but there are other frequencies in use. A transmission line is an insulated wire circuit over which electric energy is transmitted. It receives its energy from an alternator connected through a bank of transformers to give the voltage, for which the transmission line has been designed and delivers the energy to the substation which is another bank of transformers from which the energy is distributed over a network or distribution system.

The transmission line is stressed electrically. The greater the stresses that the transmission line will stand, the more energy it can deliver. If the stresses become too great the transmission line breaks down electrically and the supply of energy is cut off.

Вправа 3. Дайте відповіді на запитання:

1. How does electricity perform farm use?
2. How many phases and cycles are there in transmission line ?
3. Where do general electricity generated ?
4. From what source does transmission line receive energy?
5. What is a transmission line?
6. What is substation?
7. How do the stresses depend on amount of energy?
8. What must happen when stresses become too great ?

Вправа 4. Підставте правильний варіант замість пропуску:

1. Electricity ... has come into general farm usage.

A... as physical phenomenon...

B... as a mean of supplying energy ...

C ...as part of research...

D ...as given title by Gilbert...

2. Practically all transmission systems are.... and most of them are....

A ...one-phase.... 220 cycles

B ...three-phase....220 cycles

C ...one-phase....50 cycles

D ...three-phase.... 50 cycles.

3. Electric energy is generated in....and distributed over great areas by transmission lines.

A... individual generators...

B ...large efficient power stations...

C... nucleus ...

D... power generators...

4. A transmission line receives its energy from ...

A ...an alternator connected through a bank of transformers to give the voltage.

B ...an d.c. generator connected through a bank of transformers to give the voltage.

C an alternator connected through a bank of generators to give the voltage

D... an d.c. generator connected through a bank of transformers to transform voltage .

5. A transmission line is....

A... an insulated wireless electric energy transmission.

B... an conducting wire circuit over which electric energy is transmitted.

C... an insulated wire circuit over which electric energy is transmitted.

D an conducting wireless electric energy transmission

6. Substation is...

A ...is another bank of generators from which the energy is produced by a network.

B... the first bank of generators from which the energy is produced by a network.

C... the first bank of transformers from which the energy is distributed over a network.

D ...is another bank of transformers from which the energy is distributed over a network.

7. ...stresses that the transmission line will stand, ...energy it can deliver.

A The less.... the more...

B The greater .... the more...

C The more.....the less...

D No.... the more...

8. If the stresses become too great ..

A... the supply of energy is cut off.

B ...the plug must blow out.

C...circuit breaker is switched off.

D... the plug is cut.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те, як лінії електропередач будуть стосуватись Вашої майбутньої роботи, використавши різні типи займенників та слова тексту.

4.4. ВАРІАНТ 4

STRESSES IN TRANSMISSION CIRCUITS

Вправа 1. Знайдіть інформацію про ступені порівняння прикметників та прислівників, доповнивши аудиторний конспект .

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи ступені порівняння прикметників: *stresses in transmission circuits, distribution, wires, lines, energy carrier, try to relieve, condenser plates, separated by insulator, reaches the load, increase in the number, equipment, capacitance, over its full length, capacitor (the conductors), a variation (difference) of potential, considerable amount.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

There are stresses in transmission circuits. It is necessary for the agricultural engineer to understand the nature of stresses under which transmission and distribution circuits operate.

The wires are metal conductors in which electrons have the role of energy carriers. They try to relieve the voltage stresses by joining the molecules from which they have been forced. The wires with potential 100.000, 200.000 and 300.000 volts between them act as condenser plates separated by the dielectric of air and insulators. These condensers are constantly being charged and discharged. This energy, 1/2 C V 2, never reaches the load but results in an increase in the number of electrons that must be handled by the generating equipment and the transmission line in supplying, energy to the load.

The transmission line has a capacitance, distributed over its full length from line to line and from line to ground. The current to the capacitor (the conductors) always leads the voltage. All along the transmission line there is a variation of potential between the wires, and this difference may be a considerable amount

from one end to the other of a long transmission line.

Вправа 3. Дайте відповіді на запитання:

1.What do electric stresses favor?

2. What are wires?

3. What do wires try?

4. How do the wires with potential over 100.000 volts act?

5. Does energy 1/2 C V 2 reach the load?

6. Has the transmission line a capacitance?

7. Does the current to the capacitor lead the voltage?.

8. Is there the same potential between the ends of transmission circuits?

Вправа 4. Підставте правильний варіант замість пропуску:

1. Under electric stresses transmission and...operate.

A... generators ....

B ...transformers...

C ...circuit breakers...

D... distribution circuits...

2. Wires are .....in which electrons ....energy carriers.

A...metal conductors.... have the role of,,,,

B ...metal insulators .... have the role of....

C ...flexible circuit breakers....to move...

D... flexible conductors....to move...

3. Wires try.... the voltage stresses by...

A ...to avoid ..... by joining of molecules

B ...to relieve .... division of molecules

C... to avoid .....by division of molecules

D ...to relieve .....by joining the molecules

4. The wires with potential more 100.000 volts between them act as....

A... condenser plates separated by the dielectric of air and insulators.

B ...winding plates joint to armature circuits

C ...condenser plates separated by the dielectric of air and conductors

D... winding plates joint to the dielectric of air and insulators.

5. This energy, 1/2 C V 2...reaches the load.

A ...as rule...

B ...always...

C... never...

D... seldom...

6. The transmission line ...

A ...has no capacitance

B ...has a capacitance, distributed over its full length

C ...has a capacitance, distributed over its nearest part

D ...has different values capacitances at the same line

7. The current to the capacitor ... the voltage.

A ...never leads...

B ..always overcome...

C ...never overcomes...

D... always leads...

8 All along the transmission line there is.....potential between the wires,

A... the same...

B... a variation of...

C... no ...

D... little difference...

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те, як перепади напруги в електричному ланцюзі будуть стосуватись Вашої майбутньої роботи, вживаючи ступені порівняння прикметників та слова тексту.

4.5. ВАРІАНТ 5

ELECTRIC CIRCUITS

Вправа 1. Знайдіть інформацію про переклад багатокомпонентних іменників, приналежність іменників та множину іменників, доповнивши аудиторний конспект .

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи форми однини та множини іменників : *concepts, essential, extended conductor, free, are caused to drift, is necessary to maintain, much more frequently, direct- current generator, age(force), as long as, conducting path, direction terminal, to be opposite to , conventional, in order to, to avoid confusion, to distinguish.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

The concepts of electric charge and potential are also essential in the studying of electric currents. When an extended conductor has different potentials at its ends, the free electrons of the conductor itself are caused to drift from one end to the other. In order to continue this flow it is necessary to maintain the potential difference by some electrical source such as electrostatic generator, or, much more frequently, a battery or a direct- current generator. We consider the wire and the electric source together to form an electric circuit, the electrons drifting around it as long as the conducting path is maintained. In effect such a flow of electrons constitutes an electric current.

Batteries and direct-current generators are sources of potential difference which age the electrons to move around a circuit continually in one direction, producing a unidirectional current. For this reason such a source is said to have a fixed polarity, one terminal being called positive and the other negative. If the flow to be reversed than the terminals of the circuits must be reversed with respect to the source.

From the early day of electrical science we regard the current to be a flow of

electricity from the positive terminal to the negative one in the external circuit connected to a source. Now we know a current through a conductor to be actually a movement of electrons, and since these have negative charges, they travel around the external circuit from the negative terminal to the positive one. The electron flow is proved to be opposite to the conventional direction of current in order to avoid confusion of chargers and to distinguish one from the other by name.

Вправа 4. Дайте відповіді на запитання:

1.What happens when an extended conductor has different potentials at its ends?

2. What forms electric circuit?

3. How long do electrons drift in electric circuit?

4. What is fixed polarity?

5. What is current?

6. What is a direction of current flow?

7. How do electric charges move?

8. What must electron flow do?

Вправа 5. Підставте правильний варіант замість пропуску:

1. When an extended conductor has different potentials at its ends, the free electrons of the conductor itself....

A....are caused to drift from one end to the other

B... are caused to transform themselves.

C...have a choice either to drift or to transform themselves

D...make the potential greater.

2. ...form an electric circuit.

A Only wires....

B Only electric sources ....

C Wire and the electric source together....

D Conductors and insulators....

3. Electrons drift around electric circuit ...

A... without accordance with conducting path .

B... while the conducting path is stopped.

C... as long as the conducting path is maintained.

D... while the lamp is lighting .

4. Fixed polarity is when....

A ....both terminals are on the same polarity.

B.... both terminals are positive.

C....both terminals are negative.

D....one terminal becomes positive and the other negative.

5. The current is a flow of electricity ....

A... in the internal circuit connected to a source.

B... in the external circuit connected to a source.

C... in the internal circuit connected to a conductor.

D ...B in the external circuit connected to a conductor.

6. The electron flow is proved to be .....

A ...opposite to the conventional direction of current.

B...parallel to the conventional direction of current.

C... opposite to the reversible direction of current.

D... parallel to the reversible direction of current.

7. Electric charges travel...

A...around the internal circuit from the positive terminal to the negative one. .

B... around the internal circuit from the negative terminal to the positive one.

C... around the external circuit from the positive terminal to the negative one

D... around the external circuit from the negative terminal to the positive one.

8. Electron flow must ...

A... avoid confusion of chargers and give general name to all of them.

B...favor confusion of chargers and distinguish one from the other by name.

D ...favor confusion of chargers and give general name to all of them

C ....avoid confusion of chargers and distinguish one from the other by name.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те, як провідники, батарейки та генератори будуть стосуватись Вашої майбутньої роботи, вживаючи різні форми іменників.

4.6. ВАРІАНТ 6

ELECTROMOTIVE FORCE

Вправа 1. Знайдіть інформацію про дієслово to be як самостійне дієслово, як синонім модального та як складову пасивного стану , доповнивши аудиторний конспект .

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи дієслово to be як самостійне дієслово, як синонім модального та як складову пасивного стану : *are dislodged from, is available to do, will cause electrons to move, scientists proved, , is released , is developed, above named methods, being used, regardless of the size of the cell, putting in series, strength of the magnetic field , per second, being measured.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

When free electrons are dislodged from atoms, electrical energy is released and is available to do work. Chemical reaction, friction, heat and electromagnetic induction will cause electrons to move from one atom to another. Scientists prove electrical energy is to be released from matter by chemical reaction with batteries, heat with thermocouples, electromagnetic induction with generators and friction with static generators .

Whenever energy in any form is released, a force is developed. Electrical energy being released, a force called electromotive force /e. m. f./ is developed. An e. m. f. is present, whenever free electrons are moved from atoms, any of the above named methods being used to produce such electron motion.

If the force is in one direction, it is called direct; the force changing its direction is referred to as alternating. The direction of the force effort is seen to be dependent upon the direction in which the field is cut. The magnitude of the electrical force depends on the conditions at the source, such as the number of magnetic lines of force per unit of time.

In the battery, the determining factors as kinds of electrolytes and the kind of the metals to be used for the plates. The common dry cell is found to develop 1.5 volts of electrical force regardless of the size of the cell. Large amounts of force can be obtained only by putting many cells in series.

