MOCK TEST PAPER – 2

FINAL COURSE: GROUP – II

PAPER – 5: STRATEGIC COST MANAGEMENT AND PERFORMANCE EVALUATION

SUGGESTED ANSWERS/HINTS

1. (i) There are two performance indicators highlighted in the present case, which is used by CWL, the first being 'rate of return on capital employed' which purely monetary in nature and second being 'number of passengers travelled' which is non-monetary, but quantitative in nature. Hence some major problems (or limitation) associated with current performance indicators are–

    1. They are quantitative, hence **ignore qualitative criteria,** despite the fact in service entities quality has more relevance than quantitative factors.

    2. Performance **indicators are shareholder-oriented** only, there are focused on bottom-line (return to shareholders, as the rate of capital employed).

    3. There is **conflict between measures and objectives** – CWL is largely concerned with the wealth of their shareholder which is a long term aspect but considering ROCE as its key performance measure.

    4. Current indicators (measures) are **not a true test of performance** – CWL may rely upon the increase in the number of passengers each year as a performance indicator of their customer services, but the reasons for passengers travelling through buses are way different from this. It may also possible the way CWL's busses do not stop on each bus stop in the way the busses of another operator also not cover some stops, which cause CWL only choice to the passenger of that stop.

    (ii) To decide whether the CWL buses are overcrowded or not, the measure of occupancy (number of passengers per seat) needs to be applied.

Particulars	Route A		Route B		Total
	Ordinary Buses	Volvo Buses	Ordinary Buses	Volvo Buses	
Round Trips					
Busy Hours	6	6	6	6	
Quieter Hours	8	10	12	12	
Single Side					
Busy Hours	12	12	12	12	
Quieter Hours	16	20	24	24	

Availability of Seats (Category wise) per day (A)					
Busy Hours	624	504	624	504	2,256
Quieter Hours	832	840	1,248	1,008	3,928
Category Total	1,456	1,344	1,872	1,512	6,184
Route Total	2,800		3,384		
Passenger per day (B)					
Busy Hours	720	640	580	502	2,442
Quieter Hours	760	680	820	720	2,980
Category Total	1,480	1,320	1,400	1,222	5,422
Route Total	2,800		2,622		
Occupancy (B/A*100)					
Busy Hours	115.38	126.98	92.96	99.60	**108.24**
Quieter Hours	91.34	80.95	65.71	71.43	**75.87**
Category wise	101.65	98.21	74.79	80.82	**87.68**
Route wise	**100**		**77.48**		

Analysis

Overall occupancy is 87.68%, on prima-facie this implies more seats are available then the passenger, hence government credence does not hold true. But this 87.68% is surely a misleading number to decide where there is overcrowding or not, because it may possible during the busy hours on the specific route, a specific category of the bus may be over-occupied from particular station to another station.

Although station wise data of boarding of passengers are not given, route and bus category wise data is available. Hence in order to analyse, whether there is overcrowding or not; category wise and route wise assessment need to be done.

- There is no overcrowding during **'Quieter Hours'** on any route in any category of bus.
- There is no overcrowding on **Route B** at all, even during busy hours.
- The overcrowding is only on **Route A** that's also during busy hours.
- Overcrowding is at its peak in case of Volvo Buses on **Route A** during busy hours (126.98%), whereas ordinary buses on the same route and during same hours also have an occupancy rate of (115.38%).

(iii) Comment on Intensity of Overcrowding

The intensity of over-crowding will not be the same in all cases for impacting the performance. Overcrowding cause lack of seat for a certain passenger, it is obvious it will be in-convenient experience for such passenger; but the impact (intensity in form dissatisfaction) will be different, and it depends upon the length of journeys passengers are making. In the shorter distance (or passenger who board

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the bus from intermediate station till another, rather final source and destination of the bus) intensity will be less in comparison to the long-distance journey.

