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Name:

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ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

Course: Cost Accounting (462) • Level: B.COM / Associate Degree

Semester: Autumn 2026

Assignment No. 1 (Units 1–5)

SOLVED ASSIGNMENT GUIDE

(For Study & Reference)

Note: This guide is prepared for study and reference purposes. Students are advised to read the relevant units of the course book and write the assignment in their own words.

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Question 1: Objectives, Advantages and Limitations of Cost Accounting; Techniques of Costing (20 Marks)

Question as printed: (a) What are the objectives of cost accounting? What are its advantages and limitations? (b) Describe the various techniques of costing in detail.

Introduction

Cost accounting is the branch of accounting that records, classifies, analyses and controls the cost of producing goods and services. Financial accounting tells management the overall profit or loss of the business for a period, but it does not tell what it cost to make a particular product, run a particular department or execute a particular order. Cost accounting fills this gap. It developed because growing competition, rising costs and large-scale production made it essential for management to know costs accurately, to control them continuously and to use cost information for pricing and other decisions. This answer first explains the objectives of cost accounting, then its advantages and limitations, and finally describes in detail the various techniques of costing through which these objectives are achieved.

Part (a)(i): Objectives of Cost Accounting

The objectives of cost accounting can be summarised as follows. The first and most basic objective is cost ascertainment, that is, finding out the cost of each product, service, job, process or department by collecting and analysing expenditure under proper heads. The second objective is cost control: by comparing actual cost with predetermined standards or budgets, management can locate wastage, inefficiency and abnormal losses and take corrective action before costs get out of hand. Closely related is the third objective, cost reduction, which means achieving a permanent and real saving in the unit cost of products without lowering their quality, through better methods, materials and utilisation of resources.

The fourth objective is the fixation of selling prices. In competitive markets, and especially for tenders and contracts, prices must be quoted on the basis of reliable cost data, adding a reasonable margin of profit. The fifth objective is providing information for managerial decisions, such as whether to make or buy a component, whether to accept a special order, which product mix is most profitable, whether to replace machinery, and whether to expand or close a line of production. The sixth objective is the determination of profitability of each product, department or activity, so that unprofitable lines can be improved or dropped. A seventh objective is the valuation of inventory: cost accounting provides the cost figures for raw materials, work-in-process and finished goods needed for the preparation of financial statements and for the statement of cost of goods manufactured and sold. Finally, cost accounting aims at helping management in planning and policy formulation, for example by supplying data for budgets, profit planning and the measurement of departmental performance and responsibility.

Part (a)(ii): Advantages of Cost Accounting

A properly installed costing system benefits the firm, its workers, its customers and even the economy in many ways. It discloses the cost of each product and process, so management knows exactly where money is being spent. It helps in price fixation and in quoting for tenders with confidence, because prices rest on facts rather than guesswork. It reveals unprofitable activities, idle time, wastage of materials and inefficient processes, and thus points directly to the places where savings are possible. By setting standards and comparing them with actual results, it measures the efficiency of workers, machines and departments and supports incentive schemes that reward genuine productivity.

Cost accounting also assists inventory control: techniques such as economic order quantity, stock levels and perpetual inventory keep investment in materials at the right level, avoiding both overstocking and stock-outs. It provides a reliable basis for decision-making, including make-or-buy, product-mix and break-even decisions. It helps in controlling and reducing costs, which either increases profit or allows the firm to lower prices and remain competitive. Reliable cost records strengthen the firm's position with banks and governments, support claims in cost-plus contracts, and help management compare performance between periods and with other firms. In short, cost accounting converts raw financial data into an instrument of planning, control and profit improvement.

Part (a)(iii): Limitations of Cost Accounting

Cost accounting nevertheless has limitations that must be kept in mind. First, installing and operating a costing system is expensive: it needs extra staff, forms, records and sometimes software, so it may not suit very small businesses whose scale cannot bear the overhead.

Second, cost accounting lacks uniformity; different firms classify and allocate costs differently, so results are not always comparable, and no single system fits every industry. Third, many allocations of indirect expenses rest on estimates and assumptions, such as the basis chosen for absorbing factory overheads, so ascertained costs are approximations rather than exact figures. Fourth, the system is sometimes duplicative, because much of the data overlaps with financial accounting, increasing clerical work. Fifth, cost accounting is largely historical in its basic form: it reports what cost has already been incurred, and unless combined with standard costing and budgets it does not by itself control the future. Sixth, results can be misused or resisted: workers may see time and motion records as surveillance, and managers may take wrong decisions if they treat cost figures as precise when overhead absorption is arbitrary. Finally, cost accounting cannot by itself guarantee profit; it supplies information, but benefit depends on management acting on it promptly and wisely.