The force developed by the generator depends on the number of coils in the armature, on the speed of the armature and on the strength of the magnetic field from the field magnets, i.e., the number of lines of magnetic force cut by coil per second. The volt is known to be the unit of measure for electrical force. Wherever an e.m.f. is developed, there is also a field of energy called an electrostatic field. This field can be detected by an electroscope, the strength being measured by an electrometer.

Вправа 4. Дайте відповіді на запитання:

1.What happens when free electrons are dislodged from atoms?

2. What will cause electrons to move from one atom to another.?

3. Due what is electric energy to be released by friction ?

4. Due what is electric energy to be released by heat?

5. Due what is electric energy to be released by chemical reaction?

6. In what case is e. m. f. present ?

7. From what factors does the force developed by the generator depend on?

8.How can we obtain the large amounts of force ?

Вправа 5. Підставте правильний варіант замість пропуску:

1. When free electrons are dislodged from atoms...

A....electrical energy transforms into machinery.

B ....electrical energy is released but can not do work.

C ....electrical energy transforms into generated induction.

D ....electrical energy is released and is available to do work.

2. ....will cause electrons to move from one atom to another

A Friction, heat, chemical reaction and inductance....

B Chemical reaction, inductance, capacitance ....

C Chemical reaction, friction, heat and electromagnetic induction...

D Friction, heat, chemical reaction and capacitance ....

3. Electrical energy is to be released from matter by friction ....

A... with static generators.

B... with thermocouples.

C ...with batteries.

D ... with d.c. generators.

4. Electrical energy is to be released from matter by heat....

A ...with static generators.

B ...with thermocouples.

C ...with batteries .

D ...with d.c. generators.

5. Electrical energy is to be released from matter by chemical reaction...

A... with static generators.

B ...with thermocouples.

C ...with batteries .

D ...with d.c. generators.

6. An e. m. f. is present, whenever...

A.... free protons are moved from atoms.

B....free nuclear exists in matter.

C... free electrons are moved from atoms.

D...lamp is switching off..

7. The force developed by the generator depends on....

A... the number of armatures, on the speed of the armature .

B.... the number of coils in the armature, on the speed of the armature and on the strength of the magnetic field.

C ...only on the strength of the magnetic field.

D... on speed of windings .

8. Large amounts of force can be obtained ....

A....only by putting many cells in series.

B...by putting either parallel or series cells.

C... only by putting many cells in parallel.

D.... by putting one cell.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те, як електрорушійна сила буде стосуватись Вашої майбутньої роботи, вживаючи різні форми дієслова to be.

4.7. ВАРІАНТ 7

ELECTROMAGNETIC INDUCTION

Вправа 1. Знайдіть інформацію про дієслово to have як самостійне дієслово, як синонім модального та як складову пасивного стану , доповнивши аудиторний конспект .

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи дієслово to have як самостійне дієслово, як синонім модального та як складову пасивного стану: *following ways, heating, junction, dissimilar metals, important, use, generation of power, e.m.f, found, moving, varying flux, air gap, armature, stationary winding, rate, is cut, announced the law.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

Electromotive forces, may be induced in the following ways:

a) by electromagnetic induction,
b) by chemical action,
c) by heating the junction of two, dissimilar metals,
d) friction.

Of these three the first is by far the most important. It is the only method available for use in the generation of power. In 1831 Faraday discovered that an e. m. f. is generated in a conductor when the conductor is cut by magnetic line of force. He found that voltage could be generated in the conductor by moving either the conductor or the flux or both.

In direct current generators and motors revolving conductor cuts the stationary flux in air gap under the field poles cuts the alternating current generators the flux from revolving field—poles cuts the stationary armature, conductors while in transformers, stationary winding links a varying flux produced by an alternating e.

m. f. of a stationary winding.

When e.m.f. is generated by the motion of either the field structure or the conductors, as in alternating and direct current generators, it is called generated e.m.f. When it is produced by a changing flux as in a transformer, it is called an induced e. m. f.

As a result of his experiments, Faraday announced the law that e. m. f. induced in a conductor by electromagnetic action is proportional to the rate at which the conductor cuts magnetic lines of force. This law is probably the most important open in electrical science.

By means of transformers based on Faraday's induction coil discovery, it is simple for a current from the grid or directly from a power-station of say 132.000 volts to be stepped down for the electric train to 600 volts and for household use to 240 volts.

Smaller transformers in individual prices of electrical equipment, say a shaver or radio, may step the current down still further for special purposes.

Similarly, currents may be stepped up in voltage, if required, by the same device. The procedure is quit simple. The current is fed into the transformer across the primary, of input coil, which corresponds, to Faraday's right-hand coil. If this secondary coil has more windings of wire than the primary coil, the voltage will be stepped down.

Вправа 4. Дайте відповіді на запитання:

1. Are there three or four main ways to generate e.m.f. ?
2. What is the most important way to generate e.m.f. ?
3. What did Faraday discover?
4. How could voltage be generated ?
5. Where do direct current generators cut stationary flux?
6. What is generated e.m.f.?
7. What is induced e. m. f ?
8. What is Faraday's law ?

Вправа 5. Підставте правильний варіант замість пропуску:

1. There are .... to generate e.m.f.

A ...two ways...

B ...three ways...

C ...four ways...

D ...five ways...

2. ....is the most important way to generate e.m.f.

A Electromagnetic induction...

B Chemical action....

C Friction...

D Heating....

3. Faraday discovered that an e. m. f. is generated in a conductor when....

A ...the conductor is cut by electric line of force.

B ... the conductor is accompanied by magnetic line of force.

C... the conductor is accompanied by electric line of force.

D ... the conductor is cut by magnetic line of force.

4. Voltage could be generated in the conductor ....

A ...without any movement either the conductor or the flux.

B ... only by moving the conductor.

C ...by moving either the conductor or the flux or both.

D ...only by moving the flux.

5. Direct current generators cut stationary flux ....

A... in a stationary winding .

B... in air gap under the field poles.

C... in a flux itself..

D ...in armature.

6. Generated e.m.f is in.... and is generated by the motion of....

A....a generator.....only the field structure.

B.... a transformer.... only the conductors.

C.... a transformer.... .. either the field structure or the conductors.

D ....a generator....either the field structure or the conductors.

7. Induced e. m. f. is ....and is produced....

A ....in a transformer..... by a changing flux.

B.....in a generator..... by a changing flux.

C....in a transformer.... my moving of conductors.

D... out of transformers and generators.

8. E. m. f. induced in a conductor by electromagnetic action is....

A....reversible to the rate at which the conductor cuts magnetic lines of force.

B.... proportional to the rate of generator.

C..... proportional to the rate at which the conductor cuts magnetic lines of force.

D... reversible to the rate of electric flow.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те, як винаходи/закони Фарадея будуть стосуватись Вашої майбутньої роботи, вживаючи різні форми дієслова to have.

4.8. ВАРІАНТ 8

THE ELECTRIC FIELD

Вправа 1. Знайдіть інформацію про дієслово to have як самостійне дієслово, як синонім модального та як складову доконаних часів, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи дієслово to have як самостійне дієслово, як синонім модального та як складову доконаних часів : *separated from each other, between conductors, field, potential difference , exists, displaced, space, represented, drawn, flux density, unit charge, depends upon, length of path, voltage gradient, plates, condenser.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

In practice electrical conductors are separated from each other by an insulating material or dielectric.

When a potential difference exists between two such conductors, a field of force exists in the dielectric near the conductors and between them, in which electric charges are displaced. Any such space near a charged conductor is called an electric field.

Electric fields, similar to magnetic fields are represented by lines called electric lines of force.

Electric lines of force are so drawn that the direction of a line represents the direction in which a positive charge is displaced, while the number of lines per unit of cross section of path (the flux density) is proportional to the force on a unit charge. The force on a unit charge depends upon the intensity of the field, that is, upon the voltage impressed per unit length of path in the dielectric, called the voltage gradient. The simplest form of an electric field is the field between the paralleled

plates of a condenser.

Вправа 4. Дайте відповіді на запитання:

1.How are electrical conductors separated from each other ?

2.What is electric field?

3.Are there electric lines of force only in electric fields?

4.Must the flux density be proportional to the force on a unit charge or not?

5.From what does the force on a unit charge depend upon?

6. What is flux density?

7. What is intensity of field?

8. What is the simplest form of electric field?

Вправа 5. Підставте правильний варіант замість пропуску:

1. Electrical conductors are...

A...joint each other by an insulating material or dielectric.

B... joint each other by capacitors.

C... separated from each other by an insulating material or dielectric.

D... separated from each other by windings.

2. ....is called an electric field.

A. A space with stationary charges near a charged conductor...

B. A space with displaced charges near a charged conductor...

C.A wire tube space...

D.A winding armature action....

3. Electric fields, similar to magnetic fields ...

A... are represented by lines called electric lines of force.

B...avoid the lines called electric lines of force.

C...are surrounded by electric charges

D... avoid electric charges.

4. The flux density is...

A.... reversible to the speed of electric field.

B.... proportional to the speed of electric field.

C.... reversible to the force on a unit charge.

D ...proportional to the force on a unit charge.

5. The force on a unit charge ....

A... depends upon the intensity of the field,

B..... depends upon the speed of armature.

C.... depends upon the charge.

D.... depends upon insulators.

6. Flux density is....

A... a path moving.

B...one line of moving electrons per second .

C... the number of lines per cross-section of conductor .

D ... the number of lines per unit of cross section of path.

7. Intensity of field is....

A...the action of voltage.

B...the speed of armature per unit of time.

C... the voltage impressed per unit length of path in the dielectric.

D...the action of winding.

8. The simplest form of an electric field is the field...

A...within the paralleled plates of a condenser.

B... between the paralleled plates of a condenser.

C... within the joint parts of conductor.

D... between the joint parts of windings.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те, як електричне поле буде стосуватись Вашої майбутньої роботи, вживаючи різні форми дієслова to have .

4.9. ВАРІАНТ 9

PARAMETERS OF AN ELECTRIC CIRCUIT

Вправа 1. Знайдіть інформацію про активний дієприкметник, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи активний дієприкметник: *electric circuit, resistance, inductance, capacitance, determine, properties of the conductor, necessary ,equal, amount, linkage, tubes, measure, extend, intensity, purpose, alternator, point.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

Parameters of an electric circuit are made up of three circuit components: resistance, inductance and capacitance which determine the circuit characteristics.

1. The resistance of the circuit is determined by the properties of the conductor of the circuit. It is not necessary that the circuit be made of segments of equal resistance.

2. The amount of magnetic linkage (the number of magnetic flux tubes linking the circuit) per unit current is a measure of the inductance of the circuit.

3. If conductors are connected to metal plates, which are separated by a vacuum or insulator, an electric potential will be built between the metal plates. Electrical flux tubes will extend from one plate to the other. The intensity of the electric field per unit potential is a measure of the capacitance of the circuit.

The purpose of any circuit is to transfer electric energy from an electric generator, battery or alternator to some other point of the circuit, where electric energy is converted to some other form of energy, such as heat, light or mechanical energy. It should be understood that energy is transmitted only when both electric and magnetic field exist around the conductor. The amount of energy transfer depends on the intensities of the electric and magnetic fields.

