**MOCK TEST PAPER – 1**

**FINAL (NEW) COURSE: GROUP – II**

**PAPER – 5: STRATEGIC COST MANAGEMENT AND PERFORMANCE EVALUATION**

**SUGGESTED ANSWERS/HINTS**

1.  In consideration to Michael Porter's theory about creating a superior performance and competitive advantage, a firm's overall competitive advantage derives from the difference between the *value it offers to customer* and its *cost of creating that customer value*. In order to survive and prosper in industry, firm must meet two criteria– they *must supply what customers want* to buy and they *must survive competition*.

    To attain superior performance and attain competitive advantage, firm must have *distinctive competencies*. Distinctive competencies can take any of the following two forms:

    **Relative low-Cost advantage–** under which customers gain when a firm's total costs undercut those of its average competitor.

    **An offering or differentiation advantage–** If customer perceive a product or service as superior, they become more willing to pay a premium price relative to the price they will have to pay for competing offerings.

    **Low Cost Advantage (Cost Leadership)**

    I PACIFIC can enjoy relative cost advantage if its total costs are lower than those of its competitors. This relative cost advantage enables a business to do one of the following:

    –   Charge a lower price than its competitors for its services to gain market share and still maintain current profitability; or

    –   Match with the price of competing services and increase its profitability.

    Cost reductions in I PACIFIC can be achieved through yield management with variable pricing depending on capacity utilization with careful monitoring; application of computer and communication technology in cost effective way i.e. selling seats via the internet rather than through travel agents; trimming overhead costs by using lower cost out-of-town airports, no printed tickets, seat allocations, or free meals and drinks; efficient operations i.e. fast turnaround times for aircraft to improve utilization; and no exceptions policies to reduce the cost of handling exceptions (e.g. no flexibility for passengers who arrive late). Cost economies can also be realized from large scale operations. However, it is important to note that as soon as more firms strive to become the cost leader, rivalry become so fierce that the consequences for the profitability in the industry are disastrous.

### Differentiation Advantage

It occurs when customers perceive that a business services offering is of higher quality, involves fewer risks and/or outperform services offered by competitors. In other words, customers perceive the service offered by a business to be superior. For example, differentiation may include a firm's ability to deliver services, and other factors that provide unique customer value. I PACIFIC is a multinational passenger airline. It can adopt a differentiation approach by offering passengers a higher-quality experience than many of its rivals. This allows it to charge a premium for its flights compared to many other airlines.

A differentiation advantage can be achieved by offering enhanced features such as prime landing slots can be obtained at major airports around the world; using superior and advance technology; well-maintained, clean, and comfortable aircraft; training in customer care and the recruitment of high-quality staff; providing complementary services such as in-flight entertainment, high-quality food, and drink. Customer value can also be increased by *subjective features* such as brand image, advertising based on quality of service provided. However, differentiator cannot ignore its cost position. If costs are too high the premium price are nullified.

On successfully differentiated its offering, management of I PACIFIC may exploit the advantage in one of two ways viz., either increase price until it just offsets the cost of improvement in customer benefits, thus *maintaining* current market share; or price below the "full premium" level to *build* market share.

**Alternatively**, I PACIFIC may focus on geographical region and short point to point flights to reduce costs. Michael Porter enlightens focus as attaining low cost or product differentiation for a *particular* buyer group, segment of product line, or geographic market rather than for the industry as a whole. The focuser can attain competitive advantage within a niche, because large firms are either not attracted to niche or have ignored the potential. The narrow focus in itself though is not adequate for a competitive advantage. The firms need to optimize the strategy on two variants: cost focus and differentiation focus. One risk of a 'focus strategy' is that broadly targeted competitors devastate the segment once it becomes economically attractive.

**In addition,** the currency depreciation is hitting Airlines harder and international overhead costs have risen, the I PACIFIC should attempt to increase the number of internal domestic flights. Moreover, ATF cost can also be lowered by investment in fuel saving modern Airbuses, however, the reduction in operating costs may outweigh the capital equipment costs.

To gain competitive advantage I PACIFIC may also assess Value Shop Model. Value Shop generates value by organizing resources (e.g. people, knowledge, and skills) and deploying them to solve specific problems, for example, delivering airline services to the

passengers or delivering a solution to the business problem. Shops are organized around making executing decisions- identifying and assessing problems or opportunities, developing alternative solutions or approaches, choosing one, executing it and evaluating results.

