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FINAL MAY 2019 EXAM

SUBJECT- SCM & PE

Test Code - FNJ 7165

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Answer 1:

(i) **HAL's Control System** HAL's current control system is 'focused exclusively' on the manufacturing process and its efficiency even though HAL is also a retailer and installer of industrial ACs. It is suitable for HAL's control system to monitor manufacturing efficiency with the help of the three variances: material usage, material price and manufacturing labour efficiency. No reasons have been given for focusing on these three variances and there may be other variances which can provide useful control information that are not currently computed for example, labour rate and material yield. Although HAL uses standard costing, it is unclear whether it calculates product costs. A lack of product costs computation may be the reason that it was shocked about its 2017 profit margin. Standard costing could be in criticism for misdirecting management's attention. Thus, in the case of a 'Summer – Cool' AC where the highest standards of materials are used, it is pertinent that the quality of the finished product is not compromised. Therefore, it might be proper to accept an unfavourable material price variance to maintain the product's standards. Variance analysis should not be done in isolation but a holistic view needs to be taken about HAL's operations and the current control system may not lead to this. HAL is not currently controlling and monitoring aspects which are important for competitive success. HAL's Critical Success Factors have not been identified yet. There is monthly reporting of variances but in addition to this, there should also be follow – up actions for outcome resulting from these reports. However, a month is not inevitably the relevant reporting period for all aspects of HAL's business. If there is a production problem leading to excessive materials wastages, a month is too long time to wait before remedial action are taken. Therefore, real time or coexistent reporting may be more relevant for manufacturing operations. A major deficiency of HAL's control systems is that they do not extend to retailing and installation activities. The 'Summer' installation teams are incentivized to complete ACs which could be good for their productivity. However, there is a high level of complaints associated with their work. As there is no evident means of monitoring the installation team's work, the reasons of the complaints cannot be identified.

(ii) **Critical Success Factors (CSF)** are elements tied to the strategy of business and they represent objectives that business is trying to achieve, as a corporation, as a department or as a business unit. Critical success factors may vary over time and may include items like employee attitudes, manufacturing flexibility etc. There are a range of CSF's which could be appropriate for HAL. They include :

CSF : Installations Quality There are different quality expectations for the two ACs and there have been different levels of quality achieved, can be seen in the historic pattern of complaints. This strongly implies that the quality of installation should be tracked as a separate CSF for each AC. This CSF is important for HAL due to cost implications of rectifications and guarantee claims. It is also important to consider that because of the effect that poor quality will have on HAL's future business.

CSF : Customer Satisfaction Like quality, this CSF will need to be monitored separately for each AC. Customer satisfaction encompass the complete life of a transaction

beginning with the initial enquiry about a purchase and continuing after installation for the life of the AC. Customer satisfaction will have an influence on HAL's future business which is dependent, in part, on repeat orders and recommendations. This CSF will also show the market's view of HAL's brand.

CSF: Brand Performance HAL has two distinct brands. They are directed at different market segments and have different associated attributes. 'Summer' ACs offer limited choice to the customer and retail, on average, for Rs. 36,000. HAL would like to maintain this business at its present level (7,000 ACs a year minimum) Rs. 252 million revenue. HAL needs to ascertain where this brand is situated in its life – cycle and what marketing activities may be required to support it. The 'Summer – Cool' brand is aimed at a different market segment and HAL would like to grow this aspect of its business which produces revenue of Rs. 504 million. The success of both brands is important for the continual success of HAL and this CSF indicate a complete view of performance.

CSF : Manufacturing Excellence HAL manufactures all the ACs which it sells and installs. Manufacturing must be a substantial part of HAL's total costs and a significant contributor to profitability. Currently, HAL monitors some limited aspects of manufacturing through its control system. However, there are many other aspects which have not been reported upon, for example – innovation, labour abseentism, manufacturing flexibility and investment in technology. This CSF is much broader than the current control system. It also assists in searching for competitiveness.