Вправа 4. Дайте відповіді на запитання:

1. How many components are there in electric circuit?
2. What are circuit components?
3. Is it necessary for all circuit segments to be of an equal resistance?
4 . What is magnetic linkage?
5. What happens if conductors are connected to metal plates?..
6. What is a measure of the inductance of the circuit?.
7. What is a measure of the capacitance of the circuit?
8. Can electric energy be transmitted without electric field ?

Вправа 5. Підставте правильний варіант замість пропуску:

1. There are... in electric circuit.

A... two components...

B....three components...

C... four components...

D...five components...

2. The main circuit components are...

A... resistance, inductance and capacitance which determine the circuit characteristics.

B...intensity, density, resistance, strength which determine the circuit characteristics.

C.... resistance, inductance which do not determine the circuit characteristics.

D.... ...intensity, density, resistance, strength which do not determine the circuit characteristics.

3.....for all circuit segments to be of an equal resistance.

A. It is a rule...

B. It is a law...

C. Is it not necessary...

D. Is it necessary.....

4. Magnetic linkage is...

A.... the number of magnetizing materials.

B.... the number of magnetic flux tubes linking the circuit

C. ... the linkage of charges

D... the linkage of magnetizing materials

5. If conductors are connected to metal plates....

A. ... these metal plates will be insulated .

B. ... these metal plates will be built between an electric potential.

C. ... an electric potential will disappear between the metal plates.

D... an electric potential will be built between the metal plates.

6. ....is a measure of the inductance of the circuit.

A. The circuit moving...

B. The strength of winding...

C. The speed of armature ....

D. The amount of magnetic linkage...

7. ....is a measure of the capacitance of the circuit.

A. The intensity of the electric field per unit potential....

B. The amount of magnetic linkage...

C. The strength of winding...

D. The speed of armature ....

8. Energy is transmitted ... the conductor.

A... when one electric field exists in....

B. . only when both electric and magnetic field exist out ....

C. ..only when both electric and magnetic field exist around...

D... when one magnetic field exists in....

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір / представте презентацію про те, як параметри електричного поля будуть стосуватись Вашої майбутньої роботи, вживаючи активний дієприкметник.

4.10. ВАРІАНТ 10

ELECTRIC MOTORS

Вправа 1. Знайдіть інформацію про пасивний дієприкметник, доповнивши аудиторний конспект.

Вправа 1. Перекладіть наступні слова та складіть з ними власні речення, вживаючи пасивний дієприкметник : *is exceptionally well suited, converting, overload capacity, farm power unit, develop more than twice, rated power= horsepower rating, without damage, when properly selected and installed, to require, care, equipment, device, various loads, application, to rotate, torque, lightweight parts.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

The electric motor is exceptionally well suited for farm jobs, as it is very efficient in converting electric energy into mechanical energy, is easy to start and stop and can be controlled automatically. Its overload capacity makes it particularly important as a farm power unit since it can develop more than twice its rated power for periods of a few minutes without damage. Electric motors when properly selected and installed serve many years and require only periodic care. The electric motor has probably done more to make the farmer's standard of living equal to that of the urban resident than any other electric device including the electric lamp.

There are many different sizes of electric motors. Why are these different sizes needed or, in other words, what is different about the various loads that causes one to select one size of motor for this application and another for a different application? The answer is obtained by examining the characteristics of the various loads.

Any equipment requiring an electric motor has moving parts. The parts represent an opposition to being moved, and in order for the motor to rotate it has to develop enough force to overcome all opposition to its rotation. The

turning effort that the motor uses to overcome the opposition is called torque. The opposition is called counter-torque or resisting torque. The amount of counter-torque depends upon the construction of the equipment and upon the amount of opposition added when the machine is performing its job. Equipment with large, heavy, moving parts requires more torque than equipment with lightweight parts. A 16-ft conveyor requires more torque when it is operating at a 45° angle than it does when it is horizontal. The more torque necessary for turning the load, the larger is the horsepower rating of the motor required for the job.

Вправа 4. Дайте відповіді на запитання:

1.Why is the electric motor exceptionally well suited for farm job?

2.What makes the electric motor particular important as. a farm power unit?

3. When can it develop more than twice its rated power?

4. What is called torque?

5.What is called counter-torque?

6.What equipment requires more torque?

7. Upon what does the amount of counter-torque depend?

8.How does horsepower rating of the motor depend upon torque?

Вправа 5. Підставте правильний варіант замість пропуску:

1. Electric motor is very efficient in ....

A....converting electric energy into mechanical energy, is easy to start and stop and can be controlled automatically.

B....converting mechanical energy into electric energy, is easy to start and stop and can be controlled automatically.

C .....converting electric energy into mechanical energy, is easy to start and stop and can not be controlled automatically.

D....converting mechanical energy into electric energy, is easy to start and stop and can not be controlled automatically.

2. Its.... makes electric motor particularly important as a farm power unit.

A... loading. charge...

B...voltage....

C ....overload capacity....

D....mechanical action...

3. Electric motor....

A ...can develop more than twice its rated power for periods of a one minute without damage.

B....can develop more than three times its rated power for periods of a one minute without damage

C....can develop more than twice its rated power for periods of a few minutes being damaged.

D ....can develop more than twice its rated power for periods of a few minutes without damage.

4. Torque is...

A...the turning effort that the generator uses to overcome the opposition .

B... the turning effort that the generator uses to be steady

C... the turning effort that the motor uses to be steady

D ...the turning effort that the motor uses to overcome the opposition .

5....is called counter-torque or resisting torque.

A The opposition....

B The turning effort...

C The motor action ...

D The farm unit capacitance...

6. Equipment with large, heavy, moving parts requires .... equipment with lightweight parts.

A ...no torque similar to....

B... as much torque as...

C .....more torque than...

D.... less torque than...

7. The amount of counter-torque depends upon ...

A.... the construction of the equipment and upon its stator size when the machine is performing its job.

B.... the construction of the equipment and upon the amount of opposition added when the machine is performing its job.

C.... the construction of the bulb windings.

D...the construction of case coils.

8. ...torque necessary for turning the load, ...is the horsepower rating of the motor required for the job.

A The more.... the less...

B The more.... the larger....

C No... more...

D No....less....

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як електродвигуни будуть стосуватись Вашої майбутньої роботи, вживаючи пасивний дієприкметник.

4.11. ВАРІАНТ 11

POWER TRANSFORMERS

Вправа 1. Знайдіть інформацію про неправильні дієслова в активному та пасивному станах, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи неправильні дієслова в активному та пасивному станах : *power transformer, without moving parts, transforming alternating voltage, two electric circuits, steel core , high-(low)tension winding, a step- down(up) transformer, reverse connection, later discoveries ,practical application, to convey electric current, distances, grid, household use, windings of wire, coil*.

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

The power transformer is an electric machine, without moving parts, for transforming alternating voltage from a higher to a lower voltage or from a lower to a higher voltage. It consists of two electric circuits called the primary and secondary and a steel core (which forms a magnetic circuit). Either coil of a transformer may be used as primary or secondary. Most transformers are designed for widely different primary and secondary voltages. The coil with the high voltage is called the high-tension winding and the one with low voltage — the low-tension winding.

When a high voltage coil is the primary and the low voltage coil is the secondary, the transformer is called a step- down transformer. When the reverse connection is used, the transformer is called a step-up transformer. The ratio of the high-side voltage to the low-side voltage is called the ratio of transformation.

Generally speaking, transformers may be designed for any desired ratio of transformation. Common ratios are 5: 1, 10: 1, 20:1.

Faraday's experiments of August 29, 1831, gave us the principle of the electric transformer, without which the later discoveries of that fateful year could have little

real practical application. To convey electric current over long distances, say to supply a town, or feed an electric railway, it is necessary to generate it at a very high voltage, or force. By means of transformers based on Faraday's induction coil discovery, it is simple for a current from the grid or directly from a power-station of say 132.000 volts to be stepped down for the electric train to 600 volts and for household use to 240 volts. Smaller transformers in individual prices of electrical equipment, say a shaver or radio, may step the current down still further for special purposes. Similarly, currents may be stepped up in voltage, if required, by the same device. The procedure is quit simple. The current is fed into the transformer across the primary, of input coil, which corresponds, to Faraday's right-hand coil. If this secondary coil has more windings of wire than the primary coil, the voltage will be stepped down.

Вправа 4. Дайте відповіді на запитання:

1.What is power transformer?

2. What are the parts of transformer ?

3. What is high-tension winding?

4. What is low-tension winding ?

5. What is a step- down transformer ?

6. What is a step-up transformer?

7. What is ratio of transformation?

8. Whose experiments gave us the principle of the power transformer, without which the later discoveries of that fateful year could have little real practical application.?

Вправа 5. Підставте правильний варіант замість пропуску:

1. The power transformer is ....

A.... an electric machine, without moving parts to generate electricity

B... an electric machine, with moving parts, for transforming alternating voltage from a higher to a lower voltage or from a lower to a higher voltage.

C... an electric machine, without moving parts, for transforming alternating

voltage from a higher to a lower voltage or from a lower to a higher voltage.

D... mechanical machine to transform electricity into mechanical operations.

2 . Power transformer consists of ...

A...two electric circuits called the primary and secondary and a steel core.

B ....stator and rotor cases.

C... torque and counter torque.

D... windings and armatures.

3. High-tension winding is...

A.....winding with any tension.

B....high winding.

C....the coil with the high voltage.

D ....the coil with the low voltage.

4. Low-tension winding is...

A....the winding with any tension.

B....the high winding.

C....the coil with the high voltage.

D ....the coil with the low voltage.

5. Step- down transformer is when....

A.... the low voltage coil is the primary and the high voltage coil is the secondary.

B ....high voltage coil is the primary and the low voltage coil is the secondary.

C ... high voltage coil and the low voltage coil are both primary.

D... high voltage coil and the low voltage coil are both secondary.

6. Step-up transformer is...

A.... the low voltage coil is the primary and the high voltage coil is the

secondary.

B ....high voltage coil is the primary and the low voltage coil is the secondary.

C ... high voltage coil and the low voltage coil are both primary.

D... high voltage coil and the low voltage coil are both secondary .

7. The ratio of transformation is ...

A the ratio of the high-side voltage to the low-side voltage .

B the ratio of the low-side voltage to the high-side voltage.

C ....working ability .

D.... power of transforming..

8... gave us the principle of the power transformer, without which the later discoveries of that fateful year could have little real practical application.

A Volta's experiments on September,30,1800...

B Galvani's experiments on March, 1794...

C Faraday's experiments of August 29, 1831...

D Franklin's experiments on April 1856...

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як трансформатори будуть стосуватись Вашої майбутньої роботи, вживаючи неправильні дієслова в активному та пасивному станах.

