Mock Test Papers (MTP)

Dear Student Friends,

ICAI had released two new MTP's in December, 2021 on ICAI website. As usual, most of the questions are repetitive in nature with just a change in Company's name. Hence, to avoid the duplication of work, I have excluded the repeat questions and included only new questions with answers here.

Summary of October, 2021 - Mock Test Paper

MTP Q. No.	Reference of similar Question from our classroom notes
1	Covered in Version 4 Classroom Notes / Volume III PM / Q.3/4 [Earlier Name : BA Airlines]
2	Covered in Version 4 Classroom Notes / Volume I / Q.15/158
3	Covered in Version 4 Classroom Notes / Volume IV PM / Q.14/58 [Earlier Name : Active Multinational Ltd.]
4(a)	Covered in Version 4 Classroom Notes / Volume IV PM / Q.9/182 [Earlier Name : Automation Ltd.]
4(b)	Covered in Version 4 Classroom Notes / Volume III PM / Q.1/69
4(c)	Covered in Version 4 Classroom Notes / Volume II / Q.8/123 [Earlier Name : XYZ Electronics Ltd.]
5(a)	Covered in Version 4 Classroom Notes / Volume I / Q.6/77 [Earlier Name : Revolution Ltd.]
5(b)	Covered in Version 4 Classroom Notes / Volume II / Q.8/168
6(a)	It is a new question, hence it is covered below with answer
6(b)	Covered in Version 4 Classroom Notes / Volume II / Q.54/253 [Earlier Name : Queensland Chemicals]

Question 6(a) : [10 Marks]

Chemp. X Ltd. is a chemical manufacturing company. It has received a special project that needs to be completely executed within 3 months from the time it is accepted. The management has to communicate its acceptance or rejection of the project within few days. They have approached you, the management accountant to work out the costing for this project. Following is the information available :

1. Financing :

   The company would require a short-term overdraft of ₹ 5,00,000 immediately in order to execute the project. Bank charges an interest of 10% per annum on this overdraft. This overdraft facility would be needed for the duration of the project, that is 3 months and would be repaid in full at the end of the period.

2. Materials :

   Chemp. X Ltd. has a stock of inventory of 5,000 kg on hand that is not of immediate use. It can be sold as scrap in the market at ₹ 250 per kg. The special project requires 3,000 kg. of this inventory which can be replaced at the current market price of ₹ 300 per kg.

3. Labour :

(a) All skilled workers currently work full time in their respective departments, there are no idle hours. For this special project, 5 workers would be needed from other departments. They would totally devote 2,000 hours of labour time to this project. The cost of labour per hour ₹ 300. Since their working hours have been diverted to this project, the production in the other departments cannot be met. Hence, the company would incur a loss of contribution of ₹ 1,00,000 for these 2,000 hours. Alternatively, the company can outsource the labour for this special project at a total cost of ₹ 6,25,000. The management will opt for the more cost-effective option as the quality of both in-house manufacturing and outsourcing is the same.

(b) Overtime payment to inspection supervisor, who checks the final products would be ₹ 25,000. This would be incurred irrespective of whether the labour is in-house or outsourced.

4. Machine X-2.1”

   This project would require the use of an existing machine X-2.1”. Depreciation of X-2.1” is ₹ 40,000 per annum. The variable operating cost of X-2.1” for the three-month period would be ₹ 3,00,000. At present, X-2.1” is operating at full capacity. By diverting it exclusively for the special project would cost the company a loss of contribution of ₹ 1,00,000 for the three-month period.

5. Administration overheads include apportionment cost of ₹ 25,000 and an incremental cost (incurred specifically due to the acceptance of the project) of ₹ 10,000.

6. Total revenue that the company can earn from the project is ₹ 20,00,000.

Required :

COMMENT whether the special project should be accepted or not. Also give a complete ANALYSIS of the special project cost based on the principles of relevant costing.