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Part (b): Techniques of Costing

The techniques of costing are the different approaches or devices used to ascertain, present and control costs for different purposes. They should not be confused with the methods of costing (job, batch, process, unit, contract and so on), which depend on the nature of production; techniques can be applied within any method. The principal techniques are described below.

1. Historical (actual) costing. Under this technique, costs are ascertained after they have been incurred. The actual expenditure on materials, labour and overheads is collected and charged to products. It is simple and based on facts, and it is the foundation of most systems, but it

suffers from delay—by the time the cost is known, the production is over—and it gives no yardstick for judging whether the cost incurred was reasonable.

2. Standard costing. A standard cost is a predetermined cost of a product or operation, set on the basis of technical estimates of material quantities, labour time and overhead rates under efficient conditions. Actual costs are compared with standards, and the differences, called variances, are analysed by cause (price, usage, rate, efficiency and so on). Standard costing is thus a powerful technique of cost control: it fixes responsibility, highlights exceptions for management attention and simplifies valuation of work-in-process. Its success depends on standards that are realistic and regularly revised.

3. Marginal costing. Under marginal costing, costs are separated into fixed and variable elements. Only variable (marginal) cost is charged to products, while fixed costs are treated as period costs and written off against the contribution of the period. Contribution—sales minus variable cost—is the key figure. This technique supports break-even analysis and decisions such as product mix, acceptance of special orders, make or buy and pricing in depression, because it shows clearly how profit changes with volume. Its limitation is that, if used alone for pricing in the long run, it may ignore the need to recover fixed costs.

4. Absorption (total) costing. This is the conventional technique in which both fixed and variable manufacturing costs are fully absorbed into the cost of products through overhead absorption rates. It is used for inventory valuation and external reporting because stocks are valued at full factory cost. Its weakness is that unit cost changes with the volume of production chosen as the

denominator, and under- or over-absorbed overhead must be adjusted at the end of the period.

5. Direct costing. In direct costing, only costs that are directly attributable to a product or department—direct material, direct labour and direct expenses, sometimes including directly traceable overheads—are charged to it; common costs are not apportioned arbitrarily. It resembles marginal costing but the dividing line is traceability rather than variability. It is useful for evaluating the genuine profitability of products and segments without distorted allocations.

6. Uniform costing. When several undertakings in the same industry adopt the same costing principles and practices, the technique is called uniform costing. It is usually promoted by a trade association through a uniform costing manual. It improves inter-firm comparison, helps in fixing industry-level prices and supports healthy competition on efficiency rather than on guesswork.

7. Differential and incremental costing. Differential cost is the change in total cost that results from a proposed change in the level or nature of activity—for example, producing an extra batch, adding a product line or changing a process. Only the costs and revenues that differ between alternatives are considered. This technique is tailor-made for short-term decisions such as special orders, make-or-buy and plant replacement, because sunk and common costs that remain unchanged are irrelevant to the choice.

8. Activity-based costing (ABC). A modern development, ABC first accumulates overheads in activity cost pools (such as machine set-ups, inspections and material movements) and then assigns them to products using cost drivers that reflect actual consumption of each activity. It

produces more accurate product costs in factories with diverse products and high overheads, and it also exposes the cost of non-value-adding activities, supporting cost reduction.

Conclusion

To conclude, cost accounting aims at ascertaining, controlling and reducing cost, fixing prices, valuing inventory and guiding managerial decisions. Its advantages—detailed cost knowledge, control over wastage and inefficiency, sound pricing and better decisions—are substantial, but they must be weighed against its limitations of cost, approximation in allocations and dependence on management action. The techniques of costing—historical, standard, marginal, absorption, direct, uniform, differential and activity-based—are complementary tools: a well-designed system normally combines several of them, using historical records for fact, standards for control, and marginal and differential analysis for decisions.

Question 2: Usman & Brothers Corporation — Cost of Goods Manufactured and Sold Statement and Income Statement (20 Marks)

Question as printed: The following data are extracted from the books of Usman & Brothers Corporation for the period ended on 31st December, 2017. You are required to (a) prepare the Cost of Goods Manufactured and Sold Statement and (b) prepare the Income Statement. (Amounts in Rs. "000")

Introduction

This question requires two connected statements. The first statement starts from raw materials and works step by step to the factory cost of the goods completed during the year (cost of goods manufactured) and then, by adjusting finished goods inventories, to the cost of goods sold. The second statement sets the cost of goods sold against sales revenue to obtain gross

profit, and then deducts operating (administrative and selling) expenses to obtain net income. The essential skill tested is correct classification: only manufacturing costs—direct materials, direct labour and factory overheads, adjusted for work-in-process inventories—enter the cost of goods manufactured, while office expenses and advertisement expenses are period costs that belong in the income statement below gross profit.

