MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
VOLODYMYR DAHL EAST UKRAINIAN NATIONAL UNIVERSITY

METHODICAL INSTRUCTIONS
for the test paper No. 1

in the discipline "Intellectual Property and Commercialization of Scientific Research"

(for applicants for the 3rd (educational and scientific) level of higher education specialty, 073 "Management")

(Electronic edition)

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Methodical instructions for the performance of control work No. 1 in the discipline "Intellectual Property and Commercialization of Scientific Research" *(for applicants for the 3rd (educational and scientific) level of higher education, specialty, 073 "Management")* (Electronic edition) / Compiled by K.I. Serebriak, O.V. Maslosh - Kyiv: V. Dahl East Ukrainian National University, 2024. - 44 p.

The guidelines contain general requirements for the design of a test paper, examples of solving typical problems, and options for completing a test paper.

Compiled by Doctor of Economics, Professor Ksenia Serebriak,
Candidate of Chemical Sciences, Associate Professor Olha Maslosh

Reviewer: Doctor of Economics, Professor Yuliia Klius

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INTRODUCTION

The academic discipline "Intellectual Property and Commercialization of Scientific Research" is a component of the training of applicants for the 3rd (educational and scientific) level of higher education in the field of study "Law".

The performance of a test is a component of the educational process, an active form of practical work of higher education students.

The purpose of the control work is to systematize, consolidate and expand the practical knowledge of higher education students in the discipline "Intellectual Property and Commercialization of Scientific Research", as well as to master the skills of independent study of the discipline.

1. GENERAL REQUIREMENTS FOR EXECUTION AND DESIGN CONTROL WORK

The test should be completed in electronic form on A4 sheets (font size 14, line spacing one and a half), on one side. Recommended margins: left - 30 mm, top - 20 mm, right - 10 mm, bottom - 20 mm.

All pages of the work are numbered, without gaps, repetitions and letter additions. The first page is considered to be the title page, on which the number "1" is not put, and the general numbering begins on the next page (assignment for the test) with the number "2". The page number is indicated in the lower right corner of the page without a period at the end.

The paper must include the option number and the full text of the tasks.

The number of the test variant is defined in an additional file on the moodl platform. Each version of the test consists of one calculation task. The variants of the test are given in appendix. B of these guidelines.

The calculation task should be accompanied by step-by-step explanations. Repeated calculations should be presented in tabular form. When determining the numerical values of quantities, the units of measurement should be indicated. At the end of the calculation, you should draw a conclusion.

The following sequence is used to complete a test paper:

1) cover page (Appendix A);

2) tasks for the test (Appendix B);

3) calculation problem (problem condition, solution with all explanations, final answer, conclusion).

2. EXAMPLES OF SOLVING TYPICAL PROBLEMS

Problem 1. Evaluate the economic efficiency of acquiring a license for the production technology of product A. Take product B, which can be produced on the basis of own scientific and technical developments, as a basis for comparison. The license and equipment for the new technology were purchased in another country. It is estimated that it is expedient to produce the compared products A and B for no more than eight years (after this period, the new technology is expected to be available). The initial data for the calculations are shown in Table 1.

Table 1

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Product.	
		А	Б
1.	Annual output, pcs.	24000	24000
2.	Start of serial production, year	3-й	5-й
3.	Unit cost of production, UAH	1150	1300
4.	Upper limit of the unit price, UAH	1560	1560
5.	License acquisition costs, thousand USD	3500	-
6.	Cost of imported equipment, thousand USD	1900	-
7.	Currency conversion rate to domestic prices	5,3	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - the first year of construction; - second year of construction	 2100 900	
9.	Expenditures on in-house R&D, UAH thousand: - first year of development; - second year of development	 -	 250 600
10.	Expenditures on capital construction and equipment for the production of products based on own developments, UAH thousand - third year; - fourth year	 -	 1600 1400
11.	The average bank rate in the country of the manufacturer (licensee), share of one	0,1	0,1

Solution.

In cases where the subject of the license is a new technology aimed at reducing production costs, formula (1) is used to assess the economic efficiency of acquiring a license:

$$E_{л} = \sum_{t=1}^{T} \frac{((З_t^{пб} \cdot q_t^{л} - З_t^{рл}) - (З_t^{пб} \cdot q_t^{вл} - З_t^{р.вл}))}{(1+r)^{t-1}} \quad (1)$$

Where:

$З_t^{п.б}$ - is the specific reduced cost of producing a unit of output under the base case in year *t*, UAH/unit;

$З_t^{р.л}$, $З_t^{р.вл}$ - is the annualized present value of production costs, respectively, on the basis of a license and on the basis of own scientific and technical developments in the *t-th* year (calculated by formulas (2)-(5)), UAH;

$q_t^{л}$, $q_t^{вл}$ - is the annual output of products, respectively, based on a license and on the basis of own scientific and technical developments in the *t-th* year, units;

T - the planned duration of the license, years (determined by an expert, usually equal to the duration of the licensed product);

r - the average bank rate in the country of the product licensee (discount rate), a fraction of one.

$$З_t^{р.л} = C_t^{л} + E_{н} \cdot K^{л} \quad (2)$$

where.

$C_t^{л}$ - is the cost of annual production under the license in the t-th year (if imported raw materials are used, they are separated into a separate item), UAH;

$E_{н}$ - is the standard capital efficiency ratio (in the absence of additional guidance, equal to $1/T$);

$K^{л}$ - total capital investments of the licensee, UAH;

$$K^{л} = \sum_{t=1}^{T} (K_t^{л} + (Z_t + W_t) \cdot k_{в} \quad (3)$$

where.

$K_t^{л}$ - is the capital investment in the *t-th* year made to organize the production of products under a license, UAH;

Z_t - are payments for the license in year *t*, in UAH;

W_t - is the cost of imported equipment required to manufacture products under the license in year *t, in UAH*;

$k_{в}$ - currency conversion rate in accordance with the domestic prices for the licensed products (if the licensee and licensor are residents of Ukraine, then $k_{в} = 1$);

$$З_t^{р.в.л} = С_t^{в.л} + Е_н \cdot К^{в.л} \quad (4)$$

where.

$С_t^{в.л}$ - is the cost of annual output based on the company's own scientific and technical developments in the *t-th* year, UAH;

$К^{в.л}$ - total capital investments of the enterprise-manufacturer, UAH;

$$К^{в.л} = \sum_{t=1}^{T} К_t^{в.л} \quad (5)$$

where.

$К_t^{в.л}$ - is the capital investment in the t-th year made to organize production on the basis of own scientific and technical developments, UAH

The calculation of the licensee's total capital investment according to formula (3) is presented in Table 2 (the notation is disclosed in the explanations to formula (3)).

Table 2 takes into account that, according to the terms of the problem, the cost of acquiring a license is a lump sum payment, i.e. it is a one-off cost, as well as the cost of acquiring imported equipment.

As shown in Table 2, the total amount of the licensee's capital investment will be equal to UAH 3,620 thousand. The obtained value allows us to determine the annualized present value of the production costs of the licensed products by year (using formula (2)), as shown in Table 3.

Table 2

Calculation of the licensee's capital investments

Years of license validity	Initial data (by year)				Total capital investments
	Capital investments	Payments under the license	Cost of imported equipment purchased	Currency conversion rate	
Symbols and notation	$К_t^л$	Z_t	W_t	$k_в$	$К^л$
1	2100000	3500000	1900000	5,3	30720000
2	900000	0	0	5,3	900000
3	0	0	0	5,3	0
4	0	0	0	5,3	0
5	0	0	0	5,3	0
6	0	0	0	5,3	0
7	0	0	0	5,3	0
8	0	0	0	5,3	0
Together	3000000	3500000	1900000	-	31620000

Table 3

Calculation of the annualized present value of the license-based production costs

Years of license validity	Initial data (by year)					Annualized present value costs
	Calculating the cost of annual production			Normative capital investment efficiency ratio	Total capital investments of the licensee	
	Annual volume of annual output, pcs.	Unit cost of production, UAH	Cost of annual output under the license			
Symbols and notation	$q_t^л$	c_t	$C_t^л$	$E_н$	$K^л$	$З_t^{р.л.}$
1	0	0	0	0,125	31620000	3952500
2	0	0	0	0,125	31620000	3952500
3	24000	1150	27600000	0,125	31620000	31552500
4	24000	1150	27600000	0,125	31620000	31552500
5	24000	1150	27600000	0,125	31620000	31552500
6	24000	1150	27600000	0,125	31620000	31552500
7	24000	1150	27600000	0,125	31620000	31552500
8	24000	1150	27600000	0,125	31620000	31552500

Table 3 takes into account the delay in the start of production by the licensee until the completion of capital construction, delivery and installation of equipment, etc.

