

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
ЦЕНТРАЛЬНОУКРАЇНСЬКИЙ НАЦІОНАЛЬНИЙ  
ТЕХНІЧНИЙ УНІВЕРСИТЕТ  
КАФЕДРА ІНОЗЕМНИХ МОВ**

**АНГЛІЙСЬКА МОВА**

**Методичні вказівки до практичних занять для здобувачів  
освіти другого (магістерського) рівня, спеціальність 274  
“Автомобільний транспорт”**

**Кропивницький 2023**

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“Автомобільний транспорт”

Затверджено  
на засіданні кафедри  
іноземних мов  
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Кропивницький 2023

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Методичні вказівки Призначені для здобувачів освіти 2-го рівня спеціальності “Автомобільний транспорт”.

У цьому посібнику основну увагу звернено на розуміння специфіки лексико-граматичних засобів мовного стилю, вдосконалення навичок ознайомлювального, переглядового і вивчального читання літератури.

Тематика текстів не тільки забезпечує багатий лексико-граматичний навчальний матеріал, а й має велике пізнавальне значення.

Оцінка виконання завдань за кредитово-модульною системою здійснюється шляхом підрахунку балів, які набрані за кожний розділ методичних вказівок (Unit) окремо.

## I PART

### Text 1 THE GASOLINE INTERNAL COMBUSTION ENGINE

#### PRINCIPLES OF OPERATION (Total Score – 17 points)

##### I. Read the text using a dictionary. (Score – 6 points)

The most common type of gasoline engine is known as the four-stroke engine. The piston travels the length of the stroke outward twice and inward twice\* to produce one power impulse.

Strokes of the four-stroke cycle engine are as follows: 1) intake, 2) compression, 3) power, 4) exhaust.

*Intake Stroke.* Fuel is taken into the cylinder from the carburettor through the open intake valve and the intake manifold, when there are more than one cylinder. This is possible because air rushing through the carburettor becomes charged with\*\* gasoline in finely divided particles as the piston creates a vacuum in the cylinder in moving from the top to the bottom. When the cylinder is filled with this combustible mixture of gasoline and air, the intake valve is closed.

*Compression Stroke.* When the intake and the exhaust valves are closed, the piston moves from the bottom to the top of the cylinder, compressing the mixture into a small space, known as the combustion chamber. Before the piston has quite reached the top of the stroke, a spark is introduced and the mixture begins to burn and to expand.

*Power Stroke.* As the mixture burns, heat is produced. The products of combustion expand because of the heat produced and push the piston downward in the power stroke. As the piston nears the bottom of the power stroke the exhaust valve starts to open and becomes fully open by the time the piston is completely down.

*Exhaust Stroke.* Most of the exhaust gases leave the cylinder with a loud explosive noise. The piston moves upwards with the exhaust valve completely open and forces the remaining burned gases out of the cylinder. The exhaust valve is closed shortly after the piston has reached the top of the exhaust stroke and has started down on the intake.

\* travels the length of the stroke outward twice and inward twice - на протязі усього ходу два рази підіймається і два рази опускається

\*\* becomes charged with – насичується

##### II. Translate the sentences with the Gerund and the Present Participle.

(Score – 11 points)

1. The flywheel plays an important part in the internal combustion engine; the energy of its turning is capable of overcoming resistance and in this way the flywheel is capable of providing the force necessary to drive the piston through several strokes.
2. The piston is forced on a down- stroke by the pressure of the burning charge of petrol-vapour and air.
3. Once in every four strokes there is a firing- stroke, or “power-stroke”.
4. Two methods are employed for actuating overhead valves\*.
5. Fuel filters are of various types, some of which are formed of a number of discs capable of being cleaned without dismantling.
6. On opening the throttle air is drawn through the throat of the carburetor as a result of piston-suction.
7. Numerous systems are used for heating the mixture to ensure complete vapourization of fuel.
8. Effects of weak mixture (too little fuel or too much air) are as follows: difficulty in starting the engine, the engine will take a long time to warm up, etc.
9. It is convenient to examine the components of one cylinder of a four-stroke I.C. engine before considering multiple-cylindered engine.
10. The quantity of fuel must be capable of being controlled by the driver in order that he may regulate the speed and power of the engine.
11. When moving down the cylinder the piston leaves a partial vacuum in the cylinder and “compression space”.\*\*

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\* overhead valves – клапани верхнього розташування

\*\* compression space – простір стиску

(Total Score – 17 points)

## **TEXT 2 COMPRESSION (TOTAL SCORE – 30 POINTS)**

### **I. Read the text using a dictionary (Score – 6 points)**

This article deals with the design, operation and maintenance of air-cooled, four-stroke engines. These engines are available for operation on petrol or vaporizing oil and are being used for driving stationary and mobile farm machinery. We examine these engines under five

headings: 1) compression, 2) lubrication, 3) fuel, 4) ignition, 5) cooling.

Compression. Compression is the basis of engine power, and the components used to obtain it are crank-case, and crankshaft; connecting-rod, piston and rings; cylinder, cylinder head and gaskets; valves and tappets. The crankshaft is carried by\* two main bearings mounted in the crankcase. The piston carries two or three compression rings and one oil scraper ring; worn rings should be renewed if the gap measures\*\* 0.030in, or more.

The compression ratio is relationship between the volume of the fuel and air mixture (combustible mixture) in the cylinder when the piston is at the bottom and the volume of the same combustible mixture when the piston is at the top of the stroke. If the volume of combustible mixture in a cylinder when the piston is at the bottom of the stroke is 72 cubic inches, and the mixture is compressed to a volume of 12 cubic inches when the piston is at the top of the stroke, the compression ratio is 6 to 1. The significance of the compression ratio of an engine can be fully understood if one remembers that the amount of pressure on the piston determines the power of the engine. Other things being equal\*\*\*, the greater the pressure at the beginning of the power stroke, the greater will be the power developed.

Compression ratio is directly related to the kind of fuel that can be used without knocking. As the compression ratio goes up, the tendency to knock increases.

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\* is carried by - підтримується

\*\* if the gap measures - якщо зазор складає

\*\*\* other things being equal - при наступних рівних умовах

## **II. Translate the sentences with the participles, absolute nominative construction, the gerund and the verbak noun. (Score – 12 points)**

1. The camshafts carry one cam for actuating each valve, their action being briefly as follows:...
2. Having installed the pistons and connecting rods, replace the cylinder head.
3. The engine having stopped, the valve begins to cool and the clearance increases.

4. The camshaft may be gear or chain driven, but the method of indicating the correct mating of the camshaft and crankshaft is the same in each case.
5. It was known that crankcase dilution began with condensation of a small part of the fuel-air mixture on the cylinder walls during the compression stroke, the diluent being absorbed by the oil on the cylinder wall and the unburnt portion of diluted oil passing to the crankcase.
6. Having traced the faulty cylinder, we must next determine whether the compression loss is caused by an internal or an external fault.
7. If there are five main bearings, adjust the remaining four in the following order: 5, 1, 4, 2.
8. The possible orders of firing for a four-cylindered engine are: a) 1, 2, 4, 3; b) 1, 3, 4, 2; similar considerations apply to six-cylindered engines, the design of crankshaft being such that the usual order of firing is: 1, 5, 3, 6, 2, 4.
9. But before dealing with its vulnerability (that of the engine clutch, M. M.), let us consider the fundamental principles and basic components of the single-plate friction clutch.
10. Time is important to allow combustion to develop<sup>\*</sup>, whereas very little power would be lost by forcing the piston upwards for a very small distance against high pressure.
11. The dynamo is permanently connected to the engine<sup>\*\*</sup> and uses some of the available engine power in producing electrical power at its terminals.
12. The amounts required vary with make of engine.

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\* to allow combustion to develop – для розповсюдження полум'я

\*\* the dynamo is permanently connected to the engine – генератор закріплений на двигуні

### **III. TRANSLATE THE SENTENCES WITH THE PARTICIPLES, THE ABSOLUTE NOMINATIVE CONSTRUCTION WITH THE GERUND AND THE VERBAL NOUN. (SCORE – 12 POINTS)**

1. The camshafts carry one cam for actuating each valve, their action being briefly as follows:...
2. Having installed the pistons and connecting rods, replace the cylinder head.

3. The engine having stopped, the valve begins to cool and the clearance increases.
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\* to allow combustion to develop – для розповсюдження полум'я

\*\* the dynamo is permanently connected to the engine – генератор закріплений на двигуні

(Total Score – 30 points)

### TEXT 3 LUBRICATION (TOTAL SCORE – 18 POINTS)

#### I. Read the text using a dictionary (Score – 6 points)

The type and amount of oil to be used are specified for every engine and these, recommendations should be followed exactly for greatest satisfaction and freedom from trouble. Engine oil is used inside the

engine. We know engine oil to reduce friction, transfer heat, seal compression and keep the inside of the engine clean. It works under heat and pressure in the presence of air. These conditions tend to change the composition of the oil; other products are formed which render the oil not only almost useless for the job it is to do but positively dangerous to the engine.

It follows that good quality oil, with the correct specification for a specific engine should be used in sufficient quantity and then should be dumped before its character is changed and it is dangerous to the life of the engine.

The lubrication system could not be simpler; it contains neither filter, nor pump. The correct grade of clean oil being kept to the recommended level and renewed every 100 working hours, the dipper on the connecting-rod\* cap will do the rest.

Lubricants used by a tractor are of two types - oils and greases. In general, oil is used in the crankcase of the engine and in the gear cases, while greases are used to lubricate all other critical parts.

The choice of lubricating oil may seriously affect the life and service of a tractor. There are many factors that should be considered in making a choice. Engine lubricating oil should be of well refined oil, free from water, sediment, acid, or any substance not derived from petroleum. Oil should not corrode any metal used in engine construction.

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connecting-rod – шатун

## **II. Translate the sentences with the infinitive constructions.** (Score – 12 points)

1. See that the working part to be oiled is first thoroughly clean.
2. Troubles can be grouped under three headings: compression, cooling, lubrication; any of the many troubles to be discussed under these headings can appear in the same form from the same causes in either (S.I., or I., M.M.) engine.
3. The following tools to be wrapped a clean rag after greasing should be packed always in systematic order.
4. Decarbonizing the Villiers engine, a simple job to be done about every 200 or 300 hours.
5. An excessively high oil-level will cause the big-ends of s connecting-rods to dip into the oil in the crankcase.

6. This water had frozen in the oil-pump gears during the night, and had caused the oil-pump drive-pin to shear\* when the engine was started.
7. Dependability at high pressures and endurance under the worst conditions are some the qualities that have caused flexible pipe assemblies to be widely used.
8. The tests proved the valves to be correct.
9. For the bearings highly alloyed metals as well as plastics are used, pending on the liquids to be pumped.
10. Assume the piston to be at T.D.C. and both valves to be closed.
11. The in points to observe before installing a piston to its liner as follows....
12. Fuel to be delivered to the carburetor of a petrol-engine or, in the case of a C.L engine, to the pump-unit should be clean and free from grit, water I foreign-matter liable to block small passages, or to infer with the working of delicate parts.

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\*and had caused the oil-pump driver-pin to shear – та із-за цього штифт масляної помпи став зрізаним

(Total Score – 18 points)

#### **TEXT 4 FUEL (TOTAL SCORE – 17 POINTS)**

##### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

Fuel System. The fuel system includes air cleaner, carburettor and governor. Of these, the air cleaner is undoubtedly the most important. If it becomes clogged\*, it will cause bad starting and lack of power; if it is incorrectly serviced and allows dirty air to enter the engine, cylinder piston and crankshaft wear increase alarmingly.