Working Notes

Working 1: Raw materials used. Opening inventory of raw materials Rs. 76,800 plus purchases Rs. 288,000 gives Rs. 364,800 of materials available; deducting the closing inventory of Rs. 67,200 leaves raw materials consumed of Rs. 297,600 (76,800 + 288,000 − 67,200 = 297,600). Working 2: Total factory overheads. Factory insurance Rs. 18,000 + heat and light costs Rs. 9,600 + depreciation on machinery Rs. 13,200 + factory rent Rs. 24,000 = Rs. 64,800. Working 3: Prime cost. Raw materials used Rs. 297,600 + direct labour Rs. 170,400 = Rs. 468,000. All figures below are in Rs. "000" as printed in the question.

(a) Cost of Goods Manufactured and Sold Statement

Table 1: Usman & Brothers Corporation — Cost of Goods Manufactured and Sold Statement for the year ended 31 December 2017 (Rs. in "000")

Particulars	Rs.	Rs.
Raw materials inventory, 1 January 2017	76,800	
Add: Purchases	288,000	
Raw materials available for use	364,800	
Less: Raw materials inventory, 31 December 2017	(67,200)	
Raw materials used in production		297,600
Add: Direct labour		**170,400**
Prime cost		468,000
Add: Factory overheads:		
Factory insurance	18,000	

Heat and light costs	9,600	
Depreciation on machinery	13,200	
Factory rent	24,000	
Total factory overheads		64,800
Total manufacturing cost incurred		532,800
Add: Work-in-process inventory, 1 January 2017		**60,000**
Less: Work-in-process inventory, 31 December 2017		(57,600)
Cost of goods manufactured		535,200
Add: Finished goods inventory, 1 January 2017		**115,200**
Cost of goods available for sale		650,400
Less: Finished goods inventory, 31 December 2017		(124,800)
Cost of goods sold		**525,600**

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(b) Income Statement

Table 2: Usman & Brothers Corporation — Income Statement for the year ended 31 December 2017 (Rs. in "000")

Particulars	**Rs.**	**Rs.**
Sales		875,400
Less: Cost of goods sold		(525,600)
Gross profit		**349,800**
Less: Operating expenses:		
Office expenses	60,000	
Advertisement expenses	72,000	
Total operating expenses		(132,000)
Net income		**217,800**

Explanation and Checking of the Results

The logic of the first statement can be verified at each stage. Materials used (Rs. 297,600) plus direct labour (Rs. 170,400) gives the prime cost of Rs. 468,000, covering all costs directly traceable to production. Adding factory overheads of Rs. 64,800 gives Rs. 532,800, the

manufacturing cost thrown into production during 2017. Because the work-in-process inventory fell from Rs. 60,000 to Rs. 57,600 during the year, Rs. 2,400 of net inventory was completed and released, so the cost of goods manufactured is Rs. 532,800 + 60,000 − 57,600 = Rs. 535,200. Finished goods inventory rose from Rs. 115,200 to Rs. 124,800, meaning the firm produced Rs. 9,600 more than it sold; hence the cost of goods sold (Rs. 535,200 + 115,200 − 124,800 = Rs. 525,600) is lower than the cost of goods manufactured. In the income statement, gross profit is Rs. 875,400 − 525,600 = Rs. 349,800, and deducting the two operating expenses (office expenses Rs. 60,000 and advertisement expenses Rs. 72,000, totalling Rs. 132,000) gives net income of Rs. 217,800 (all amounts in Rs. "000", i.e. Rs. 217,800,000).

Two classification points deserve emphasis. First, depreciation in this question relates to machinery, a factory asset, so it is a factory overhead and forms part of product cost; had it related to office equipment it would have been an operating expense. Second, advertisement is a selling expense and office expenses are administrative expenses; neither is ever included in the cost of goods manufactured, however much they help the business as a whole. The results also permit simple interpretation: the gross profit margin is 349,800 ÷ 875,400 ≈ 40.0% of sales, and the net profit margin is 217,800 ÷ 875,400 ≈ 24.9% of sales, indicating a comfortably profitable year, although operating expenses consume a large share (about 37.7%) of gross profit, which management may wish to examine.

