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Students' Department

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AMERICAN INSTITUTE EXAMINATIONS

(NOTE.—The fact that these answers appear in THE JOURNAL OF ACCOUNTANCY should not cause the reader to assume that they are the official answers of the board of examiners. They represent merely the opinions of the editor of the *Students' Department.*)

EXAMINATION IN ACCOUNTING THEORY AND PRACTICE—PART I
May 15, 1930, 1 P. M. to 6 P. M.

The candidate must answer the first four questions and one other question.

No. 4 (20 points):

You are engaged by a firm of attorneys to advise and aid in a general reorganization of their offices, with particular reference to accounting procedure, cost, etc.

Upon investigation you find that it has been the practice to keep a chronological record of hours spent upon each undertaking and, upon completion of a matter, to bill the client from this record, taking into consideration preëstablished minimum rates per hour for the various partners and attorneys, the nature of the work, etc.

The operations of the firm as a whole result in a profit, but no attempt beyond rough estimates has ever been made to determine the cost per hour to the firm of each member of the staff. Further investigation leads you to believe that much individual work is done at less than cost.

You discuss the situation with the firm members and you are requested to prepare for their consideration a comparative table showing the direct, overhead and total costs per hour to the firm of each partner and attorney, in comparison with the minimum billing rates in effect.

From the above information and the following data, construct the required table, bearing in mind the fact that the partners wish the accounting system, which you are about to install, to provide for recording the direct cost of available time, sickness, holidays and other non-chargeable time.

(a) The three partners are actively engaged in the practice of law.
(b) The legal staff, including the partners, numbers nine, and may be designated by numbers in your solution, numbers 1 to 3 being the partners.
(c) The normal working year per man is conceded to be 1,981 hours and 181 hours per annum are considered a reasonable allowance per man for all non-chargeable time.
(d) The partners draw $1,000 each per month which they consider as salary. The annual salaries of the members of the legal staff are:

Number 4	—$5,400	Number 7	—$3,600
" 5	— 4,800	" 8	— 3,600
" 6	— 4,200	" 9	— 2,400

(e) The minimum billing rates per hour are: Numbers 1, 2 and 3, $10; Number 4, $7.50; Number 5, $6.50; Number 6, $4.50 and Numbers 7, 8 and 9, $3.
(f) The firm's actual expenses for the year under review (exclusive of partners' drawings) were as follows:

Salaries:	
Legal staff	$24,000.00
Stenographers	15,641.00
Others	8,155.00
	$47,796.00

Rent	18,301.00
Stationery and supplies	3,730.51
Telephone and telegraph	3,101.15
Depreciation	2,514.63
Miscellaneous expenses	3,066.98
	$78,510.27

Solution:

From the information given in the problem it seems that the overhead is more or less relative and should be distributed upon a basis of (1) relative minimum billing rates, or (2) relative salaries received by the partners and the members of the staff. It may be reasonably assumed that the partners will have available for their particular work the most capable stenographers (stenographers' salaries); that their offices (rent) will be large and will be located in the most desirable space; that their equipment (depreciation) will be more costly; and that most of the "miscellaneous" expense will be incurred by them.

The total overhead for the year amounted to $54,510.27 as shown below:

Stenographers	$15,641.00
Other salaries	8,155.00
Rent	18,301.00
Stationery and supplies	3,730.51
Telephone and telegraph	3,101.15
Depreciation	2,514.63
Miscellaneous expense	3,066.98
Total	$54,510.27

The salaries of the partners and the members of the staff total $60,000.00 of which—

Chargeable time is 1800/1981 of $60,000.00 or	$54,517.92
and non-chargeable time is 181/1981 of $60,000.00 or	5,482.08
Total	$60,000.00

For practical purposes, the overhead of $54,510.27 may be considered as being 100% of the productive salaries of the partners and members of the staff and is so treated in the comparative table on the following page.

No. 5 (15 points):

The stock transactions following were made by A:

Jan. 5, 1926	Purchased 300 shares of X Corporation for $3,000.
Sept. 1, 1927	Twenty per cent. stock dividend received.
Feb. 1, 1928	Purchased 100 additional shares of X Corporation for $6,800.
Jan. 1, 1929	Twenty-five per cent. stock dividend received.
Jan. 2, 1930	Stockholders of record, on this date, were entitled to purchase one (1) additional share of stock for $50 for every five (5) shares held, option expiring February 2, 1930. 300 rights sold for $3 each. 125 shares of X Corporation sold for $10,000.
Feb. 1, 1930	Exercised option on remaining rights. Market value of stock was $90.