Each internal combustion engine being designed to burn a certain kind of fuel, and to do most efficient performance, the proper fuel should always be used in an engine. If a fuel that is not correct for the engine is used continually, many difficulties are likely to be experienced; lack of power, overheating, excessive fuel consumption, knocking, rapid wear, and other troubles. Some engines are designed to use two kinds of fuel, under certain specified conditions. Two-fuel engines are ordinarily started and warmed up on gasoline, and operated at work on a heavier fuel, such as distillate or tractor fuel.

Liquid fuels may be generally divided into light and heavy. Gasoline,

benzol are light fuels while distillate, tractor fuel, fuel oil are heavy fuels.

Storing fuel. We know fuel that is not stored properly to deteriorate rapidly. The chief factors causing deterioration of fuel in storage are heat and moisture. Gasoline, in particular, should be stored out of direct sunshine\*\* if at all possible, and where there is relatively little change in temperature.

Much motor fuel is stored in steel barrels. These are sometimes stored out of doors and under trees, A better arrangement is to have them in a special shed far removed from other buildings. Sometimes storage tanks are buried in the ground; in this case pumps are attached to the tanks that will deliver the fuel directly to the tank of a tractor. Underground storage is found to provide relatively stable temperature. The result is that little fuel is lost from evaporation, and relatively little condensation of moisture from the air occurs.

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\* becomes clogged - забруднюється

\*\* out of direct sunshine - захищеним від сонячного проміння

## **II. TRANSLATE THE SENTENCES WITH PREPOSITION "OF" AND THE NOMINATIVE INFINITIVE CONSTRUCTION (SCORE – 11 POINTS)**

1. Of these symptoms, lack of power is the only one that always accompanies compression loss.
2. Of the above, worn crankshaft and bearing are the most common causes of partial pressure loss.
3. Bad starting, for example, can be the result of many faults, only two of which can be attributed to the lubricating system.
4. Of these two, one is the entry of excessive amounts of oil into the combustion chambers.
5. The governor spring is fitted in one of a series of notches (notch = мітка, зарубка, насічка) on the governor lever.
6. Knocking is likely to be due to very serious trouble.
7. If lack of pressure proves to have been caused by a broken pipe, examine all the pipes for signs of similar failure.
8. The consumption of liquid fuels by the British agricultural industry this year is expected to be about 260 million gallons of vaporizing oil, and 11½ million gallons of Diesel oil. Vaporizing oil, for 20 years the predominant tractor fuel, showed a slight decrease in consumption this

- trend is expected to continue as Diesel oil consumption rises steadily.
9. It is usual to fit a very fine filter between the fuel-tank and the carburettor or between the tank and the pump-unit in the case, of a C.I. engine; this filter, whether of wire-gauze or any other design, is required to prevent the passage, not only of solid particles, but also of drops of water.
  10. The engine may appear to choke itself when opening up the throttle.
  11. The tractor and its attachments, after months of continual use, are said to be still in very good condition.

(Total Score – 17 points)

### **TEXT 5 IGNITION (TOTAL SCORE – 22 POINTS)**

#### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

Engines may be of two types: a spark ignition (S.I.) engine and a compression ignition (C.I) engine.

Let us consider fuel-system layout and function in a spark ignition engine. There are two versions: one uses petrol for starting and vaporizing-oil for running; the other uses petrol only. The petrol/vaporizing system includes all the components of the petrol version, plus those peculiar to itself.

The essential assemblies are as follows: air cleaner, petrol tank, **vaporized-oil** tank, fuel pipes, filters, carburettor, inlet manifold, exhaust manifold, governor and controls.

The air outlet of the air-cleaner is connected by the carburettor and inlet manifold to the engine cylinders. When the air passes out of the cleaner through the carburettor, it mixes with fuel there and enters the cylinders via the inlet manifold.

In most vaporizing-oil systems, one carburettor usually handles petrol for starting and vaporizing-oil during work. But there are a few systems that employ a carburettor for each fuel.

A small machine known as a magneto is used for producing the spark to ignite the explosive mixture in the cylinder of the engine. The main essentials of the magneto are a coil of insulated wire, a condenser and a contact breaker. The wire is wound round a soft-iron core. One end is earthed to the magneto frame, whilst the other is electrically connected to one of a pair of contact-breaker points. The contact point

to which the wire is connected is electrically insulated from all but the other point, which, in turn, is earthed to the magneto body. The contacts open and close continuously in use. The condenser is "bridged" (увімкнутий паралельно) across the contact.

The secondary circuit extends outside the magneto. Its main essentials are about a mile of fine wire, a secondary lead out (or pick-up) (провід високої напруги) rotor, distributor cover, plug cables, spark plugs, engine cylinder block and magneto body. The fine wire is coiled round the primary, and is heavily insulated.

When the magneto shaft is rotated, a low-voltage current is magnetically induced into the primary circuit. The contact points in this circuit separate mechanically each time one of the pistons reaches the firing-point of its compression stroke.

The separation of the points cuts the primary current. If it were not for the condenser, the current would refuse to be cut.

When the primary current is cut, a high-voltage (ap-prox. 10,000-20,000) current is induced in the secondary circuit.

At a fantastic speed, this current passes from the secondary coil, along the pick-up to the rotor, which is timed to deliver it to the cable attached to a given spark plug. It passes down the insulated centre of the plug and jumps the plug points causing a spark and consequent ignition of the air/fuel mixture.

## **II. TRANSLATE THE ASYNDECTIC SENTENCES (SCORE – 5 POINTS)**

1. The troubles C. I. (=a compression ignition engine because its fuel is ignited by heat generated from the compression of air within its cylinders) and S.I. (=a spark ignition engine because its fuel is ignited by an electric spark) versions of the 4-cylinder water-cooled 4-stroke engine are subject to can be separated into those common to both, those confined to S.I., and those found only with C. I.
2. Advancement of the ignition is measured by the position at the time the advanced spark occurs, in relation to T.D.C.
3. The filter should be washed in clean fuel and allowed to dry before it is replaced; do this each time the oil is changed.
4. Clean the element and inlet pipe each time the engine is decarbonized.
5. The ice had melted by the time the engine had been dismantled in the

workshop.

### **III. TRANSLATE THE SENTENCES WITH THE SUBJUNCTIVE MOOD (SCORE – 12 POINTS)**

6. It is important that there should be no restriction of the fuel supply to the C. I. engine, hence air-cleaners must be cleaned frequently.
7. Should the external filter assembly provide no evidence of its being the cause of pressure loss, investigation should proceed towards the pump.
8. Internal leakage is rare; should it occur, it will be between the exhaust and the inlet manifolds; to detect it, remove the manifold assembly, fit a blind gasket between the carburettor and inlet manifold, lay the assembly so that the ports are uppermost, and fill the inlet manifold with clean fuel.
9. Wherever a powerful engine is necessary, it is therefore general to employ more than one cylinder, each cylinder being much smaller than it would have to be the case if only one were used.
10. This ensures that the engine warms up more quickly than it would if the whole of the water circulated.
11. Had the driver noticed the indicator and not started his engine, he might also have noticed the leak; had he realized the significance of this, action could have been taken to cure the leak and thus prevent the formation of ice in the pump.

(Total Score – 22 points)

### **TEXT 6 DIESEL ENGINES GENERAL CHARACTERISTICS (TOTAL SCORE – 20 POINTS)**

#### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

Diesel, or compression ignition engines are similar to the spark ignition engines in principle. However, there are important differences. On the intake stroke of the Diesel engine air only enters the cylinder, and is compressed on the next stroke. At the end of the compression stroke the air temperature has been raised to approximately 1,200°F. by decreasing its volume to about 1/16 of the original volume. This temperature is known to be high enough to burn heavy fuel that is sprayed into the compressed and heated air by a specially constructed injection mechanism. Since the Diesel engine operates with such high compression, its parts must be heavier and must fit more perfectly than in a spark ignition engine. Although Diesel engines will theoretically operate on any oil that can be pumped

through the injector, they operate much more efficiently on "Diesel Fuel" or fuel oil.

Some Diesel engines are designed on the two-cycle principle, performing the four necessary operations in two strokes. A blower is usually used to inject air into the cylinder, and to force burned gases out at the end of the power stroke.

The most critical part of the Diesel engine is the fuel-injecting system. The plungers are built to fit very closely\*.

Any dust or dirt in the fuel soon wears the injecting pumps until they cannot inject the fuel against the high compression in the cylinder. Special care must be taken with\*\* Diesel fuel to keep it clean and to deliver it clean to the injecting pumps.

As an added precaution, several very fine screens and filters are used in the supply line. These must be kept clean and operating efficiently as a protection to the pumps.

Manufacturer's instructions are particularly important in servicing Diesels.

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\* are built to fit very closely - підгонюються дуже щільно

\*\* special care must be taken with... - особливу увагу треба проявити у відношенні...

## **II. TRANSLATE THE SENTENCES WITH THE "-ING-FORMS", THE "-ED-FORMS" AND THE INFINITIVE CONSTRUCTUINS (SCORE – 14 POINTS)**

1. When inspecting components in which the cause of any defect is suspected, care must be taken, in each case, not to jump to conclusions without careful consideration of the possibilities.
2. The principles to be followed in tracing these faults have been given in Ch. 8.
3. Opening the valves reduces the compression ratio from about 17 to 1 to approximately 5 to 1.
4. The routine maintenance required consists simply of following the tractor manufacturer's oil recommendations.
5. Before returned 10 service, an injector. must fulfil four requirements.
6. Compared with (=as compared to) an impulse-starter magneto, coil ignition timing is often found easier to check because there is no impulse.

7. Since each valve has to be actuated once only during two revolutions of the, crankshaft, the cart-shafts are driven at half the speed of the crankshaft.
8. When the piston is at the right-hand end as a result of pumping, and the spring thereby compressed, the cylinder is said to be "charged".
9. The shaft may be made to do useful work.
10. The temperature quoted is usually 200°F.
11. Both systems are fitted to the same vehicle, either system being capable of being put into action at the will of the driver.
12. The driver's responsibility for the efficiency of his vehicle (машина, автомобиль) must be emphasized throughout training.
13. When a driver can pass the test, he may be considered to have completed the recruit stage of his training.
14. The initial training of drivers must aim at satisfying the requirements in maintenance duties.

(Total Score – 20 points)

### **TEXT 7 FUEL INJECTION (TOTAL SCORE – 17 POINTS)**

#### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

To overhaul a 4-cylinder C.I.- engine's fuel system is a specialist's task. To prevent the need for such an over-haul is a driver's task which will not cost more than a few hours effort per year. But first of all let us study basic principles of fuel injection common to such engines as Caterpillar, David Brown, International, Marshall, Perkins\* and others.

Naturally, there are differences in design, make and layout of the fuel equipment used on these engines, there being also engine differences: the Marshall is a horizontal, single-cylinder, two-stroke unit, the others are mainly 4- and 6-cylinder, vertical, in-line power units.

These differences do not affect the common fundamental principles of fuel systems employed, but they could cause confusion if we attempted to consider all the engines under one heading. To avoid this we will deal only with the 4-cylinder in-line 4-stroke engines.

The fuel system is known to comprise three main assemblies; air cleaner injectors and injector pump. The injectors, one for each cylinder, are situated in the cylinder head. The injector-pump assembly incorporates four plunger pumps, and is mounted on the engine and driven at half

crankshaft speed. Each plunger is connected to an injector by a high-quality steel fuel pipe. The function of these main assemblies in the working cycle of the cylinder is as follows. The piston, on its inlet stroke, draws air through the cleaner into the cylinder. On compression stroke, this air is squeezed into about one-sixteenth of its original volume and, as a result, its temperature rises to over 1,000°F.