It is also worth noting why the two statements must not be confused with each other. The cost of goods manufactured and sold statement is an internal cost statement: it is built only from manufacturing data and explains how the factory converted raw materials, labour and factory overheads into finished production during the year. The income statement, by contrast, is a

financial statement addressed to owners and other outside readers: it matches the revenue earned during the year with the cost of the goods actually sold and with the operating expenses of the same period, in accordance with the matching principle. Because finished goods inventory increased during 2017, part of the year's manufacturing cost is stored in the closing inventory on the balance sheet rather than charged against 2017 sales, and it will be charged in 2018 when those goods are sold. Likewise, the fall in work-in-process inventory means that a small part of the cost of goods manufactured in 2017 originated in costs incurred in 2016. Understanding these inventory adjustments is essential, because ignoring opening and closing inventories—a common student error—would overstate or understate both the cost of goods sold and the profit of the year, and would break the agreement between the income statement and the balance sheet.

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Conclusion

In conclusion, the cost of goods manufactured is Rs. 535,200, the cost of goods sold is Rs. 525,600, gross profit is Rs. 349,800 and the net income of Usman & Brothers Corporation for the year ended 31 December 2017 is Rs. 217,800 (all figures in Rs. "000"). The two statements together show both the factory performance of the business and its overall trading result, which is exactly the purpose for which cost accounting information is prepared.

Question 3: Job Order Costing in Service Organisations; Job Cost Sheets of Junaid Garments Firm (10 + 10 Marks)

Question as printed: (a) Several service organizations use the Job Order Costing system. Describe some reasons that support the use of Job Order Costing by such enterprises. (b) Junaid Garments Firm is engaged in two jobs to complete the order of a customer. The cost data of the

two jobs that were in process on January 1, 2015 are: Job No. 250 — Material Rs. 5,000, Direct Labour Rs. 3,000, Overheads cost Rs. 2,000; Job No. 450 — Material Rs. 4,500, Direct Labour Rs. 3,300, Overheads cost Rs. 2,300. Other costs on each job: Material Rs. 10,000, distributed as 3:2 on the jobs; Labour Rs. 6,000 distributed equally on both jobs; and FOH 10% of the wages of direct labour. The number of units manufactured on jobs is 1,000 and 1,200. Required: (1) Calculate total cost and unit cost by preparing a job order cost sheet for each job. (2) Find the selling price if the gross margin is 20% of the cost of manufacturing.

Introduction

Job order costing is the method of costing used where work is performed according to a customer's specific order and each job or order is separately identifiable. Although the method is associated with factories such as printing presses and repair workshops, it is equally—and increasingly—used by service organisations, because professional and personal services are also delivered as distinct engagements for distinct clients. Part (a) explains the reasons that support this use, and part (b) applies the method practically by preparing job cost sheets for the two jobs of Junaid Garments Firm.

Part (a): Why Service Organisations Use Job Order Costing

The first reason is that services are heterogeneous and client-specific. An audit engagement, a court case, a house design, a surgical procedure and an advertising campaign each have a unique scope, so their costs cannot be averaged over identical units the way process costing averages the cost of identical litres or kilograms. Each engagement must be costed on its own, like a job. Second, job order costing supports accurate billing and pricing. Service firms commonly bill clients on a cost-plus basis or must justify fees; a job cost sheet showing

professional time, materials and disbursements, and overhead for that client provides the factual basis for the invoice and for quotations for similar future work. Third, it measures profitability client by client and engagement by engagement. A firm may discover that a prestigious client is actually unprofitable because the engagement consumed far more senior staff time than expected; such insight is impossible if all costs are pooled.

Fourth, job costing provides cost control. Estimated cost can be compared with actual cost on the job cost sheet while the engagement is still in progress, so overruns in hours or expenses are caught early. Fifth, it assists in valuing work-in-progress: at the end of an accounting period, partly completed engagements represent an asset, and job cost sheets give their accumulated cost directly. Sixth, it creates accountability: the partner, manager or supervisor responsible for a job can be identified, and staff time recorded against job numbers through time sheets discourages idle time and misallocation of hours. Seventh, it helps in scheduling and capacity decisions, because records of past jobs show how long similar engagements take and which skills they consume. Finally, in services such as hospitals, vehicle repair and equipment maintenance, government and insurance reimbursements are often job-based, so job records are needed to support claims. For all these reasons, job order costing fits service enterprises naturally: the “job” is simply the client engagement, and professional labour replaces direct labour on the factory floor.

Part (b): Job Order Cost Sheets — Junaid Garments Firm

Working notes. (i) The costs given as at January 1, 2015 are the opening work-in-process balances of the two jobs and are carried into the cost sheets. (ii) The additional material of Rs. 10,000 is distributed in the ratio 3:2, giving Rs. 6,000 to Job No. 250 and Rs. 4,000 to Job No.

450. (iii) The additional labour of Rs. 6,000 is distributed equally, Rs. 3,000 to each job. (iv) Factory overhead (FOH) is 10% of the wages of direct labour incurred on each job, i.e. 10% of Rs. 3,000 = Rs. 300 for each job, and is added to the overhead cost already accumulated.