In this way, the above discussed strategies may be more appropriate for helping I PACIFIC in achieving superior performance and competitive advantage over its competitors.

2. (i)

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**Star Paper Mart**
**Environmental Cost Statement**

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| Particulars | H1 | | H2 | |
|---|---|---|---|---|
| | Amount (in lakhs) | % to total | Amount (in lakhs) | % to total |
| **Environmental Prevention Costs** | | | | |
| Creating Environment policies [(6/2) × 0.8] [(6/2) × 1.1] | 2.4 | 0.68 | 3.3 | 0.96 |
| Investment in protective equipment [(7,725 – 65) – 7,620] | - | - | 40# | 11.58 |
| **Sub-Total (a)** | **2.4** | **0.68** | **43.3** | **12.54** |
| **Environmental Detection Costs** | | | | |
| Monitoring (78 in the ratio of 1:2) | 26 | 7.40 | 52 | 15.06 |
| Performing Contamination test | - | - | 4 | 1.16 |
| Environmental Audit [1 × 8] [2 × 8] | 8 | 2.28 | 16 | 4.63 |
| **Sub-Total (b)** | **34** | **9.68** | **72** | **20.85** |
| **Environmental Internal Failure Costs** | | | | |
| Recycling Scrap (275 in the ratio of 3:2) | 165 | 46.95 | 110 | 31.86 |
| Disposing of Toxic Material | 150 | 42.69 | 120 | 34.75 |
| **Sub-Total (c)** | **315** | **89.64** | **230** | **66.61** |
| **Grand Total (a + b + c)** | **351.4** | **100** | **345.3** | **100** |

*# Since the details regarding useful economic life of the newly erected plant and the machine is not given, hence the entire incremental cost recognised in H2 only (when put to use); despite the benefit will arise over the useful economic life in form of a reduction in generation of waste.*

**(ii) Analysis**

The environmental cost incurred in H2 (₹345.3 lakhs) is comparatively less than what was incurred in H1 (₹351.4 lakhs). Environmental internal failure costs reduced in H2 (₹230 lakhs) in comparison to H1 (₹315 lakhs), but still a substantial

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3

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component of total environmental costs (66.61% in H2 against 89.64% in H1). The reduction of environmental internal failure costs is the outcome of increased environmental prevention costs (12.54% in H2 against 0.68% in H1) and environmental detection costs (20.85% in H2 against 9.68% in H1).

*Note* – *Since the policy document also states 'zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise' hence there are no **environmental external failure costs.***

(iii) **Evaluation**

Apart from getting the certificate, the cross-functional team has terms of reference *'to improve the environmental impact & image of SPM as eco-friendly enterprise and control environmental cost'*

In the context of **controlling environmental cost**, the team attained a reasonable reduction in total environmental cost, impact in this environmental cost statement (over H1 and H2) seem low because the incremental cost due to purchase of premium version of plant and machine is charged in H2, which will benefit in form reduced waste over the useful economic life.

In the context of **improving the image of SPM as an eco-friendly enterprise**, the policy document which in practice also states– *'zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise'* and same is also visible through environmental cost statement as there are no environmental external failure costs

In the context of **improving the environmental impact**, SPM able to generate low waste in H2 (2,000 MT) in comparison of H1 (3,000 MT) just by installing new plant and machine which produce less waste, increased monitoring, and audits.

**Hence it can be concluded that the team is successfully serving the terms of reference.**

3. (a) The situation is governed by the actions of the manager of Division Beta. Based on a transfer price of ₹40 per component, the variable cost per unit of Product BZ will be ₹48.

| Demand | Selling Price p.u. (₹) | Variable Cost p.u. (₹) | Contribution p.u. (₹) | Total Contribution (₹'000) |
|---|---|---|---|---|
| 2,000 | 120 | 48 | 72 | 144 |
| 4,000 | 100 | 48 | 52 | 208 |
| **5,000** | **90** | **48** | **42** | **210** |
| 6,000 | 82 | 48 | 34 | 204 |
| 7,000 | 70 | 48 | 22 | 154 |
| 8,000 | 65 | 48 | 17 | 136 |