Just before the piston reaches top dead center (T.D.C) of compression stroke - usually when the crankshaft is within about 20° of it - the pump begins to inject fuel into the compressed air via the injector. As the self-ignition temperature of this oil is considerably less than 1,000°F., the air temperature causes combustion. The fuel-injection period lasts through about 30° of crankshaft movement, and the piston is forced down by the expansion of combustion. Next comes the exhaust stroke, at the end of which the cycle begins again. The cycles of the remaining cylinders are arranged to produce a firing order of 1,3,4,2 or 1,2, 4,3.

The speed and power of the engine is varied by varying the quantity of fuel injected, but the volume of air drawn into each cylinder remains the same at all speeds. Consider a 4-cylinder 4-stroke C.I engine doing 1,000 r.p.m. and using a gallon of fuel per hour. As there are two firing strokes per crankshaft revolution, there must also be 2,000 fuel injections per minute. This equals to 120,000 per hour. Consequently, the gallon of fuel used in one hour is pushed into the engine in 120,000 separate units.

The injection of each 120,000th of a gallon must begin when the engine crankshaft is a specific number of degrees from\*\* T.D.C. and last through about 30° subsequent movement\*\*\*, Furthermore, the fuel must be injected in a uniform spray.

---

\* Caterpillar, David Brown. International Marshall Perkins - назви фірм, що виготовляють двигуни.

\*\* is a specific number of degrees from - знаходиться на відстані в певній кількості градусів.

\*\*\* last through about 30° subsequent movement - продовжується в наступній стадії повороту, приблизно рівного 30°.

## **II. TRANSLATE THE SENTENCES WITH THE INFINITIVE AT THE BEGINNING OF THE SENTENCES. (SCORE – 11 POINTS)**

1. To satisfy the requircmntg of different designs of cyl-jinder-head, many variations in design of injector-nozzles are seen.

2. To allow for the heavy work of starting large C.I. engines, it is usual to fit 24-volt electrical equipment to heavy C.I. engines vehicles; once started, the C.I. engine does not require the same degree of warming up as does the petrol-engine.
3. To move the piston from T.D.C. to B.D.C., the crankshaft must turn through 180°.
4. To make an accurate comparison between different makes, three measurements are needed: overall diameter, bore diameter and witch.
5. To check the pump first (= first of all, MM) make sure, by disconnecting its feed pipe, that it is receiving an adequate supply.
6. To enable the sludge to be drawn off, the tank should slope about ½ in per foot of its length.
7. To prevent acidity, add lime at the rate of 1 Ib. per 100 Ib. of calcium chloride.
8. To prove whether a stoppage is in the feed line or the tank, disconnect the pipe at the top, and then work backwards or forwards according to whether or not fuel flows from the tank.
9. To bring about ignition by compression, advantage is taken of the fact that, if air or other gas be compressed rapidly into a very small space, it becomes very hot.
10. To start the engine the fuel-pump control lever must first be moved into its closed position.
11. To get the best out of an engine, supply it with clean air, oil, fuel and water, keep it hot, work it hard, and abide by its maker's instruction book.(Total Score – 17 points)

### **HUMOR**

Prof. – “Before we begin the examinations, are there any question?”

Fresh – “What’s the name of this course?”

\*\*\*

Fresh – “Professor, I can’t go the class today”

Prof. – “Why?”

Fresh – “I don’t feel well”

Prof. – “Where don’t you feel well?”

Fresh – “In class.”

## **TEXT 8 COOLING SYSTEMS (TOTAL SCORE – 17 POINTS)**

### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

Let us examine cooling system arrangements in common use. The simplest is known as the thermo-syphon system. The cylinder block and head contain connected water passages. From the cylinder-head water passage a pipe extends into the top of the radiator. From the bottom of the radiator, a pipe is connected to the water passage at the bottom of the cylinder blocks. Thus there is a complete circuit. A fan is provided to draw air through the radiator core.

When the engine is running, the water in the head and upper part of the cylinder block becomes hot and rises into the radiator. At the same time cooler water passes from the bottom of the radiator into the bottom of the cylinder block. The fan draws air through the core and dissipates some of the heat into the surrounding atmosphere. Thus the water circulates continually.

The chief disadvantage of the thermo-syphon system is that circulation tends to be sluggish, consequently a large radiator capacity and connections are required. To reduce these, it is customary to fit a pump to assist circulation. Most cooling system pumps are the centrifugal impeller type, usually situated in the passage between cylinder head and radiator and driven by the fan-belt. This system is called the pump-assisted thermo-syphon.

Another device frequently incorporated in cooling systems is the thermostat. The purpose of this is to restrict the circulation of warm water to the engine until it has reached a predetermined temperature. This ensures that the engine warms up more quickly than it would if the whole of the water circulated.

The complete thermostat assembly is usually contained in the water passage between the cylinder head and the radiator. And as long as the valve is closed, no considerable amount of water can pass into the top of the radiator. When the water around the engine reaches a given temperature, the valve opens and allows circulation through the radiator. The temperature at which the valve should open is usually stamped on the thermostat body.

### **II. Translate the sentences with the compound predicate, an infinitive**

**or a subordinate clause used as a predicative** (Score – 11 points)

1. The purpose of this pipe is to release pressure which is automatically created as a result of expansion from heat.
2. The fact is that as long as the valve is closed, no considerable amount of water can pass into the top of the radiator.
3. Whatever cooling-system be fitted to the engine, its purpose is to keep the temperature of the working-parts between reasonable limits.
4. The difficulty is that extra fuel is required to give sufficient vapour to form a correct mixture when air and engine are cold.
5. Most water-cooled systems are fitted with a fan, mounted behind the radiator; the function of the fan is to assist the air-stream.
6. Most large engines are fitted with a fan and other devices: their function is to speed up the natural draught.
7. The difference (between petrol engines and vaporizing oil engines, MM) is that in tractors burning vaporizing oil the inlet and exhaust manifolds are usually combined to allow the exhaust gases to heat part of the inlet manifold and thus pre-heat the air/fuel mixture before it enters the engine.
8. Where no reserve-tank is fitted, the procedure for the petrol system is that the body of a filter is utilized to do duty as a reserve-tank while the autovac (вакуумбачок) is being refilled.
9. The purpose of an automatic release valve is to open at a predetermined pressure and allow oil to escape directly into the sump.
10. To reduce the risk of broken gears is to put the towed tractor in its highest gear and engage the clutch very slowly.
11. The piston will travel down the cylinder to B.D.C. and leave a partial vacuum in the cylinder and "compression-space"; if, now one of the valves be opened to the atmosphere, air will be sucked in to fill the increased space; the volume of this air is known as the "swept-volume" of the cylinder; the swept-volume of the cylinder is what is also known as its "capacity".

(Total Score – 17 points)

## **TEXT 9 STARTING SYSTEMS (TOTAL SCORE – 18 POINTS)**

### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

We know different starting arrangements to be in common usage. Some of them are as follows: The Caterpillar C.I. engine is started by an auxiliary horizontally opposed 2-cylinder petrol engine\* which drives the flywheel

of the main engine. Provided the starter engine runs at the correct speed and engages properly with the flywheel, the most probable causes of non-starting are faulty fuel supply and incorrect injection timing.

An International starting system no longer included in British made models allows the C.I. engine to run as a S.I. unit until warm. In the cylinder head, above each cylinder, there is a chamber closed to its cylinder\*\* by a valve. A spark plug is screwed into each chamber. A magneto is provided in addition to a carburettor and petrol manifold.

To start the engine, the fuel-pump control lever must first be moved into its closed position. Movement of a second lever\*\*\* opens the cylinder-head chamber valves and also allows petrol to enter the carburettor. Opening the valves reduces the compression ratio from about 17 to 1 to approximately 5 to 1. This enables the engine to be turned easily either by hand or electric motor, and also allows an air/petrol mixture to be drawn into the cylinders and to be ignited by the spark plugs.

When the engine has become warm the driver, by returning the lever, closes the chamber valves and isolates the carburettor. The compression ratio is thus raised to that necessary for compression ignition.

The injector pump is brought into action by movement of its control lever.

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\* horizontally opposed 2-cylinder petrol engine – горизонтально опозитний 2-х циліндровий бензиновий двигун.

\*\* closed to its cylinder – відділений від свого циліндру (тут)

\*\*\* a second lever - декомпресор (тут).

## **II. TRANSLATE THE SENTENCES WITH DIFFERENT MEANINGS OF THE WORD "THAT" (SCORE – 12 POINTS)**

1. Provided that the injectors are in good order, it is seldom that I have to swing the engine twice unless the weather is frosty.
2. This operation together with that of renewing a side-valve springs discussed in the next chapter.
3. All I.C. engines'except those of certain light motorcycles make use of more than one cylinder.
4. It is said that so-called "self-starting"carburettors are provided with an arrangement of separate jets, etc., brought into action only when the engine is cold.
5. Connecting-links to a throttle-valve are similar to those for a hand-lever and often interconnected with them, Sometimes through a mechanical

governor-control.

6. Energy surplus to that required by the flywheel for bringing the engine round to the next power-stroke is available for driving the vehicle and auxiliaries other than those electrically driven, take their power originally from the engine-crankshaft.
7. One of the automatic devices is that of ignition tuning; the majority of vehicles, however, are fitted with a hand-control, which may be the only means of varying the ignition-timing when driving, or may be additional to a semi-automatic control.
8. When this occurs, the piston is forced on a down-stroke by the pressure of the burning charge and energy is supplied to the flywheel; it is by this means that the flywheel gains energy.
9. The small air-cooled engine is often the most neglected power unit on a farm; one reason is that its maintenance is rarely the responsibility of one man.
10. Fuel-system faults can be divided into those that prevent an engine from starting and those that affect its running only.
11. The effects of under-oiling, however, are the same as those of lack of oil-pressure.
12. As a general rule, the carburettor has three adjustments; a throttle stop screw\* by which the throttle is prevented from closing fully; an idler jet screw\*\* that controls the air/fuel mixture during low engine speeds, and a main jet screw\*\*\* to control the amount of fuel supplied at high speeds.

\* обмежений гвинт стопорної заслонки

\*\* опорний гвинт холостого ходу (дрозельної заслонки)

\*\*\* гвинт головного жиклера

(Total Score – 18 points)

## HUMOR

Employee – “Sir, can you let me off tomorrow afternoon to go Christmas shopping with my wife?”

Employer – “Certainly not! We are too busy!”

Employee (much relieved) – “Thank you, sir, you are very kind!”

## CROSSWORD PUZZLE

1			2	3	4			5
		6						

		7						
8	9					10		
	11							
12					13			
		14		15	16			
		17					18	
			19					

**Across:**

2) a small fairy; 6) knowledge arranged in an orderly manner; 7) a sound especially with reference to its quality, duration, etc.; 8) a main stem of a tree; 10) the most stubborn and still animal; 11) a synonym for “noise”; 12) a synonym for “a root”; 13) the opposite of “close”; 14) a synonym for “ugly”; 17) the supreme ruler in Russia; 18) a personal pronoun; 19) a device for catching animals.

**Down:**

1) a price to be paid for a thing; 2) a person who studies economics; 4) money which people pay for trade or partly unions; 5) a group of people at the office, enterprise, ect.; 6) a person who likes to know everything but know nothing; 9) something gray but bigger than a mouse; 12) a place where people wait for a tram, a bus etc.; 15) a synonym for “an automobile”; 16) a synonym for “an epoch”.