Table 3: Job Order Cost Sheet — Job No. 250 (Units produced: 1,000)

Cost element	Brought forward (Rs.)	Added during period (Rs.)	Total (Rs.)
Material	5,000	6,000	11,000
Direct labour	3,000	3,000	6,000
Overheads / FOH	2,000	300	2,300
Total cost of the job			**19,300**
Unit cost (19,300 ÷ 1,000 units)			**19.30**

Table 4: Job Order Cost Sheet — Job No. 450 (Units produced: 1,200)

Cost element	Brought forward (Rs.)	Added during period (Rs.)	Total (Rs.)
Material	4,500	4,000	8,500
Direct labour	3,300	3,000	6,300
Overheads / FOH	2,300	300	2,600
Total cost of the job			**17,400**
Unit cost (17,400 ÷ 1,200 units)			**14.50**

Selling Price (Gross Margin 20% of Cost of Manufacturing)

Gross margin is 20% of the cost of manufacturing, so the selling price equals total cost plus 20% of total cost. For Job No. 250: margin = 20% × 19,300 = Rs. 3,860; total selling price = 19,300 + 3,860 = Rs. 23,160 for 1,000 units, i.e. Rs. 23.16 per unit. For Job No. 450: margin = 20% × 17,400 = Rs. 3,480; total selling price = 17,400 + 3,480 = Rs. 20,880 for 1,200 units, i.e. Rs. 17.40 per unit. The comparison is instructive: although Job No. 450 absorbed more total labour, its larger output of 1,200 units spread the costs more thinly, giving it a lower unit cost (Rs. 14.50

against Rs. 19.30) and therefore a lower selling price per unit. This illustrates a central strength of job costing—it shows the cost and price of each order separately instead of hiding differences inside an average.

Conclusion

To conclude, service organisations use job order costing because their work consists of distinct, client-specific engagements whose cost, billing and profitability must be traced separately. Applying the method, the total cost of Job No. 250 is Rs. 19,300 (unit cost Rs. 19.30; selling price Rs. 23,160, or Rs. 23.16 per unit) and the total cost of Job No. 450 is Rs. 17,400 (unit cost Rs. 14.50; selling price Rs. 20,880, or Rs. 17.40 per unit), after adding a gross margin of 20% of the cost of manufacturing in each case.

Question 4: Process Costing — Cost of Production Report, Department B of the Friends Company (20 Marks)

Question as printed: The Friends Company uses a process costing system. Department B received 14,000 units at a cost of Rs. 280,000. The Department B costs were Rs. 24,000 for direct labour and Rs. 89,250 for factory overheads. Normal spoilage is 5% of good output; inspection and identification of spoilage takes place at the 90% stage of completion. A total of 8,000 units were completed and transferred to Department C for further processing. At the end of the month, 5,000 units were still in process, estimated to be 60% complete as to the conversion cost. Required: Prepare a cost of production report for Department B.

Introduction

In process costing, costs are accumulated by department or process for a period and are averaged over the units produced, because the units are identical and flow continuously

through the processes. The cost of production report is the key document of the system: it reconciles the units received with the units produced, lost and still in process, converts the physical units into equivalent units for each cost element, computes the cost per equivalent unit, and finally assigns the total departmental cost to units transferred out, spoiled units and the ending work-in-process. This answer prepares the report for Department B, giving careful treatment to spoilage: units spoiled within the normal limit have their cost absorbed by the good units, whereas abnormal spoilage is a loss of the period. Since there is no opening work-in-process, the weighted-average and first-in first-out computations coincide.

Step 1: Quantity Schedule

Department B received 14,000 units. Of these, 8,000 units were completed and transferred to Department C and 5,000 units remain in process. The balancing figure, 14,000 − 8,000 − 5,000 = 1,000 units, was spoiled and detected at inspection. Normal spoilage is 5% of good output (the 8,000 good units completed), i.e. 400 units; the remaining 1,000 − 400 = 600 units are abnormal spoilage.

Table 5: Quantity Schedule — Department B

Units to account for	Units	Units accounted for	Units
Units received from Department A	14,000	Units completed and transferred to Dept. C	8,000
		Units spoiled at inspection (at 90% stage):	
		Normal spoilage (5% of 8,000 good units)	400
		Abnormal spoilage (balancing figure)	600
		Ending work-in-process (60% complete as to conversion)	5,000
Total units to account	**14,000**	**Total units accounted**	**14,000**

for		for	

Step 2: Equivalent Units of Production

Equivalent units express partly finished work in terms of fully finished units. Transferred-in cost is received at the start of the process, so every unit in Department B—completed, spoiled (spoiled units had passed through the department up to the 90% inspection point, having received all their transferred-in material) and in ending inventory—carries 100% of transferred-in cost. Conversion cost (labour plus overhead) is incurred gradually: completed units are 100% converted, spoiled units were 90% converted when inspected, and ending work-in-process is 60% converted.