4

Division Beta will produce 5,000 units of Product BZ and will therefore order 5,000 of component AX from Division Alpha.

| Particulars | Alpha (₹'000) | Beta (₹'000) | AML (₹'000) |
|---|---|---|---|
| Revenue | 200 | 450 | 450 |
| *Less:* Variable Costs | 60 | 240 | 100 |
| *Less:* Fixed Costs | 60 | 90 | 150 |
| **Profit** | **80** | **120** | **200** |

**(b)** The situation for the group should be judged using the total marginal costs of the divisions. This will give a variable cost per Product BZ of ₹20.

| Demand | Selling Price p.u. (₹) | Variable Cost p.u. (₹) | Contribution p.u. (₹) | Total Contribution (₹'000) |
|---|---|---|---|---|
| 2,000 | 120 | 20 | 100 | 200 |
| 4,000 | 100 | 20 | 80 | 320 |
| 5,000 | 90 | 20 | 70 | 350 |
| **6,000** | **82** | **20** | **62** | **372** |
| 7,000 | 70 | 20 | 50 | 350 |
| 8,000 | 65 | 20 | 45 | 360 |

The profit maximising output is 6,000 units of Product BZ.

**(c)** **Statement Showing Monthly Profit** (transfer price = marginal cost of AX)

| Particulars | Alpha (₹'000) | Beta (₹'000) | AML (₹'000) |
|---|---|---|---|
| Revenue | 72 | 492 | 492 |
| *Less:* Variable Costs | 72 | 120 | 120 |
| *Less:* Fixed Costs | 60 | 90 | 150 |
| **Profit** | **-60** | **282** | **222** |

The profit maximising output is 6,000 units of Product BZ using marginal cost of component AX as the transfer price. This will earn a total monthly profit for the AML Group ₹2,22,000.

**(d)** Transfer at marginal cost is *unsuitable for performance evaluation* since they do not provide an incentive for the supplying division to transfer goods and services internally. This is because they do not contain a profit margin for the supplying division. Top Management's intervention may be necessary to instruct the supplying division to meet the receiving division's demand at the marginal cost of the transfers. Thus, divisional autonomy will be undermined. Transferring at cost

5

plus a mark-up creates the *opposite conflict*. Here, the transfer price meets the performance evaluation requirement but will not induce managers to make *optimal decisions*. **To resolve the above conflicts the following transfer pricing methods have been suggested:**

*Dual Rate Transfer Pricing System*

The supplying division records transfer price by including a *normal profit margin* thereby showing reasonable revenue. The purchasing division records *transfer price at marginal cost* thereby recording purchases at minimum cost. This allows for better evaluation of each division's performance. It also improves co-operation between divisions, promoting *goal congruence* and reduction of *sub-optimization* of resources.

*Two Part Transfer Pricing System*

This pricing system is again aimed at resolving problems related to distortions caused by the full cost-based transfer price. Here,

Transfer price = marginal cost of production + a lump-sum charge (two part to pricing).

While marginal cost ensures recovery of additional cost of production related to the goods transferred, lump-sum charge enables the recovery of some portion of the fixed cost of the supplying division. Therefore, while the supplying division can show better profitability, the purchasing division can purchase the goods at lower rate compared to the market price.

4.  (a) **Decision Making – PJ Ltd.**

With increasing completion, dynamic market changes, changing needs of customers, *non-financial* and *ethical considerations* have gained relevance in the decision- making process. A company may face the dilemma of meeting customers' needs while protecting employees' rights. While there are no clear-cut parameters to measure the impact of such decisions, they have a *long-term impact on the company's operations that ensures profitability and sustainability of an organization*.

In the given scenario, a customer who contributes close to 65% of PJ Ltd.'s profits has been making turnaround demands that are unreasonable for the company employees to meet. PJ Ltd. has to decide whether to continue doing business with the customer based on the current terms or protecting the work environment of its employees. In the current scenario, *it is in PJ's long term interests to protect its employees' rights (a non-financial consideration). Keeping this approach in mind, PJ Ltd. decided to terminate business with the profitable client. While this had a significant impact on revenues in the short term, in the long run PJ Ltd. was able to get business from new clients.* Also, realizing the *value of service* provided, the

**6**

dropped client came back with projects on equitable terms. Therefore, even though it did not make financial sense in the short run, decisions based on non-financial metrics played an important role in ensuring PJ Ltd.'s long term sustainability.