**Across:**

2-old; 6-science; 7-tone; 8-trunk; 10-ass; 11-ago; 12-stem; 13-open; 14-nice; 17-tear; 18-he; 19-trap.

**Down:**

1-cost; 2-economiet; 3-link; 4-fee; 5-personnal; 6-student; 9-rat; 12-stop; 15-car; 16-era.

## **TEXT 10 COLD RADIATORS AND COLD STARTS (TOTAL SCORE – 26 POINTS)**

### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

Cold radiators and cold cylinder walls are found to encourage corrosion, wear and tear. Corrosion in engine is less likely to occur at cooling water temperature about 176°F, than at lower temperatures. A test which is referred to was carried out by the Standard Oil Company in America which showed the cylinder wear of a petrol engine, after 60 hours operation, to be 38 times greater at a cooling water temperature of 114.8°F. At the same time the engine output is reported to have been smaller by 3% while fuel consumption was greater by 20°. Another test referred to and carried out by the Marine Experimental Division of the U.S. Navy on four-stroke Diesel engines showed a cylinder wear to be 20 times greater at 122°F than at 185°F.

Starting engine from cold also has bad effects. A German test showed that cylinder wear after one hour's operation and after starting from cold (cooling water temperature 59°F) was 55% greater than when starting with a cooling water temperature of 140°F. After 2 hours operation the difference was still 35%, and only after three hours operation did cylinder wear figures reach their normal level. The writer recommends filling radiators with hot water before starting an engine in the morning.

### **II. TRANSLATE THE SENTENCES WITH PASSIVE INFINITIVES AFTER MODAL VERBS. (SCORE – 8 POINTS)**

1. Shifting of the gear-change lever into and out of gear should be carried out with the lightest possible touch.
2. In order that towing of one vehicle by another may be carried out, certain essentials must be complied with.
3. Oil holes too should be observed; perhaps the only difference, between the upper and lower halves of a bearing is that one contains an oil hole while the other is blind.
4. We have since received results of later tests giving the following drawbar pulls (зусилля на крюкі), which show the performance of these tractors to have improved since the earlier tests were made.
5. Replacing cylinder head put the head on fit the manifold shield which is shown extending (= to be extending, ММ) under nuts 15 \to 16in Figure 116, fit the coil and bracket as shown in Figure 113; screw all the head nuts finger-tight, and then lighten them half a turn at a time in the sequence

shown in Figure 116.

6. Severe damage may be done as the result of exposing the water-cooling system of an engine to the action of even slight frost without due precaution.
7. To protect the cooling system against frost, you must either drain it or keep it filled with a solution of antifreeze.
8. When the engine is cold, the oil-pressure may be expected to be higher than after warming up.

### **III. TRANSLATE THE SENTENCES THE INFINITIVE CONSTRUCTIONS IN SUBORDINATE CLAUSES (SCORE – 12 POINTS)**

1. Adjust the ignition-control lever to the position found by experience to be the most suitable.
2. Misfiring is divisible into that which constantly affects one or two cylinders and that which seems to hop indiscriminately to any cylinder.
3. The upper parts of the cylinders, the valve-sorts and the exhaust-valve itself are the parts most likely to become overheated.
4. It is impossible to deal with every condition likely to arise in such a repair but the following comments should prove helpful.
5. A sure way of obtaining reliable evidence is to fit a magneto, plugs and tables that are known to be sound.
6. A different thawing technique is required for a system found to have frozen solid while the engine was shut down.
7. Many defects are such that, although appearing to be due to a certain cause, an unsuspected fault, of a different nature, may be the true cause.
8. To avoid waste of time and the possible upsetting of adjustments which are quite in order, it is important where the remedy is thought to lie in the driver's hands, to make quite certain that the action which he proposes to take is the right one.
9. If leakage of water into the cylinders is thought to be the cause of white smoke, see Ch. 15 for its detection and cure.
10. The following are the chief obstacles likely to be encountered.
11. This installation, believed to be the first of its kind in Britain was designed by Mr. Sidney in consultation with the chief agricultural engineer.
12. The tests showed that each batch (= партія, порція) of hay took one week to dry, which seems to be an answer to those farmers who claim that this method involves long drying periods in the barn.

(Total Score – 26 points)

## **TEXT 11 FREEZING UP (TOTAL SCORE – 17 POINTS)**

### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

It was so cold last winter that some Diesel fuels were affected and could not feed the engine's injection system. In extreme instances, engines could not be started because of this.

Protection can be provided either by keeping the tractor and fuel away from frost, or else by diluting the fuel with a 20% addition of lamp paraffin vaporizing oil.

It should be noted that the lamp paraffin must be added before the fuel has been affected by extreme cold.

Protecting Cooling Systems. The best method of protecting the water cooling system of an engine is the subject of controversy. Some prefer to drain the system each time the engine is shut down; some rely on a good brand of antifreeze, while others fill the cooling system with Diesel oil.

In my opinion the best method is a good brand of antifreeze. But it must be used at the right strength and in a system that does not leak. If the system leaks, the strength of the solution may be reduced by the addition of water and antifreeze will be of no use. If the leak is internal it may allow the solution to enter the engine with disastrous effects on the crankshaft and cylinder walls.

Before using antifreezes, flush the system, see that the cylinder head nuts are tight and that the water hoses are sound.

If draining the system is preferred, the cylinder block as well as the radiator must be drained. Insert a wire in the taps to make sure they are not blocked by dirt.

When filling the system and starting the engine, keep the radiator covered until the engine is warm. If this is not done the fan will draw cold air through the core, and the water in the radiator may become frozen while the thermostat restricts the circulation of warm water to the engine cylinder block until it reaches a predetermined temperature.

I am in two minds about\* the use of Diesel oil as an antifreeze.

Electric Batteries. A battery that is exposed to frost should always be topped up immediately before it is to be charged. If it is topped up after the

machine to which it is fitted is shut down, the distilled water may freeze before it has mixed with the acid solution in the cells. Starting a cold and stiff engine puts a great strain on an electric battery. This strain can be eased by using the correct grade of oil, fuming the engine once or twice by hand and by disengaging the engine clutch when using the starter.

Do not engage the starter motor of a spark-ignition engine for longer time than three to four seconds at a time. The starter of a Diesel engine may be engaged for longer periods, but not exceeding 20 seconds because of the strain thrown on the battery.

Keep batteries well charged at all times during frosty weather. The electrolyte of a discharged battery will freeze in 25° of frost, but it takes about 50° to freeze a battery that is three-quarters charged.

Water Ballast. A solution of calcium chloride should be used to prevent the water ballast in tyres\*\* from freezing. Use 2 lb. of chloride to each gallon of water and add lime at the rate of 1 lb. per 100 lb. of chloride to prevent acidity. This mixture will give protection against 32° of frost.

When mixing, always add the chloride to the water- never the other way round. Allow the solution to cool before putting it into the inner tube. Never use the chloride solution in a radiator.

Slush and Mud. Slush and mud can cause breakdowns if allowed to freeze around certain types of mechanism overnight. The damage occurs when power is applied to the frozen components. This frequently happens to track-layers which have become frozen to the ground. Clean the machine at the vulnerable points before leaving it exposed to frost and park the tractor on stones or pieces until you are sure that all is well.

Wheels, track rollers and all moving parts which operate in slush and mud and have to be lubricated regularly should be oiled or greased twice as frequently as normal when there is a likelihood of the dirt entering the bearings.

---

\* I am in two minds about – я не певен

\*\* water ballast in tyres – водяний баласт в шинах (для поліпшення зчеплення з ґрунтом)

## **II. TRANSLATE THE SENTENCES WITH THE VERBS OF OBLIGATION (SCORE – 11 POINTS)**

1. The chemical industry put such requests before the pump builders that the

building program and also the construction of the pumps had to be changed generally.

2. The type DOH, too, had to be improved in performance and therefore in construction, because of higher demands on the part of the chemical industry.
3. The older model had to remain in the field.
4. Where the level of fuel in the fuel-tank is lower, other means have to be employed to deliver fuel from tank to carburettor or pump-until.
5. The engine should be decarbonized at about every 500 working hours.
6. Carbon should be removed also from inside the piston.
7. It should be noted that the most expensive oil is not necessarily the best for a given engine.
8. The following precautions should be observed.
9. Spark plugs have a dirty job to do, but they must be clean if they are to do it properly.
10. This is necessary especially where very small amounts of liquid are to be delivered at very high pressure and small tolerances.
11. The cooling system should be drained each time the engine is to be left shut down during frosty weather.

(Total Score – 17 points)

## **TEXT 12 TOP OVERHAULING A FORDSON MAJOR DIESEL (TOTAL SCORE – 12 POINTS)**

### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

The top overhaul of the Fordson Diesel engine, as described in this article, includes decarbonizing, grinding the valves, cleaning and testing the fuel injectors. It is not always easy to determine when an engine needs a top overhaul.

The symptoms calling for it are loss of power and sometimes black smoke, misfiring and bad starting. But these symptoms can also arise from faults in the air and fuel system and the exact cause should be determined by special equipment including an injector tester, otherwise there is always the chance that a top overhaul will prove to have been unnecessary.

All carbon should, of course, be removed from the valves, the head and from the interior of the exhaust manifold. The pistons and tops of the cylinder liners should also be decarbonized. Before doing this, plug the water and oil passages in the face of the cylinder block with clean non-

fluffy cloth.

To make a thorough job of decarbonizing a Diesel engine the injectors should be cleaned, tested, and, if necessary, adjusted. This cannot be done without special equipment.

Before returned to service, an injector must fulfil four requirements:

- 1) it must begin to spray at 185 atmospheres;
- 2) not allow a pressure of 150 atmospheres to drop below 100 atmospheres in less than six seconds;
- 3) the four sprays of fuel from the holes should be uniform, well atomized and free from streaks and distortion<sup>\*</sup>;
- 4) after a nozzle has been wiped dry, the tip must remain dry after delivering three or four injections.

The air cleaner is a most important accessory on the Diesel engine and it should be inspected during the over-hauls remove and clean the pre-cleaner. If dirt is lodged between the louvres, remove it gently so as not to damage them. Misguided enthusiasts<sup>\*\*</sup> have been known to prise the louvres<sup>\*\*\*</sup> apart with a screw-driver<sup>\*\*\*\*</sup>; this upsets the air flow and reduces the efficiency of the cleaner.

---

\* well atomized and free from streaks and distortion – добре розпиленням, суцільним і прямим

\*\* misguided enthusiasts – некомпетентні ентузіасти

\*\*\* louvres – жалюзі

\*\*\*\* screw-driver – привід

## **II. TRANSLATE THE SENTENCES WITH "FOR+THE OBJECT+THE INFINITIVE" CONSTRUCTION (SCORE – 6 POINTS)**

1. All the components should be kept clean for this system to be efficient.
2. It is rare for a gearbox-to-clutch housing oil seal to fail alone; usually it is accompanied by bearing, shaft or coupling fault.
3. A report should be made on completion of running-in (обкатка) period for the following to be carried out: cleaning-out of fuel-supply system, filters, etc.
4. It is important for drivers to be given every opportunity of exercising these responsibilities.\*

5. The figures given under "correct" are those necessary for an engine to be "as new".
6. It is often necessary for the fuel to be transported to them (tractors, M.M.) in drums or trailer tank.

---

\* these responsibilities – ці зобов'язання

(Total Score – 12 points)

### **TEXT 13 RECONDITIONING A PERKINS DIESEL (TOTAL SCORE – 51 POINTS)**

#### **I. READ THE TEXT USING A DICTIONARY (SCORE – 6 POINTS)**

Perkins sell Diesel engines. They have a "Perpetuity Plan" which provides Perkins users with factory-reconditioned engines in part exchange for\* those requiring a major overhaul. The reconditioned engine carries a guarantee similar to that of a new engine.