4.12. ВАРІАНТ 12

TRANSFORMER NAME PLATE AND CONNECTIONS

Вправа 1. Знайдіть інформацію про інфінітив та інфінітивні структури, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи інфінітивні структури : *name plate, kva rating, low voltage winding, leads, outside of the transformer case, connected in series, supply rated kva, short circuit, connections, single-phase transformers, damage may be used to supply, wire, point, ground.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

There is transformer name plate. The name plate on the transformer gives the voltage and kva ratings of the transformer and shows how the coils are connected. It is common practice to build the low voltage winding in two coils and bring four leads to the outside of the transformer case. The coils may be connected in series or parallel. If the coils are for 115 or 230 volts, they will supply rated kva at either voltage.

The transformer should always be connected as shown on the nameplate. Otherwise a short circuit which would damage the windings may result.

There are transformer connections. Single-phase transformers may be used for either single - phase, two-phase or three-phase connections. One single-phase transformer may be used to supply three-wire 115-230 volts or 230-460 volts.

Since the secondary winding is electrically insulated from the primary, any point of the secondary may be connected to ground. In single-phase, 115-230-volt circuits it is common practice to ground the centre of the winding. If the system is a three wire, 230-volt circuit with the centre of the coil grounded, there is a potential of 115 volts from the ground to either wire. The transformer case should be grounded.

Вправа 4. Дайте відповіді на запитання:

1. What is shown in the transformer name plate?

2.How many coils and leads are there outside of the transformer case in common practice ?

3. How may the coils of transformer be connected ?

4. What happens if transformer is not connected according to its nameplate?

5. For what connections may single-phase transformers be used?

6. What part of winding is grounded in single-phase, 115-230-volt circuit?

7. What happens if the system is of three wires?

8. What must engineer do with the transformer case?

Вправа 5. Підставте правильний варіант замість пропуску:

1. The name plate of the transformer gives its....

A capacitance, inductance and shows what is its case.

B voltage , kva ratings and shows how the coils are connected.

C voltage , kva ratings and shows its inductance

D capacitance, inductance and shows its voltage

2. In common practice there are low voltage winding in... coils and ...leads outside of the transformer case.

A ...four... four...

B... two... two...

C... four... two...

D.... two... four...

3. The coils of transformer may be connected ...

A ...only in series.

B...only parallelly.

C... in series or parallel.

D ...to each other.

4. If transformer is not connected according to its nameplate...

A ...a short circuit would damage the windings.

B... it would be nothing dangerous

C....it would be new transformer construction ready to work

D... the leads would be simply mixed

5.Single-phase transformers may be used for... connections.

A...only single- phase...

B... only two-phase...

C... only three-phase..

D... single-phase, two-phase or three-phase ...

6. In single-phase, 115-230-volt circuits it is common practice to ground ....of the winding.

A...both sides...

B ... the left end ...

C...the right end...

D ...the centre...

7. If the system is a three wire,..

A ...there is a potential of 115 volts from the ground to the ground.

B...there is a potential of 220 volts from the wire to the wire.

C...there is a potential of 115 volts from the ground to either wire.

D ...there is a potential of 220 volts from the ground to either wire.

8. The transformer case ...

A...must be electrified .

B ...should be grounded.

C... should be divided into two parts .

D... must be stressed.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як технічний паспорт з параметрами електричного приладу будуть стосуватись Вашої майбутньої роботи, вживаючи інфінітивні структури.

4.13. ВАРІАНТ 13

SAFETY DEVICES

Вправа 1. Знайдіть інформацію про загальнонаукові дієслова, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи загальнонаукові дієслова : *safety devices , dangerous , not carefully used, faulty, installation, piece of equipment, to cause a serious fire , fatal consequences, to resist corrosion, insulation of power leads, portable appliances, frame, flexible , irons and kettles, plug , thickest pin, breaks down, to avoid , household fuse, exceeds a certain amount.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

Electricity can be dangerous if it is not carefully used. A faulty installation or a defective piece of equipment can cause a serious fire and there is also the danger of an electric shock, with possible fatal consequences. Many precautions should be taken and safety devices should be used to minimize these dangers, insulation, earthing, fuses and automatic cut- outs being among the most common safety devices.

Insulation is the covering of a conductor with a non- conducting material to prevent it from touching another conductor. The materials are also used vary according to the nature of the conductor and the condition in which it is used. It has to be with stand extremes of temperature and resist corrosion. The insulation of power leads to portable appliances must be flexible and also very strong.

Any piece of electrical apparatus having a metal body or frame, especially portable appliances such as electronic irons, kettles and power tools, must be earthed as a safety measure. Earthing is brought about by connecting the metal body or frame, directly to earth with a thick conductor. In a 3-pin power plug the thickest pin is always to earth the connection. If a fault develops inside the apparatus or if the insulation on a flexible lead breaks down, an

electric shock because of touching the apparatus may be avoid since the current will take the easier path back to earth.

The most common safety device and one which is used in every household installation is the ordinary fuse. This is simply a piece of wire to be connected in series in the circuit.

The fuse should be of such a resistance that will melt and therefore break the circuit if the current flowing in the circuit exceeds a certain amount. When it happens, we say that the fuse «blows». It is very important that fuse wire of the correct amperage be used.

Вправа 4. Дайте відповіді на запитання:

1. What case can electricity be dangerous?
2. What are the most common safety devices.?
3. What is insulation?
4. What are demands to insulating material?
5. What must be earthed as a safety measure?
6. What is esrthing?
7. How is a 3-pin power plug earthed ?
8. What is a fuse?

Вправа 5. Підставте правильний варіант замість пропуску:

1. Electricity can be dangerous…

A …anytime.

B… if it is carefully used.

C …if it is not carefully used.

D… if we use safety devices.

2 . The main safety devices are….

A... insulation, earthing, fuses and transformers.

B ...insulation, earthing, fuses and automatic cut- outs.

C ...automatic cut- outs, generators and fuses.

D ...transformers, generators and electrically heated furnaces.

3. Insulation is…

A ...the covering of a insulator with a non- conducting material to prevent it from touching another insulator.

B ...the uncovering of a conductor with conducting material to prevent it from touching another insulato.r

C... the covering of a insulator with a non- conducting material to prevent it from touching another conductor.

D ...the covering of a conductor with a non- conducting material to prevent it from touching another conductor.

4. Insulating material …

A has to overcome voltage

B has to be with stand extremes of temperature and resist corrosion

C has not to be with stand extremes of temperature and resist corrosion

D has not to be flexible.

5. ....must be earthed as a safety measure

A Any piece of electrical apparatus having a metal body or frame, especially portable appliances....

B Only metal parts especially in portable appliances....

C Insulated wires of electrical apparatus...

D Only conductors of electrical apparatus...

6. Earthing is...

A. ....connecting of the metal body or frame, directly to earth with a thin conductor.

B...working on the Earth .

C ....connecting of the metal body or frame, directly to earth with a thick conductor.

D ....imparting of the metal body from frame with a thick conductor.

7. In a 3-pin power plug ...

A...the thinnest pin is never earthed.

B ...the thinnest pin is always to earth the connection.

C...the thickest pin is seldom to earth the connection.

D ...the thickest pin is always to earth the connection.

8. Fuse is...

A... the industrial conductor to deliver electricity through the wires.

B....the most common safety device in every household installation, seems to be a piece of wire to be connected in series in the circuit .

C....the most common safety device but which is used rarely seems to be a piece of wire to be connected in series in the circuit.

D... the most common a part of transformer to step up voltage.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як технічні засоби електробезпеки будуть стосуватись Вашої майбутньої роботи, вживаючи загальнонаукові дієслова.

4.14. ВАРІАНТ 14

MAGNETISM

Вправа 1. Знайдіть інформацію про ввідні структури, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи ввідні структури: *piece of iron, coil with a strong electric current, temporarily magnetized, to cause, is called a magnetomotive force, convenient unit, space, tend, poles, contain, the strength of the field, intensity, measure of the degree, conveniently represented, tangent to the line, density*.

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

Magnetizing Force. When a piece of iron is brought near a magnet or a coil with a strong electric current, it is temporarily magnetized. The inducing or magnetizing force that causes the iron to become magnetized is called a magnetomotive force. Very powerful magnetizing force may be produced by the use of electric currents. The strong magnetic fields in many machines are being produced in this way. The unit of magnetizing force (magneto-motive force) is called the ampere. When electric currents are used as a magnetizing force, a more convenient unit which is used is the ampere-turn.

Magnetic Field. Any space in which magnetic materials tend to become magnetized is a magnetic field. The space near the pole of a magnet or near an electric current is a field of this kind. In such a space the poles of a magnet contain magnetic forces.

Field Intensity. The intensity of a magnetic field is a measure of the degree to which a magnetic substance placed in the field tends to become magnetized. The field is strong or weak depending upon whether this tendency is great or small. A magnet pole in a magnetic field has a force which is proportional to the strength

of the field and this force may be taken as a measure of field intensity.

Lines of Force. Magnetic fields are conveniently represented by lines called lines of force. These lines are so drawn that a small magnetic needle, if moved along a line of force, would everywhere be tangent to the line. The density of the lines are drawn close together, while at some distance from point. Near the poles where the field intensity is high, the lines at any point indicates the intensity of the field at that the poles where the intensity is less, the lines are farther apart.

Вправа 4. Дайте відповіді на запитання:

1.When is iron magnetized?

2.What is magnetomotive force ?

3.What is ampere?

4.What does field intensity measure?

5.What is magnetic field?

6.What are lines of force?

7. To what is the force of a magnet pole proportional?

8.Do the lines indicate the same intensity in every point?

Вправа 5. Підставте правильний варіант замість пропуску:

1. ...iron is temporarily magnetized.

A When a piece of iron is brought far from a magnet or a coil with a strong electric current...

B When a piece of iron is brought near a magnet or a winding with a strong electric current...

C When a piece of iron is brought near a magnet or a coil with a weak electric current...

D When a piece of iron is brought near a magnet or a coil with a strong electric current...

2 ....is called a magnetomotive force.

A The inducing or magnetizing force that causes the iron to become

magnetized...

B The inducing or magnetizing force that causes no metal to become magnetized...

C The force which moves magnets in every case....

D Electromotive force ....

3. ...is called the ampere.

A The unit of electromotive force...

B The unit of magnetizing force (magneto-motive force)...

C Either the unit of electromotive force or the unit of magnetizing force (magneto-motive force)...

D Nether the unit of electromotive force nor the unit of magnetizing force (magneto-motive force)...

4. The intensity of a magnetic field is a measure of ...

A... the ratio of electric current generating

B...chemical action within electric device which field tends to become magnetized.

C ...the degree to which a magnetic substance placed in the field tends to become magnetized.

D...the degree of electric efficiency to form magnetic forces.

5. Magnetic field is...

A...electric field.

B...a field where the physical magnets are usually stored.

C ...any space in which magnetic materials tend to.become magnetized

D... no space in which magnetic materials tend to become magnetized.

6. Lines of force are....

A ...electric wires.

B ...marks to represent magnetic field.

C...degrees of intensity and capacitance .

D...magnets.

7. A magnet pole in a magnetic field has a force which is proportional ....

A ...to the strength of the field.

B...to the intensity of the field.

C ...to the capacitance of the field.

D...to the magneto-motive force.

8. Near the poles where the field intensity is high, ...

A... the lines at any point indicates the density of the field.

B ...the lines at no point indicates the density of the electric current flux.