(iv) Balanced Scorecard at CWL

Balanced scorecard first referred by Robert Kaplan and David Norton in 1990. Balanced Scorecard can equip, CWL with a **performance management system** (which is more than just measurement system) which will be superior, in terms of ensuring the availability of information to business manager to make better and informed decision and evaluation thereof, by establishing multiple objectives supported by performance measures in each of four perspectives.

Financial Perspective – Ensuring the availability of accurate financial data on timely basis is one among the priority of management, hence Kaplan and Norton suggested the process of storing and retrieving financial information should be centralised and automated.

In the case of CWL, currently, there is a **conflict between financial measures and objectives.** The maximising shareholder's wealth which is a long term aspect but considering ROCE as its key performance measure which is influenced by short term decision.

Balanced Scorecard (through diverse financial measures) will help CWL to align its financial measure and objective, by **focusing on investment (new buses may lead to more passenger and old busses obviously cause loss of passenger) and dividend decision** to ensure wealth maximisation. It also helps CWL **emphasis on EVA** (economic value added) to see the wider picture rather considering ROCE as a performance measure. On need, additional financial data such as risk assessment and cost aspects; may also be included.

Customer (Passenger) Perspective – Statement by MD of CWL '**CWL is committed to both shareholders and passengers**' shows increasing realisation of the importance of passenger focus. Customer **satisfaction is very important for any business**, because if the customer is not satisfied, they will find another supplier to fulfil their need; may even causes closure of business, hence **customer the base should be categorised and analysed**.

Presently, CWL may rely upon the **increase in the number of passengers** each year as a performance indicator of their customer services, but the reason of a passenger travelling through buses are way different from this. CWL may move to number of the repeated customer as criteria but there is a problem in that too, because there are limited competitors (options to passenger), it may possibly the way CWL's buses do not stop on each bus stop in the way the buses of another operator also not cover some stops, which cause CWL only choice to the passenger of that stop.

Balanced Scorecard may help the CWL to know the **qualitative facts** about passenger and their behaviour, likewise how many passengers are travelling through bus because they feel it will help them to save cost, to save effort and anxiety caused by traffic. It also helps the CWL to understand if it **shifts to electronic buses,** will the passenger occupancy improve where it's less now. The survey may be expensive mode but fetch information to decide the right measure and performance in the same. Like how many % age of passenger actually uses Wi-Fi and LED (in case of Volvo) and affected by same.

Internal Business Process Perspective **-** This allows the manager to know how well their business is running. Mind it the **internal processes efficiency can be closely linked to customer satisfaction**. As per fact available in the case, CWL clearly ignored this perspective.

Balanced scorecard will help CWL to **address the issues like reliability and over-crowding** (by identifying the reason - cut down the stop causing over-crowding). This will help CWL in changing the government perspective. Hence their **permit may be renewed by the government** after two years from now. Because in order to enhance share-holders wealth CWL is expected to continue operation on the same route for two more terms.

Innovation, Learning & Growth Perspective **–** Innovation in the way the organisation operates, learning of employees and growth strategies are key to success of any business. Innovation can improve customer's experience and in-service entities learned staff can play a vital role in differentiating the service experience.

Innovation at CWL may include change of technology for ensuring un-interrupted Wi-Fi, different menu of snack on different days, the introduction of electronic buses (specifically this move may open wide doors of growth for CWL)

Learning of employee may result in a reduction in maintenance time which they spent on preventive maintenance. And the learning of front desk and staff which interest with a passenger can improve customer experience.

(v) **Expected issues which may arise regarding performance indicators, while CWL applying the balanced scorecard.**

Prioritising is never easy; hence the choice of performance measures is critical. But the same become more critical when balance need to be developed among different stakeholder group. In the case of CWL too, challenges in the selection of performance measures (indicators) are expected, because it needs to leave apart the existing focus from shareholders. Even time horizon of measures considered by balanced scorecard are comparatively longer. There are some other issues as state below–

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1. **Some of the indicators are hard to measure than others** – Data related to performance in reference to certain indicators are easily available (easy to record, store, present and analyse relevant data & conversion of qualitative facts in quantitative numbers), whereas in case other It may not. For example, it easy to calculate over-crowding (through occupancy ratio) but difficult to quantify the inconvenience caused to the passenger. Environment impact may be another example. Apart from this, the cost of collecting and analysing these data also need to be considered.