The calculation showed that during the first two years, the licensee's annualized present value costs will amount to UAH 3952.5 thousand, and in the following years - UAH 31552.5 thousand annually.

If the manufacturer refuses to purchase a license and produces product B on the basis of its own R&D, the manufacturer's investments, in addition to capital construction and purchase of production equipment, will include the costs of its own R&D (Table 4, using formula (5)).

As shown in Table 4, the manufacturer will make capital investments in the organization of production during the first four years. The total amount of capital investment will be UAH 3,850 thousand

The calculation of the annualized present value of production costs is shown in Table 5 (using formula (4)).

Table 4

Calculation of capital investments of a manufacturing company

Years of production	Initial data (by year)		Total capital investments
	Expenditure on in-house R&D	Expenditure on capital construction and equipment acquisition	
1	250000	0	250000
2	600000	0	600000
3	0	1600000	1600000
4	0	1400000	1400000
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
Together	850000	3000000	3850000

According to the calculations, if the manufacturer refuses to purchase the license, the present value of the manufacturer's expenses will amount to UAH 481.25 thousand annually for the first four years (before the start of production) and UAH 31681.25 thousand annually for the following years.

Table 5

Calculation of the annualized present value of production costs based on in-house research and development

Years of production products	Initial data (by year)					The annualized present value costs
	Calculating the cost of annual production			Normative capital investment efficiency ratio	Total capital investment of the manufacturer	
	Annual output, pcs.	Unit cost of production, UAH	Cost of annual output			
Symbols and notation	$q_t^{в.л}$	c_t	$C_t^{в.л}$	$E_н$	$K^{в.л}$	$З_t^{р.в.л.}$
1	0	0		0,125	3850000	481250
2	0	0	0	0,125	3850000	481250
3	0	0	0	0,125	3850000	481250
4	0	0	0	0,125	3850000	481250
5	24000	1300	31200000	0,125	3850000	31681250
6	24000	1300	31200000	0,125	3850000	31681250
7	24000	1300	31200000	0,125	3850000	31681250
8	24000	1300	31200000	0,125	3850000	31681250

In order to assess the economic efficiency of acquiring a license according to formula (1), it is necessary to determine the specific reduced costs of producing a unit of output under the base case ($З_t^{п.б}$). According to the terms of the problem, the basic option is the production of product B on the basis of own scientific and technical developments. Then after the start of production $З_t^{п.б} = 31681{,}25 / 24000 = 1320{,}052$ UAH.

The calculation of the cost-effectiveness of acquiring a license (by year) is shown in Table 6.

Table 6 shows that the purchase of a license, compared to the use of the results of own scientific and technical developments, will lead to a decrease in the profit of the manufacturer by almost UAH 5358 thousand over eight years (before the transition to a new production technology). Therefore, the purchase of this license is not advisable.

Table 6

Calculating the effectiveness of license acquisition

Years of license validity	Initial data (by year)						Efficiency of license acquisition
	Unit production costs per unit of output	Annual production volume based on license	Annualized present value of production costs based on the license	Annual production volume based on in-house research and development	Annualized present value of production costs based on in-house research and development	Average bank rate in the country of the licensee	
Symbols and notation	$З_t^{п.б.}$	$q_t^{л}$	$З^{р.л.}$	$q_t^{вл}$	$З^{р.вл.}$	r	$E_л$
1	1320,052	0	3952500	0	481250	0,1	-3471250,00
2	1320,052	0	3952500	0	481250	0,1	-3155682,00
3	1320,052	24000	31552500	0	481250	0,1	504132,23
4	1320,052	24000	31552500	0	481250	0,1	458302,03
5	1320,052	24000	31552500	24000	31681250	0,1	87937,98
6	1320,052	24000	31552500	24000	31681250	0,1	79943,62
7	1320,052	24000	31552500	24000	31681250	0,1	72676,02
8	1320,052	24000	31552500	24000	31681250	0,1	66069,11
Together	-	-	-	-	-	-	-5357871,00

Task 2. Evaluate the economic efficiency of acquiring a license for the production technology of product A intended for sale in three market segments C1, C2, C3 at different prices. An alternative solution is to produce product B to meet the same consumer needs. The price of products in the respective market segments and other initial data for the calculations are given in Table 7. The license and equipment for the new technology were purchased in another country.

Table 7

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Product.	
		А	Б
1.	Annual output, pcs. - for market segment 1 - for market segment 2 - for market segment 3	 12000 10000 2000	 11200 9800 2700
2.	Start of serial production, year	2-й	4-й
3.	Unit cost of production, UAH	1150	1300
4.	Upper limit of the unit price of comparable products, UAH: - in market segment 1 - in market segment 2 - in market segment 3	 1500 1430 1550	 1600 1620 1510
5.	License acquisition costs, thousand USD	3300	-
6.	Cost of imported equipment, thousand USD	175	-
7.	Currency conversion rate to domestic prices	5,3	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - first year of construction	 2100	
9.	Expenditures on in-house R&D, UAH thousand: - first year of development; - second year of development	 -	 250 600
10.	Expenditures on capital construction and equipment for the production of products based on own developments, UAH thousand - third year	 -	 1600
11.	The average bank rate in the country of the manufacturer (licensee), share of one	0,1	0,1

According to the forecast, it is advisable to manufacture the products being compared for no more than eight years (after this period, a new technology should be expected).

Solution.

In cases where the object of the license is a new product intended to replace an existing product on the market, formula (6) is used to assess the economic efficiency of acquiring a license:

$$E_л = \sum_{t=1}^{T} \frac{((\sum_{i=1}^{n} p_{it}^{л} \cdot q_{it}^{л} - З_t^{р.л}) - (\sum_{i=1}^{n} p_{it}^{в.л} \cdot q_{it}^{в.л} - З_t^{р.в.л}))}{(1+r)^{t-1}} \quad (6)$$

where.

$p_{it}^{л}$, $p_{it}^{в.л}$ - is the price of a unit of product manufactured on the basis of a license and on the basis of own scientific and technical developments in the *t-th* year, respectively, intended for sale in the *i-th* market segment, UAH;

$q_{it}^{л}$, $q_{it}^{в.л}$ - is the annual volume of production, respectively, on the basis of a license and on the basis of own scientific and technical developments in the *t-th* year, intended for sale in the i-th market segment, thousand units;

$З_t^{р.л}$, $З_t^{р.в.л}$ - is the annualized present value of production costs, respectively, on the basis of a license and on the basis of own scientific and technical developments in the *t-th* year (calculated by formulas (2)-(5)), UAH;

T - the planned duration of production, years (determined by experts);

r - the average bank rate in the country of the product licensee (discount rate), a fraction of one.

The calculation of the licensee's total capital investment using formula (3) is presented in Table 8.

Table 8

Calculation of the licensee's capital investments

Years of license validity	Initial data (by year)				Total capital investments
	Capital investments	Payments under the license	Cost of imported equipment purchased	Currency conversion rate	
Symbols and notation	$K_t^{л}$	Z_t	W_t	$k_в$	$K^{л}$
1	2100000	3300000	175000	5,3	20517500
2	0	0	0	5,3	0
3	0	0	0	5,3	0
4	0	0	0	5,3	0
5	0	0	0	5,3	0
6	0	0	0	5,3	0
7	0	0	0	5,3	0
8	0	0	0	5,3	0
Together	2100000	3300000	175000	-	20517500

Table 8 takes into account that, according to the terms of the problem, the cost of acquiring a license is a lump sum payment, i.e. it is a one-off cost, as well as the cost of acquiring imported equipment.