C ...the lines of some cases to generate electricity.

D... the lines at any point indicates the intensity of the field.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як явище магнетизму буде стосуватись Вашої майбутньої роботи, вживаючи ввідні структури.

4.15.ВАРІАНТ 15

MAGNETIC FIELD

Вправа 1. Знайдіть інформацію про загальнонаукову лексику, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи загальнонаукову лексику: *to exert a force ,in order to draw, to hold in opposition, law of gravity, invisible, latter phenomenon, is considered to be composed of lines, direction, north, south pole, crosses. another, reason, freely suspended, bar magnet, mariner's compass, is bent, the shape of U , familiar, horseshoe magnet*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

Magnets exert a force on some metals. In order to draw some metals to itself and hold it in opposition to the law of gravity, the magnetic field must exert a force. There is an invisible magnetic field between the poles of the magnet. This field is considered to be composed of lines of force, and, in as much as a force has direction, these lines are thought to be leaving the north pole or end of the magnet and entering the south pole.

Note that the density of the lines is greatest at the poles, it becomes deam farther apart. Note that no line of force crosses another.

This latter phenomenon is the reason why a freely suspended bar magnet will line itself up parallel with the lines of force existing between the north and south magnetic poles of the earth.

In the mariner's compass, the end of the magnet that points toward the earth's north geographic pole is called the north pole, the other end being the south pole. If the bar magnet is bent into the shape of a U, it forms the familiar horseshoe magnet.

Вправа 4. Дайте відповіді на запитання:

1.Why must magnetic field exert a force?

2. What kind of field is there between the poles of the magnet?

3. What is direction for magnetic lines of force to move?

4. Is there the same destiny of force lines?

5. Do the lines of force cross each other?

6. What is north pole in the mariner's compass?

7. What is south pole in the mariner's compass?

8. What is horseshoe magnet ?

Вправа 5. Підставте правильний варіант замість пропуску:

1...., the magnetic field must exert a force

A To drift some metals and hold them in opposition due to the law of gravity...

B To draw some metals and hold them in opposition due to the law of gravity...

C To draw some metals and hold them in opposition due to Faraday's law...

D To draw some metals placing together due to Faraday's law...

2. There is... between the poles of the magnet.

A ...an invisible magnetic field...

B...an visible magnetic field...

C...an invisible electric field...

D ...an visible electric field...

3. Magnetic lines of force...

A ...are proved to on no poles of magnet at the same moment.

B...are proved to be on the both poles of magnet at the same moment.

C ...are thought to be leaving the south pole or end of the magnet and entering the north pole.

D ...are thought to be leaving the north pole or end of the magnet and entering the south pole.

4. The density of the force lines...

A... is greatest at the poles, and becomes deam farther apart.

B... is lowest at the poles, and becomes stronger farther apart.

C... is always the same.

D... is not present at all.

5. Note that...

A ...each line of force seldom crosses another.

B ...every line of force crosses another every tim.

C ...no line of force crosses another at all.

D... there are no lines of forces.

6. North pole in the mariner's compass is...

A... the end of the magnet that points toward the earth's north geographic pole.

B ...the end of the magnet that points toward the earth's south geographic pole.

C ... the coolest end of steel needle.

D ...the scheme of geographical north area .

7. South pole in the mariner's compass is...

A ...the end of the magnet that points toward the earth's north geographic pole.

B ...the end of the magnet that points toward the earth's south geographic pole.

C ... the hottest end of steel needle.

D ... the scheme of geographical south area.

8. Horseshoe magnet is...

A... no physical device.

B ...every bar magnet .

C ... a bar magnet to be bent into the shape of a U.

D ... to measure voltage.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як магнітне поле буде стосуватись Вашої майбутньої роботи, вживаючи ввідні структури.

4.16. ВАРІАНТ 16

GENERATOR

Вправа 1. Знайдіть інформацію про структури There is/ There are, в різних часах, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи структури There is/ There are у різних часах: *generation, to convert, to reverse, conversion, similarities, external circuit, charges, to create, wire, windings , somewhat analogous, water pump, flow, inside, source, reciprocating, steam engine , water falling, waterwheel, internal combustion, engine, wind turbine, a hand cran,k compressed air, connection, high voltage, low currents ,moving electrically ,charged belts, plates, inefficiency, difficulty, insulating, power ratings, quantities, significant, survived.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

In electricity generation, an electrical generator is a device that converts mechanical energy to electrical energy, generally using electromagnetic induction. The reverse conversion of electrical energy into mechanical energy is done by a motor- motors and generators have many similarities. A generator forces electric charges to move through an external electrical circuit, but it does not create electricity or charge, which is already present in the wire of its windings. It is somewhat analogous to a water pump, which creates a flow of water but does not create the water inside. The source of mechanical energy may be a reciprocating or turbine steam engine, water falling through a turbine or waterwheel, an internal combustion engine, a wind turbine, a hand crank, compressed air or any other source of mechanical energy.

Before the connection between magnetism and electricity was discovered, electrostatic generators were invented that used electrostatic principles.

These generated very high voltages and low currents. They operated by using

moving electrically charged belts, plates and disks to carry charge to a high potential electrode.

The charge was generated using either of two mechanisms:

-Electrostatic induction

-The triboelectric effect, where the contact between two insulators leaves them charged.

Because of their inefficiency and the difficulty of insulating machines producing very high voltages, electrostatic generators had low power ratings and were never used for generation of commercially-significant quantities of electric power. The Wimshurst machine and Van de Graaff generator are examples of these machines that have survived.

Вправа 4. Дайте відповіді на запитання:

1.What is electrical generator?

2.Does electrical generator produce charges?

3.The source of mechanical energy may be a reciprocating or turbine steam engine, water falling or waterwheel, an internal combustion engine, a wind turbine, a hand crank, compressed air, may not it?

4.Electrostatic generators generated very high voltages and low currents, did not they?

5.How were electrostatic generators driven?

6.Had the electrostatic generators had high power ratings?

Вправа 5. Підставте правильний варіант замість пропуску:

1. Electrical generator is a device that converts mechanical energy to electrical energy, generally using...

A heating

B friction

C chemical action

D electromagnetic induction.

2.The reverse conversion of electrical energy into mechanical energy is done by ....

A.... a stator

B.... a motor

C... a rotor

D... no device.

3.Motors and generators .....many similarities.

A have

B have not

C has

D has not

4. Electrostatic generators generated.....

A ...very low voltages and high currents.

B.....very high voltages and low currents.

C....no voltage

D....no current.

5. Electrostatic generators operated by electrically charged belts, plates and disks to carry ....to a high potential electrode.

A ...disk...

B ...field....

C ...charge...

D ... plate...

6. Electrostatic generators ....used for generation of commercially-significant quantities of electric power.

A ...was...

B.... were...

C... were ever ....

D ...were never...

7. There was..... for electrostatic generators.

A...difficulty of insulating machines..

B... not difficulty of insulating machines

C... difficulty of conducting machines...

D... no machines...

8. A generator forces electric charges to move through an...

A... external electrical circuit.

B ... internal electrical circuit.

C.... external combustion engine.

D... solar energy.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як генератор буде стосуватись Вашої майбутньої роботи, вживаючи ввідні структури. вживаючи структури There is/ There are в майбутньому часі.

4.17. ВАРІАНТ 17

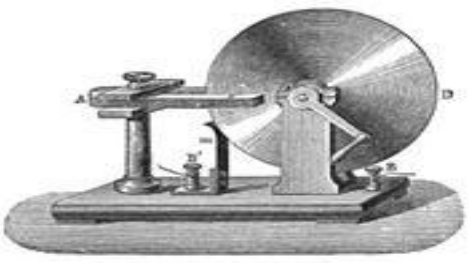
JEDLIK'S DYNAMO AND FARADAY'S DISK

Вправа 1. Знайдіть інформацію про кількісні, порядкові та дробові багатокомпонентні числівники, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи кількісні, порядкові та дробові багатокомпонентні числівники : *experiments, rotating, devices, to call, stationary, revolving, parts concept, to realize, thought essence, instead of permanent, opposite to, each other around, to induce, decades ,ahead of its time, operating principle, law, potential difference, conductor, perpendicular ,to move, built ,copper, horseshoe magnet , DC voltage, large amounts of current, inefficient, self-canceling, counter flows ,directly underneath, backwards, outside the influence, limits, the power output, to the pickup wires, waste heating, to array to maintain, a steady number of turns, to produce any desired voltage, by varying, subsequent designs , wire windings.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

In 1827, Hungarian Anyos Jedlik started experiments with electromagnetic rotating devices which he called electromagnetic self-rotors. In the prototype of the single-pole electric starter (finished between 1852 and 1854) both the stationary and the revolving parts were electromagnetic. He formulated the concept of the dynamo at least 6 years before Siemens and Wheatstone but didn't patent it as he thought he wasn't the first to realize this. In essence the concept is that instead of permanent magnets, two electromagnets opposite to each other induce the magnetic field around the rotor. Jedlik's invention was decades ahead of its time.



In 1831-1832 Michael Faraday discovered the operating principle of electromagnetic

generators. The principle, later called Faraday's law, is that a potential difference is generated between the ends of an electrical conductor that moves perpendicular to a magnetic field. He also built the first electromagnetic generator, called the 'Faraday disc', a type of homopolar generator, using a copper disc rotating between the poles of a horseshoe magnet. It produced a small DC voltage, and large amounts of current. This design was inefficient due to self-canceling counter flows of current in regions not under the influence of the magnetic field. While current flow was induced directly underneath the magnet, the current would circulate backwards in regions outside the influence of the magnetic field. This counter flow limits the power output to the pickup wires, and induces waste heating of the copper disc. Later homopolar generators would solve this problem by using an array of magnets arranged around the disc perimeter to maintain a steady field effect in one current-flow direction.

Since the output voltage is proportional to the number of turns, generators could be easily designed to produce any desired voltage by varying the number of turns. Wire windings became a basic feature of all subsequent generator designs.

Вправа 4. Дайте відповіді на запитання.

1.What devices were called electromagnetic self-rotors?

2. Did Romanian Anyos Jedlik formulate the concept of the dynamo at least 6 years before Siemens and Wheatston?

3. What is principle of dynamo’s work?

4. What is Faraday's law?

5**.** How was the first electromagnetic generator called?

6. Did the first electromagnetic generator produce a small DC voltage, and large amounts of current?

Вправа 5. Підставте правильний варіант замість пропуску:

1. Electromagnetic …are called electromagnetic self-rotors.

A rotating devices

B stationaty devices

C power tools

D equipment

2. Two electromagnets opposite to each other induce the magnetic field …the rotor.

A near

B around

C next to

D under

3 Potential difference is generated between the ends of an …that moves perpendicular to a magnetic field.

A electrical insulator

B electrical conductor

C magnetic insulator

D magnetic conductor

4. 'Faraday disc' produced a small…., and large amounts of current

A AC voltage

B DC voltage

C no voltage

D device

5. The output ….is proportional to the number of turns

A speed

B voltage

C rated power

D flow

6. Generators …to produce any desired voltage by varying the number of turns.

A …could be easily designed…

B…could not be designed…

C… are not to…

D… became transformers to…

7 .Wire windings became a basic feature of… subsequent generator designs.