2. The relative **importance of measures varies** – It's quite possible that some aspects value more to a certain passenger than other aspects to the same passenger, hence the measure shall be decided very carefully considering their importance from a wider perspective. Value chain/shop may be the best tool for this. For example, Wi-Fi connectivity may be a major issue for certain passenger than timing or environment impact of the bus in which s/he travels.

   Note – Certain measure have regulatory (like the safety of passenger) importance, hence must be put on priority over other.

3. **Too many measures also lead nowhere** – The prime concern of CWL is to maximise the wealth of its shareholder, which can be attained in many manners and ways. Then each way may have certain implication and that implication can be measured through separate performance indicators. Too many indicators/measures may cause unnecessary time and financial resource. Hence a clear strategy must be developed prior to choosing measures for performance management.

4. The measure **may overlap and has a conflict inter-se** – Two measure may not lead to the same implication, if considering the environmental impact, CWL shifts to electronic buses, obviously it capital employed will go up and the rate of return will come down. Hence, it's quite often the improvement of performance in one measure is detrimental to another measure's performance.

2. (i) The current cost and profit per unit are calculated as below:

Cost Component	Units	Actual Cost p.a. for 10,000 racks (₹)	Actual Cost per rack
Revenue	10,000 racks	75,00,000	750
Direct Material	5,20,000 sq. ft.	20,00,000	200
Direct Labour	1,00,000 hrs.	10,00,000	100
Machine Setup	15,000 hrs.	1,50,000	15
Mechanical Assembly	200,000 hrs.	30,00,000	300
Total Cost		61,50,000	615
Profit		13,50,000	135

Therefore, the current cost is ₹615 p.u. while the profit is ₹135 p.u. Machine setup is the time required to get the machines and the assembly line ready for production. In this case, 15,000 hours spent on setting up does not add value to the storage racks directly. Hence, it is a non-value add activity.

(ii) New sale price per rack is ₹675 per unit. The profit per unit needs to be maintained at ₹135 per unit. Hence, the new target cost per unit = new selling price per unit – required profit per unit = ₹675 - ₹135 = ₹540 per unit.

(iii) As explained above, current cost per unit is ₹615 while the target cost per unit is ₹540. Hence, the cost has to be reduced at least by ₹75 per unit. Analysis of the cost data shows the variances between the budget and actual material usage and labor hours. It is given that the material procurement rate and labor hour rate is the same for budgets and actuals. Hence, the increment in cost of direct materials and labor is due to inefficient use of material and labor hours to complete the same level of production of 10,000 storage racks.

Corrective actions to address these inefficiencies could result in the following savings:

(a) Inefficiencies resulted in use of extra 20,000 sq. ft. of material.

Material cost per sq. ft. = Actual cost / Actual material usage = ₹20,00,000 / 5,20,000 sq. ft. = ₹3.85 per sq. ft.

Therefore, inefficiencies resulted in extra cost = 20,000 sq. ft. × ₹3.85 per sq. ft. = ₹77,000.

If corrective action is taken, for 10,000 racks this translates to a saving of ₹7.70 per unit.

(b) Inefficiencies resulted in extra 10,000 hrs. to be spent in production.

Labor cost per hr. = Actual cost / Actual labor hrs. = ₹10,00,000 / 10,000 hrs. = ₹10 per hr.

Therefore, inefficiencies resulted in extra cost = 10,000 hrs. × ₹10 per hour = ₹100,000.

If corrective action is taken, for 10,000 racks this translates to a saving of ₹10 per unit.