**(b)** The new product can be sold into the market at a maximum of ₹ 25 per unit. The company also seeks a minimum mark-up of 25% on product cost, which means the product should have a target cost of ₹ 20 per unit. Calculation is as below:

Target Cost + 25% Mark-up on cost = ₹ 25

*Or*, Target Cost per unit = ₹ 20 per unit.

### Statement Showing "Life Cycle Cost *per unit*"

| Particulars of Cost | ₹ |
|---|---|
| Manufacturing Cost *per unit* | 16.00 |
| *Add:* - Research and Development, Design Cost $\left(\dfrac{₹\,1,50,000}{40,000\,\text{units}}\right)$ | 3.75 |
| - End of Life Costs $\left(\dfrac{₹\,70,000}{40,000\,\text{units}}\right)$ | 1.75 |
| - Promotion and Capacity Cost $\left(\dfrac{₹\,20,000}{40,000\,\text{units}}\right)$ | 0.50 |
| Total Life Cycle Cost *per unit* | 22.00 |

The above life cycle cost of the proposed product is above the target cost of ₹ 20 per unit hence, the product should not be manufactured.

### OR

| | |
|---|---|
| Differentiation can be achieved by | Innovation |
| Process of obtaining services | Procurement |
| Process Acceptance | Appraisal Cost |
| Cutting departmental expenditure by 5% | Economy |
| Improves the motivation of junior managers | Decentralization |

**(c)  (i)**               **Customer's Profitability Statement**

| Particulars | Customer- 'Mx' | Customer- 'Nx' |
|---|---|---|
| **Sales (units)** | **350** | **500** |
| | ₹ | ₹ |
| Selling Price *per unit* | 5,400 | 5,400 |

7

| | | |
|---|---|---|
| Less: Discount (Quantity) | 270<br>(₹5,400 × 5%) | 270<br>(₹5,400 × 5%) |
| Less: Discount (Delivery) | --- | 432<br>(₹5,400 × 8%) |
| Selling Price (Net of Discounts) per unit | 5,130 | 4,698 |
| Less: Variable Cost per unit | 4,420 | 4,420 |
| Contribution per unit | 710 | 278 |
| Total Contribution | 2,48,500<br>(₹710 × 350 units) | 1,39,000<br>(₹278 × 500 units) |
| Less: Additional Overheads | | |
| Delivery Cost | 17,500<br>(5 × ₹3,500) | --- |
| Order Processing Cost | 10,000<br>(5 × ₹2,000) | 20,000<br>(10 × ₹2,000) |
| Profit per customer* | 2,21,000 | 1,19,000 |
| Profit per customer per unit | 631.43 | 238.00 |

**Analysis**

Even though Mx has lower sales volume (30% lesser from 'Nx'), it is contributing almost double profit that is being contributed by 'Nx' as overall discount offered to customer 'Mx' is quite less.

**(ii) Comments on the "Discount Policy on Delivery"**

Discount on delivery offered to customer 'Nx' is ₹432 per unit. If transport for delivery is provided to customer 'Nx' then the cost would have been ₹70 per unit (10 deliveries × ₹3,500 / 500 units), which is lesser by ₹362. It may also be noted that delivery cost in case of customer 'Mx' is only ₹50 per unit (₹17,500 ÷ 350 units). Hence, company needs to review discount policy on delivery but significance of profitability of customer 'Nx' should also be kept in mind while doing so.

**5. (a) (i) Workings**

**Statement Showing 'Inventory Holding Cost' under Plan 1**

| Particulars | Pd. 1 | Pd. 2 | Pd. 3 | Pd.4 |
|---|---|---|---|---|
| Opening Inventory<br>…(A) | --- | 8,000 | 8,500 | 7,500 |
| Add: Production | 17,500 | 17,500 | 17,500 | 17,500 |

| | | | | |
|---|---|---|---|---|
| *Less:* Demand/ Sales | 9,500 | 17,000 | 18,500 | 25,000 |
| Closing Inventory …(B) | 8,000 | 8,500 | 7,500 | --- |
| Average Inventory $\left(\dfrac{A+B}{2}\right)$ | 4,000 | 8,250 | 8,000 | 3,750 |
| Inventory Holding Cost @ ₹6.50 | 26,000 | 53,625 | 52,000 | 24,375 |