(iii) **Standard Costing and Reporting System** HAL may be required to abandon or modity its standard costing and reporting system. The rationale behind this is that the current control system might lead to an inappropriate emphasis being placed on certain aspects of performance. It is noteworthy that the installations for 'Summer' AC is causing a substantial level of complaints whereas there has never been a complaint made about a 'Summer Cool' AC. It could be that the different remuneration arrangements for the ACs' installation teams have led to this and as the complaint level is an important aspect of the CSF i.e. Customer Satisfaction, HAL may need to modify its remuneration arrangements. It should also reckon whether it would be benefited from a broader range of variance reporting, for example, it may find reporting useful to report on labour rates and material yield. For all CSFs, HAL will need to determine the appropriate reporting intervals. Although it is useful to synchronize this with the accounting reporting cycle, CSFs and KPIs do not necessarily coexist with accounting period ends. Some KPI's may require to be reported in real – time, for example, material wastage, others may be of a longer duration like Customer Satisfaction. There is a strong argument for disassociation of the CSFs reporting from the financial reporting cycles.

(20 marks)

Answer 2:

(A)

This questions shows that RI is subject to a size effect but ROI is not. The **larger size for the W_1 Division** (which is more than 6 times that of the W_2 Division) overcomes its **lower profitability,** as measured by ROI. Thus, RI is not a good way to compare divisions that differ greatly on size. **(2 marks)**

Workings

	W_1 (Rs.)	W_2(Rs)	Remark
ROI	12.50%	20.00%	W_2 division has the higher ROI.
	(Rs. 1,20,00,000/ Rs. 9,60,00,000)	(Rs. 31,20,000/ Rs. 1,56,00,000)	
RI	Rs. 24,00,000	Rs. 15,60,000	W_1 division has the higher RI.
	(Rs. 1,20,00,000 – 0.1 × Rs. 9,60,00,000)	(Rs. 31,20,000 – 0.1 × Rs. 1,56,00,000)	

(3 marks)

(B)

Calculation of Loss of Time Per Shift

	Mins.
Lunch Break	30
Tea Break	15
Breakdown, Repair, and Startup Time (68 mins / 2 Shift)	34
Total Time Loss Per Shift	79

Availability Ratio per shift = $\left\{\frac{480\ mins.-79\ mins.}{480\ mins.}\right\} \times 100\%$

= 83.54% **(0.5 mark)**

Actual Production = 140 tablets per shift

Standard time = 2.5 minutes

Standard Time Required = 140 units × 2.5 minutes

= 350 minutes **(0.5 mark)**

Actual Time Taken = 480 mis. – 79 mins.

= 401 minutes **(0.5 mark)**

Performance Ratio = $\left\{\frac{350\ mins.}{401\ mins.}\right\} \times 100\%$

= 87.28% **(1 mark)**

Quality Ratio = $\left\{\frac{140\ tab.-25\ tab.}{140\ tab.}\right\} \times 100\ \%$

= 82.14% **(0.5 marks)**

Thus, OEE = 0.8354 × 0.8728 × 0.8214

= 59.89% **(0.5 marks)**

Since OEE of SSK Pharmaceuticals Ltd. is lesser than 85% i.e. World Class Performance Level, **Company is advised to improve its each ratio** i.e. availability ratio, performance ratio and quality ratio by collecting information related to all downtime and losses on machines, analyzing such information through graphs and charts, making improvement decisions thereon like autonomous maintenance, preventive maintenance, reduction in set up time etc. and implementing the same. **(1.5 marks)**

(C)

For commercial enterprises, generating profits is a very important objective. Likewise, **not-for- profit enterprises** have certain **cultural, social or educational objectives** for which they are created. Regardless of the type of organization, it is important to know whether the internal operations meet certain performance benchmarks, that will ensure that the organization achieves its objectives in a better manner. Moreover, even if the organization does not operate for profits, it is important for it to be **"cost effective". Resources (including money) should be used optimally to achieve intended outcomes**. For example, HS can use this benchmarking tool to look into the following **questions:**

(a) Does the organization function in an efficient and cost effective manner?
(b) Does the estate management make best use of the buildings to achieve the objectives of the organization?
(c) Does the estate management function manage upkeep of buildings in terms of repairs and improvements in an effective manner?
(d) Are the tenants satisfied with the service provided by the estate management and the suitability of the accommodation for their needs?

"Value for Money (VFM)" is an assessment made based on the criteria of economy, efficiency and effectiveness.