(c) Machine setup cost is a non-value added cost. Value analysis can be done to determine if the setup time of 15,000 hrs. can be reduced. However, since these activities have been carried out for a reason, care should be taken to ensure that this change should not adversely impact the production activity later down the stream.

(d) Mechanical assembly cost is almost half of the total cost. These are costs incurred during the production process on the assembly line. Value analysis

can be done to determine if the production process can be made more efficient. For example, the process can be streamlined, such that steps can be combined that can be handled by fewer people (process centering). Similarly, value analysis / value engineering can focus on the product design.

Some questions to raise may be:

- Can the product be designed better to make the production more efficient?

- Can the design be minimized to include fewer parts and thus make it easier and efficient to manufacture?

- Can be substitute parts to make it more efficient? Or

- Is there simply a better way of producing the same product?

While target costing is a dynamic and corrective approach, care must the taken the product quality, characteristics and utility are maintained.

3. (i) EVA of JWUL for the year ending 31st March 2022 is negative ₹0.16 Crores.

Calculation of EVA →

NOPAT – (WACC × Capital Employed)

= ₹156.40 crores – (8% × ₹1,957 crores)

= ₹156,40 crores – ₹156.56 crores

= **– ₹0.16 Crores**

Working Note 1 – Computation of NOPAT (Net operating profit after tax)

Particulars	₹ in Crore
Operating Profit	176.00
Add:	
Accounting Depreciation	124.00
Provision for Bad and Doubtful Debts	6.00
Research and Development	20.00
Other Non-Cash Items	22.00
Less:	
Economic Depreciation	156.00
Tax Paid	23.00
Tax Saving on Interest (₹42crores × 30%)	12.60
NOPAT	**156.40**

Working Note 2 - Computation of Capital Employed

Particulars	₹ in Crore
Capital Employed as on 31.03.2019	1,940.00
Add:	
Provision for Bad and Doubtful Debts as on 31.03.2019 (i.e. ₹12 - ₹6 crore)	6.00
Other Non-Cash Items (incurred in 2018-19)	11.00
Adjusted Opening Capital Employed	**1,957.00**

Working Note 3 - Calculation of WACC

$[(K_e × V_e) + (K_d × V_d)]/ (V_e + V_d)]$

= 15% × 0.30 + 5% × 0.70

= 8%

(ii) Evaluation of Financial Performance →

Presently, JWUL is distorting value (negative EVA of ₹16 lacs) as it is not able to meet the economic cost of its own capital, hence detrimental to shareholder's interest. The negative EVA raise the question on sustainability of business, hence *perpetual succession become doubtful.*

The prominent reason of negative EVA may be a higher cost of equity for JSDSL i.e. 15%. Here it is worth noting that despite around <u>73.40% (585/797) of the revenue to JWUL is from WDO</u> which is *regulated one* and wherein *demand is guaranteed in future.* Hence, *investing risk shall be low.*

Another major reason of negative EVA may be cap on ROCE in case of WDO hence NOPAT can't be raised beyond a level. JWUL can focus on WPO to increase its NOPAT (to make it enough for break-even) *or* it can slash its *capital employed* by selling unutilized or under-utilized assets.

(iii) ROCE of WDO is 6.25% (see working note below), hence JWUL is complying with the acceptable cap limit of 6.50%.

Working Note – Computation of ROCE from WDO

$$ROCE = \left(\frac{Operating\,Profit}{Capital\,Employed} \right) × 100.00\%$$

= (₹110 crores / ₹1,760 crores) × 100

= 6.25%

(iv) **Advise →**

> In order to improve performance in term of EVA or profitability JWUL may apply any of the initiative either individually or in any combination– operating profits can be made to grow without employing more capital in both operations, but especially in WDO i.e. greater efficiency; additional capital shall be invested in WPO where the return is more than the cost of obtaining the capital, i.e. profitable growth; capital shall be divested from those projects that do not cover the cost of capital, i.e. liquidate unproductive capital.