Table 6: Equivalent Units — Department B

Output	Transferred-in EU	Conversion EU
Units completed and transferred out (8,000 × 100%)	8,000	8,000
Spoiled units (1,000 × 90% for conversion)	1,000	900
Ending work-in-process (5,000 units; 60% conversion)	5,000	3,000
Total equivalent units	**14,000**	**11,900**

Step 3: Cost per Equivalent Unit

Total cost to account for is Rs. 280,000 (transferred-in) + Rs. 24,000 (direct labour) + Rs. 89,250 (factory overheads) = Rs. 393,250; direct labour and factory overheads together form the conversion cost of Rs. 113,250. The cost per equivalent unit is therefore: transferred-in, Rs. 280,000 ÷ 14,000 = Rs. 20.00; conversion, Rs. 113,250 ÷ 11,900 = Rs. 9.5168 (say Rs. 9.52); total

cost per completed unit = Rs. 29.5168 (say Rs. 29.52). A spoiled unit, being only 90% converted, had absorbed Rs. 20.00 + (90% × 9.5168) = Rs. 28.5651 when it was rejected.

Step 4: Cost Assignment (Cost of Production Report)

Table 7: Cost Assignment — Department B

Cost accounted for	Calculation	Rs.
Units completed (before normal spoilage)	8,000 × Rs. 29.5168	236,134
Add: Cost of normal spoilage absorbed by good units	400 × Rs. 28.5651	11,426
Cost transferred to Department C		**247,560**
Abnormal spoilage (loss of the period)	600 × Rs. 28.5651	17,139
Ending work-in-process:		
Transferred-in cost	5,000 × Rs. 20.00	100,000
Conversion cost	3,000 × Rs. 9.5168	28,551
Total ending work-in-process		128,551
Total cost accounted for	247,560 + 17,139 + 128,551	393,250

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Note on rounding: amounts are rounded to the nearest rupee; the small rounding difference is adjusted within the work-in-process figure so that the total cost accounted for agrees exactly with the total cost to account for, Rs. 393,250 (= 280,000 + 24,000 + 89,250).

Explanation of the Treatment of Spoilage

The treatment adopted above follows standard process-costing practice. Normal spoilage is an unavoidable feature of an efficient process, so its cost is a proper product cost; because inspection occurs at the 90% stage—near the end of Department B's work—the cost of the 400 normally spoiled units is borne only by the good units that passed inspection, that is, the 8,000 completed units, and not by the ending work-in-process, which has not yet reached the inspection point. Abnormal spoilage of 600 units, by contrast, results from inefficiency or

abnormal causes and is not a cost of production; its cost of Rs. 17,139 is separated and charged as a loss to the income statement (cost of goods sold) of the period, so that management attention is drawn to it. The ending work-in-process of Rs. 128,551 will be carried forward as the opening inventory of Department B for the next month, and the transferred-out cost of Rs. 247,560 becomes the transferred-in cost of Department C.

A final practical point concerns the records that follow from the report. The cost transferred out, Rs. 247,560, is debited to the work-in-process account of Department C as its transferred-in cost, and Department C will add its own labour and overhead before the goods pass to finished stock; the abnormal spoilage loss of Rs. 17,139 is debited to a separate abnormal loss account so that it is visible in the monthly operating statement rather than hidden in product cost. Management should also read the physical message of the report alongside the financial one: 1,000 spoiled units out of 14,000 received is a spoilage rate of about 7.1% of input, against a normal allowance represented by the 400 units, so the 600 abnormally spoiled units call for investigation of machine settings, material quality and operator training in Department B during the coming month.

Conclusion

The cost of production report for Department B shows a cost per equivalent unit of Rs. 20.00 for transferred-in cost and Rs. 9.5168 for conversion cost, a total of Rs. 29.5168 per completed unit. The total departmental cost of Rs. 393,250 is fully accounted for: Rs. 247,560 transferred to Department C (including Rs. 11,426 of normal spoilage absorbed), Rs. 17,139 written off as abnormal spoilage loss, and Rs. 128,551 retained in ending work-in-process—so the report balances completely.