Answer 6(a) :

Special Project - Relevant Cost :

Item of Cost	Working / Reference	Amount (₹)
Project financing : Interest on overdraft	Interest @ 10% on ₹ 5,00,000 for 3 months **(Refer note 1)** [10% x ₹ 5,00,000 x 3 / 12]	12,500
Materials	**(Refer note 2)** [3,000 kg. **x** ₹ 250]	7,50,000
Labour		
(a) Outsourced labour cost	**(Refer note 3)**	6,25,000
(b) Overtime paid to inspection supervisor	**(Refer note 4)**	25,000
Machine X-2.1" cost	**(Refer note 5)**	
(a) Operating cost of machinery for special project	Given	3,00,000
(b) Opportunity cost of diverting X-2.1" machine	Contribution lost for 3 months	1,00,000
Administration overheads	Incremental cost **(Refer note 6)**	10,000
Total cost for accepting the project		**18,22,500**

Comment : Revenue to be earned from the project is ₹ 20,00,000 while the relevant cost of accepting the project would be ₹ 18,22,500. The project can yield an incremental profit of ₹ 1,77,500. Therefore, the special project should be accepted.

Notes :

Note 1 : Project financing for 3 months through overdraft of ₹ 5,00,000 at interest of 10% per annum.

This is a relevant cost since it is an incremental cost to be incurred only if the project is accepted. The incremental cost is the interest to be paid on the overdraft of ₹ 5,00,000 for 3 months. At the end of three months, the overdraft will be repaid in full, therefore there will be no further incremental cost.

Note 2 : Material cost

The company already has material of 5,000 kg. in its inventory. This a sunk cost that has already been incurred. Materials requirement for this project is 3,000 kg. which can be sourced from the current inventory of 5,000 kg. This material could have been sold as scrap at ₹ 250 per kg. However, since 3,000 kg. of this material can be used for this project, the sale proceeds from the scrap sale of 3,000 kg would be the opportunity cost that has to be accounted for. This is the cash inflow forgone if the project is accepted.

Replacement cost of 3,000 kg at ₹ 300 per kg would be irrelevant, because there is no need to buy this material, it is already in inventory. Also the material has no further immediate use, so there is no need to replace it.

Note 3 : Labour cost – cost of in-house production vs. cost of outsourcing the work for the project.

Five skilled workers from other departments would need to devote 2,000 hours for this project. They are paid at ₹ 300 per hour. They are fully working in their respective departments and are not idle. The cost of labour of these 5 workers for a total of 2,000 hours @ ₹ 300 per hour would be a relevant cost for the project i.e. ₹ 6,00,000.

To this, the loss of contribution of ₹ 1,00,000 for diverting the skilled workers' hours for the project represents an opportunity cost that is also a relevant cost. This is the revenue forgone if the project is undertaken.

Thus, the total labour cost for in house production

= cost of skilled workers + contribution lost (opportunity cost)

= ₹ 6,00,000 + ₹ 1,00,000 = ₹ 7,00,000

The cost of outsourcing the work for this project is ₹ 6,25,000. Since the quality of work is the same under both options it is cost effective to outsource the labour for this special project. Therefore, the relevant cost for the special project is ₹ 6,25,000.

Note 4 : Overtime paid to inspection supervisor

Overtime paid to inspection supervisor specially for this project is an incremental cost, hence it is a relevant cost.

Note 5 : Machine X-2.1"

The variable operating cost of X-2.1" ₹ 3,00,000 is an incremental cost, hence relevant cost.

The depreciation of ₹ 40,000 per annum on it is a sunk cost and hence not relevant.

The machine X-2.1" works at full capacity, with no idle time. Hence the contribution loss of ₹ 1,00,000 for the three-month period due to this diversion will be an opportunity cost that has to be accounted for. This is revenue forgone if the project is accepted is relevant.

Note 6 : Administrative overhead

Allocation of administrative overhead of ₹ 25,000 is not a relevant cost since this is a common cost or sunk cost already incurred. Incremental administrative cost of ₹ 10,000 incurred specifically for the project is a relevant cost and hence has to be accounted for.

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Summary of November, 2021 - Mock Test Paper

MTP Q. No.	Reference of similar Question from our classroom notes
1	Covered in Version 4 Classroom Notes / Volume V / Q.14/50
2	Covered in Version 4 Classroom Notes / Volume II / Q.3/9 [Earlier Name : BYD Alloy Ltd.]
3	Covered in Version 4 Classroom Notes / Volume I / Q.6/132 [Earlier Name : Storewell Industries Ltd.]
4(a)	Covered in Version 4 Classroom Notes / Volume I / Q.50/215 [Earlier Name : Mr. 'S']
4(b)	Covered in Version 4 Classroom Notes / Volume IV / Q.9/182 [Earlier Name : Automation Ltd.]
4(c)	It is a new question, hence it is covered below with answer
5(a)	Covered in Version 4 Classroom Notes / Volume III / Q.27/130
5(b)	Covered in Version 4 Classroom Notes / Volume II / Q.56/255 [Earlier Name : NZSCO Ltd. - Earlier figures were double]
6(a)	It is a new question, hence it is covered below with answer
6(b)	Covered in Version 4 Classroom Notes / Volume IV / Q.1/89 [Earlier Name : SPM]