The plan works as follows. When a user decides that his engine is nearing the time for a major overhaul, he orders a reconditioned engine from Perkins. The old engine goes back to the works to be reconditioned and then passed to another user.

Improvements that have been made in design since a particular engine was produced, are incorporated in the reconditioned version. There is no limit to the number of times that an engine can be reconditioned - hence the title "Perpetuity Plan",

To see what a user gets for his money, I spent a day watching engines being reconditioned.

First, the engine is completely dismantled-even to the removal of cylinder-head studs from the cylinder block. Pistons, rings, main and big-end bearings, valve springs, gudgeon pins and similar items are scraped. Then the components that are likely to be used again are steam-cleaned or chemically degreased. Manufacturing standards prevail. Testing and inspection takes about 50% of the time for reconditioning. For instance, the crankshaft is put through a crack detector twice: once before it is reground and once after.

When the crack detector is used on a crankshaft, the shaft is first magnetized and then bathed in a special fluid, which owing to the action of the magnetic lines of force, forms a dark line or lines over any crack that

may exist. Faulty shafts are scrapped and sound shafts are demagnetized and reground 0.010in., 0.020in. or 0.030in. under-size, then they are again crack detected, demagnetized and inspected.

The sizes, date of reconditioning and other data are then stamped on a brass plate which is fitted to the camshaft side of the cylinder block\*\*.

Connecting rods are tested for cracks by a slightly different technique from that used for the crankshaft, the fluid being poured on while a 500-amp. current passes through the rod. This treatment causes the cracks to turn green and the colour shows up when the rod is inspected in a special chamber.

Rods which pass this test are then checked for alignment and fitted with new big-end and gudgeon pin bearings.

The water-jacket of the cylinder block is sealed and tested under pressure for leaks. Blocks that pass the test are then fitted with cylinder liners and main bearings. Dry liners are used in the P series engines\*\*\*. They are forced home\*\*\*\* by an hydraulic press, they are then bored and finally honed. Wet liners are a hand-push fit\*\*\*\*\* and require no further treatment.

Water pumps, lubrication oil pumps and similar accessories are reconditioned and tested individually before being fitted to an engine. The completed engine is given, a five-hour running test. Finally, it is painted the colour that to normal for its application to a given machine.

---

\* in part exchange for – у частковий обмін на

\*\* Is fitted to the camshaft side of the cylinder block – прикріплюються до блоку циліндрів з боку кулачкового валу.

\*\*\* The P series engines – двигуни серії Перкінс

\*\*\*\* are forced home – встановлюється на місце

\*\*\*\*\* are hand-push fit – встановлюється вручну

## II. TRANSLATE THE SENTENCES WITH “THE MORE – THE BETTER” CONSTRUCTION (SCORE – 10 POINTS)

1. The nearer to the everyday practice a school farm can get, however, the more realistic will be the training given.
2. Theoretically, the greater the number of filters, the better, but in practice there must be a limit.
3. The higher the number (indicating oil viscosity, M. M.), the thicker the oil.

4. The colder the weather, the more frequently this should be done.
5. The larger the number of cylinders, the greater the smoothness of running and the lighter the flywheel required.
6. The more quickly the magnet is moved relative to the coil, the greater will be the deflection of the pointer of the ammeter.
7. The greater the proportion of the commutator\* which is included between the two brushes, the greater will be the output.
8. The nearer the pivot is placed to the load in comparison with its distance from the handle, the greater will be the magnification of the force applied.
9. The greater the magnification on the one hand, the greater will be the reduction on the other.
10. The more violent the change which can be brought about when breaking the low-tension circuit, the stronger will be the high-tension impulse induced in the high-tension coil.

\* the proportion of the commutator – число пластин коллектора (тут)

**(TOTAL SCORE – 16 POINTS)**

Humor

Professor – “A fool can ask more questions than a wise man can answer”

Student – “No wonder so many of us flunk in our exams!”

\*\*\*

Uncle John came to stay, and before he left he gave his nephew fiver. “Now be careful with that money, Tommy”, he said.

Remember the saying, “A fool and his money are soon parted”.

“Yes, Uncle”, replied Tommy, “but I want to think you parting with it, just the same”.

### CROSSWORD PUZZLE

1	2	3		
	4			
5				6
7				

**Across:**

1. A synonym for “edge”. 2. A pronoun contrasted with “many”. 3. A synonym for “memory”. 4. A synonym for “beam”.

**Down:**

2. A conjunction with the meaning “on condition that”. 3. Power or keeping facts in the mind. 5. Somebody that uses. 6. A number of things of the same kind

**Across:** 1-Rim. 4-Few. 7- Store. 8-Ray.

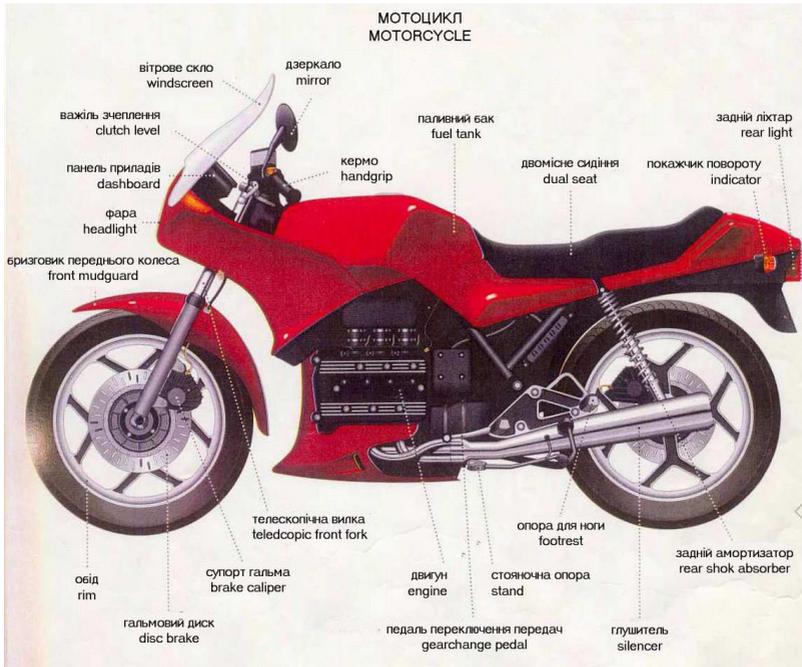
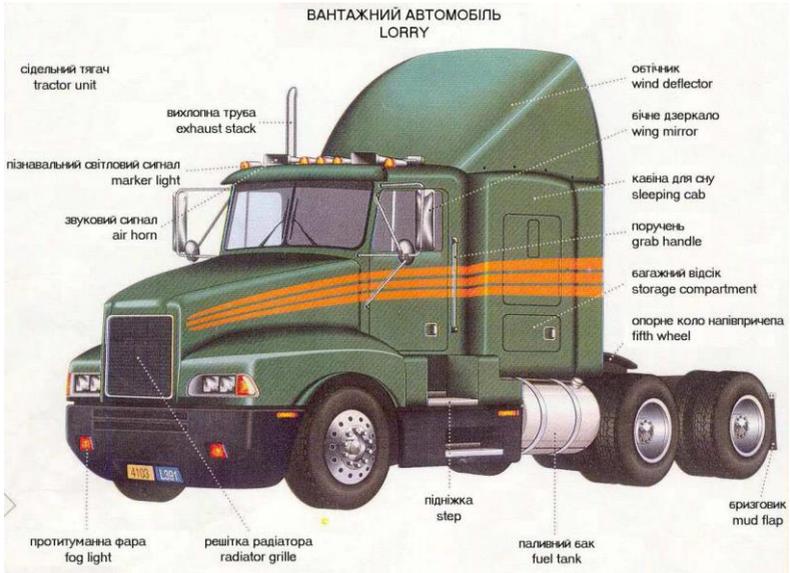
**Down:** 2-If. 3-Memory. 5-User. 6-Set.

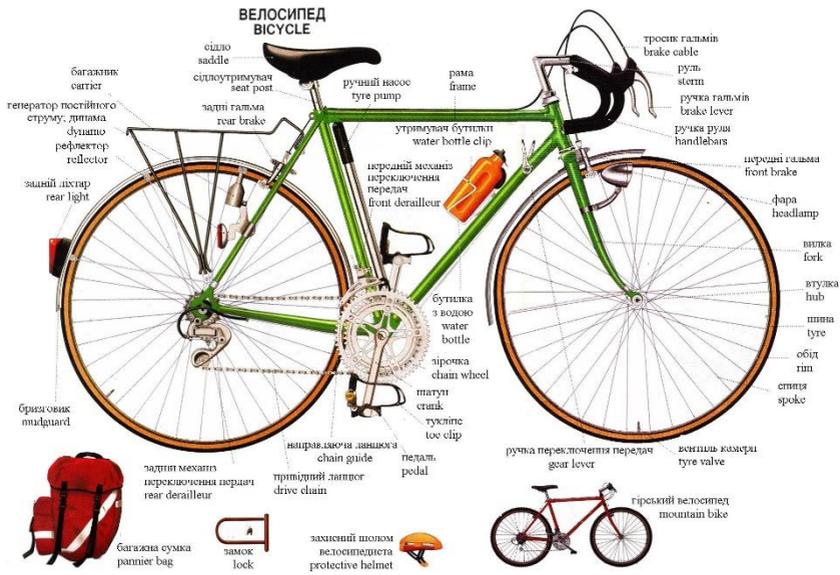
**II PART**

Запам’ятайте назви.

**Road transport Автодорожній транспорт (Score – 20x4=80 points)**







**TEXTS FOR READING**

**TEXT 1. AUTOMOBILES (SCORE – 6 POINTS)**

Economic development has led over recent years to greet increases in production of motor ears in almost all countries.

Our era has sometimes even been named the age of electricity and automobiles, though quite recently other characteristics have come instead like the "age of plastics" and the "age of nuclear energy". What is the reason for the tremendous advancement of automobiles? The motor car is the most efficient thermal powered road vehicle, since it makes the most effective use of the most widely spread and comparatively cheap fuel: benzine (gasoline) and other oil products, Another reason for the vast expansion of automobile transport is its comparatively high speed and its versatility. Bad roads are only a partial impediment to the automobile, especially the modern lorry, which scales steep gradients, seldom sticks in mud, and easily, negotiates sharpest curves. Automobiles are applicable to a vast variety of purposes and they possess most different design. Besides passenger cars and lorries, there exist hosts of special service motor cars, such as ambulances or automobiles for emergency medical aid, emergency technical repair, machines for fire-brigades, dump-cars, tanks for liquids of various description beginning with milk tanks and ending with oil tanks. Motor buses - both city and interurban - have won their own, and not such a small part of short and long-distance passenger traffic is effected by means of

these vehicles, which, just as passenger cars, are winning every day in comfort, speed and safety. Tourism is materially helped by motor-buses which, along with motor-launches, are responsible "for the transportation of tourists to various places of interest. Not to be forgotten in connection with internal-combustion engine vehicles is also the motor-cycle which caters for individual needs and, to a great extent, for sport.

### **TEXT 2 PASSENGER CARS (SCORE – 6 POINTS)**

The general tendencies mapped out by the automotive industry for passenger cars generally are: increased speed, higher efficiency, more comfort, enhanced safety for both passenger and driver. Streamlining of passenger car's is applied to an ever increasing extent.