Operating margin from WPO is 31.13% (66.00/212.00) compared to 18.80% (110.00/585.00) of WDO. JWUL may use the WDO activities as a trusted source of *cash profit to reinvest* in expansion of the WPO. *There is scope of expansion in WPO, because the JWUL currently using* <u>20% of total water supply for packing operation against the upper cap of 35%</u>. *Hence, JWUL shall expand the WPO (non-regulated businesses) to extent of 175% [(35%/20%) × 100] of current level using the cash generated by the regulated operation i.e. WDO.*

Further, JWUL may **improve profitability by controlling costs** within WDO activities through performance measurement. The regulatory body cannot argue that the company is overcharging its customers to increase profit margin. This is *possible* **through strict observance of expenses and using cost savings techniques through efficiency improvements**. In order to control cost within WDO, targets should be based on minimal variances and adopting cost reduction methods. It is important here to note that there is **only a limited scope for increase in the operating profit of WDO due to ROCE cap. The maximum allowed operating profit can be only ₹114.4 crore i.e. 6.50% of ₹1,760 crore of capital employed.**

Thus, JWUL should go to expand its WPO as this is producing higher operating profit margins.

4. **(a)** For each day, 'F' spends ₹360 per clerk (₹90 per hr. × 4 hrs.). Therefore, 'F' spends ₹1,080 per day to employ three clerks. Annually, this outlay amounts to ₹2,59,200 (₹1,080 per day × 240 days).

Over five years, the outlay would be ₹12,96,000. If the WCMS is implemented, the initial cost is ₹1,25,000. If we add the annual cost of ₹36,000, the total cost over five years amounts to ₹3,05,000. Since one clerk will be needed as well, 'F' has to incur ₹4,32,000 over five years to pay clerk (₹4,32,000 = ₹90 × 4 hrs. × 1 clerk × 240 days × 5 years). Therefore, the total cost of this option is ₹7,37,000.

Accordingly, there is cost saving of ₹5,59,000 from WCMS implementation.

Relevant Non-Financial Considerations

The WCMS may be a lot more efficient, but more rigid. For instance, what if, a student forgets to bring his/ her card or transaction failure due to connectivity issue, and may not have enough cash to pay. Automated systems may be less able to handle these situations. Having clerks may add an aspect of flexibility and a human aspect that is hard to quantify.

Conclusion

Obviously, WCMS option is more cost effective for 'F' because there is a cost saving of ₹5,59,000. But, non- financial factors should also be taken into consideration.

(b) Decision Making – P 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 <u>long-term impact on the company's operations that ensures profitability and sustainability of an organization</u>.

In the given scenario, a customer who contributes close to 60% of P Ltd.'s profits has been making turnaround demands that are unreasonable for the company employees to meet. P 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 P's <u>long term interests to protect its employees' rights (a non-financial consideration)</u>. Keeping this approach in mind, P Ltd. decided to terminate business with the profitable client. While this had a significant impact on revenues in the short term, <u>in the long run P Ltd. was able to get business from new clients.</u> Also, realizing the <u>value of service</u> provided, the 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 P Ltd.'s long term sustainability.

OR

Identification of Perspectives of Independent Situation - 'Balance Scorecard'

SI. No.	Organization	Perspective
(i)	Courier Company	Customer Perspective
(ii)	Tuition Centre	Learning and Growth Perspective
(iii)	Computer Manufacturing Company	Internal Business Perspective
(iv)	Government Taxation Department	Learning and Growth Perspective