Inventory Holding Cost *for the four periods*     = ₹1,56,000

(₹26,000 + ₹53,625 + ₹52,000 + ₹24,375)

**Statement Showing 'Additional Cost-Overtime' under Plan 2 (JIT System)**

| Particulars | Pd. 1 | Pd. 2 | Pd. 3 | Pd.4 |
|---|---|---|---|---|
| Demand/ Sales | 9,500 | 17,000 | 18,500 | 25,000 |
| Production in Normal Time | 9,500 | 17,000 | 18,000 | 18,000 |
| Production in Over Time …(A) | --- | --- | 500 | 7,000 |
| Variable Cost *per unit* | 30.00 | 30.00 | 32.50 | 35.00 |
| Additional Cost – Overtime *per unit* …(B) (@ 30% of Variable Cost) | 9.00 | 9.00 | 9.75 | 10.50 |
| Additional Cost – Overtime …(A) × (B) | --- | --- | 4,875 | 73,500 |

Total Additional Payment (Overtime)   =   ₹78,375

(₹4,875 + ₹73,500)

**Statement Showing 'Additional Variable Cost*' under Plan 2 (JIT System)**

| Particulars | Pd. 1 | Pd. 2 | Pd. 3 | Pd.4 | Total |
|---|---|---|---|---|---|
| Production (Plan 1) | 17,500 | 17,500 | 17,500 | 17,500 | 70,000 |
| Variable Cost …(A) | 5,25,000 | 5,25,000 | 5,68,750 | 6,12,500 | 22,31,250 |
| Production (Plan 2, JIT) | 9,500 | 17,000 | 18,500 | 25,000 | 70,000 |
| Variable Cost …(B) | 2,85,000 | 5,10,000 | 6,01,250 | 8,75,000 | 22,71,250 |
| Total | | | | …(B) – (A) | 40,000 |

* *excluding overtime cost*

Incremental Production Cost in JIT System   =   ₹78,375 + ₹40,000

=   ₹1,18,375

Therefore, Saving in JIT System (Net)   =   ₹1,56,000 – ₹1,18,375

=   ₹37,625

**9**

**(ii) Advice**

Though Innovation Ltd is saving ₹37,625 by changing its production system to Just-in-time but it has to consider *other factors* as well before taking any final call which are as follows:-

— Innovation Ltd has to ensure that it receives materials from its suppliers on the exact date and at the exact time when they are needed. Credentials and reliability of supplier must be thoroughly checked.

— To remove any quality issues, the engineering staff must visit supplier's sites and examine their processes, not only to see if they can reliably ship high-quality parts but also to provide them with engineering assistance to bring them up to a higher standard of product.

— Innovation Ltd should also aim to improve quality at its process and design levels with the purpose of achieving "Zero Defects" in the production process.

— Innovation Ltd should also keep in mind the efficiency of its work force. Innovation Ltd must ensure that labour's learning curve has reached at steady rate so that they are capable of performing a variety of operations at effective and efficient manner. The workforce must be completely retrained and focused on a wide range of activities.

**(b)** The budgetary control system appears to have several very important shortcomings which reduce its effectiveness and may in fact cause it to interfere with good performance. Some of the shortcomings are explained below.

**Lack of Coordinated Goals:** Mr. Singh had been led to believe high quality output is the goal; it now appears low cost is the goal. He does not know what the goals are and thus cannot make decisions which lead toward reaching the goals.

**Influences of Uncontrollable Factors:** The actual performance relative to budget is greatly influenced by uncontrollable factors i.e. rush orders. Thus, the variance reports serve little purpose for evaluation of performance.

**The Short-Run Perspectives:** The monthly evaluation and the budget tightening on a monthly basis result in a very short-run perspective. This will result in inappropriate decisions.

The improvements in the budgetary control system must correct the deficiencies described above. Accordingly:

- Budgetary control system must more clearly define the company's objectives.

- Budgetary control system must develop an accounting reporting system which better matches controllable factors with supervisor responsibility and authority.

- Establish budget values for appropriate time periods which do not change

monthly simply as a result of a change in the prior month's performance.