Economy *involves* ***minimising resource consumption*** *while meeting specified requirements of quality and quantity.* Minimize the cost of resources / required inputs (implies to spend less) while ensuring that the desired quality of service is achieved. For HS, inputs could be purchases made for maintenance and repair work like sanitary fittings, AC, wooden structure for the houses etc., while resources could be the labour employed to carry out these services. HS should aim at purchasing required quality of inputs at the least possible price. Skilled labour needed for this job should be procured at the lowest pay scale possible. Procuring these at lower cost leads to savings for HS. At the same time, HS should ensure that cost cutting / saving does not come at the cost of quality. Lower quality, implies inferior service levels, which ultimately will compromise HS' social commitment to provide quality housing to needy members of its community.

Efficiency involves ***maximising the ratio between resources (input) and the output of goods, services or other results.***

The **focus of efficiency** is on the process of rendering service. The objective of efficient operations is to **maximize output using minimum resources**. Improved productivity means that resources procured are used in an optimal way (implies spending well).

In the case of HS, one of the resources is the labour employed for repair and maintenance work. Efficiency (productivity) measured would be the relationship between the employees available and the repair work performed by them**. If the pool of employees do more repair work than the benchmark set, productivity is higher**. This also closely ties up with economy (cost) of operations. If the given pool of employees (resources), who are paid optimum salary (cost), cater to more repair and maintenance work, economy of operations is achieved due to higher productivity of operations. In case

these activities are outsourced, efficiency and economy can be achieved by calling for tenders. Select the tender that provides maximum work for least cost.

In addition, HS may explore options for efficiencies from business process improvements, shared services as well as further efficiencies with in assets management.

Effectiveness involves *ensuring that* ***the outcome achieves the desired policy aims and objectives.*** Have the objectives been achieved, how does the impact of the actual output / service compare with its intended impact? (Implies to spend money wisely to achieve desired objectives).

In the case of HS, effectiveness could be assessed based on the following questions

(a) Are the housing needs of the targeted community members met?
(b) Are the tenants satisfied with the accommodation?
(c) Given its social cause, are the staff friendly, courteous and hospitable to the customers?
(d) Do the housing accommodations comply with safety standards and other legal requirements?

Each measure is inter linked with the other. For example, HS has replaced sanitary fittings in the kitchen and bathroom in 45 houses for Rs.26,100 each, costing a total of Rs.11,74,500. Compared to ES that has spent Rs.52,200 on each house for sanitary fitting replacement. For the cost of Rs. 11,74,500 ES could have replaced fittings in only 22 houses (Rs.11,74,500 / 52,000) as compared to HS' ability to replace fittings in 45 houses. Therefore, HS' decision has been economical, getting more work done for same cost. At the same time, this does not indicate whether the fittings replaced by HS are of similar or better quality as compared to ES. ES could have used better quality fittings that last longer, enhance customer experience, safety etc. The spending by ES could have been more effective than HS because it helps achieve the desired objective of customer satisfaction, safety and lesser running cost for maintenance. Therefore, to achieve economy, HS may have compromised on effectiveness.

Benchmarking is a good method of measuring performance it enables a comparison of the process, costs etc. with those of a close competitor. Services will be expected to use benchmarking information to learn from best practice, change procedures and processes to achieve enhanced methods of working, and reduce unnecessary expenditure.

However, **benchmarking of performance against ES is not ideal**. The performance of HS can be better measured by adopting *benchmarking against similar charities* whose primary objective is the provision of accommodation to the communities in which they operate.

Thus, HS must have permanent membership of the House Benchmarking Organisations, which helps social housing property-owners to compare the costs of service delivery, resources, and key performance indicators across all areas of the business. For example, the management of HS can enquire about a norm in respect of the repair charges, sanitary charges or wood structure replacement charges etc. of similar non-profit seeking organisations.

Further, benchmarking should be conducted annually to analyse all areas of the business and is used to identify high performing, low cost services. Using the annual benchmarking exercise results, the HS can plan to target those areas that are low performing and high cost.