As shown in Table 8, the total amount of the licensee's capital investments will be equal to UAH 20517.5 thousand.

The resulting value allows us to determine the annualized present value of the license-based production costs by year (using formula (2)), as shown in Table 9.

Table 9

Calculation of the annualized present value of the license-based production costs

Years of validity licenses	Initial data (by year)					Annualized present value costs
	Calculating the cost of annual production			Normative coefficient of efficiency of capital investments	The total capital investments of the licensee	
	Annual output of of products, pcs.	Unit cost of production of production, UAH	Cost of annual production of products under license			
Symbols and notation	$q_t^л$	c_t	$C_t^л$	$E_н$	$K^л$	$З_t^{р.л.}$
1	0	0	0	0,125	20517500	2564688
2	24000	1150	27600000	0,125	20517500	30164688
3	24000	1150	27600000	0,125	20517500	30164688
4	24000	1150	27600000	0,125	20517500	30164688
5	24000	1150	27600000	0,125	20517500	30164688
6	24000	1150	27600000	0,125	20517500	30164688
7	24000	1150	27600000	0,125	20517500	30164688
8	24000	1150	27600000	0,125	20517500	30164688

Table 9 takes into account the delay in the start of production by the licensee until the completion of capital construction, delivery and installation of equipment, etc. The annual output of product A is calculated as the sum of the output intended for all market segments.

The calculation showed that during the first year (before the start of serial production of product A), the licensee's annual present value costs would amount to

about UAH 2564.7 thousand, and in subsequent years - more than UAH 30164.7 thousand annually.

If the manufacturer refuses to purchase a license and produces product B on the basis of its own R&D, the manufacturer's investments, in addition to capital construction and purchase of production equipment, will include the costs of its own R&D (Table 10, using formula (5)).

Table 10

Calculation of capital investments of a manufacturing company

Years of production	Initial data (by year)		Total capital investments
	Expenditure on in-house R&D	Expenditure on capital construction and equipment acquisition	
1	250000	0	250000
2	600000	0	600000
3	0	1600000	1600000
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
Together	850000	1600000	2450000

As shown in Table 10, the manufacturer will make capital investments in the organization of production during the first three years. The total amount will be 2450 thousand UAH.

Then the annualized present value costs of output B by the producer will be by year (Table 11, using formula (4)).

In Table 11, the annual output of product B is calculated as the sum of the output destined for all market segments.

According to Table 11, in case of refusal to purchase a license, the manufacturer's present value costs for the first three years (before the start of production) will amount to UAH 306.25 thousand annually, and UAH 31116.25 thousand annually in the following years.

The calculation of the cost-effectiveness of acquiring a license (by year) is shown in Table 12 (using formula (6)).

Table 11

Calculation of the annualized present value of production costs based on in-house research and development

Years of production	Initial data (by year)					Annualized present value costs
	Calculating the cost of annual production			Normative coefficient of efficiency of capital investments	Total capital investments investments of a manufacturing company	
	Annual output of of products, pcs.	Unit cost of production of production, UAH	The cost of annual production output			
Symbols and notation	$q_t^{вл}$	c_t	$C_t^{вл}$	$E_н$	$K^{вл}$	$З_t^{р.вл.}$
1	0	0	0	0,125	2450000	306250
2	0	0	0	0,125	2450000	306250
3	0	0	0	0,125	2450000	306250
4	23700	1300	30810000	0,125	2450000	31116250
5	23700	1300	30810000	0,125	2450000	31116250
6	23700	1300	30810000	0,125	2450000	31116250
7	23700	1300	30810000	0,125	2450000	31116250
8	23700	1300	30810000	0,125	2450000	31116250

Table 12

Calculating the effectiveness of license acquisition

Years of license validity	Initial data (by year)							Efficiency of license acquisition
	Unit price on a license basis	Annual production volume based on license	Annualized present value of production costs based on the license	Unit price based on our own scientific and technical developments	Annual production volume based on in-house research	Annualized present value of production costs based on in-house research and development	Average bank rate in the country of the licensee	
Symbols and notation	$p_{it}^{л}$	$q_{it}^{л}$	$З_t^{р.л.}$	$p_{it}^{вл}$	$q_{it}^{вл}$	$З_t^{р.вл.}$	r	$E_л$
1	0	0		0	0			
	0	0		0	0			
	0	0	2564688	0	0	306250	0,1	-2258438

Years of license validity	Initial data (by year)							Efficiency of license acquisition
	Unit price on a license basis	Annual production volume based on license	Annualized present value of production costs based on the license	Unit price based on our own scientific and technical developments	Annual production volume based on in-house research	Annualized present value of production costs based on in-house research and development	Average bank rate in the country of the licensee	
2	12000	1500		0	0			
	10000	1430		0	0			
	2000	1550	30164688	0	0	306250	0,1	5037784
3	12000	1500		0	0			
	10000	1430		0	0			
	2000	1550	30164688	0	0	306250	0,1	4579804
4	12000	1500		11200	1600			
	10000	1430		9800	1620			
	2000	1550	30164688	2700	1510	31116250	0,1	-1143079
5	12000	1500		11200	1600			
	10000	1430		9800	1620			
	2000	1550	30164688	2700	1510	31116250	0,1	-1039162
6	12000	1500		11200	1600			
	10000	1430		9800	1620			
	2000	1550	30164688	2700	1510	31116250	0,1	-944693
7	12000	1500		11200	1600			
	10000	1430		9800	1620			
	2000	1550	30164688	2700	1510	31116250	0,1	-858812
8	12000	1500		11200	1600			
	10000	1430		9800	1620			
	2000	1550	30164688	2700	1510	31116250	0,1	-780738
Together	-	-	-	-	-	-	-	2592667

According to the results of Table 12, the purchase of a license, compared to the use of the results of own scientific and technical developments, will increase the profit of the manufacturing enterprise by almost UAH 2593 thousand over eight years (before the transition to a new production technology).

Problem 3. Estimate the economic efficiency of selling a license to three licensees. The initial data for the calculations are given in Table 13.

Table 13

Initial data for calculating the effectiveness of license sales

No. p/n	Indicator.	Licensees		
		first	second	third
1.	License validity period, years	4	3	5
2.	Average annual sales, thousand units.	200,0	400,0	300,0
3.	Forecasted fluctuation in demand relative to average annual sales, %. - first year - second year - third year - fourth year - fifth year	 100 120 110 70	 100 130 70 -	 90 125 130 10055
4.	Projected average annual unit price, UAH	25,0	22,0	20,0
5.	Percentage of deductions from revenue in favor of the licensor, %.	9	9	9
6.	Average bank rate in the license holder's country, fraction of one	0,1	0,1	0,1
7.	Licensor's expenses for the preparation and sale of a license, UAH thousand	20,0	14,0	14,0

Solution.

The economic efficiency of the sale of a license for the entire period of the license agreement is determined by formula (7):

$$E_{л} = \sum_{j=1}^{M} B_j^{л} \cdot k_{в} - \sum_{t=1}^{T} \frac{З_t^{ппл}}{(1+r)^{t-1}} \qquad (7)$$

where.

$B_j^{л}$ - is the revenue to the licensor for the *j-th* licensee, monetary units;

$k_{в}$ - currency conversion rate in accordance with domestic prices for the licensed products (if the licensee and licensor are residents of Ukraine, $k_{в} = 1$);

M - number of possible licensees

T - planned duration of the license agreement, years;

$З_t^{ппл}$ - is the licensor's expenses in year *t* for the preparation and sale of the license, UAH;

r - average bank rate in the license holder's country (discount rate), fraction of one

In a situation where the object of the license is a new product that has not been produced by the licensee before, the licensor's revenue can be determined using formula (8):

$$B_j^{л} = \sum_{t=1}^{T} \frac{p_{tj}^{л} \cdot q_{tj}^{л}}{(1+r)^{t-1}} \cdot L_t^{л} \qquad (8)$$

where.