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

Particulars		MT Ltd.	KG Ltd.	MG Bros.
Sales (units)		2,000	1,000	800
		(₹)	(₹)	(₹)
Sales Revenue	...(A)	2,20,00,000	1,10,00,000	88,00,000
Less: Average Variable Cost (₹5,500 × 60% = 3,300 p.u.)	...(B)	66,00,000	33,00,000	26,40,000
Contribution [70% of Sales] ...(A) - (B)		1,54,00,000	77,00,000	61,60,000
Less: Additional Overheads				
Delivery Cost (No. of K.M. × ₹200)		2,00,000	1,60,000	1,80,000
Emergency Delivery Cost (No. of Emergency Delivery × ₹21,000)		42,000	21,000	----
Order Processing Cost (No. of Orders × ₹6,000)		24,000	12,000	48,000
Specific Discount		55,00,000	22,00,000	13,20,000
Sales Commission		33,00,000	11,00,000	4,40,000
Advertisement Cost		8,75,000	6,15,000	4,30,000
Profit *per customer**		54,59,000	35,92,000	37,42,000
Profit Margin *per customer** (%)		24.81%	32.65%	42.52%
Rank		III	II	I

* Before Deducting General Fixed Overhead Cost

(ii) The Contribution Margin is 70% for each Customer but when the other Overheads Costs *per customer* is included in the above Profitability Statement the Profitability of the three Customers become different. MG Bros. is the most Profitable Customer.

5. (i) **Identification of Bottleneck:** Installation of cameras is the bottleneck in the operation cycle. The annual capacity for manufacturing and installation are given to be 750 camera units and 500 camera units respectively. Actual capacity utilization is 500 camera units, which is the maximum capacity for the installation process. Although, 'A One Security' can additionally manufacture 250 camera units, it is

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constrained by the maximum units that can be installed. Therefore, the number of units manufactured is limited to 500 camera units, subordinating to the bottleneck installation operation. Therefore, **'A One Security'** should focus on improving the installation process.

(ii) **Improving Capacity of Installation Technique:** Every camera sold increases the through put contribution by ₹1,500 per camera unit (sale price ₹2,500 per camera unit less direct material cost ₹1,000 per camera unit). By improving the current installation technique an additional 50 camera units can be sold and installed. This would involve total additional expenditure of ₹40,000. Hence, the incremental benefit would be:

Particulars	Amount (₹)
Increase in throughput contribution	75,000
(additional 50 camera units ₹1,500 per camera unit)	
Less: Increase in total expenditure	40,000
Incremental benefit	35,000

Since the annual incremental benefit is ₹35,000 per annum, **'A One Security'** should implement this improvement to installation technique, the current bottleneck operation.

(iii) **Improving Manufacturing Capacity:** Every camera sold increases the throughput contribution by ₹1,500 per camera unit (sale price ₹2,500 per camera unit less direct material cost ₹1,000 per camera unit). By improving the current manufacturing technique an additional 150 camera units can produced. This would involve a cost ₹100 per camera unit due to necessary changes to made in direct materials. Therefore, number of units manufactured can increase to 650 camera units. However, production of 150 camera units will not translate into additional sales, because each sale also requires installation by **'A One Security'**. In a year only 500 camera installations can be made, leading to an inventory pile up of 150 camera units. This is detrimental to **'A One Security'**, since it does not earn any contribution by holding inventory. Therefore, **'A One Security'** should not go ahead with the proposal to improve the manufacturing technique.

(b) (i) In participative budgeting, subordinate managers create their own budget and these budgets are reviewed by senior management. Such budget communicates a sense of responsibility to subordinate managers and fosters creativity. This is also called bottom up approach (sometime referred as participative approach).

As the subordinate manager creates the budget, it might be possible that the budget's goals become the manager's personal goal, resulting in greater goal congruence. In addition to the behavioural benefits, participative budgeting

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also has the advantage of involving individuals whose knowledge of local conditions may enhance the entire planning process.

The participative budget described here appears participative in name only. In virtually every instance, the participative input is subject to oversight and discussion by sales manager. Some amount of revision is also common. However, excessive and arbitrary review that substitutes a top-down target for a bottom-up estimate makes a deceit process. Such a gutting appears to be the case in EWPL. J's statement indicates a very autocratic style. The revision process also seems to be arbitrary and capricious. There is little incentive for the salesgirls to spend much time and effort in projecting the true expected sales because they know that the target would be revised again and J's estimate will prevail. This situation creates an interesting discussion about the costs and benefits of participative budgeting and gives rise to game playing and slack.