NAME OF FIRM

Comparative table showing direct, overhead, and total costs per hour of partners and attorneys in comparison with the minimum billing rates in effect

Hourly basis

Staff members:	Total salaries paid	Productive salaries	Non-productive salaries	Overhead	Total cost	Billing rate in effect	Excess of cost over billing rate in effect
Partners—							
1	$12,000.00	$ 6.06	$ .61	$ 6.06	$12.73	$10.00	$2.73
2	12,000.00	6.06	.61	6.06	12.73	10.00	2.73
3	12,000.00	6.06	.61	6.06	12.73	10.00	2.73
Attorneys—							
4	5,400.00	2.73	.27	2.73	5.73	7.50	1.77*
5	4,800.00	2.42	.24	2.42	5.08	6.50	1.42*
6	4,200.00	2.12	.21	2.12	4.45	4.50	.05*
7	3,600.00	1.82	.18	1.82	3.82	3.00	.82
8	3,600.00	1.82	.18	1.82	3.82	3.00	.82
9	2,400.00	1.21	.12	1.21	2.54	3.00	.46*
Total	$60,000.00	$30.30	$3.03	$30.30	$63.63	$57.50	$6.13

NOTE.—The cost per hour of productive salaries was obtained by dividing the annual salary paid by 1981 hours.

The cost per hour of non-productive time was obtained by multiplying the salary charge per hour by the fraction $\frac{\text{181 (non-chargeable hours)}}{\text{1800 (chargeable hours)}}$ or approximately 10%.

The overhead cost per hour is 100% of the cost per hour of productive salaries.

You are requested to ascertain (a) the profit on the sale of rights, (b) profit on sale of stock and (c) cost of remaining stock held, as required by the federal tax regulations.

NOTE.—Make your computations to the nearest cent, disregarding extended decimal figures.

Solution:

The present income-tax regulations provide that the cost of the stock is to be divided between the stock and the rights in proportion to their relative market values. On January 2, 1930, the date on which the stockholders of record were entitled to the right to purchase additional stock, the market value of the stock and the rights was determined by the sale of 300 rights at $3.00 each and 125 shares of stock for $10,000.00 or $80.00 per share. The division of the cost of the stock between the stock and the rights follows:

		First lot		*Second lot*	
	Market value	Amount	Per share or right	Amount	Per share or right
Stock	$80.00	$2,891.57	$6.42571	$6,554.22	$52.43376
Rights	3.00	108.43	.24096	245.78	1.96624
Total	$83.00	$3,000.00	$6.66667	$6,800.00	$54.40000

As only two lots of the stock of X Corporation were held, and as the number of shares sold, i. e., 125 shares, was the amount held in the second lot, it may be assumed that the shares sold can be identified as having been those of the second lot. On that assumption the taxable profit on the sale of the stock would be—

Selling price of 125 shares sold	$10,000.00
Cost applicable to the shares sold (second lot)	6,554.22
Taxable profit on sale of stock	$ 3,445.78

If it is assumed that the 125 rights of the second lot were included in the sale of 300 rights, the taxable profit on the rights would be—

Selling price of 300 rights		$900.00
Cost applicable to rights sold—		
125 at $1.96624 or	$245.78	
175 at .24096 or	42.17	287.95
Taxable profit on sale of rights		$612.05

The cost of the remaining stock held as required by the federal tax regulations is determined as follows:

Rights received	575
Rights sold	300
Rights exercised	275

As one additional share of stock could be purchased for $50.00 for every five rights held, A purchased, on February 2, 1930—

55 shares (275÷5) at $50.00 for		$2,750.00
to which should be added the value of the rights exercised—		
275 × $.24096		66.26
Cost of new stock purchased		$2,816.26

The value of the 450 shares of the first purchase is—

Cost of stock		$3,000.00
Deduct—		
Value of rights sold	$42.17	
Value of rights exercised	66.26	
Total value of rights		108.43
Value of 450 shares held		$2,891.57

The foregoing solution was based on the assumption that the stock sold and the rights sold and exercised could be identified. However, if it were impossible to identify these lots, it would be necessary to proceed on the theory of "first in—first out."

The allocation of the cost of the stock to the stock and the rights in proportion to their market values would not be affected, but a considerable increase in the taxable income would arise if the stock sold was of the first lot acquired.