$p_{tj}^{л}$ - is the price of a unit produced by the *jth* licensee in year *t, in* monetary units;

$q_{tj}^{л}$ - is the annual output of products by the *j-th* licensee in the t-th year, units;

r - average bank rate in the license holder's country (discount rate), fraction of one

T - Planned duration of the license agreement, years

$L_t^{л}$ - is a deduction from the licensee's revenue in favour of the licensor in the *t-th* year, a fraction of a unit

To determine the revenue, the licensor must first calculate the annual production volumes of each licensee, as shown in Table 14.

Table 14

Sales of products by licensees by years

Years of license validity	Licensees					
	first		second		third	
	%	thousand units.	%	thousand units.	%	thousand units.
Annual average	100	200	100	400	100	300
1	100	200	100	400	90	270
2	120	240	130	520	125	375
3	110	220	70	280	130	390
4	70	140	0	0	100	300
5	0	0	0	0	55	165

The obtained values allow us to calculate the licensor's revenue using formula (8) (Table 15).

Table 15 clearly demonstrates that the licensor's revenue for the first licensee ($B_1^{л}$) will be slightly less than UAH 1,587 thousand, for the second ($B_2^{л}$) it will exceed UAH 2,186 thousand, and for the third ($B_3^{л}$) it will be more than UAH 2,188 thousand.

The economic efficiency of the license sale (by year) can be calculated using formula (7) (Table 16). In Table 16, the column $B_j^{л}$ shows the total revenue to the licensor for all licensees. The value of $k_в$ is assumed to be 1.00, since the unit price in hryvnias suggests that the licensees are residents of Ukraine.

The licensor's expenses for the preparation and sale of the license will be incurred once (in the first year). Since all licensees are residents of a single country, Table 16 shows the total amount of the relevant costs for all licensees.

Table 15

Calculation of revenue to the licensor by licensees

Years of license validity	Initial data (by year)				Revenue to the licensor
	Unit price of the product	Annual production volume	Average bank rate in the license holder's country	Deductions by the licensee in favor of the licensor	
Symbols and notation	$p_{tj}^{л}$	$q_{tj}^{л}$	r	$L_t^{л}$	$B_j^{л}$
	The first license holder				
1	25	200000	0,1	0,09	450000,0
2	25	240000	0,1	0,09	490909,1
3	25	220000	0,1	0,09	409090,9
4	25	140000	0,1	0,09	236664,2
5	0	0	0,1	0	0
Total for the first licensee					1586664,2
	The second license holder				
1	22	400000	0,1	0,09	792000,0
2	22	520000	0,1	0,09	936000,0
3	22	280000	0,1	0,09	458181,8
4	0	0	0,1	0	0
5	0	0	0,1	0	0
Total for the second licensee					2186181,8
	The third licensee				
1	20	270000	0,1	0,09	486000,0
2	20	375000	0,1	0,09	613636,4
3	20	390000	0,1	0,09	580165,3
4	20	300000	0,1	0,09	405710,0
5	20	165000	0,1	0,09	202855,0
Total for the third licensee					2288366,7

The calculations showed that the total economic efficiency (additional profit) of the license sale for all years of the license agreements with the three licensees will amount to more than UAH 6,061 thousand

Table 16

Cost-effectiveness for the licensor

Years of license validity	Initial data (by year)				Efficiency of license sales
	Revenue to the licensor	Currency conversion rate	Costs of preparing and selling a license	Average bank rate in the license holder's country	
Symbols and notation	$B_j^л$	$k_в$	$З_t^{ппл.}$	r	$E_л$
1	1728000	1,0	48	0,1	1727952
2	2040545	1,0	0	0,1	2040545
3	1447438	1,0	0	0,1	1447438
4	642374	1,0	0	0,1	642374
5	202855	1,0	0	0,1	202855
Together	6061213	-	-	-	6061165

Problem 4. A foreign company has expressed its intention to acquire a license for a new contact welding method for pipes with a diameter of 720-1220 mm developed by a Ukrainian company.

A preliminary study of the conditions for applying the new technology and related costs has shown that the volume of welding work performed on the above-mentioned pipes can be up to 24,000 joints per year, with additional capital investment in the development of the new welding method of approximately USD 500 thousand, and operating cost savings (additional profit) per joint of USD 75.

The new welding technology can be mastered by the licensee within one year. It is assumed that the license agreement will be valid for 10 years.

According to foreign sources, the amount of possible remuneration for patented technology varies between 23-35%, and therefore can be taken at the average level of 29% of the licensee's total revenue.

The total present value costs of preparing and selling the license, according to preliminary estimates of the Ukrainian company, will not exceed UAH 800 thousand

Estimate the efficiency of the license sale, assuming an average bank rate in Ukraine of 17% and a conversion rate of 8.0.

Solution.

The economic efficiency of selling a license for the entire period of the license agreement is determined by formula (7). Some differences in solving this problem are that the object of this license agreement is a production technology. In this case, the licensor's revenue is calculated using formula (9):

$$B^{л} = \sum_{t=1}^{T} \frac{p_t^{л} \cdot \Delta q_t^{л} - \Delta C_t - \Delta K_t}{(1+r)^{t-1}} \cdot L_t^{л} \qquad (9)$$

where.

$p_t^{л}$ - is the price of a unit of the licensee's products (services) in the *t-th* year, UAH;

$\Delta q_t^{л}$ - is the increase in the volume of production (provision of services) by the licensee in the *t-th* year, units;

ΔC_t - is the change in the amount of the licensee's current expenses in the *t-th* year, UAH;

ΔK_t - is the change in the amount of the licensee's capital expenditures in the *t-th* year, UAH;

r - the average bank rate in the licensor's country (discount rate), a fraction of one;

T - planned duration of the license agreement, years;

$L_t^{л}$ is a deduction from the licensee's revenue in favor of the licensor in the *t-th* year, a fraction of one.

The calculation of the licensor's revenue based on the task data is presented in Table 17.

Table 17 takes into account that the potential licensee has already carried out similar work (using a different technology); no increase in the volume of welding work is expected ($\Delta q_t^{л} = 0$), so the price of welding one joint ($p_t^{л}$) is not provided (assumed to be UAH 0).

The change in the amount of current (ΔC_t) expenses should be reflected in Table 17 with a negative sign, as it demonstrates their savings (reduction).

Since the new technology will be introduced within one year, the additional capital costs (ΔK_t) will also be incurred only in the first year. The additional capital costs are shown in Table 17 with a positive sign (an increase).

The calculation showed that the licensor's total revenue would be more than USD 2,700 thousand, with its distribution over the years being uneven as a result of discounting the current annual amount.

The economic efficiency of selling a license for the expected ten years of the license agreement is determined in Table 18 (using formula (7)).