Among passenger cars the Volga stands out with particular prominence. At the Brussels World Fair people admired the fine lines and wonderful finishing of the new Volga motor car. The Volga motor car is comfortable, simply and easily controlled, convenient for servicing with the best dynamic and economic characteristics. The Grand Prix was presented to the Volga motor car, at the exhibition in the capital of Belgium.

The engine has: four cylinders, a four-stroke cycle carburettor, with overhead valves. The Cylinder bore is 92mm; the Piston stroke is 92mm; the Displacement, 1 in 2.445; the Compression ratio - 7.5: 1.

The Lubricating system is combined-forced and splash.

The Fuel system is equipped with a downdraft carburettor, air filter and muffler. Fuel-gasoline with octane number 80.

The Cooling system is fluid, closed type with forced circulation.

The Electric Equipment consists of a Storage battery 12v and 54A-hr, in ebonite block; a Generator of 220W; a current and voltage Regulator; an Ignition battery; a Distributor with automatic, centrifugal and vacuum regulator and hand octane selector; a Starter with electric engagement of drive, as well as head lights and other lamps.

### **Text 3. LORRIES (Score – 6 points)**

As to freight-carrying trucks, we see here a vast range of most different types. Nowadays .the traditional road-going lorry has been joined by long-distance heavies, and on the other end of the scale there are machines designed for short-run operation at construction sites, forest estates, etc. ranging from the tropics to polar regions. Transport economy is of paramount importance, and ordinary

lorries are unable to fill the need whenever loading or unloading times are of considerable duration or when difficult loads requiring special containers are needed. Cross-country vehicles are sometimes used then, but work on designing new and better types of both passenger cars and lorries (including trailers and tractors) is under way both in our and in other countries.

#### **TEXT 4. AIR TRANSPORT (SCORE – 6 POINTS)**

Of all other means of travelling from place to place the aeroplane is the quickest. But what is a really modern aeroplane? We shall describe the IL-18 that won a diploma and a gold medal at the Brussels Exhibition. This plane made many long-range flights which have proved its fine flying, and operational performance.

The Soviet-made IL-18 is powered by four turboprop engines which make it safe, for it can take off with only three engines operate and continue level flight with only two.

All hot parts in the power plant are isolated from the aircraft structure by heat-resistant titanium firewalls.

The nacelles have a very efficient ventilation system for dissipating heat. The fuel stock is held in the wing tanks. For safety reasons, there is no fuel in the under-fuselage section of the wing.

Besides, there is a powerful fire-fighting system, charged with an extremely strong fire-extinguishing agent.

The flight deck is separated from the remainder of the fuselage with a pressure bulkhead. In case of a sudden decompression of the flight deck, there would be no loss of pressure in the passenger cabin.

Many of the navigational instruments, radio and pressurisation equipment are duplicated to improve reliability.

The nose-mounted radar warns the pilot of ground obstacles, aeroplanes and storm clouds ahead. In some cases this radar also helps to navigate the plane.

Dependable and effective electric-thermal de-icers add to flying safety.

The passenger cabin has comfortable upholstered reclining seats; Each seat has a small downy cushion, safety belts and an ash-tray.

The air-conditioning system maintains constant "room" temperature (about 20° at 40 per cent relative humidity) in the cabin at any altitude and in all seasons.

Cabin pressure is maintained at sea level up to 5,200m. At 8,000m. the pressure is as that of 1,500 m. and at 10,000m. it is as at 2,400m.

A fully equipped galley is provided on board the plane.

At the passengers' disposal are wardrobes, baggage compartments and well-equipped toilet rooms.

The aircraft seats from 73 up to 111 passengers depending on the layout.

The ceiling, walls and bulkheads are covered with fire-resistant fabric and Pavinol plastic.

The window and door curtains are made of light synthetic fabric.

The ceiling lamps, made of heat-resistant organic glass, flood the cabin with soft diffused light at night.

The flight crew — pilots, navigator and radio operator — are all seated in one compartment in the glazed nose part of the fuselage.

The front part of the flight deck is occupied by three instrument panels: the central panel and two flight panels of the first pilot and of the co-pilot. The radio and electric control panels are above the central panel.

### **Вправи**

#### **1. Прочитайте наступні інтернаціональні слова та назвіть їх українські еквіваленти.**

a) (Score – 3 points)

horizontal, vertical, a distance, physical, a machine.

b) (Score – 6 points)

A conveyor, an operation, nature, a limit, a characteristic, a reason, a model; limitations, to fix,; fixed; transmission, to transmit, an autoclave; a lift, to lift, an elevator, fruits, a crane, a roller, a type, conservation.

c) (Score – 6 points)

physical characteristics, the physical reason, physical nature, electric nature, an electric lift, to lift materials, the lifting of materials, machine industry, a fixed distance, fixed limits, a conveyor of a roller type, a distance of 25 meters.

#### **2. Прочитайте вголос наступні слова, запам'ятайте їх правильну**

**вимову. Приклади, що справа, закінчіть засвоєним словом.** (Score – 25 points)

Зразок:

a proper instrument for .....

Is your choice of the equipment .....  
?

SPACE - місце, що займає предмет; простір; a wide space; a narrow space

a wide space between ..... (the desks)

a space of 3 ..... (millimeters)

The space between the line are ..... (small).

The equipment takes up too much ..... (space).

OPERATION - процес, робота; an operation of lifting; an automatic operation.

An operation of .....

The machine is in .....

PROPER - вірний, повинен, підходящий; a proper choice, at a proper distance.

a proper instrument for .....

I think it is proper to .....

The car is running at a proper .....

Is your choice of the equipment .....  
?

REPAIR - ремонт; the machine is under repair; repair to a conveyor.

repair to .....

After the repair

The autoclave reeds .....

The plant is closed during .....  
the equipment for .....

WOODEN - дерев'яний; a wooden desk, a wooden box.

a table with wooden .....

a house with wooden .....

The lid of the table is .....

**3. Заповнюючи пропуски в наступних реченнях, перевірте, чи засвоїли Ви слова.** (Score – 4 points)

1. There are wide \_\_\_\_\_ between the lines of this book.
2. Have you any \_\_\_\_\_ instrument to open the box?
3. What time does \_\_\_\_\_ of the conveyor take?
4. Fig. 2 shows \_\_\_\_\_ of this machine.

5. Are there \_\_\_\_\_ boxes for packing goods (товари)?

**4. Прочитайте вголос наступні слова, запам'ятайте їх правильну вимову. Передайте зміст наведених прикладів. (Score – 4 points)**

а) Зразок:

*BELT - стрічка, ремінь; a wide belt; The belt has 25 metres in length.*

The belt of a conveyor. At the plants belts can transport goods over long distances.

*HOIST - підйомник. An electric hoist.*

Mobile truck ['moubail trak] - самохідний візок. A mobile truck of a new construction.

*TRACTOR TRAINS - електрокрани; a tractor train of ten trailers (прицеп).*

б) Опишіть на англійській мові ким? чим? як? і де? можуть бути виконані наступні дії.

Зразок:

*TO CONVEY - перевозити, транспортувати; to convey goods; to convey passengers. Pipes convey hot water to every part of a building. (Score – 6 points)*

1. TO PACK - пакувати; to pack things; to pack books into a box.
2. TO LOAD - вантажить, навантажувати, завантажувати; to load a conveyor; to load a ship;
3. TO SHIFT - зрушувати; to shift heavy machines; to shift the desk from the door to the window;

**5. Заповнюючи пропуски в наступних реченнях, перевірте, чи запам'ятали Ви слова. (Score – 6 points)**

1. Does this bus \_\_\_\_\_ workers to the plant?
2. Can you \_\_\_\_\_ the autoclave to the left of the window?
3. The workers are \_\_\_\_\_ing the conveyor.
4. \_\_\_\_\_ and \_\_\_\_\_ are widely used in industry and in every-day life.
5. A \_\_\_\_\_ is a type of equipment which lifts heavy materials.
6. What is the length of the \_\_\_\_\_ of this new conveyor?

**6. Прочитайте наступні слова, запам'ятайте їх вимову. Передайте**

**зміст наведених прикладів.**

Зразок: *VARIOUS* - різний; at various distances from Moscow; at various times. Various tapes of equipment; various technological processes.

(Score – 4 points)

1. MANUAL - ручний; manual labor; manual worker;
2. INTERMITTENT - періодичний; a machine of intermittent operation; an intermittent action.

b) Підберіть до наступних іменників відповідні визначення. (Score – 3 points)

1. WIDTH - ширина; a road of great width; 10 metres in width; various width; width of a belt;
2. AREA - площа, простір, ділянка; the area of a building, the area of a triangle.
3. GRAIN - зерно; a ship with grain; a grain elevator;

**7. Заповніть пропуски.** (Score – 5 points)

1. Can you find the \_\_\_\_\_ of a triangle?
2. A hoist is a tape of equipment of \_\_\_\_\_ operation.
3. At our plant there are many conveyors with \_\_\_\_\_ width.
4. This conveyor conveys \_\_\_\_\_ from the cars (залізничні вантажні вагони) to the elevator.
5. Before the October Revolution there were many plants of \_\_\_\_\_ labour in Russian.

**8. Речення перекладіть. Значення термінів запам'ятайте.** (Score – 6 points)

a)

1. In every branch of industry various machine handle goods of any size and weight.
2. There is a special branch of science which studies the principles of movement of various goods. We call this branch of science the bending of materials.
3. Conveyors can transport loads over and lops short distances.

b) Прочитайте наступні речення. Встановіть приблизно значення виділених технічних термінів. Запам'ятайте їх

1. The lines travel goods from one point to another may be straight or curved.

2. We know two types of movement of goods: an intermittent type of movement and continuous type of movement.

**9. Прочитайте наступні слова, Запам'ятайте вимову. Передайте зміст наведених прикладів. Переробіть ці приклади в речення. (Score – 10 points)**

Зразок: TO OPERATE – робити, приводити в рух;

to operate at a great speed; to operate a conveyor; to operate a machine; - this conveyor operates at a great speed. I know how to operate a conveyor. To operate this machine you must have some special knowledge.

PRINCIPLE – принцип, закон, правило;

principles of physics; principles of movement; a man of principle; a man of no principles; the first principles of geometry; to work on principle; Galileo's principle; Archimedes principle; a principle on universal gravitation;

TO APPLY – використовувати, вживати;

to apply a principle, to apply a machine; to apply the belt of a conveyor;

APPLICATION – використання, застосування, уживання;

application of atomic energy, application of conveyor belts, application of power for handling machines, materials.

TO CARRY – нести, перевозити;

to carry goods, to carry by air, to carry by train, to carry by a conveyor;

**10. Заповнюючи пропуски в наступних реченнях, перевірте, чи засвоїли Ви слова. (Score – 5 points)**

1. This machine \_\_\_\_\_ at a great speed.
2. Railway and ships \_\_\_\_\_ goods.
3. For handling goods engineers \_\_\_\_\_ various handling equipment.
4. In this book we can read about the first \_\_\_\_\_ of Mechanics.
5. The last lecture was about practical \_\_\_\_\_ of this principle.

**11. Виконуючи наступні вправи, перевірте, чи засвоїли Ви слова. Перекладіть наступні речення. (Score – 13 points)**

a)

1. Ships carry goods to our port from various countries.
2. In all these instruments the principle is the same.
3. Belts handle goods in a continuous movement, and hoists handle goods intermittently.
4. This plant produces machines for packing operations.
5. There are the conveyor belts in the room. The spaces between them are metres. They convey grain to various departments of the elevator.

b)

1. Механізація і автоматизація витісняє ручну працю.
2. Знайдіть площу трикутника.
3. Чи є у Вас підходящий інструмент для ремонту машини?
4. Лінії переміщення товару можуть бути прямими і прогнутими.
5. Малюнок показує як працює це кран.

c) Дайте відповідь на наступні питання.