Question 4(c) : [10 Marks]

'Xu' and 'Yu' are two divisions of the Shenzhen group. The 'Xu' division manufactures electrical components which it sells to other divisions and external customers.

The 'Yu' division has designed a new product, Product B, and has asked 'Xu' to supply the electrical component, Component A, that is needed in the new product. This will be a completely new style of component. Each unit of Product B will require one Component A. This component will not be sold by 'Xu' to external customers. 'Xu' has quoted a transfer price to 'Yu' of ₹ 180 for each unit of Component A.

It is policy of the Shenzhen group to reward managers based on their individual division's return on capital employed.

Details of the monthly production for each division are as follows :

'Xu' Division

Output	Component A will be produced in batches of 1,000 units. The maximum capacity is 6,000 components per month.
Variable Cost	₹ 60 per component
Fixed Costs	₹ 2,00,000 (these are incurred specifically to produce Component A)

'Yu' Division

Output	Product B will be produced in batches of 1,000 units. The maximum customer demand is 6,000 units of Product B per month.
Variable Cost	₹ 36 per unit, excluding the cost of Component A
Fixed Costs	₹ 3,00,000 (these are incurred specifically to produce Component B)

The relationship between monthly customer demand and the selling price of Product B is shown below :

Demand	Selling Price per unit (₹)
1,000 units	480
2,000 units	440
3,000 units	400
4,000 units	360
5,000 units	320
6,000 units	268

Required :

(i) CALCULATE based on a transfer price of ₹ 180 per Component A, the monthly profit that would be earned as a result of selling Product B by : 'Xu' division, 'Yu' division, Shenzhen group. (5 Marks)

(ii) CALCULATE the maximum monthly profit from the sale of Product B for the Shenzhen group at all possible sales prices. (5 Marks)

Answer 4(c) :

(i) Analysis at various Sales Prices :

Based on a transfer price of ₹ 180 per component, the total variable cost per unit of Product B will be (180 + 36) = ₹ 216. Profit of 'Yu' Division :

Demand	Selling Price (₹)	Variable Cost (₹)	Contribution Per unit (₹)	Total Contribution (₹)
1,000 units	480	216	264	2,64,000
2,000 units	440	216	224	4,48,000
3,000 units	400	216	184	5,52,000
4,000 units	360	216	144	**5,76,000**
5,000 units	320	216	104	5,20,000
6,000 units	268	216	52	3,12,000

Decision : 'Yu' will produce 4,000 units of Product B to earn maximum profit and will therefore order only 4,000 units of Component A from 'Xu'. The profitability statement below is prepared for sale of 4,000 units only.

Particulars	Xu (₹)	Yu (₹)	Group (₹)
Revenue	7,20,000 [4,000 x 180]	14,40,000 [4,000 x 360]	14,40,000 [4,000 x 360]
Less: Variable Costs	2,40,000 [4,000 x 60]	8,64,000 [4,000 x 216]	3,84,000 [4,000 x 96]
Less: Fixed Costs	2,00,000	3,00,000	5,00,000
Profit	2,80,000	2,76,000	5,56,000

(ii) The situation for the entire should be judged using the total marginal costs for the entire group. This will give a variable cost per Product unit of B of ₹ 96 (60 + 36).

Demand	Selling Price (₹)	Variable Cost (₹)	Contribution (₹)	Total Contribution (₹)
1,000 units	480	96	384	3,84,000
2,000 units	440	96	344	6,88,000
3,000 units	400	96	304	9,12,000
4,000 units	360	96	264	10,56,000
5,000 units	320	96	224	**11,20,000**
6,000 units	268	96	172	10,32,000

The profit maximizing output for the group is 5,000 units of Product B. This will earn a total monthly profit for the Shenzhen Group of ₹ 6,20,000 (₹ 11,20,000 - ₹ 5,00,000 FC).