Table 17

Calculation of the licensor's revenue by years, UAH

Years of license validity	Initial data (by year)								Licensor's revenue
	Unit price of services	Increase in the volume of services provided	Calculation of changes in the amount of current expenses			Change in capital expenditure	Average bank rate	Deductions by the licensee in favor of the licensor	
			Change in running costs per joint	Total amount of welding work	Change in the amount of current expenses				
Symbols and notation	$p_t^л$	$\Delta q_t^л$	$\Delta c_t^л$	$q_t^л$	ΔC_t	ΔK_t	r	$L_t^л$	$B^л$
1	0	0	-75	24000	-1800000	500000	0,17	0,29	377000,0
2	0	0	-75	24000	-1800000	0	0,17	0,29	446153,8
3	0	0	-75	24000	-1800000	0	0,17	0,29	381328,1
4	0	0	-75	24000	-1800000	0	0,17	0,29	325921,4
5	0	0	-75	24000	-1800000	0	0,17	0,29	278565,3
6	0	0	-75	24000	-1800000	0	0,17	0,29	238090,0
7	0	0	-75	24000	-1800000	0	0,17	0,29	203495,7
8	0	0	-75	24000	-1800000	0	0,17	0,29	173928,0
9	0	0	-75	24000	-1800000	0	0,17	0,29	148656,4
10	0	0	-75	24000	-1800000	0	0,17	0,29	127056,8
Together	-	-	-	-	-	-	-	-	2700195,5

Table 18

Economic efficiency of the licensor

Years of license validity	Initial data (by year)				Efficiency of license sales
	Licensor's revenue	Currency conversion rate	Costs of preparing and selling a license	Average bank rate	
Symbols and notation	$B^л$	$k_в$	$З_t^{ппл.}$	r	$E_л$
1	377000,0	8,0	800000	0,17	2216000
2	446153,8	8,0	0	0,17	3569231
3	381328,1	8,0	0	0,17	3050625
4	325921,4	8,0	0	0,17	2607371
5	278565,3	8,0	0	0,17	2228523
6	238090,0	8,0	0	0,17	1904720

Years of license validity	Initial data (by year)				Efficiency of license sales
	Licensor's revenue	Currency conversion rate	Costs of preparing and selling a license	Average bank rate	
7	203495,7	8,0	0	0,17	1627966
8	173928,0	8,0	0	0,17	1391424
9	148656,4	8,0	0	0,17	1189251
10	127056,8	8,0	0	0,17	1016454
Together	2700195,5	-	-	-	20801565

In Table 18, the costs of preparing and selling a license are included only in the first year, as they can only be incurred before the license is transferred to the licensee.

The calculations showed that the total economic effect of the Ukrainian enterprise over the expected 10 years of the license agreement will amount to more than UAH 20,801.5 thousand (taking into account changes in the value of money over time).

3. CRITERIA FOR ASSESSING THE TEST WORK

After receiving the assignment, the student completes the test using the recommended methodology. In case of any questions or problems with writing the paper, the student seeks advice from the teacher according to the teacher's consultation schedule.

The finished test work must be uploaded to the moodle platform in the appropriate block. The deadline for completing the work is specified in the deadline settings on the moodle platform.

The test is considered to be passed if the calculation is correct.

Works that are not accepted for review or returned for revision are not accepted:

– are not fully implemented;

– were made with gross errors;

– issued without complying with the requirements;

– are not performed independently or do not correspond to the given option (in this case, the student is offered a new option).

When checking a test paper, the teacher makes comments on each item to which an incomplete answer is given or errors are made. The student, having received an

unsatisfactory grade, must correct the errors and respond to the teacher's comments, after which the work is resubmitted.

4. LIST OF REFERENCES

1. Ivanova K.V. Improving the management of the innovation potential of industrial enterprises on the basis of harmonization [Text] : monograph / Ivanova K.V., Ovechkina O.A., Dolzhansky I.Z. ; Higher Educational Institution; Makiivka Economic and Humanitarian Institute. - Donetsk : Knowlidge, Donetsk publishing house, 2012. - 272 c.
2. Ivanova K.V. Economics and organization of innovation activity. Methodical instructions for the implementation of control works (for students of the training direction 6.030504 "Enterprise Economics") / Technological Institute of V. Dahl East Ukrainian National University (Sievierodonetsk), 2013. 83 p.

APPENDIX A

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

VOLODYMYR DAHL EAST UKRAINIAN NATIONAL UNIVERSITY

Faculty of Economics and Management

Department of Economics and Entrepreneurship

Control work
in the discipline

INNOVATIVE PROPERTY AND COMMERCIALIZATION SCIENTIFIC RESEARCH

Option ___.

Group _____

Applicant

_____

20__/20__ academic year

APPENDIX B

Options for control work

Option 1

To assess the economic efficiency of acquiring a foreign license for a new technology for the production of a biologically active additive by a domestic pharmaceutical company (technology A). As a basis for comparison, take another technology for the production of the same biologically active additive based on the results of the company's own scientific and technical developments (technology B).

Equipment for the new technology must be purchased in the licensor's country. It is estimated that in five years any of the above technologies will become obsolete and must be replaced by a more advanced one. The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Technology	
		А	Б
1.	Annual output, kg.	480	430
2.	Start of serial production, year	2-й	3-й
3.	Cost price per kg of product, UAH	1950	2100
4.	Upper price limit for 1 kg of product, UAH	4800	4800
5.	Expenditure on license acquisition, thousand euros	100	-
6.	Cost of imported equipment, thousand euros	40	-
7.	Currency conversion rate to domestic prices	40,7	-
8.	Capital expenditures during the first year required to start production under the license, UAH thousand	120	-
9.	Expenditures on in-house R&D, UAH thousand: - first year of development; - second year of development	 - -	 900 180
10.	Expenditures on capital construction and equipment for the production of products based on own developments, UAH thousand - second year	 -	 120
11.	Average bank rate in Ukraine in the reporting year, fraction of one	0,17	0,17

Option 2

Evaluate the economic efficiency of acquiring a foreign license for the production technology of product A, intended for sale in three market segments C1, C2, C3 at different prices. Along with the license, the licensor supplies the necessary equipment.

An alternative solution is to produce product B to meet the same consumer needs. The price of the product in the respective market segments and other inputs to the

calculation are given in the table.

According to the forecast, products A and B will be in demand over the next 6 years.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Products.	
		A	Б
1.	Annual output, pcs. - for the C1 market segment - for the C2 market segment - for the C3 market segment	 500 2000 1200	 1600 800 1300
2.	Start of serial production, year	3-й	4-й
3.	Unit cost of production, UAH	710	720
4.	Upper limit of the unit price, UAH: - in the C1 market segment - in the C2 market segment - in the C3 market segment	 900 940 920	 900 940 920
5.	Expenditure on license acquisition, thousand euros	66	-
6.	Cost of imported equipment, thousand euros	70	-
7.	Currency conversion rate to domestic prices	40,7	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - the first year of construction; - second year of construction	 160 100	 - -
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 140 200
10.	Expenditures on capital construction and equipment for the production of products based on domestic developments, UAH thousand - third year	 -	 260
11.	Average bank rate in Ukraine, fraction of one	0,14	0,14

Option 3

Estimate the economic efficiency of selling a license to three foreign licensees. The initial data for the calculations are given in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Licensees		
		first	second	third
1.	License validity period, years	4	3	5
2.	Average annual sales volume, thousand units.	30,0	40,0	20,0
3.	Forecasted fluctuation in demand relative to the average annual sales volume, %. - first year - second year - third year - fourth year	 160 130 70	 140 100 60	 150 130 100

No. p/n	Indicator.	Licensees		
		first	second	third
	- fifth year	40 -	- -	70 50
4.	Projected average annual unit price, EUR	200	210	250
5.	Currency conversion rate	40	40	40
6.	Percentage of deductions from revenue in favor of the licensor, %.	1	1	1
7.	Average bank rate in Ukraine, fraction of one	0,18	0,18	0,18
8.	Licensor's expenses for the preparation and sale of a license, UAH thousand	20,0	60,0	50,0

Option 4

Evaluate the economic efficiency of a domestic licensor's sale of a production technology license that will allow a foreign licensee to improve its own production of product A.

The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Meaning.
1.	License validity period, years	5
2.	Projected additional average annual production and sales of product A, units.	500000
3.	Projected average annual unit price, EUR	15
4.	Amount of savings in the licensee's annual operating costs, thousand euros	60
5.	Additional capital investments of the licensee related to the improvement of production of product A, thousand euros	200
6.	Percentage of deductions from revenue in favor of the licensor, %.	1,0
7.	Currency conversion rate	40,7
8.	Average bank rate in Ukraine, fraction of one	0,16
9.	Licensor's expenses for the preparation and sale of a license, UAH thousand	600

Option 5

Determine the annual profit from the production of a new item of labor (material) on the basis of an industrial property object using the initial data provided.

Table.