1. In what branches of science do scientists apply Galileo's principle?
2. Do you know the two main groups of loads?
3. Do the conveyor belts find wide application in materials handling?

**12. Спираючись на граматичні ознаки визначіть присудок в наступних реченнях. Прочитайте речення вголос, чітко зберігаючи паузу присудка та об'єднання присудка і прямого додатка. Речення перекладіть. (Score – 11 points)**

a)

1. This crane cranes loads of up to 2 tons.
2. Equip, the grain conveyor with a device for automatic stopping and starting.
3. When transporting the grain over long distances connect the two lengths of the conveyor.
4. At this point the line branches into two.
5. Time the speed of conveying and record it.
6. In your letter Indicate the length of the conveyor and the diameter of its rollers.

b)

1. Usually engineers group loads into two groups.
2. When operating the crane use the instruction.
3. Before the test\* examine the sections of the conveyor. After this change the sections every two hours and record the speed of the conveyor's operation.
4. Engineers spend much time and energy in developing materials

handling equipment.

5. The price list includes the machine parts too.

---

\* teat - цапфа

**13. Читаючи речення в голос, за допомогою інтонації і розстановки пауз покажіть різницю у значеннях виділених слів. (Score – 10 points)**

1. The hoist handles heavy machine parts.
2. The truck handle out the track in vertical position.
3. The conveyor turns two ways: right and left.
4. The conveyor turns occur in two places, of the line.
5. After this group the loads as to their properties.
6. After this group the loads change their properties.
7. The crane travels are of various lengths.
8. The crane travels on tracks of various lengths.
9. For such operations use an air hoist.
10. For such operations the use of an air hoist is not proper.

**14. Виходячи з правил протилежних суфіксів, вставте присудок в наступних реченнях. (Score – 5 points)**

1. Figure 2 \_\_\_\_\_ a standard conveyor.
2. Tractor trains and mobile trucks \_\_\_\_\_ goods to any part of a plant.
3. Our plant \_\_\_\_\_ conveyors and elevators.
4. These machine \_\_\_\_\_ various materials.
5. For transporting the grain in a horizontal direction engineers \_\_\_\_\_ conveyors.

**15. Виходячи з правил порядку слів і правил прямого додатку, перекладіть наступні речення на англійську мову. (Score – 3 points)**

1. Термін „транспортування матеріалів” ми використовуємо у всіх напрямках промисловості.
2. Тяжкі матеріали підіймає електropідйомник.
3. Багато часу затрачають інженери на розробку (in developing) підйомно-транспортного обладнання.

b) Прочитайте наступні приклади, доповніть їх, де це необхідно. (Score – 6 points)

A. What is this?

- B. It is figure 1.  
 A. What does it show?  
 B. It shows a hoist  
 A. .... the hoist on the floor?  
 B. No, it ..... .It hangs on the wall.  
 A. How ..... the hoist operate?  
 B. It ..... heavy things.  
 A. What is there in ..... figure 2?  
 B. .... also a hoist.  
 H. A. What hoist ..... it?  
 B. .... an electric hoist.  
 A. Is there a man in the picture?  
 B. Yes, ..... .  
 A. Are ..... boxes in the picture?  
 B. No, there ..... only one box in the picture.  
 A. Does the hoist hang on a wall?  
 B. No, it ..... .  
 A. Where ..... the hoist?  
 B. It ..... on a rail (рельс).  
 A. Who operates the hoist?

**16. За допомогою граматичних ознак визначити слова з суфіксом -ed. Прочитайте речення вголос, чітко дотримуйтеся пауз присудка. Речення перекласти. (Score – 4 points)**

1. The rollers are spaced at distances depending upon the size of the load.
2. A special device used by the engineer helped him to show the physical characteristics of the material.
3. At the meeting the workers discussed the Plan.
4. For these materials the engineers employed the apron conveyors.

**17. За допомогою граматичних ознак визначити присудок в наступних реченнях. Речення перекласти. (Score – 7 points)**

1. In the solid rollers the bearings are mounted in cups.
2. The teacher explained these formulae to the students.
3. Most of the gravity conveyors are constructed with metal frames of different types.
4. When we worked in the shop we used different instrument.
5. Discharging sections of the conveyor are operated either manually or mechanically.
6. The assistant showed the professor a list of temperature changer

received during the experiment.

7. An apron conveyor mounted in a movable frame is called a portable apron conveyor.

**18. Прочитайте наступні речення. Вкажіть яку функцію в реченнях виконують слова з суфіксом –ed. (Score – 7 points)**

1. The students of our institute helped in building the new hostel.
2. High labour productivity is characteristic for the plants provided with modern machinery.
3. The word “cup” used in technical texts has many meanings.
4. He was asked to show the machine in operation.
5. The control of this industrial process is automatized.
6. The articles translated by the student help him in his scientific work.
7. Our Earth is of the planets heated by the Sun.

**19. Поясніть граматичні функції виділених слів. Речення перекласти. (Score – 5 points)**

1. The assistant measures the temperature of the liquid every three hours.
2. There is much gas in the tube.
3. Every week the plant produces many steel machine parts.
4. There are few flasks on the shelf.
5. The workers of our factory like this large building.

**20. Прочитайте наступні речення і встановіть значення виділених слів. (Score – 7 points)**

1. The conical roller may be either singal or double.
2. The chain ..... fastened to the rollers.
3. The length of various conveyors depends upon the strength of the chain.
4. Here are many types of vacuum tubes which are used in industrial control.
5. He works as an engineer at this plant.
6. Both the engineer and the operator ranted to operate the conveyer in an hour.
7. He was respected (to respect - поважать) both as a teacher and as a man.

**21. Прочитати тільки ті речення, в яких слово conveyor є опорним**

**іменником.** (Score – 4 points)

1. When a heavy-duty apron conveyor is mounted on a movable frame, it is called a portable apron conveyor.
2. Some apron conveyor modifications are applied for various industrial operations.
3. The length of conveyor depends on many various factors.
4. A steel belt conveyor is adapted for handling bulk materials.

**22. Прочитайте наступні речення і визначіть виділені слова.**

**Пропуски заповніть службовими словами.** (Score – 7 points)

1. The methods used in ..... experimental work are new.
2. On ..... conveyor there are rollers spaced at equal intervals.
3. The roller mounted on the axle must be ..... solid ..... double.
4. The conveyor ..... is set in our shop can be operated manually ..... mechanically.
5. Every day ..... cars carry the grain to ..... elevator and discharge it to the belt conveyor.
6. It is necessary to fasten the frame ..... the conveyor.
7. The ice-breakers (криголами) are propelled by atomic energy.

**23. Доповніть речення вибираючи для цього іменники, дані справа.** (Score – 5 points)

- |  |                              |
|--|------------------------------|
| 1. Yesterday the tourists visited our town picture<br>.....                      | a) conveyor                  |
| 2. For carrying heavy materials we use a<br>continuous wooden apron .....        | b) angle                     |
| 3. Different types of handling equipment are used<br>in various industrial ..... | c) gallery                   |
| 4. The students discussed the institute conference<br>.....                      | d) operations                |
| 5. Actors from many countries of the world take<br>part in the Moscow film ..... | e) festival<br>f) programmer |

**24. Виділіть логічним наголосом опорний іменник. Будьте готові передати зміст кожного з прочитаних речень.** (Score – 5 points)

1. Yesterday the workers discussed the food factory production plan.
2. They showed the new institute conference hall to the delegates.
3. The roller spiral conveyor is used for transporting materials .... one floor to another.
4. A gravity roller conveyor is constructed with metal frames.

5. They started the experiment in the well-equipped institute chemical laboratory.

b) Визначить, чим відрізняється описаний транспортер від пасового конвеєру. (Score – 6 points)

### **TEXT 5 GRAVITY ROLLER CONVEYOR (SCORE – 6 POINTS)**

Definition. A type of a package-carrying conveyor which supports the load on rollers, turning in fixed bearings and spaced at distances depending upon the size of the load.

Description. The rollers in a gravity conveyor are of several types. One is know as the solid roller, which consists of one piece of tubing with cups in the ends in which the bearings are mounted. Another type is known as the double roller, in which two individual rollers are mounted on the same axle, but each turns independently of the other. The third, type is a conical roller, which can either be single or double, depending upon the purpose for which it is used.

Most of the gravity conveyors are constructed with petal frames for supporting the roller axles and are built in standard lengths on 5 and 10 feet. They are built in curved sections of 45 and 90 degrees and with switch sections and discharging section which can operated either manually or mechanically.

Application. Gravity roller conveyors can be used for transporting goods both in short and long lengths. These conveyors can be used in packing rooms of food enterprises, in various branches of industry, at canaries, at grain elevators, in the production of mixed feeds.

**I. З приведених нижче тверджень назвіть номери тих, які відповідають змісту прочитаного.** (Score – 5 points)

1. Rollers in a gravity conveyor are of several types.
2. For handling special objects concave rollers are sometimes used.
3. A gravity roller conveyor is generally used for lowering materials.
4. A conical roller can be either single or double.
5. Metal frames are built in standard lengths of 5 and 10 feet.

**II. Вкажіть той абзац тексту, в якому розповідається, де і як використовується гравітаційний роликівий конвеєр.** (Score – 3 points)

**III. Прочитайте речення тільки один раз і підготуйтеся**

**передати їх зміст.** (Score – 5 points)

1. The engineer showed us the device employed for determining the size of those particles.
2. In a repair-shop they repaired the axle.
3. The scientists used this new method in his work.
4. The Dockers discharged the ship which had delivered some machinery for the grain elevators.
5. Large packages mounted on the truck can be propelled by tractors or power truck.

b) Визначить, чим відрізняється описаний конвеєр від гравітаційного роликowego транспортера. (Score – 6 points)

### **TEXT 6. APRON CONVEYOR** (Score – 6 points)

Definition. Apron conveyor (Пластинковий конвеєр) is a continuous carrying surface made of wood or steel slats (Пластини), propelled by one or more strands of chain and supported either by the chain or by one of the rollers.

Description. A continuous wooden apron conveyor is made up of the slats set close together. The slats are usually fastened to roller chains which run in steel guides (Пазы).

Apron conveyor for handling packaged materials are generally of wood-and-chain construction. In some apron conveyors wood slats can be fastened to iron or steel chain which is not fitted with rollers.

When this type of a conveyor is mounted in movable frame it is called a portable apron conveyor depends upon the strength of the chain and the size of the driving motor.

Application. Apron conveyor are very widely employed for handling heavy packages and are used as mobile floors for continuous transportation. A great many different styles and modifications of apron conveyor are used in various industrial operations. Apron conveyors made of wood are particularly adapted to handling packaged materials. These made of steel are especially useful for carrying heavy materials. This type of conveyor is used in every branch of food industry.

**II. Найдіть у тексті речення, які є відповіддю на дані питання:**  
(Score – 4 points)

1. What type of a conveyor do we call a portable apron conveyor?

2. What is an apron conveyor?
3. What does a length of this conveyor depend upon?
4. What slats are used in the apron conveyor?

**III. Найдіть у тексті речення, в яких говориться про те,** (Score – 6 points)

- а) що існує багато видів пластинчатих конвеєрів;
- б) де і як використовуються пластинчаті конвеєри.