Question 5: Economic Order Quantity and the Evaluation of a Quantity-Discount Offer — Alpha Manufacturing Company (20 Marks)

Question as printed: (a) Explain economic order quantity, annual ordering cost and annual carrying cost of material inventory and the benefits which can be reaped if these control factors are implemented by the management of an organization at the time of procurement. (b) The Alpha Manufacturing Company is purchasing a particular material at the cost of Rs. 300 per unit. Monthly usage is 1,500 units. The ordering cost is Rs. 50 per order and the annual carrying cost is 16%. Presently, the procurement of material is based on Economic Order Quantity modeling. A supplier has offered to supply the requisite material at 5% discount if orders in lots of 3,000 units are placed. Required: Evaluate this offer to determine whether the company should accept this offer or purchase the materials on an Economic Order Quantity basis.

Introduction

Inventory is usually the largest single item of working capital in a manufacturing firm, yet both extremes of stockholding are costly: too much stock locks up cash and invites deterioration and obsolescence, while too little stock causes emergency purchases and stoppages of production. Inventory control techniques resolve this tension by answering two questions—how much to order at a time, and when to order. The economic order quantity (EOQ) answers the first question. Part (a) explains EOQ, ordering cost and carrying cost and the benefits of applying them; part (b) uses the model to evaluate a supplier's quantity-discount offer to the Alpha Manufacturing Company.

Part (a)(i): Economic Order Quantity

The economic order quantity is that quantity of a material, ordered at one time, which minimises the total of the ordering cost and the carrying cost of the inventory. If orders are placed in small lots, many orders are needed each year and ordering cost is high, but average stock—and therefore carrying cost—is low. If orders are placed in large lots, ordering cost falls but carrying cost rises. EOQ is the lot size at which the two costs are equal and their total is at its minimum. It is computed by the formula EOQ = √(2AS ÷ C), where A is the annual usage (requirement) of the material in units, S is the cost of placing one order, and C is the carrying cost per unit per year (often stated as a percentage of the unit price). The model rests on assumptions: demand is known and constant, the price per unit is constant, ordering and carrying costs are known and stable, replenishment is instantaneous, and no stock-outs occur. Even where these assumptions hold only approximately, EOQ gives management a scientific starting point for lot-sizing.

Part (a)(ii): Annual Ordering Cost and Annual Carrying Cost

Ordering cost is the cost of placing and receiving an order: preparing purchase requisitions and orders, correspondence and follow-up, receiving, inspection and handling of the delivery, and processing the supplier's invoice for payment. The cost per order is largely fixed whatever the size of the order, so the annual ordering cost equals the number of orders placed in the year multiplied by the cost per order, that is, (annual usage ÷ quantity per order) × ordering cost per order; it therefore falls as the order size increases. Carrying (or holding) cost is the cost of keeping stock in the store: interest on the capital locked up in inventory, store rent and staff, insurance, handling, and losses from deterioration, evaporation, pilferage and obsolescence. It

is normally expressed per unit per year, frequently as a percentage of the unit purchase price, and the annual carrying cost equals the average inventory (order quantity ÷ 2, when usage is uniform) multiplied by the carrying cost per unit per year; it therefore rises as the order size increases. Good procurement control consists of balancing these two opposing costs at the EOQ.

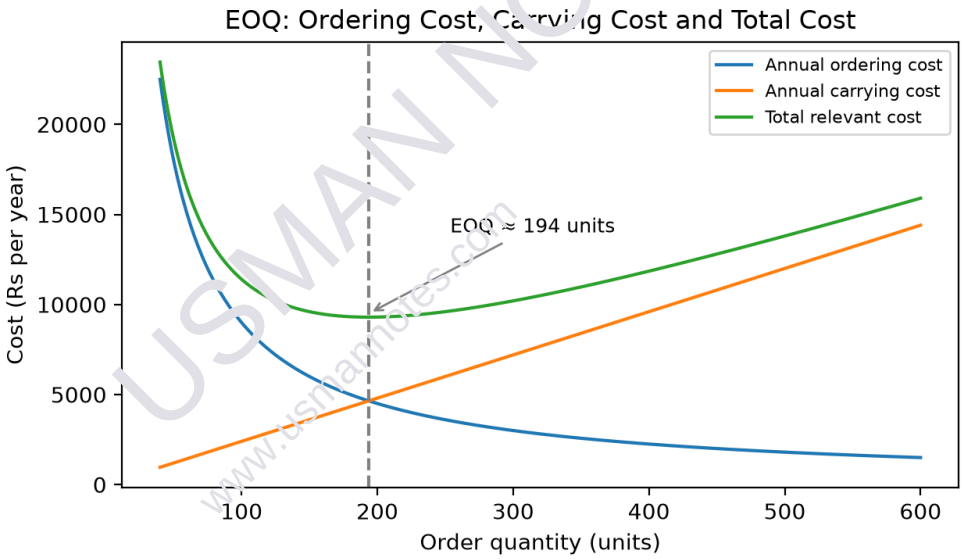


Figure 1: Ordering cost falls and carrying cost rises with order size; total cost is minimum at the EOQ, where the two curves cross.