Initial data for calculating the efficiency of the use of an industrial property object

Indicator.	Year	
	basic	estimated
Material price, thousand UAH/kg thousand USD /kg	- 4	40 -
Currency conversion rate	-	36,75
Material consumption per unit of output, kg	32	27
Current production costs, thousand UAH/year	80000	88000
Capital expenditure on production, thousand UAH/year	92000	100800

Indicator.	Year	
	basic	estimated
Duration of the new subject of work, years	-	5
Production volume, tones per year	400	420

Option 6

To evaluate the economic efficiency of a domestic industrial enterprise acquiring a license from a foreign licensor for the technology of restoring the anticorrosive coating on the inner surface of chemical equipment (technology A). In addition, the licensor supplies special equipment. Technology B, which can be developed by the company's R&D department, can be used as a basis for comparison.

Forecast estimates show that the maximum period of application of any of these technologies is six years. The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Technology	
		A	Б
1.	Annual volume of anti-corrosion work and orders	15	16
2.	Start of order fulfilment, year	2-й	3-й
3.	Cost per order, UAH	28000	30000
4.	Upper limit of the price of one order, UAH	50000	50000
5.	Expenditure on license acquisition, thousand euros	40,3	-
6.	Cost of imported equipment, thousand euros	10	-
7.	Currency conversion rate to domestic prices	40,7	-
8.	Expenditures on domestic equipment for the production of products under license, UAH thousand: - first year	60	-
9.	Expenditures on in-house R&D, UAH thousand: - first year of development; - second year of development	-	200 20
10.	Expenditures on equipment for the production of products based on in-house developments, UAH thousand: - second year	-	380
11.	Average bank rate in Ukraine as of the reporting year, fraction of one	0,18	0,18

Option 7

Evaluate the economic efficiency of acquiring a foreign license and the necessary equipment for the production of product A, intended for sale in three market segments C1, C2, C3. If the license is cancelled, it is possible to produce and sell product B on market segments C1, C2, C3. According to forecast estimates, products A and B will be in demand over the next 6 years.

The price of products in the relevant market segments and other inputs for the calculations are shown in the table below.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Products.	
		А	Б
1.	Annual output, pcs. - for the C1 market segment - for the C2 market segment - for the C3 market segment	 450 480 420	 450 460 440
2.	Start of serial production, year	3-й	4-й
3.	Unit cost of production, UAH	950	960
4.	Upper limit of the unit price, UAH: - in the C1 market segment - in the C2 market segment - in the C3 market segment	 1600 1900 1800	 1800 1600 1900
5.	Expenditure on license acquisition, thousand euros	50	-
6.	Cost of imported equipment, thousand euros	30	-
7.	Currency conversion rate to domestic prices	40,7	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - the first year of construction; - second year of construction	 260 740	 - -
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 80 100
10.	Expenditures on capital construction and equipment for the production of products based on domestic developments, UAH thousand - third year	 -	 600
11.	Average bank rate in Ukraine, fraction of one	0,15	0,15

Option 8

Estimate the economic efficiency of selling a license to three foreign licensees. The initial data for the calculations are given in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Licensees		
		first	second	third
1.	License validity period, years	5	5	2
2.	Average annual sales volume, thousand units.	20,0	40,0	30,0
3.	Forecasted fluctuation in demand relative to the average annual annual sales volume, %. - first year - second year - third year - fourth year	 180 160 110	 170 140 100	 150 50 -

	- fifth year	30 20	60 30	- -
4.	Projected average annual unit price, EUR	50	30	40
5.	Currency conversion rate	40,7	40,7	40,7
6.	Percentage of deductions from revenue in favor of the licensor, %.	2	2	2
7.	Average bank rate in Ukraine, fraction of one	0,17	0,17	0,17
8.	Licensor's expenses for the preparation and sale of a license, UAH thousand	80,0	70,0	35,0

Option 9

Evaluate the economic efficiency of a domestic licensor's sale of a production technology license that will allow a foreign licensee to improve its own production of product A.

The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Meaning.
1.	License validity period, years	6
2.	Projected additional average annual production and sales of product A, units.	5000
3.	Projected average annual unit price, EUR	2000,0
4.	Amount of savings in the licensee's annual operating costs, thousand euros	180
5.	Additional capital investments by the licensee related to the improvement of production of product A, thousand euros	120
6.	Percentage of deductions from revenue in favor of the licensor, %.	2
7.	Currency conversion rate	40,7
8.	Average bank rate in Ukraine, fraction of one	0,15
9.	Licensor's expenses for the preparation and sale of a license, UAH thousand	300

Option 10

Determine the annual profit from the production of a new item of labor (material) on the basis of an industrial property object using the initial data provided.

Table.

Initial data for calculating the efficiency of the facility industrial property

Indicator.	Year	
	basic	estimated
Material price, thousand UAH/kg thousand USD/kg	- 4	50 -
Currency conversion rate	-	36,75
Material consumption per unit of output, kg	45	46
Current production costs, thousand UAH/year	79000	80000
Capital expenditure on production, thousand UAH/year	100000	100800

Duration of the new subject of work, years	-	5
Production volume, tones per year	400	420

Option 11

Estimate the economic efficiency of acquiring a foreign license for industrial technology A and the corresponding equipment by a domestic enterprise. Take the domestic technology B as the basis for comparison.

According to the forecast, in 8 years, an alternative technology will appear on the market, which will lead to the abandonment of technologies A and B. The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Technology	
		А	Б
1.	Annual production volume, m ^{3}	20000	20500
2.	Start of production, year	3-й	4-й
3.	Unit cost of production, UAH	180	190
4.	Upper limit of product price, UAH	260	260
5.	Expenditure on license acquisition, thousand euros	300	-
6.	Cost of imported equipment, thousand euros	60	-
7.	Currency conversion rate to domestic prices	40,7	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - the first year of construction; - second year of construction	 600 400	
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 1300 1000
10.	Expenditures on capital construction and equipment for the production of products based on domestic developments, UAH thousand - third year	 -	 1500
11.	Average bank rate in Ukraine in the reporting year, fraction of one	0,15	0,15

Option 12

Evaluate the economic efficiency of acquiring a foreign license and equipment for the production of product A, intended for sale in two market segments C1, C2. Along with the license, the licensor supplies the necessary equipment. An alternative solution is to produce product B for sale in the same markets. The price of the product in the respective market segments and other initial data for the calculations are shown in the table. It is estimated that products A and B will be in demand for the next 6 years.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Products.	
		A	Б
1.	Annual output, units. - for the C1 market segment - for the C2 market segment	 6000 8000	 7000 6500
2.	Start of serial production, year	3-й	4-й
3.	Unit cost of production, UAH	1500	1600
4.	Upper limit of the unit price, UAH: - in the C1 market segment - in the C2 market segment	 1800 1700	 1700 1800
5.	Expenditure on license acquisition, thousand euros	170	-
6.	Cost of imported equipment, thousand euros	130	-
7.	Currency conversion rate to domestic prices	40,7	-
8.	Expenditures on domestic equipment for the production of products under license, UAH thousand: - the first year of construction; - second year of construction	 80 100	 - -
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 700 500
10.	Expenditures on equipment for the production of products based on domestic developments, UAH thousand: - third year	 -	 600
11.	Average bank rate in Ukraine, fraction of one	0,17	0,17

Option 13

Estimate the economic efficiency of selling a license to three foreign licensees. The initial data for the calculations are given in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Licensees		
		first	second	third
1.	License validity period, years	5	6	4
2.	Average annual sales volume, thousand units.	130,0	140,0	100,0
3.	Forecasted fluctuation in demand relative to the average annual sales volume, %. - first year - second year - third year - fourth year - fifth year - sixth year	 170 140 100 60 30 -	 180 150 120 80 50 20	 150 100 100 50 - -
4.	Projected average annual unit price, EUR	20	30	50
5.	Currency conversion rate	40,7	40,7	40,7
6.	Percentage of deductions from revenue in favor of the licensor, %.	1	1	1
7.	Average bank rate in Ukraine, fraction of one	0,16	0,16	0,16

No. p/n	Indicator.	Licensees		
		first	second	third
8.	Licensor's expenses for the preparation and sale of a license, UAH thousand	50,0	70,0	40,0

Option 14

Evaluate the economic efficiency of a domestic licensor's sale of a production technology license that will allow a foreign licensee to improve its own production of product A.