**IV. Виконайте письмовий переклад.** (Score – 18 points)

1. A self-contained belt conveyor, mounted on wheel or casters (коліщата), for moving from one location to another. These conveyors designed primarily for handling bulk (сипучий) material. They are constructed with a take-up pulley (натяжний ролик) and a drive pulley (ведучий ролик), over which operates a wooden-canvas or rubber covered belt, supported in the intermediate section either by idler (натяжний) pulley, steel plates, or both.

2. A device, for continuously transporting material in a horizontal or slightly inclined direction, using a wide thin belt or band (конвеєрна стрічка) as a moving or carrying agent; originally known as a band (стрічковий) conveyor.

3. A gravity conveyor on which packages move downward on a roller runway, arranged in a helical form around a central vertical axis.

### **TEXT 7 FROM THE HISTORY OF MATERIALS HANDLING**

**I. Read the text using a dictionary** (Score – 6 points)

Materials handling is not a new subject. Man has always tried to multiply his own strength. Man's first prime mover (джерело енергії) was his own arm. Its power is only one tenth of a horse power. But when man used it to drive a horse he increased his own power by 900 per cent. The use of the wheel (колесо) and harnessing (прискорення) rivers again increased man's power. Later man developed the steam engine (паровий двигун) and the electric motor which also shortened his time of doing work. So we see, that harnessing of mechanic equipment made it possible for man to shorten the time necessary for lifting and shifting various materials.

Some of the basic principles of many modern materials-handling machines applied many centuries ago and apply now. For example, Archimedes (Архімед) in developing a device for raising water made practical one of

the first mechanical devices for handling materials, and the same principle applies to-day. The most we can do is (Все, що ми можемо зробити, складається з...) improve the design and variety of the equipment for fuller use of the new construction materials (конструкторські матеріали) and to apply the equipment for today's production operations.

The term "materials handling" is new. Until about 30 years ago people used such terms as conveying, lifting, transporting, shifting, mechanical handling, and many others. However, finally they close materials handling because it really covers handling of materials in transportation, in storage, in process, in the raw and finished state, whether the operation is performed manually or mechanically.

As we know engineers base economical materials handling on work, time and space. Handling materials is work, especially in the lift phase. To do work requires power, and the power of lifting materials depends on the standard physical formula:

$$\text{Power} = (\text{Weight}) \times (\text{Distance}) / \text{Time}$$

The material for lifting always has a fixed weight. The distance is also fixed. So, there are two variables. Fixing (установлення) one of them fixed the other. We may economize on power at the expense (за рахунок) of time, or on time at the expense of power.

I. До наступного заняття повторіть зміст нижче наведених слів. (Score – 6 points)

- a) purpose, a piece, solid, support, decide
- b) depend on, a tube, surface, steel, an angle

II. Перевірте чи запам'ятали Ви слова. Заповніть пропуски словами, потрібними за змістом.

a) (Score – 4 points)

purpose, a price, solid, support, decide

The full length of this tube is 10 metres and the length of this ..... of it is 8 metres.

1. The belt ..... the material and moves it.
2. The experiment shows regular changes in the ..... bodies.
3. This equipment may be used for different ..... .

b) (Score – 4 points)

depend on, a tube, surface, steel, an angle

1. The type of deformation ..... the material which the body is made of.
2. ABC is a triangle. It has three .....: BAC, ABC and BCA.
3. There is some oil on the ..... of this liquid.
4. The walls off this ..... are thick.

III. Прочитайте наступні інтернаціональні слова і дайте їх українські еквіваленти: (Score – 3 points)

a)

a section, a diameter, physical adj., a cram, a standard, horizontal adj, an interval, a foot, nature n., an aggregate, production n.

b) Прочитайте наступні інтернаціональні слова и поясніть їх значення: (Score – 3 points)

to press, a roller, to adapt, a container, individual, to pack, double, gravity, to construct.

c) прочитайте наступні словосполучення і дайте їх українські еквіваленти: (Score – 10 points)

1. to press metal details, 2. to press bolts, 3. to press tubes of various diameters, 4. to adapt the equipment for this purpose, 5. to adapt the machine for handling materials, 6. a double roller, 7. steel rollers, 8. metal rollers, 9. conical rollers, 10. an individual aggregate, 10. individual sections.

IV. Прочитайте в голос наступні слова, запам'ятайте їх правильну вимову. Передайте зміст наведених прикладів. Закінчуючи самостійно приклади, розташовані зліва, використовуйте знайомі Вам слова, які підходять за змістом. (Score – 6 points)

AXLE ['xksl] n.- ось (деталь машини); the axle of a roller the axle of a wheel;

This front axle of a car is .....

Every car has .....

As axle of a car is .....

A conveyer has .....

There are fixed axles in a .....

Those rollers turned on a fixed .....

FRAME [freIm] n.- каркас, корпус; the frame of a building the frame of a car. (Score – 7 points)

The engine frame is .....

The conveyer is mounted in a .....

The frame of the crane is made of .....

A gravity roller conveyer is constructed with a

The frame of the truck is .....metal .....

The frame of the model is .....

This wooden .....

PARKAGE n. – товар в упаковці. (Score – 7 points)

a window .....

a package of .....

a machine .....

a package with ..... various.

There are some packages of ..... on new ..... the .....

A load of four .....

The packages of grain are .....

V. Роблячи наступну вправу перевірте, чи засвоїли Ви слова.

VI. Прочитайте вголос наступні слова, запам'ятайте їх правильну вимову. Передайте зміст наступних прикладів.

а) Опишіть по-англійські одну із характеристик пристрою використовується цей пристрій. (Score – 4 points)

CUP - втулка; a steel cup, a glass cup; a tube with cups for bearings  
(для підшипників);

STRAND - звено; a strand of chain; a steel strand;

б) Опишіть на англійській мові ким? чим? як? де? можуть бути виконані наступні дії. (Score – 14 points)

1. TO DISCHARGE - вивантажити, розвантажити; to discharge materials, to discharge goods, to discharge at different point, to discharge on both sides of the conveyer, to discharge a car, to discharge at a great speed;
2. TO PROPEL - приводити в рух, пересунути в перед; to propel an engine by steam, to propel material by gravity (самоплином), to propel goods along a conveyer belts;
3. TO EMPLOY - використовувати; to employ new methods, to employ the right motor, to employ a pen for writing;

4. TO MOUNT - монтувати, вставляти в оправу; to mount the roller on a rod, to mount an engine;
5. TO SET - встановлювати; to set a roller, to set a crane in a proper position, to set a glass in window, to set limits, to set the length of a conveyor;
6. TO SPACE - розміщувати з проміжками; to space rollers with 5mm intervals, to space equipment in a shop, to space loads on a conveyor;
7. TO FASTEN - закріплювати; to fasten a fan on the demonstration table, to fasten a screen on the wall, to fasten a lid on the box, to fasten the conveyor to the floor, to fasten the machine with bolts.

## Vocabulary

1. automobile (motor-car або motor vehicle) - автомобіль
2. nuclear energy - ядерна енергія
3. advancement - успіх розповсюдження
4. efficient (або effective) - ефективний, з високим ККД
5. thermal powered road vehicle - автомобіль з тепловим двигуном
6. benzine (gasoline или petrol) - бензин
7. expansion - розширення
8. versatility - різносторонність застосування
9. partial - частковий
10. Impediment перешкода
11. lorry англ. (або truck амер.) - вантажівка
12. to scale - підніматися
13. steep gradient - крутий схил
14. to stick in mud - загрузнути в багні
15. to negotiate - проходити
16. sharp curve - крутий поворот
17. applicable - який застосовується
18. a vast variety of purposes - різноманітне призначення
19. design - конструкція
20. passenger car - легковий автомобіль
21. host - більшість
22. special service - спеціальне призначення
23. ambulance або emergency medical aid car - машина швидкої допомоги
24. fire-brigade - пожежна команда
25. emergency technical repair machine - автомобіль технічної швидкої допомоги
26. dump-car - самоскид
27. tank зд. автоцистерна
28. liquids of various description - різноманітні рідини
29. milk tank молочна цистерна
30. oil tank цистерна для нафтопродуктів
31. city motor bus - міський автобус
32. interurban bus - автобус міжміського призначення
33. to win a part - вибороти собі місце

34. short (тут) - близький
35. long distance - далекого проходження
36. passenger traffic - пасажирські перевезення
37. to effect - виконувати
38. vehicle - транспортний засіб
39. to win ... in - придбати більше
40. speed - швидкість
41. safety - безпека
42. materially - значно
43. motor-launch - катер
44. are responsible for (тут) - служать для
45. not to be forgotten - потрібно згадати
46. internal-combustion engine - двигун внутрішнього згорання
47. motor-cycle - мотоцикл
48. to cater for - обслуговування
49. to map out - позначати
50. the automotive industry - машинобудування
51. increased speed - збільшення швидкості
52. enhanced safety - підвищення безпеки
53. driver - водій, шофер
54. streamlining - надання кузову обтічної форми
55. to apply to - звертатися
56. to stand out with particular prominence - особливо виділятися
57. fine lines - красиві лінії
58. finishing - обробка
59. comfortable - комфортний, зручний
60. convenient for servicing - зручний (в обслуговуванні або для обслуговування)
61. dynamic and economic characteristics технічні і економічні показники
62. "Grand Prix" (фр.) - Великий приз
63. exhibition - виставка
64. four-stroke cycle - чотирьохтактний
65. carburettor - карбюратор
66. overhead valves - поверхове розміщення клапанів
67. cylinder bore - діаметр циліндра
68. piston stroke - хід поршня
69. displacement - робочий об'єм

70. compression ratio - ступінь стискання
71. lubricating system - система змазки
72. forced lubrication - змазування під тиском
73. splash lubrication - змазування розбризкуванням
74. fuel system - система живлення, система подачі пального
75. to be equipped - бути оснащеним
76. downdraft carburettor - карбюратор з падаючим потоком
77. air filter - повітряний фільтр
78. muffler - глушник
79. octane number - октанове число
80. cooling system - система охолодження
81. fluid - рідинний
82. closed type - замкнута система (охолодження)
83. forced circulation - примусова циркуляція
84. storage battery - акумулятор
85. V - вольт
86. A-hr - ампер-година
87. ebonite block - ебонітовий корпус
88. generator - генератор
89. W = watt ват
90. current regulator - регулятор сили струму
91. voltage regulator - регулятор напруги
92. ignition - запалення
93. distributor - розподільник запалювання
94. centrifugal - центробіжний,
95. vacuum regulator - вакуумний регулятор
96. hand octane selector - ручний октан-коректор
97. head lights - фари
98. electric engagement of drive - електричне ввімкнення привода
99. lorry (або freight-carrying truck) - вантажівка
100. traditional road-going lorry - звичайна вантажівка
101. long distance heavies - тягач для далеких перевезень
102. short-run operation - робота з коротким пробігом
103. construction site - будівельним майданчик
104. forest - estates лісорозробки
105. to range - варіюватися
106. to-be of paramount importance - мати вирішальне значення
107. to fill the need - відповідати вимогам

- 108. whenever - в тих випадках коли
- 109. loading time - час або строк завантаження
- 110. unloading time - час або строк розвантаження
- 111. load - вантаж
- 112. container - контейнер
- 113. cross-country vehicle - всюдихід
- 114. trailer - причеп
- 115. tractor - тягач
- 116. to be under way - в роботі

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## АНГЛІЙСЬКА МОВА

Методичні вказівки до практичних занять для здобувачів освіти другого (магістерського) рівня, спеціальність 274 “Автомобільний транспорт” – ЦНТУ, 2023, – 58 с.