The entire company from top management down must be educated in sound budgetary procedures so that all parties will understand the total process and recognize the benefit to be gained.

6. (a) **Special Project Cost**

| Item of Cost | Comments / Working | Amount (₹) |
|---|---|---|
| Project financing: Interest of overdraft | Interest @10% on overdraft of ₹5,00,000 for 3 months [10% × ₹5,00,000 × (3months / 12 months)] **(Refer note 1)** | 12,500 |
| Materials | **(Refer note 2)** | 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 |
| Overheads | **(Refer note 5)** | |
| (a)   Operating cost of machinery for special project | 3 months | 3,00,000 |
| (b)   Opportunity cost of diverting X-2.1" machine | Contribution lost ₹1,00,000 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 cost of accepting the project would be ₹18,22,500. The project can yield a surplus of ₹1,77,500. Therefore, the special project can 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

11

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 worth 5,000 kg in its inventory. This is 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 since 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 2,000 hours would be a relevant cost for the project.

Total hours by 5 skilled workers = 2,000 hours

Rate per hour = ₹300 per hour

Labour cost for in house skilled workers= 2,000 hours × ₹300 per hour = ₹6,00,000

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

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 ₹625,000.

**Note 4: Overtime paid to inspection supervisor**

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

**Note 5: Machine X-2.1"**

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

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

This machine X-2.1" works at full capacity, 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.

**Note 6: Administrative overhead**

Allocation of administrative overhead of ₹25,000 is not a relevant cost since this is a 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.

**(b) Variance Interpretation**

The sales quantity variance and the sales mix variance describe how the sales volume contribution variance has been affected by a change in the *total quantity of sales* and a *change in the relative mix of products sold*.

From the figures arrived for the sales quantity contribution variance, we can observe that the increase in total quantity sold would have gained an additional contribution of ₹2,124,600, if the actual sales volume had been in the budgeted sales proportion.

The sales mix contribution variance shows that the variation in the sales mix resulted in a curtailment in profit by ₹570,600. The change in the sales mix has resulted in a relatively higher proportion of sales of Q-2 which is the chemical that earns the lowest contribution and a lower proportion of Q-1 which earn a contribution significantly higher. The relative increase in the sale of Q-3 however, which has the highest unit contribution, has partially offset the switch in mix to Q-2.

**Workings**

**Statement Showing Standard Contribution**

| | Q-1 ₹/ kg | Q-2 ₹/ kg | Q-3 ₹/ kg |
|---|---|---|---|
| Average Selling Price | 17,600 | 2,560 | 22,400 |
| Direct Material ($C_2H_6O$) Cost | 8,000 | 1,280 | 9,600 |
| Direct Labour Cost | 3,200 | 480 | 4,800 |
| Variable Overhead Cost | 320 | 48 | 480 |
| Contribution | 6,080 | 752 | 7,520 |

13

**Sales Contribution Mix Variance**

| Products | Actual Quantity [AQ] | Actual Sales at Budgeted Proportion [RAQ] | Difference [AQ − RAQ] | Contribution ₹ [SC] | Mix Variance (₹' 000) SC × [AQ − RAQ] |
|---|---|---|---|---|---|
| Q-1 | 900 | 1,150 | 250 (A) | 6,080 | 1,520 (A) |
| Q-2 | 3,875 | 3,737.50 | 137.50 (F) | 752 | 103.40 (F) |
| Q-3 | 975 | 862.50 | 112.50 (F) | 7,520 | 846 (F) |
|  | 5,750 | 5,750 |  |  | 570.60 (A) |

**Sales Contribution Quantity Variance**

| Products | Budget Sales Quantity [BQ] | Actual Sales at Budgeted Proportion [RAQ] | Difference [RAQ - BQ] | Contribution ₹ [SC] | Qty. Variance (₹' 000) SC × [RAQ − BQ] |
|---|---|---|---|---|---|
| Q-1 | 1,000 | 1,150 | 150 (F) | 6,080 | 912 (F) |
| Q-2 | 3,250 | 3,737.50 | 487.50 (F) | 752 | 366.60 (F) |
| Q-3 | 750 | 862.50 | 112.50 (F) | 7,520 | 846 (F) |
|  | 5,000 | 5,750 |  |  | 2,124.60 (F) |