A… all…

B… only some…

C… no…

D… several ….

8. Michael Faraday discovered the operating principle of…

A …electrostatic transformer.

B …electrostatic generator.

C …electromagnetic generators.

D …electromagnetic transformer.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як генератори старого типу будуть стосуватись Вашої майбутньої роботи, вживаючи ввідні структури. вживаючи кількісні, порядкові та дробові багатокомпонентні числівники.

4.18. ВАРІАНТ 18

DYNAMO

Вправа 1. Знайдіть інформацію про всі форми вираження пасивного стану, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи всі форми вираження пасивного стану: *are no longer used, due to the size , complexity, high power applications, belt-driven, high-current, spinning, capable of delivering power, to convert, mechanical rotation, a pulsing direct electric current, accidental discoveries ,became the source, DC electric motor AC alternator, rotary converter, stationary, constant, magnetic field, set of rotating windings,to turn within that field, permanent called field coils, rarely power distribution, solid state, before, only means, power generation ,mostly, curiosity.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях :

Dynamos are no longer used for power generation due to the size and complexity of the commutator needed for high power applications. This large belt-driven high-current dynamo produced 310 amperes at 7 volts, or 2,170 watts, when spinning at 1400 RPM.

The dynamo was the first electrical generator capable of delivering power for industry. The dynamo uses electromagnetic principles to convert mechanical rotation into a pulsing direct electric current through the use of a commutator. The first dynamo was built by Hippolyte Pixii in 1832.

Through a series of accidental discoveries, the dynamo became the source of many later inventions, including the DC electric motor, the AC alternator, the AC synchronous motor and the rotary converter.

A dynamo machine consists of a stationary structure, which provides a constant magnetic field, and a set of rotating windings which turn within that field. On small machines the constant magnetic field may be provided by one or more permanent

magnets; larger machines have the constant magnetic field provided by one or more electromagnets, which are usually called field coils.

Large power generation dynamos are now rarely seen due to the now nearly universal use of alternating current for power distribution and solid state electronic AC to DC power conversion. But before the principles of AC were discovered, very large direct-current dynamos were the only means of power generation and distribution. Now power generation dynamos are mostly a curiosity.

Вправа 4. Дайте відповіді на запитання:

1 How does dymamo use electromagnetic principles?

2 What later inventions were made due to dynamo base?

3 What is structure of dynamo?

4 Does number of magnets depend on size of machines?

5 What time were large direct-current dynamos the only means of power generation and distribution?

6 Are dynamos used for power generation due to the size and complexity of the commutator needed for high power applications nowadays?

Вправа 5. Підставте правильний варіант замість пропуску:

1.A dynamo machine consists of a stationary structure, which provides … field

A… a constant magnetic ….

B ….changeble…

C… no…

D…electrostatic transformers …

2. The dynamo uses electromagnetic principles. to convert mechanical rotation into a direct electric current through the use of …

A …a commutator.

B …a winding.

C …the coils.

D …the turns.

3. The first dynamo was built by…

A. M.Faradey in 1800-ies

B. Hippolyte Pixii in 1832.

C. A.Volta in 1800.

D. scientist G.Dynamo in 1800-ies.

4. The dynamo machine consists of a… structure

A…reciprocating…

B….rotary…

C …changeable…

D ….stationary… stationary

5. The dynamo was the first electrical generator …

A… capable of delivering power for industry.

B… not able of delivering power for industry.

C…only capable of delivering power for household needs

D…not to be used at all.

6 ….dynamo produced 310 amperes at 7 volts.

A Large belt-driven high-current…

B Small belt-driven high-current…

C Large belt-driven low-current…

D Small belt-driven low-current…

7. Larger machines have the constant magnetic field provided by one or more electromagnets, which are usually called…

A…field coils.

B…windings

C…armatures

D….electrostatic magnets.

8. Large power generation dynamos are now rarely seen due to the now nearly universal use of …for power distribution

A…direct current…

B …alternating current…

C…no current…

D…voltaic piles…

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як динамо-машини будуть стосуватись Вашої майбутньої роботи, вживаючи пасивний стан.

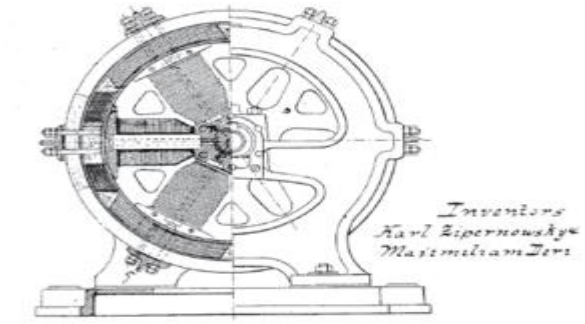
4.19. ВАРІАНТ 19

OTHER ROTATING ELECTROMAGNETIC GENERATORS

Вправа 1. Знайдіть інформацію про всі форми вираження активного стану, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи всі форми вираження активного стану: *example, synchronou,s singly-fed direct current (DC) generator, alternator. constant speed ,precisely frequency, grid, limits outputs, waveform, doubly-fed, brushless wound-rotor, to incorporate, permanent, field windings, success, variable, speed constant frequency, applications, renewable energy technologies. full output, performance, electronic control cost, reliability and efficiency benefits.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:



Without a commutator, the dynamo is an example of an alternator, which is a synchronous singly-fed generator. With an electromechanical commutator, the dynamo is a classical direct current (DC) generator. The alternator must always operate at a constant speed that is precisely synchronized to the electrical frequency of the power grid for non-destructive operation. The DC generator can operate at any speed within mechanical limits but always outputs a direct current waveform.

Other types of generators, such as the asynchronous or induction singly-fed generator, the doubly-fed generator, or the brushless wound-rotor doubly-fed generator, do not incorporate permanent magnets or field windings (i.e, electromagnets) that establish a constant magnetic field, and as a result, are seeing success in variable speed constant frequency applications, such as wind turbines or

other renewable energy technologies.

The full output performance of any generator can be optimized with electronic control but only the doubly-fed generators or the brushless wound-rotor. Doubly-fed generator incorporate electronic control with power ratings that are substantially less than the power output of the generator under control, which by itself offer cost, reliability and efficiency benefits.

Вправа 4. Дайте відповіді на запитання:

1 Can dynamo be an example of an alternator?

2 With an electromechanical commutator, the dynamo is a classical (AC) generator, is not it?

3 Must the alternator always operate at a constant speed?

4 Electromagnets establish a permament magnetic field, do not they?

5 How can full output performance of any generator be optimized?

6 Doubly-fed generators incorporate electronic control with power ratings, do not they?

Вправа 5. Підставте правильний варіант замість пропуску:

1. Alternator is a synchronous singly-fed….

A generator

B transformer

C winding

D core

2. The alternator must always operate at a …speed

A ….reserse…

B …constant…

C…clockwise ….

D…counterclockwise…

3. Doubly-fed generator …electronic control with power ratings.

A… divides ….

B …incorporates…

C…limits…

D…prohibits….

4 .Speed constant frequency applications are …

A…instruments to measure speed

B…transformers.

C …not turbines

D.. wind turbines

5. The DC generator can operate at any speed …

A and pressure.

B without any limits.

C within mechanical limits .

D without mechanical limits.

6. The DC generator always outputs …

A …a direct current waveform.

B …an alternating current waveform.

C….any types of current without waves

D….both a.c. and d.c.

7. Alternator must always operate at a constant speed synchronized to the …for non-destructive operation.

A …no form of electric conductor…

B …electrical frequency of wire…

C…electrical frequency of plug….

D ….electrical frequency of the power grid…

8. The dynamo is an example of an alternator…

A… without a commutator.

B …together with a commutator.

C…as well with as without commutator

D… every time.

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як електрогенератори будуть стосуватись Вашої майбутньої роботи, вживаючи різні форми активного стану.

4.20. ВАРІАНТ 20

MHD GENERATOR AND GENERATOR PARTS

Вправа 1. Знайдіть інформацію про артиклі та сталі структури з/ без артиклів, доповнивши аудиторний конспект.

Вправа 2. Перекладіть наступні слова та складіть з ними власні речення, вживаючи сталі структури з/ без артиклів: *directly, to extract power, hot , field, without the use, rotating ,machinery, output, flam,e well able to, heat, steam, power plant, boilers, to design, government, substantial development, culminating , less efficient, combined-cycle gas turbines, rotating, stationary part, alternator, power-producing component, armature, winding, permanent, mounted field circuit, discussion, to refer, slip rings, small amount of field current, necessarily, direct current machines.*

Вправа 3. Прогляньте текст та запишіть короткий зміст в 5 українських реченнях:

A magneto-hydrodynamic generator directly extracts electric power from moving hot gases through a magnetic field, without the use of rotating electromagnetic machinery. MHD generators were originally developed because the output of a plasma MHD generator is a flame, well able to heat the boilers of a steam power plant. The first practical design was the AVCO Mk. 25, developed in 1965. The U.S. government funded substantial development, culminating in a 25Mw demonstration plant in The two main parts of a generator or motor can be described in either mechanical or electrical terms.

Mechanical:

-Rotor: The rotating part of an alternator, generator, dynamo or motor.

-Stator: The stationary part of an alternator, generator, dynamo or motor.

Electrical:

Armature: The power-producing component of an alternator, generator, dynamo or

motor. In a generator, alternator, or dynamo the armature windings generate the electrical current. The armature can be on either the rotor or the stator.

Field: The magnetic field component of an alternator, generator, dynamo or motor.

The magnetic field of the dynamo or alternator can be provided by either electromagnets or permanent magnets mounted on either the rotor or the stator. (For a more technical discussion, refer to the Field coil article.)

Because power transferred into the field circuit is much less than in the armature circuit, AC generators nearly always have the field winding on the rotor and the stator as the armature winding. Only a small amount of field current must be transferred to the moving rotor, using slip rings. Direct current machines necessarily have the commutator on the rotating shaft, so the armature winding is on the rotor of the machine.

Вправа 4. Дайте відповіді на запитання:

1.From what matter does a magneto-hydrodynamic generator directly extract electric power?

2.Does magneto-hydrodynamic generator use of rotating electromagnetic machinery?

3. Is output of a plasma MHD generator ia flame,?

4. Is MHD generator flame well able to cool the boilers of a steam power plant?

5. What is rotor?

6. What is stator?

Вправа 5. Підставте правильний варіант замість пропуску:

1… of a generator or motor can be described in either mechanical or electrical terms.

A Only one part...

B No parts…

C Two main parts…

D Four main parts…

2. The rotating part of an alternator, generator, dynamo or motor is…

A… rotor.

B …stator.

C …armature.

D …field winding.

3.The stationary part of an alternator, generator, dynamo or motor is…

A… rotor.

B …stator.

C …armature.

D …field winding.

4.The power-producing component of an alternator, generator, dynamo or motor is…

A… rotor.

B …stator.

C …armature.

D …field winding.

5.In a generator, alternator, or dynamo the ….generate the electrical current.

A wires

B coils

C armature turns

D armature windings

6.The armature can be on …

A only stator

B only rotor

C neither the rotor nor the stator.