Selling price of 125 shares sold	$10,000.00
Cost applicable to the shares sold (125 × $6.42571)	803.21
Taxable profit on sale of stock	$ 9,196.79

The taxable profit on the rights sold, assuming that these could not be identified, would be—

Selling price of 300 rights	$ 900.00
Cost applicable to rights sold—300 at $.24096	72.29
Taxable profit on sale of rights	$ 827.71

The cost of the remaining stock held would be—

First lot—		
Originally held	450 shares	
Sold	125 shares	
On hand	325 shares at $6.42571 per share	$2,088.36
Second lot—		
125 shares at $52.43376 per share		$6,554.22
New stock purchased—		
55 shares at $50.00 per share		$2,750.00

Add—value of rights exercised—		
150 rights of first lot at $.24096	$ 36.14	
125 rights of second lot at $1.96624	245.78	281.92
Total cost of new stock purchased		$3,031.92

A statement of the transactions appears on page 152.

No. 6 (15 points):

An individual inherits a one-sixth royalty in coal lands, estimated to contain 188,160,000 tons of coal. The property is leased on a royalty basis of 25 cents per ton, payable annually, and it is expected that the coal will be extracted in equal amounts annually over a period of 40 years.

Calculating interest at 6 per cent., what is the individual's interest in the property?

Six million tons of coal were mined during the first year.

What proportion of the royalty received should be treated as income and what as return of capital?

Given $(1.06)^{40} = 10.285718$.

Solution:

The individual's interest in the property is the present value of annual royalties to be received by the individual. The amount of the annual royalty to be paid the individual, based upon the assumption that the coal will be extracted in equal amounts annually, is—

Estimated amount of coal contained in coal lands	188,160,000 tons
Royalty, per ton	25 cents
Total royalties receivable during 40 years	$47,040,000
Annual royalty	1,176,000
One-sixth interest in annual royalty	196,000

The amount of 1 for 40 periods at 6% is given as 10.285718.

The present value is, therefore, $1 \div 10.285718$ or .097222187.

Compound discount is $1 - .097222187$ or .902777813.

The present value of an ordinary annuity of 1 is $.902777813 \div .06$ or 15.0462969.

The present value of an ordinary annuity of $196,000 for 40 periods at 6% is $\$196{,}000 \times 15.0462969$ or $2,949,074.19 which is the value of the individual's inheritance.

The second part of the problem requires the proportion of income and return of capital in the royalty received on the six million tons of coal mined during the first year. If the production for the year had been as estimated, i. e., 4,704,000 tons, the royalty received would have been divided as follows:

Value of individual's inheritance	$2,949,074.19

Royalty received	$196,000.00
6% of value of inheritance (income)	176,944.45
Return of capital	$ 19,055.55

However, the actual annual production in the future can not be known, and estimates must be used. As the value of the inheritance is set at $2,949,074.19, Statement of transactions by "A" in the capital stock and rights of the X Corporation for the period January 5, 1926, to February 1, 1930

		First lot						*Second lot*					
		Stock			Rights			Stock			Rights		
Date	Particulars	Quantity	Per Share	Amount	Quantity	Per right	Amount	Quantity	Per share	Amount	Quantity	Per right	Amount
Jan. 5, 1926	Purchase..................	300	$10.00000	$3,000.00									
Sept. 1, 1927	Stock dividend (20%)......	60											
	Total...................	360	$ 8.33333	$3,000.00									
Feb. 1, 1928	Purchase..................							100	$68.00000	$6,800.00			
Jan. 1, 1929	Stock dividend (25%)......	90						25					
	Total...................	450	$ 6.66667	$3,000.00				125	$54.40000	$6,800.00			
Jan. 2, 1930	Stockholders of record, on this date, were entitled to purchase one (1) additional share of stock for $50.00 for every five (5) shares held..			*108.43*	450	$ .24096	$108.43			*245.78*	125	$1.96624	$245.78
	Total...................	450	$ 6.42571	$2,891.57	450	$ .24096	$108.43	125	$52.43376	$6,554.22	125	$1.96624	$245.78
	Rights sold (300)...........				175	.24096	42.17				125	1.96624	245.78
	Balance.................	450	$ 6.42571	$2,891.57	275	$ .24096	$ 66.26	125	$52.43376	$6,554.22			
	Stock sold (125)...........							125	52.43376	6,554.22			
Feb. 1, 1930	Exercised option on remaining rights, purchasing 55 new shares at $50.00 per share..	55	$50.00000	$2,750.00									
	Transfer value of 275 rights exercised................			66.26	*275*	*.24096*	*66.26*						
	Value of new stock.........	55	$51.20473	$2,816.26									
	Value of stock remaining....	505	$11.30263	$5,707.83									

the value per ton of the coal in place is $2,949,074.19 divided by 31,360,000 tons or $.094039 per ton. The income for the first year based upon the actual production of 1,000,000 tons will show—

	Per ton	1,000,000 tons
Royalty received	$ .25	$250,000.00
Value	.094039	94,039.00
Income	$ .155961	$155,961.00

NEW YORK ACCOUNTING EXAMINATION

This department has been requested to solve the following problem set by the accounting examiners of the University of the State of New York on November 11, 1929:

A chemical company manufactures two products from the same ingredients, viz: every 2,000 pounds of raw material produces 1,000 pounds of product "a" and 800 pounds of product "b" of which latter product, however, 50% is waste and unsalable. The plant is divided into the following three departments:

Raw-material department,
  Grinding and mixing.
Conversion department "A,"
  Converting product "a" into salable form.
Conversion department "B,"
  Converting product "b" into salable form.