(ii) In top-down approach, budget figures will be imposed on sales personnel by senior management and sales personnel will have a very little participation in the budget process. Such budget will not interest them since it ignores their involvement altogether. While in bottom-up approach, each sales person will prepare their own budget. These budgets will be combined and reviewed by seniors with adjustment being made to coordinate the needs and goals of overall company. Proponents of this approach is that salespersons have the best information of customer's requirements, therefore they are in the best position in setting the sales goal of the company. More importantly, salespersons who have role in setting these goals are more motivated to achieve these goals. However, this approach is time-intensive and very costly when compared with top-down approach. In order to achieve personal goals, participants may also engage in politics that create budgetary slack and other problems in the budget system.

Since both top down and bottom-up approaches are legitimate approaches, so EWPL can use combination of both. Seniors know the strategic direction of the company and the important external factors that affect it, so they might prepare a set of planning guidelines for the salesgirls. These guidelines may include forecast of key economic variables and their potential impact on the EWPL, plans for introducing and advertising a new product and some broad sales targets etc. With these guidelines, salesgirls might prepare their individual budget. These budgets need to be reviewed to validate the uniformity with the EWPL's objectives. After review, if changes are to be made, the same should be discussed with salesgirls involved.

6. (a) Material M

The requirement of 1,000 units of Material M has to be purchased in entirety since there are no units in stock. Therefore, the relevant cost will be the replacement cost at ₹10 per unit, which for 1,000 units is ₹10,000 (1,000 units × ₹10 per unit).

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Material N

There is a requirement of 1,500 units of Material N, of which 600 units are in stock. Material N used regularly in the production of all types of dyes. If the 600 units in stock are used, they need to be replenished (replaced) in order to meet production demands of other dyes. In addition, for the special order, additional 900 units of Material N is required to be procured from the market. Therefore, 1,500 units of Material N has to be procured if the special order is undertaken. The relevant cost will be the replacement cost at ₹10 per unit, which for 1,500 units is ₹30,000 (1,500 units × ₹20 per unit).

Material O

There is a requirement of 1,000 units of Material O, of which 700 units are in stock. The balance 300 units have to be procured at the replacement (market) price of ₹13 per unit, which would be ₹3,900. Material O has no other use, so if the special order is not undertaken the stock of 700 units can be sold at ₹10 per unit. So, the opportunity cost of undertaking this order is ₹7,000. Therefore, the relevant cost for Material O is procurement cost of 300 units plus the opportunity cost of not disposing the current stock of 700 units, which would be ₹3,900 + ₹7,000 = ₹10,900.

Material P

The entire requirement of 250 units of Material P is in stock. If the special order is not accepted, Golden paints has two options (i) sell the excess material at ₹12 per unit or (ii) use it as a substitute for Material Z, which would otherwise need to be procured.

(i) The realizable value of Material P is ₹3,000 (250 units × ₹12 per unit).

(ii) Material P can be used as a substitute for 350 units of Material Z. Since there is no stock of Material Z currently, if the special order is accepted, the entire quantity would have to be procured at ₹11 per unit. This would cost the company ₹3,850 (350 units × ₹11 per unit).

Both options (i) and (ii) represent opportunity cost if the special order is accepted. The relevant cost for Material P, if the special order is accepted would be higher of either of these two opportunity costs. The higher opportunity cost of that of procuring Material Z from the market at ₹3,850. Therefore, the relevant cost for Material P is ₹3,850.

Therefore, the relevant cost to accepting the special order would be the cumulative of the relevant cost for Materials M, N, O, and P. This works out to ₹54,750.

(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 ₹21,24,600, if the actual sales volume had been in the budgeted sales proportion.

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The sales mix contribution variance shows that the variation in the sales mix resulted in a curtailment in profit by ₹5,70,600. 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

Sales Contribution Mix Variance

	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

	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)