Question 6(a) :

Great Eastern Appliances Ltd. (GEAL) manufactures consumer durable products in a **very highly competitive market**. GEAL is considering launching a new product "Kitchen Care' into the market and gathered the following data :

Expected Market Price.....₹ 5,000 per unit

Direct Material Cost.....₹ 1,850 per unit

Direct Labour Cost.....₹ 80 per hour

Variable Overhead Cost.....₹ 1,000 per unit

Packing Machine Cost (specially to be purchased for this product)..₹ 5,00,000

GEAL expects the selling price for the new product will continue throughout the product's life and a total of 1,000 units can be sold over the entire lifetime of the product.

Direct labour costs expected to reduce as the volume of output increases due to the effects of 80% learning curve (index is -0.3219). The expected time to be taken for the first unit is 30 hours and the learning effect is expected to end after 250 units have been produced. Units produced after first 250 units will take the same time as the 250^{th} unit.

Required :

(i) CALCULATE the expected total labour hours over the life time of the product "Kitchen Care". (3 Marks)

(ii) CALCULATE profitability of product "Kitchen Care" that GEAL will earn over the life time of the product. (3 Marks)

(iii) CALCULATE average target labour cost per unit over the life time of the product if GEAL requires average profit of ₹ 800 per unit, to achieve its long term objectives. (2 Marks)

(iv) Implementation of the target costing technique requires intensive marketing research. Why intensive marketing research is required to implement target costing technique? COMMENT (2 Marks)

Note : $250^{-0.3219} = 0.1691$, $249^{-0.3219} = 0.1693$.

Answer 6(a) :

(i) Calculation of 'Total Labour Hours' over the Life Time of the Product 'Kitchen Care" :

The average time per unit for 250 unit is

$Y_x = a*x^b$

$Y_{250} = 30 \times 250^{-0.3219}$

$Y_{250} = 30 \times 0.1691$

$Y_{250} = 5.073$ hours

Total time for 250 units = 5.073 hours x 250 units

= 1,268.25 hours

The average time per unit for 249 units is

$Y_{249} = 30 \times 249^{-0.3219}$

$Y_{249} = 30 \times 0.1693$

$Y_{249} = 5.079$ hours

Total time for 249 units = 5.079 hours x 249 units

= 1,264.67 hours

Time for 250th unit	=	1,268.25 hours – 1,264.67 hours
	=	3.58 hours
Total Time for 1,000 units	=	(750 units x 3.58 hours) + 1,268.25 hours
	=	3,963.25 hours

(ii) Profitability of the Product "Kitchen Care" for lifetime :

Particulars	Amount (₹)	Amount (₹)
Sales (1,000 units @ ₹ 5,000 per unit)		50,00,000
Less : Direct Material (1,000 units @ ₹ 1,850 per unit)	18,50,000	
Direct Labour (3,953.25 hours x ₹ 80 per hour)	3,16,260	
Variable Overheads (1,000 units x ₹ 1,000)	10,00,000	31,66,260
∴ Contribution		18,33,740
Less : Packing Machine Cost (for lifetime)		5,00,000
∴ Profit over the lifetime of product		13,33,740

(iii) Calculation of average 'Target Labour Cost' per unit :

Particulars	Amount (₹)
Expected Sales Value (as above)	50,00,000
Less : Desired Profit (1,000 units x ₹ 800 per unit)	8,00,000
∴ Target Total Cost	42,00,000
Less : Direct Material (1,000 units x ₹ 1,850)	18,50,000
Variable OH Cost (1,000 units x ₹ 1,000)	10,00,000
Packaging Machine Cost	5,00,000
∴ Target Labour Cost	8,50,000
Average Target Labour Cost per unit (₹ 8,50,000 / 1,000 units)	850

(iv) Target cost is the difference between estimated selling price of a proposed product with specified functionally and quality and the target margin. This is a cost management technique that aims to produce and sell products that will ensure the target margin. It is an integral part of the product design. While designing the product, the company needs to understand what value target customers will assign to different attributes and different aspects of quality. This requires use of techniques like value engineering and value analysis. Intensive marketing research is required to understand customer preferences and the value they assign to each attribute and quality parameter. This insight is required to be developed before the product is introduced. The company plays within the space between the maximum attributes and quality that the company can offer and the minimum acceptable to target customers. Therefore, in absence of intensive marketing research, the target costing technique cannot be used effectively.

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