The raw materials consumed in the raw-material department amounted to 2,000,000 pounds and cost 8¢ per pound. The departmental expenses are as follows:

Expenses	Raw material dept.	Conversion dept. "A"	Conversion dept. "B"
Labor	$ 70,000	$ 75,000	$25,000
Heat, light, and power	15,000	18,000	9,000
Depreciation	2,500	15,000	17,000
Machinery maintenance	3,500	12,000	12,000
Rent	16,000	20,000	9,000
Insurance	3,000	5,000	8,000
Departmental expense	10,000	15,000	12,000
Total	$120,000	$160,000	$92,000

The selling and administrative expenses applicable to both products amount to 20% of their cost. Product "a" sells for 60¢ per pound, less discounts of 25% and 10%. Product "b" sells for 70¢ per pound, less 10% discount. Figure the margin of profit on each product, setting forth the result in an appropriate statement such as would be required by the operating officials of the company.

Solution:

As every 2,000 pounds of raw material produces 1,000 pounds of product "a" and 800 pounds of product "b," the cost of the raw material used, the labor and other expenses of the raw-material department should be distributed to departments "A" and "B" on the basis of 1,000/1,800 and 800/1,800 respectively.

A CHEMICAL COMPANY
Computation of cost of production by departments
for the period from . . . to . . .

	Raw-material department			Conversion department "A"			Conversion department "B"		
	Pounds	Amount	Cost per pound	Pounds	Amount	Cost per pound	Pounds	Amount	Cost per pound
Raw materials consumed	2,000,000	$160,000.00	$.08000						
Labor		70,000.00	.03500						
Manufacturing expenses:									
Heat, light, and power		15,000.00	.00750						
Depreciation		2,500.00	.00125						
Machinery maintenance		3,500.00	.00175						
Rent		16,000.00	.00800						
Insurance		3,000.00	.00150						
Departmental expense		10,000.00	.00500						
Total manufacturing expenses		$ 50,000.00	$.02500						
Cost of grinding and mixing	2,000,000	$280,000.00	$.14000						
Distributed to:									
Conversion department "A"	1,000,000	$155,555.55	$.15555	1,000,000	$155,555.55	$.15555			
Conversion department "B"	800,000	124,444.45	.15555				800,000	$124,444.45	$.15555
Total produced	1,800,000	$280,000.00	.15555						
Labor					75,000.00	.07500		25,000.00	.03125
Manufacturing expenses:									
Heat, light, and power					18,000.00	.01800		9,000.00	.01125
Depreciation					15,000.00	.01500		17,000.00	.02125
Machinery maintenance					12,000.00	.01200		12,000.00	.01500
Rent					20,000.00	.02000		9,000.00	.01125
Insurance					5,000.00	.00500		8,000.00	.01000
Departmental expense					15,000.00	.01500		12,000.00	.01500
Total manufacturing expenses					$ 85,000.00	$.08500		$ 67,000.00	$.08375
Total				1,000,000	$315,555.55	$.31555	800,000	$216,444.45	$.27055
Less—waste and unsalable product							400,000		
Cost of production				1,000,000	$315,555.55	$.31555	400,000	$216,444.45	$.54111

A CHEMICAL COMPANY

Statement of operations by products for the period from . . . to . . .

	Product "A" (1,000,000 pounds) Amount	Per pound	Per Cent.	Product "B" (400,000 pounds) Amount	Per pound	Per Cent
Selling price	$600,000.00	$.60000		$280,000.00	$.70000	
Less—discount 25%	150,000.00	.15000				
	$450,000.00	$.45000				
Less—discount 10%	45,000.00	.04500		28,000.00	.07000	
Net selling price	$405,000.00	$.40500	100.00%	$252,000.00	$.63000	100.00%
Cost of production	315,555.55	.31555	77.92	216,444.45	.54111	85.89
Gross profit	$89,444.45	$.08945	22.08%	$ 35,555.55	$.08889	14.11%
Selling and administrative expenses (20% of cost of production)	63,111.11	.06311	15.58	43,288.89	.10822	17.18
Net profit or loss *	$ 26,333.34	$.02634	6.50%	$ 7,733.34*	$.01933*	3.07%