The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Meaning.
1.	License validity period, years	5
2.	Projected additional average annual production and sales of product A, units.	1300
3.	Projected average annual unit price, EUR	2000,0
4.	Amount of savings in the licensee's annual operating costs, thousand euros	70
5.	Additional capital investments of the licensee related to the improvement of production of product A, thousand euros	200
6.	Percentage of deductions from revenue in favor of the licensor, %.	1
7.	Currency conversion rate	40,7
8.	Average bank rate in Ukraine, fraction of one	0,17
9.	Licensor's expenses for the preparation and sale of a license, UAH thousand	200

Option 15

Determine the annual profit from the production of a new item of labor (material) on the basis of an industrial property object using the initial data provided.

Table.

Initial data for calculating the efficiency of the facility industrial property

Indicator.	Year	
	basic	estimated
Material price, thousand UAH/kg thousand USD /kg	- 3	40 -
Currency conversion rate	-	36,75
Material consumption per unit of output, kg	32	27
Current production costs, thousand UAH/year	90000	88000
Capital expenditure on production, thousand UAH/year	92000	91800
Duration of the new subject of work, years	-	4
Production volume, tonnes per year	700	750

Option 16

Evaluate the economic efficiency of acquiring a license for a foreign technology for production purposes (technology A). In addition to the license, the licensor provides the necessary equipment. A domestic technology B for a similar purpose can be used as a basis for comparison. In 6 years, technology C is expected to appear on the market, which can completely replace technologies A and B. The initial data for the calculations are given in the table.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Technology	
		A	Б
1.	Annual output, units.	8100	8000
2.	Start of serial production, year	2-й	3-й
3.	Unit cost of production, UAH	700	720
4.	Upper limit of the unit price, UAH	920	920
5.	Expenditure on license acquisition, thousand euros	280	-
6.	Cost of imported equipment, thousand euros	80	-
7.	Currency conversion rate to domestic prices	10,7	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - first year of construction	 1000	
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 1400 900
10.	Expenditures on capital construction and equipment for for the production of products based on domestic technology, UAH thousand: - second year	 -	 1500
11.	Average bank rate in Ukraine, fraction of one	0,16	0,16

Option 17

The management of a domestic enterprise considers the feasibility of introducing the production of innovative products with subsequent sales in market segments C1, C2, C3. If the company acquires a foreign license (the licensor also supplies production equipment), it will produce product A. A slightly different domestic technology will allow it to produce product B, which is similar in most respects to product A and can replace it on the market.

According to the forecast, products A and B will be in demand over the next 7 years.

You need to assess the cost-effectiveness of acquiring a license based on the data

in the table.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Products	
		A	Б
1.	Annual output, pcs. - for the C1 market segment - for the C2 market segment - for the C3 market segment	 50000 48000 65000	 60000 45000 58000
2.	Start of serial production, year	3-й	4-й
3.	Unit cost of production, UAH	150	150
4.	Upper limit of the unit price, UAH: - in the C1 market segment - in the C2 market segment - in the C3 market segment	 250 200 300	 200 300 250
5.	Expenditure on license acquisition, thousand euros	100	-
6.	Cost of imported equipment, thousand euros	30	-
7.	Currency conversion rate to domestic prices	10,7	-
8.	Expenditure on capital construction and domestic equipment to manufacture products under license, UAH thousand: - the first year of construction; - second year of construction	 160 120	 - -
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 400 500
10.	Expenditures on capital construction and equipment for for the production of products based on domestic developments, UAH thousand: - third year	 -	 600
11.	Average bank rate in Ukraine, fraction of one	0,16	0,16

Option 18

Estimate the economic efficiency of selling a license to three foreign licensees. The initial data for the calculations are given in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Licensees		
		first	second	third
1.	License validity period, years	4	4	5
2.	Average annual sales volume, thousand units.	10,0	10,0	15,0
3.	Forecasted fluctuation in demand relative to the average annual volume sales of products, %. - first year - second year - third year - fourth year - fifth year	 170 135 65 30 -	 180 120 80 20 -	 190 160 100 40 10
4.	Projected average annual unit price, EUR	2,60	2,80	2,50
5.	Currency conversion rate	10,7	10,7	10,7
6.	Percentage of deductions from revenue in favour of the licensor, %.	1,5	1,5	1,5

7.	Average bank rate in Ukraine, fraction of one	0,15	0,15	0,15
8.	Licensor's expenses for the preparation and sale of a license, UAH thousand	20	20	30

Option 19

Evaluate the economic efficiency of a domestic licensor's sale of a production technology license that will allow a foreign licensee to improve its own production of product A.

The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Meaning.
1.	License validity period, years	6
2.	Projected additional average annual production and sales of product A, units.	1250
3.	Projected average annual unit price, EUR	2100,0
4.	Amount of savings in the licensee's annual operating costs, thousand euros	70
5.	Additional capital investments of the licensee related to the improvement of production of product A, thousand euros	300
6.	Percentage of deductions from revenue in favor of the licensor, %.	0,8
7.	Currency conversion rate	10,7
8.	Average bank rate in Ukraine, fraction of one	0,17
9.	Licensor's expenses for the preparation and sale of a license, UAH thousand	205

Option 20

Determine the annual profit from the production of a new item of labor (material) on the basis of an industrial property object using the initial data provided.

Table.

Initial data for calculating the efficiency of the use of an industrial property object

Indicator.	Year	
	basic	estimated
Material price, thousand UAH/kg thousand USD /kg	- 5	60 -
Currency conversion rate	-	10,7
Material consumption per unit of output, kg	32	27
Current production costs, thousand UAH/year	60000	65000
Capital expenditure on production, thousand UAH/year	95000	90200
Duration of the new subject of work, years	-	5
Production volume, tonnes per year	450	450

Option 21

Estimate the economic efficiency of selling a license to three foreign licensees. The initial data for the calculations are given in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Licensees		
		first	second	third
1.	License validity period, years	5	5	2
2.	Average annual sales volume, thousand units.	20,0	30,0	50,0
3.	Forecasted fluctuation in demand relative to the average annual sales volume, %. - first year - second year - third year - fourth year - fifth year	 180 150 110 50 20	 180 140 100 60 20	 140 60 - - -
4.	Projected average annual unit price, EUR	50	60	40
5.	Currency conversion rate	10,7	10,7	10,7
6.	Percentage of deductions from revenue in favor of the licensor, %.	2	2	2
7.	Average bank rate in Ukraine, fraction of one	0,17	0,17	0,17
8.	Licensor's expenses for the preparation and sale of a license, UAH thousand	80,0	90,0	35,0

Option 22

Evaluate the economic efficiency of acquiring a license for a foreign technology for production purposes (technology A). In addition to the license, the licensor provides the necessary equipment. A domestic technology B for a similar purpose can be used as a basis for comparison.

In 6 years, technology C is expected to appear on the market, which may completely replace technologies A and B.

The initial data for the calculations are shown in the table below

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Technology	
		A	Б
1.	Annual output, units.	5800	6000
2.	Start of serial production, year	2-й	3-й
3.	Unit cost of production, UAH	690	710
4.	Upper limit of the unit price, UAH	920	920
5.	Expenditure on license acquisition, thousand euros	250	-
6.	Cost of imported equipment, thousand euros	90	-
7.	Currency conversion rate to domestic prices	10,7	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - first year of construction	 900	
9.	Expenditures on domestic R&D, UAH thousand:		

No. p/n	Indicator.	Technology	
		А	Б
	- first year of development; - second year of development	- -	1500 900
10.	Expenditures on capital construction and equipment for the production of products based on domestic technology, UAH thousand: - second year	 -	 1400
11.	Average bank rate in Ukraine, fraction of one	0,16	0,16

Option 23

Evaluate the economic efficiency of acquiring a foreign license and equipment for the production of product A, intended for sale in two market segments C1, C2. Along with the license, the licensor supplies the necessary equipment.