Part (a)(iii): Benefits of Implementing These Control Factors

Implementing EOQ and conscious control of ordering and carrying costs at the time of procurement yields several benefits. Total inventory cost is minimised, directly improving profit. Working capital is released, because average stock is held at the economic level instead of at an arbitrary, usually excessive, level set by habit or guesswork, and the freed cash can be used elsewhere in the business. Regular, right-sized ordering reduces the risks of deterioration, obsolescence and price falls on excessive stocks and cuts insurance, storage and handling charges. At the same time, because the model is built on known usage, the danger of stock-outs

and production stoppages is reduced, and emergency buying at premium prices is avoided. Purchasing staff time is used efficiently—neither wasted on an excessive number of small orders nor exposed to the risk of a few very large commitments. Finally, EOQ discipline feeds wider control: it supports the fixing of maximum, minimum and re-order levels, standardises procurement decisions, and provides a benchmark against which special offers, such as quantity discounts, can be evaluated objectively—exactly the exercise performed in part (b).

Part (b): Evaluation of the Supplier's Offer

Given data: unit price Rs. 300; monthly usage 1,500 units, so annual usage A = 1,500 × 12 = 18,000 units; ordering cost S = Rs. 50 per order; carrying cost = 16% of unit price per year. Step 1 — the EOQ at the present price: carrying cost per unit per year C = 16% × 300 = Rs. 48. EOQ = √(2 × 18,000 × 50 ÷ 48) = √37,500 ≈ 194 units. Step 2 — total annual cost under the EOQ policy: purchase cost = 18,000 × 300 = Rs. 5,400,000; number of orders = 18,000 ÷ 194 ≈ 93 orders, ordering cost ≈ Rs. 4,648; average inventory = 194 ÷ 2 = 97 units, carrying cost ≈ 97 × 48 = Rs. 4,648 (at the EOQ the two costs are equal, as theory predicts); total relevant cost ≈ Rs. 9,295; total annual cost ≈ Rs. 5,409,295. Step 3 — total annual cost if the offer is accepted: discounted price = 300 − 5% = Rs. 285 per unit; purchase cost = 18,000 × 285 = Rs. 5,130,000; orders in lots of 3,000 units = 18,000 ÷ 3,000 = 6 orders, ordering cost = 6 × 50 = Rs. 300; carrying cost per unit = 16% × 285 = Rs. 45.60; average inventory = 3,000 ÷ 2 = 1,500 units, carrying cost = 1,500 × 45.60 = Rs. 68,400; total annual cost = 5,130,000 + 300 + 68,400 = Rs. 5,198,700.

Table 8: Comparison of the EOQ Policy and the Discount Offer (per year)

Cost item	EOQ policy (Rs.)	Discount offer – lots of 3,000 (Rs.)
Purchase cost (18,000 units)	5,400,000 (at Rs. 300)	5,130,000 (at Rs. 285)
Annual ordering cost	4,648	300

Annual carrying cost	4,648	68,400
Total annual cost	**5,409,295**	**5,198,700**
Saving from accepting the offer		**210,595**

Decision and discussion. On pure cost figures, the company should accept the offer: although carrying cost rises sharply (from about Rs. 4,648 to Rs. 68,400, an increase of about Rs. 63,752) and ordering cost falls by about Rs. 4,348, the price saving alone is 18,000 × Rs. 15 = Rs. 270,000, so the net annual saving is approximately Rs. 210,595. Before finally accepting, however, management should confirm the qualitative conditions: the store must have space for 3,000 units at a time; the material must not deteriorate or become obsolete during the longer holding period (average stock rises from about 97 units, worth roughly Rs. 29,100, to 1,500 units, worth Rs. 427,500, so considerably more cash is locked up); demand must be expected to remain at 1,500 units per month; and the supplier's quality and reliability at the discounted price must be unchanged. Subject to those checks, the offer is financially advantageous.

Conclusion

To conclude, EOQ balances annual ordering cost against annual carrying cost so that total inventory cost is minimised, and applying the model brings lower costs, released working capital and dependable supplies. For the Alpha Manufacturing Company the EOQ is approximately 194 units and the total annual cost under the EOQ policy is approximately Rs. 5,409,295, whereas accepting the supplier's 5% discount for lots of 3,000 units costs approximately Rs. 5,198,700 per year—a saving of about Rs. 210,595. The company should therefore accept the offer, provided storage, shelf-life and demand conditions permit.