D either the rotor or the stator.

7. Power transferred into the field circuit …in the armature circuit.

A has the same amount as…

B…equals…

C….as well as…

D…is much less than…

8. …of field current must be transferred to the moving rotor, using slip rings

A Everithing…

B No amount…

C Only a small amount…

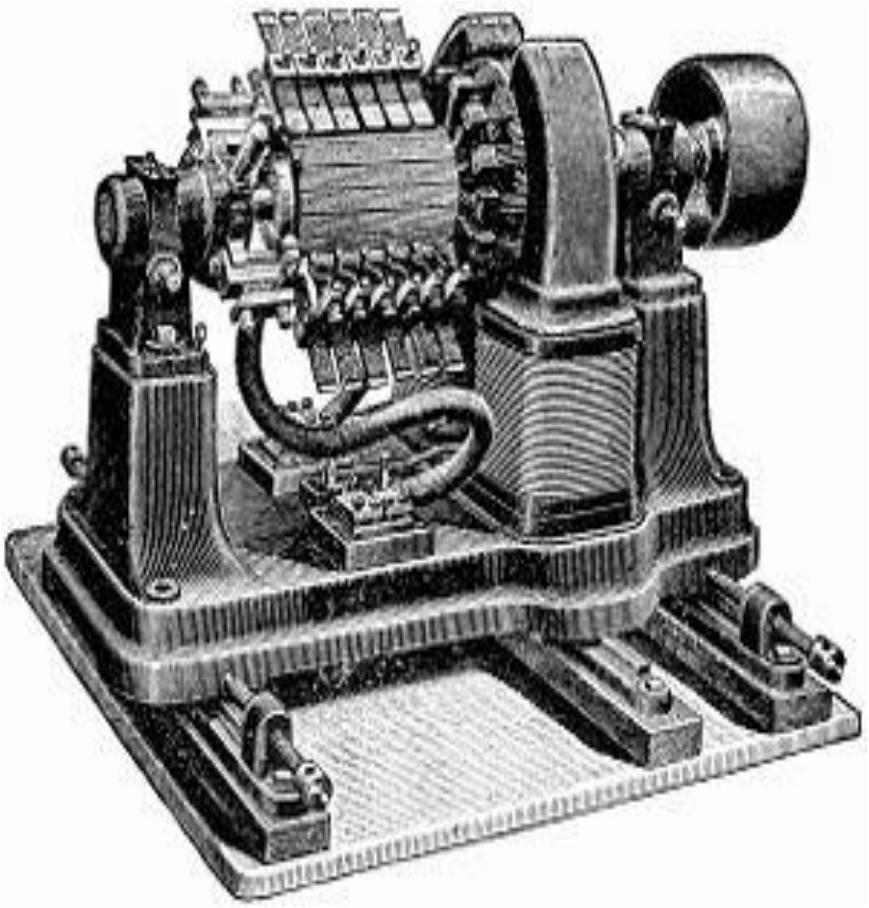
D Only a great amount…

Вправа 6. Складіть план тексту та зазначте в дужках терміни, які вживаються в даному пункті.

Вправа 7. Напишіть твір/представте презентацію про те, як магнітні генератори будуть стосуватись Вашої майбутньої роботи, вживаючи сталі структури з/ без артиклів.

5.ЧАСТИНА 3

ДОДАТКОВІ ЗАВДАННЯ ДЛЯ САМОСТІЙНОЇ РОБОТИ ПІД КЕРІВНИЦТВОМ ВИКЛАДАЧА (НА ВИБІР СТУДЕНТА)



Seek and you'll find

The Bible

Knowledge is power

F.Bacon

5.1. ЗАВДАННЯ 1

Перекажіть власний текст, дотримуючись наступного плану та виразів:

The plan for rendering the text	*Some expressions to be used*
1.The title of the article	The article is headlined....

	The headline of the article I have read is...
2.The author of the article, where and when the article was published	The author of the article is.... The article is written by.... It is (was) published in... It is (was)printed in....
3.The main idea of the article	The main idea of the article is... The article is about.... The article is developed to.... The article deals with... The article touches upon... The purpose of article is to give the reade some information on.... The aim of the article is to provide the reade with some material (data) on...
4.The comments of the article. Some facts, names, figures.	a) The author starts by telling the reade that... b) The author writes (states, stresses , thinks, points out) that... The article describes.... c)According to the text...Further the author reports (says)... The article goes on to say that... d)In conclusion.... The author comes to the conclusion that...
5.Your opinion of the article	I found the article interesting (important, dull, of no value, too hard to understand)

5.2. ЗАВДАННЯ 2

Зробіть анотацію тексту за планом ЗАВДАННЯ 1:

Light can be produced in any one of several ways. Certainly one of the earliest sources of light was the torch, made by setting on fire one end of a heavy stick of

wood. Later there came other devices for obtaining light from a burning object. Lamps, whether or not they use wicks, utilize this principle; candles likewise supply light by burning the material of which they are made; and illuminating gas affords still another example of the production of light by flame. Such sources of light as these are quite inefficient; most of the energy produced in the transformation that takes place is lost to the surroundings as heat energy.

Edison's first power distribution station was of great importance in bringing to the world a new and superior light source. His incandescent lamp was, in the beginning, much less efficient than it is now. The filaments for the early lamps were made of carbonized bamboo, and could not be raised to a temperature sufficiently high to produce a very brilliant light; the light produced by such lamps was quite yellowish in color.

Modern incandescent lamps have filaments made of tungsten, a metal which has an extremely high melting point. The filament of such a lamp can be raised to a very high temperature, and the light becomes more nearly like sunlight as we raise the temperature of the filament.

Light is also produced by the luminous tubes of neon signs. Some years ago arc lights were used for lighting city streets; such are lights have comparatively few applications now, for incandescent lamps serve most of the purposes previously served by arc light. Coming into prominence at present as a source of illumination is the fluorescent tube, a source of light which is at the same time more efficient and more like sun light than most other source now available.

The light which reaches us from the sun is generally thought of as being very nearly perfect for our visual needs. We find, when this light is analyzed, that it contains colors extending from a deep violet to a brilliant red, the colors corresponding to the well-known hues of the rainbow. Analysis of light from other sources shows a different color constitution from that of the light we commonly call white light. Thus the light from an incandescent lamp has less blue in it than does sunlight; when we compare the "white light" of sunlight with the "white light" produced by an incandescent lamp, therefore, we find that the light from the

incandescent lamp has a decidedly yellow tinge.

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5.3. ЗАВДАННЯ 3

Доповніть ряд загальнонаукових слів тими. які були у тексті Вашого варіанта (invention, development, research, science тощо), спостерігши словотвірні зміни на кшталт :

1.**to invent - invention - inventor** - винаходити - винахід - винахідник

2.**research - researcher** –дослідження - дослідник

3.**to observe - observation** - спостерігати - спостереження

4. **to discover – discovery** – відкривати, відкриття

5.**to charge - to discharge – charged** - заряджати - розряджати - заряджений (під дією електричного заряду)

6.**to light - light (2) – lighting rod** - освітлювати - 1-світло, 2- легкий - громовідвід

7.similar - dissimilar – однорідний - різнорідний

8.**conductor - semiconductor** - провідник - напівпровідник

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5.4. ЗАВДАННЯ 4

Оформіть текст Вашого варіанту в картку читача:

Reader's name_____

The suitable text is_____

The representative frazes_____

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Whom are you going to speak with_____

What result do I expect_____

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5.5. ЗАВДАННЯ 5

Дізнайтесь у Вашого товариша інформацію про його текст згідно картки читача завдання 5, використовуючи структури на кшталт (I‘d really appreciate you - *Я був би дуже вдячний Вам* , Tell me please –

Скажіть мені будь ласка.....та ін).та запишіть.

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5.6. ЗАВДАННЯ 6

Сумістіть запропоновані визначення з наступними описами :

1.Under the first Law of Thermodynamics, ... is the ratio of work or energy output to work or energy input, and cannot exceed 100 percent.

2..... under the Second Law of Thermodynamics is determined by the ratio of the theoretical minimum energy that is required to accomplish a task relative to the energy actually consumed tp accomplish the task.

3. Generally, the measured .....of a device, as defined by the First Law, will be higher than that defined by the Second Law.

4. The energy of moving electrons is.....

5.A condition that results from an imbalance between the number of protons and the number of electrons in a substance is...

6.All the conductors and electricity using devices that are connected to a source of electromotive force (or generator).

7.A measure of the amount of energy lost during the generation, transmission and distribution of electricity is...

8. The path followed by electrons from a generation source, through an electrical system and returning to the source is...

9.The amount of work accomplished by electrical power, usually measured in kilowatt-hours (kWh). One kWh is 1,000Watts and is equal to 3,413Btu.is...

10.The process of producing electricity by transforming other forms of sources of energy into electrical energy which measured in kilowatt- hours is...

11.The physically connected generation, transmission and distribution facilities and components operated as a unit is....

12.A device containing two conducting electrodes, made of dissimilar materials that are immersed in a chemical solution to form electric charge is...

13.A chemical change in a substance that results from the passage of an electric current through an electrolyte is....

14.The electrical and magnetic fields created by the presence or flow of electricity is...

15.A conductor that is brought in conducting contact with a ground is....

16.The amount of energy derived from an electrical source per unit quantity of electricity passing through the source is.....

17.An elementary particle of an atom with a negative electrical charge to

determine the chemical properties of an atom is.....

18.A corporation, person, agent that owns and/or operates facilities for the generation, transmission and distribution or sale of electricity is....

A Electrical System

B Electric Circuit

C Electromotive force

D Electricity generation

E Efficiency

F Electrolysis

G Electromagnetic Field

H Electrical Energy

K Electrical Charge

L Electron

N Electric system

M Electric Utility

O Electrode

P Electrochemical Cell

Q Electric Energy

R Electrical System

S Energy Losses.

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5.7. ЗАВДАННЯ 7

Виявіть своє ставлення до почутої від товариша інформації стосовно його тексту , використовуючи кліше «згода- незгода» та запишіть :

Develop your speech in dialogues using TRUE/FALSE structures.