An alternative solution is to produce product B for sale in the same markets. The price of the product in the respective market segments and other inputs to the calculation are given in the table.

According to the forecast, products A and B will be in demand over the next 6 years.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Products.	
		А	Б
1.	Annual output, units. - for the C1 market segment - for the C2 market segment	 7000 8000	 7500 8500
2.	Start of serial production, year	4-й	2-й
3.	Unit cost of production, UAH	1300	1350
4.	Upper limit of the unit price, UAH: - in the C1 market segment - in the C2 market segment	 1450 1480	 1500 1510
5.	Expenditure on license acquisition, thousand euros	180	-
6.	Cost of imported equipment, thousand euros	110	-
7.	Currency conversion rate to domestic prices	10,7	-
8.	Expenditures on domestic equipment for production under license, UAH thousand: - the first year of construction; - second year of construction	 60 120	 - -
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 650 700
10.	Expenditure on equipment for the production of products based on based on domestic developments, UAH thousand: - third year	 -	 600
11.	Average bank rate in Ukraine, fraction of one	0,17	0,17

Option 24

Determine the annual profit from the production of a new item of labor (material)

on the basis of an industrial property object using the initial data provided.

Table.

Initial data for calculating the efficiency of the facility industrial property

Indicator.	Year	
	basic	estimated
Material price, thousand UAH/kg thousand USD/kg	- 6	80 -
Currency conversion rate	-	10,7
Material consumption per unit of output, kg	18	15
Current production costs, thousand UAH/year	90000	92000
Capital expenditure on production, thousand UAH/year	900000	1000800
Duration of the new subject of work, years	-	4
Production volume, tonnes per year	700	720

Option 25

Evaluate the economic efficiency of a domestic licensor's sale of a production technology license that will allow a foreign licensee to improve its own production of product A.

The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of license sales

No. p/n	Indicator.	Meaning.
1.	License validity period, years	4
2.	Projected additional average annual production and sales of product A, units.	205000
3.	Projected average annual unit price, EUR	15
4.	Amount of savings in the licensee's annual operating costs, thousand euros	50
5.	Additional capital investments of the licensee related to the improvement of production of product A, thousand euros	200
6.	Percentage of deductions from revenue in favor of the licensor, %.	1,0
7.	Currency conversion rate	10,7
8.	Average bank rate in Ukraine, fraction of one	0,16
9.	Licensor's expenses for the preparation and sale of a license, UAH thousand	550

Option 26

Determine the annual profit from the production of a new item of labor (material) on the basis of an industrial property object using the initial data provided.

Table.

Initial data for calculating the efficiency of the use of an industrial property object

Indicator.	Year	
	basic	estimated
Material price, thousand UAH/kg	-	100

Indicator.	Year	
	basic	estimated
thousand USD/kg	9	-
Currency conversion rate	-	10,7
Material consumption per unit of output, kg	35	20
Current production costs, thousand UAH/year	90000	88000
Capital expenditure on production, thousand UAH/year	290000	300000
Duration of the new subject of work, years	-	5
Production volume, tones per year	400	440

Option 27

Evaluate the economic efficiency of acquiring a license for a foreign technology for production purposes (technology A). In addition to the license, the licensor provides the necessary equipment. A domestic technology B for a similar purpose can be used as a basis for comparison.

In 6 years, technology C is expected to appear on the market, which may completely replace technologies A and B.

The initial data for the calculations are shown in the table below

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Technology	
		А	Б
1.	Annual volume of anti-corrosion work and orders	18	16
2.	Start of order fulfilment, year	2-й	3-й
3.	Cost per order, UAH	28000	35000
4.	Upper limit of the price of one order, UAH	50000	50000
5.	Expenditure on license acquisition, thousand euros	35	-
6.	Cost of imported equipment, thousand euros	15	-
7.	Currency conversion rate to domestic prices	10,7	-
8.	Expenditures on domestic equipment for production of products under license, UAH thousand: - first year	80	-
9.	Expenditures on in-house R&D, UAH thousand: - first year of development; - second year of development	-	200 20
10.	Expenditures on equipment for the production of products based on in-house developments, UAH thousand: - second year	-	420
11.	Average bank rate in Ukraine as of the reporting year, fraction of one	0,18	0,18

Option 28

Evaluate the economic efficiency of acquiring a foreign license and the necessary equipment for the production of product A, intended for sale in three market segments

C1, C2, C3. If the license is cancelled, it is possible to produce and sell product B on market segments C1, C2, C3. According to forecast estimates, products A and B will be in demand over the next 6 years.

The price of products in the relevant market segments and other inputs for the calculations are shown in the table below.

Table.

Initial data for calculating the effectiveness of license acquisition

No. p/n	Indicator.	Products.	
		A	Б
1.	Annual output, pcs. - for the C1 market segment - for the C2 market segment - for the C3 market segment	 490 480 450	 450 460 440
2.	Start of serial production, year	3-й	5-й
3.	Unit cost of production, UAH	950	970
4.	Upper limit of the unit price, UAH: - in the C1 market segment - in the C2 market segment - in the C3 market segment	 1700 1600 1700	 1800 1650 1900
5.	Expenditure on license acquisition, thousand euros	20	-
6.	Cost of imported equipment, thousand euros	40	-
7.	Currency conversion rate to domestic prices	10,7	-
8.	Expenditures on capital construction and domestic equipment for the production of products under license, UAH thousand: - the first year of construction; - second year of construction	 280 710	 - -
9.	Expenditures on domestic R&D, UAH thousand: - first year of development; - second year of development	 - -	 70 110
10.	Expenditures on capital construction and equipment for production of products based on domestic developments, UAH thousand: - third year	 -	 500
11.	Average bank rate in Ukraine, fraction of one	0,15	0,15

Option 29

Estimate the economic efficiency of selling a license to three foreign licensees. The initial data for the calculations are given in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Licensees		
		first	second	third
1.	License validity period, years	5	6	3
2.	Average annual sales volume, thousand units.	120,0	170,0	100,0
3.	Forecasted fluctuation in demand relative to the average annual sales volume, %. - first year - second year - third year - fourth year - fifth year - sixth year	 190 140 100 60 10 -	 180 170 120 80 30 20	 180 100 20 - - -
4.	Projected average annual unit price, EUR	20	30	50
5.	Currency conversion rate	10,7	10,7	10,7
6.	Percentage of deductions from revenue in favor of the licensor, %.	1	1	1
7.	Average bank rate in Ukraine, fraction of one	0,16	0,16	0,16
8.	Licensor's expenses for the preparation and sale of a license, UAH thousand	30,0	70,0	40,0

Option 30

Evaluate the economic efficiency of a domestic licensor's sale of a production technology license that will allow a foreign licensee to improve its own production of product A.

The initial data for the calculations are shown in the table.

Table.

Initial data for calculating the effectiveness of the license sale

No. p/n	Indicator.	Meaning.
1.	License validity period, years	6
2.	Projected additional average annual production and sales of product A, units.	25000
3.	Projected average annual unit price, EUR	2000,0
4.	Amount of savings in the licensee's annual operating costs, thousand euros	170
5.	Additional capital investments of the licensee related to the improvement of production of product A, thousand euros	420
6.	Percentage of deductions from revenue in favor of the licensor, %.	2
7.	Currency conversion rate	10,7
8.	Average bank rate in Ukraine, fraction of one	0,15
9.	Licensor's expenses for the preparation and sale of a license, UAH thousand	250

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Compilers:

Kseniia Serebriak
Olha Maslosh

Редактор
Техн. редактор О.В. Маслош
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імені Володимира Даля

Адреса видавництва: вул. Іоанна Павла II, 17
Тел.+38(050)218 04 78, факс (06452) 4 03 42
e-mail: vidavnictvoSNU.ua@gmail.com