TRUE: The statement is correct…- *Положення правильне...*

No objections- *Не заперечую...*

It is true..... - *Це правда...* I

No mistakes....- *Без помилок*

I agree - *Я погоджуюсь*

FALSE : I don't think so….- *Я так не думаю...*

I wouldn't say so… - *Я б цього не сказав...*

It is false.... - *Це неправда....*

It is not correct – *Це неправильно*

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5.8. ЗАВДАННЯ 8

Вивчіть запропоновані фрази та складіть 5 власних речень по спеціальності :

As long as	доки
Above named	вищезазначені
According to	згідно з
Although	хоча
As much as I know	наскільки я знаю
As to /as for/	що стосується
As a result	в результаті
As is known	як відомо
Because of	завдяки
But for	якби не
By means of	завдяки
Due to	завдяки
Either ....or	або....або.....
Neither... nor..	ні.....ні....
However	однак, тим не менш
It accordance with	відповідно до
In addition to	в додаток до
In case of	в випадку
In consequence of	в результаті
In favour of	на чиюсь користь
In front of	навпаки
In spite of	не дивлячись на
In stead	замість
In the event of	в випадку якщо
In view of	з точки зору
Inasmuch –	оскільки
Owing to	через,завдяки
On behalf of	від імені
Thanks to	дякуючи
With a view to	з метою

With regard to	відносно
For the sake of	заради
In front of	перед
Apart from	крім
As compared with	порівняно
In conformity with	відповідно з

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5.9. ЗАВДАННЯ 9

Обговоріть з товаришем тексти Ваших варіантів в діалозі, вживши наступні вирази :

I know the answer – *Я знаю відповідь*

I'll try to say – *Я постараюсь сказати*

As far as I know… - *Наскільки я знаю…*

As for me - *На мою думку*

Repeat please - *Повторіть, будь ласка*

What do you mean ? *Що Ви маєте на увазі ?*

How does the word... translate? *Як перекладається слово.... ?*

What is translation of....? *Який переклад... ?*

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5.10.ЗАВДАННЯ 10

Ознайомтесь з наступними синонімами та спробуйте пояснити їх загальне значення у власних реченнях:

1.motion – movement

2.to be made up - to consist of

3.to get - to obtain

4.like - similar

5.unlike – dissimilar

6.to use - to apply

7.to do - to perform

8.to connect - to link

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5.11. ЗАВДАННЯ 11

Сполучіть відповідники, використовуючи словник термінів:

1.at rest = *1. у стані спокою*

2. in motion =	*2. джерело*
3.to boil =	*3. гальванічна батарея*
4. phenomenon =	*4. бензиновий двигун*
5. rubbed with fur =	*5.ядро*
6. amber =	*6. пластина*
7. to attract =	*7. провід, дріт*
8. to elapse=	*8. явище*
9. source =	*9. кип'ятити*
10.voltaic pile =	*10. потертий хутром*
11.cooper =	*11. притягувати, приваблювати*
12. zinc=	*12. минати, проходити*
13.plate=	*13. у русі*
14.wire=	*14. частинка*
15.continuous current=	*15. буртин (янтар)*
16.gasoline engine =	*16. мідь*
17. particle=	*17. цинк*
18.nucleus=	*18.Лейденська банка*
19.to store =	*19. повітряний змій*
20. Leyden Jar =	*20. зберігати, накопичувати*
21. kite =	*21?*

1.1. Доведіть свою думку правильності свого вибору в вправі 9 , використовуючи, наприклад, такі положення:

I think it is true because I have consulted the dictionary attentively-

Я думаю, що це правда, тому що уважно проконсультувався з словником .

I suppose it is correct because I have recently read about it in Ukrainian –

Я гадаю, що це правильно, тому що читав про це недавно українською.

1.2. Перевірте правильність свого вибору в вправі 9 за ключем , наданим викладачем, та визнайте свою помилку в невірних варіантах,

використовуючи наприклад, такі положення:

Well, I have made several mistakes in the statements .- *Так, я зробив кілька помилок у висловленнях.*

Please forgive me - *Будь, ласка пробачте мені.*

I apologize for my incorrect choice – *Пробачте за неправильний вибір*.

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5.12. ЗАВДАННЯ 12

Вмотивуйте обрання для нижченаведеного тексту назви з наступних :

1. MODERN KINDS OF LIGHTING

2. YOUNG'S EXPERIMENTS

3. OMTH'S LAW AND RESISTANCE

4. LIGHT SOME FUNDAMENTAL PROPERTIES

5. SOURCE OF LIGHT

6. THE VELOSITY of LIGHT

The free electrons which contribute to the electric current have a low drift velocity in the negative direction of the field within the conductor. In moving through the metal in a common general direction they enter into frequent collisions with the molecules of the metal and as a result they are continually retarded in their forward motion and are not able to attain a velocity U, which depends on the value of the field and the nature of the substance. The collisions which tend to reduce the drift velocity of the electrons act as a retarding force. When a current is flowing, this retarding force must be exactly equal to the accelerating force of the field.

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5.13. ЗАВДАННЯ 13

Вмотивуйте обрання для нижченаведеного тексту назви з наступних :

1MODERN KINDS OF LIGHTING

2.YOUNG'S EXPERIMENTS

3.OMTH'S LAW AND RESISTANCE

4.LIGHT SOME FUNDAMENTAL PROPERTIES

5.SOURCE OF LIGHT

6.THE VELOSITY of LIGHT

Scientists have learned, though careful, painstaking research, many of the properties which we call light. Methods are available for determining the velocity of light, the intensity of a given source of light, and the color content of a given light ray. Light can be used in many ways, not only for illumination but also for killing bacteria, activating photoelectric cells, and the like.

But although much is known about light, and although it can be used in many different ways, the full story of what light is can still not be told in any positive manner. In answer to the question, "What is light?" , science can only reply: "Light is a phenomenon which has associated with it two natures: in some ways light behaves as a wave motion; in other ways it seems to be composed of a large number of small moving particles."

It is our purpose in the following pages to consider some of the thing we know about light; later we shall discuss some of the ideas now believed to be true concerning the nature of light.

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5.14. ЗАВДАННЯ 14

Вмотивуйте обрання для нижченаведеного тексту назви з наступних :

1MODERN KINDS OF LIGHTING

2.YOUNG'S EXPERIMENTS

3.OMTH'S LAW AND RESISTANCE

4.LIGHT SOME FUNDAMENTAL PROPERTIES

5.SOURCE OF LIGHT

6.THE VELOSITY of LIGHT

Light can be transmitted from one place to another very quickly. The light from a powerful searchlight travels the several miles to the end of its-visible-path in a small fraction of a second. The velocity of light in air is so great that a ray of light is capable of traveling a distance equal to seven times the circumference of the earth in one second. Its velocity in vacuum is even greater than this by a small amount.

Scientists worked out two different ideas about the nature of light. At first these ideas did not agree. But as scientists have studied light still further, they have come to realize that both are right. One theory, advanced by Newton, that light consists of a stream of particles or corpuscles traveling in straight lines or rays. By means of this theory it is possible to explain laws of mirrors and lenses, and formation of shadows. The other view of light, advanced by the Dutch scientist, Cristian Huyghens, at about the same time, is that light is a train of waves traveling through space. This theory also explains the laws of mirrors and lenses very well, and even the formation of shadows. Nevertheless, Newton's theory was favoured for a long time and Huyghens' was almost forgotten. Then, in 1801, an English scientist named Thomas Young did an experiment that could not be explained at all by Newton's corpuscular theory.

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5.15. ЗАВДАННЯ 15

Вмотивуйте обрання для нижченаведеного тексту назви з наступних :

1MODERN KINDS OF LIGHTING

2.YOUNG'S EXPERIMENTS

3.OMTH'S LAW AND RESISTANCE

4.LIGHT SOME FUNDAMENTAL PROPERTIES

5.SOURCE OF LIGHT

6.THE VELOSITY of LIGHT

Young's experiment held a remarkable result**.** He found that by adding two quantities of light you don't always get more light. Sometimes you get darkness. In his experiment he allowed light of a single colour to pass through a small hole in one screen and fall on another screen in front of it. The result was a patch of light on the second screen. When he used two holes close together in the first screen, two overlapping patches of light were formed on the second screen. But the region where they overlapped, instead of being brighter because of the addition of two quantities of light, was crossed by dark lines. The dark lines indicated places where the streams of light from the two holes, instead of re-enforcing each other, interfered with each other and cancelled each other out.

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5.16. ЗАВДАННЯ 16

Зробіть анотацію тексту за планом ЗАВДАННЯ1:

Agriculture is one of the key branches of our national economy. New and new types of machines, electric and electronic devices with automatic control system are being introduced into agricultural production. The broad utilization of machinery reduced manual labor and raises labor productivity to a higher level. To operate up-to-date machinery our collective farms need highly qualified specialists.

Agricultural higher educational establishments used to train such specialists.

Agricultural engineering means the application of engineering knowledge to agriculture. The agricultural engineer must understand that there are basic differences between agriculture and other industries.

The efforts of electricians, i.e. agricultural engineers capable of designing, operating, controlling end adapting any form of electric energy to farm needs are wanted by modern agriculture.

As it is known electric power has become the main source of energy in agricultural production and its sphere of applying is ever increasing. Electric motors are well suited for farm jobs because of their automatic control, long life, compact construction, ability to run either in cold or in hot weather, etc.

All kinds of equipments for handling milk, such as milking machines, are operated by electricity. The great effects of various types of radiation on seeds, plants, insects and animals have been studied and are well-known today.

Farmers often use electric light for night: plowing, cultivating, etc. Night vegetable harvesting is practical with simple headlight but is better with tractor mounted generators equipped with floodlight for large- area operations.

Those were a few examples of applying electric power on the farm.

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5.17. ЗАВДАННЯ 17

Складіть діалог згідно текстів базового тексту 5 за прикладом:

A.Good morning, Mick.

B. Hi, Sam.

A. Do you know anything about the history of electricity?

B.Yes, I do . I can tell you a lot about the inventions of Fhales, Gilbert, Galvani, Volta, Faraday and other physicists.

A.So, what did Fhales discover?

B. He was the first Greek philosopher to begin the first observation of static electricity and did famous experiment with the rubbed amber.

A. Thanks for your answers. I am interested in such facts and I am going to read additional materials at our library.

B. Not at all. I'll join you later.

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5.18. ЗАВДАННЯ 18

Визначіть дієслово речення , його час, поясніть , в яких випадках вживається дана форма, доповніть речення показовим прислівником

тощо та перекладіть.

1в -He had been known about/ I have been asking about primary windings/ Rate caused rps./

2в- I have forgotten almost everything about measuring devices/ It meant something new about charged particles/. Core casing was made of cooper

3в- It leads to instant overheating/Coil turns were being insulated/ They were mouted in the shape of similar transformers

4в-Conductor has been applied/They are heating the surface/-Strength of field has threaded the winding.

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5.19. ЗАВДАННЯ19

Визначіть дієслово речення , його час, поясніть , в яких випадках вживається дана форма, доповніть речення показовим прислівником

тощо та перекладіть.

5в-The wires are being cut in nearby circuit/The exiter is unsulated/-Switch became dim/

6в-Instrument applies bar magnet /Voltaic pile releazed e.m.f. / It has been attracting light objects/

7в-Name plate had been chosen instantly/.Store batteries were the studied devices/They are being extended in one direction

8в-They were to insulate power output/ He was connecting waves of this curve / That generator got available amounts/

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5.20. ЗАВДАННЯ 20

Визначіть час та стан присудкків, перекладіть їх українською:

1. The electron was discovered more than fifty years ago but has never been

seen.

2. In this type of receiver a crystal detector is followed by an audio amplifier.

3. Some circuits are affected by changes in line voltage.

4. The distribution of the flux is influenced by the frequency of the flux and the resistance of the coil.

5. Most electronic devices are enclosed in glass tubes from which the air has been pumped out.

6 .Semiconductor devices which are being used to help electron valves reduce the size of instruments considerably.

7. The receiver has been develop[ed to illustrate the principle of molecular electronics.

8. The turbines are driven by the kinetic energy of the water.

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