Overall, HS should have **strong commitment to value for money**, which needs to be **reflected in the business plan and in service-delivery plans**. By applying these principles

HS would be able to achieve the optimum utilisation of resources, which will in turn lead to extra capacity and allow HS to provide better services. **(10 marks)**

Answer 3:
(A)

(i) Assumed Quotation Price 'P', Quantity 'Q'

The Marginal Cost of a 'Wagon' is Rs. 13,60,000

(Rs. 2,20,000 × 4 Casnub Bogies + Rs. 4,80,000) **(1 mark)**

Demand Function for a 'Wagon'

P	= Rs. 17, 10,000 – (Rs. 50,000/2) × Q
Revenue (R)	= Q × [17,10,000 – 25,000 × Q]
	= 17,10,000 Q – 25,000 Q^2
Marginal Revenue (MR)	= 17,10,000 – 50,000 Q
Marginal Cost (MC)	= 13,60,000

(1 mark)

Profit is Maximum where Marginal Revenue (MR) equals to Marginal Cost (MC)

17,10,000 – 50,000 Q	= 13,60,000
Q	= 7.00 units

By putting the value of 'Q' in Demand Function, value of 'P' is obtained.

P	= 17,10,000 – (50,000/2) × Q
	= 17,10,000 – 25,000 × 7.00
	= Rs. 15,35,000

At Rs. 15,35,000 unit Quotation Price of a Wagon the Eastern Company Ltd.'s profit will be Maximum. **(2 marks)**

(ii) At CBD the Divisional Manager would ensure that Divisional Marginal Revenue should be equal to Division's Marginal Cost so that Profit can be Maximum.

MR of a Casnub Bogies	= MC of Manufacturing a Casnub Bogies
3,20,000 – 2 (10,000/30) × Q	= 2,20,000
Q	= 150 units

Selling price of a Casnub Bogie 'P' is

P	= 3,20,000 – (10,000/30) × 150
	= Rs. 2,70,000

(2 marks)

CBD will earn Maximum Profit when it will Quote Rs. 2,70,000 to the Outside Market. Since, Outside Market Quotation is Transfer Price as well, so Transfer Price to WD will be Rs. 2,70,000 and it forms part of WD's Marginal Cost.

At WD, Division Manager would ensure that Divisional Marginal Revenue should be equal to Division's Marginal Cost so that Profit can be Maximum.

MR of a Wagon = MC of Manufacturing a Wagon
17,10,000 – 50,000 ×Q = (Rs. 2,70,000 × 4 Casnub Bogies) + Rs. 4,80,000
Q = 3.00 units

(2 marks)

Quotation Price of a Wagon 'P' should be :
P = Rs. 17,10,000 – 25,000 × 3.00
= Rs. 16,35,000 **(1 mark)**

The unit Quotation Price of Wagon that emerges as a result of Market Based Transfer Pricing is Rs. 16,35,000. **(1 mark)**

(B)

(i) Statement of 'Expected Quality Costs'

Particulars	**Current Situation (Rs.)**	**Proposed Situation (Rs.)**
Prevention Costs	---	4,50,000
Appraisal Costs	---	50,000
External Failure Costs	3,20,000	2,35,120
Internal Failure Costs	7,55,556	3,91,538
Total Quality Costs	10,75,556	11,26,658

(2 marks)

Workings

External Failure Cost

Particulars	**Current Situation**	**Proposed Situation**
Customer's Demand …(A)	28,000 units	28,000 units
Number of units Dispatched to Customers …(B)	32,000 units	30,939 units
Number of units Replaced …(B) – (A)	4,000 units	2,939 units
External Failure Cost {4,000 units × Rs.(35+25+15+5)}; {2,939 units × Rs.(35+25+15+5)}	Rs.3,20,000	Rs.2,35,120

(2 marks)

Internal Failure Cost

Particulars	**Current Situation**	**Proposed Situation**
Number of units Dispatched to Customers …(A)	32,000 units	30,939 units
Number of units Produced & Rejected …(B)	40,000 units	34,377 units

50000 units / 80%) , (30939 units / 90%)		
Number of units Discovered Faulty … (B) – (A)	8,000 units	3,438 units
Cost of Faulty Production …(D) {8,000 units × Rs.(35+25+15)}; {3,438 units × Rs.(35+25+15)}	Rs.6,00,000	Rs.2,57,850
Material Scrapped (40000 units / 90% x 10%) , (34777 units / 90% x 10%)	4,444.44 units	3,819.67 units
Cost of Material Scrapped …(E) {4,444.44 units × Rs.35}; {3,819.67 units × Rs.35}	Rs.1,55,556	Rs.1,33,688
Internal Failure Cost …(D)+(E)	Rs.7,55,556	Rs.3,91,538

(4 marks)

(ii) Recommendation

On purely *financial grounds* the company should not accept the proposal because there is an increase of Rs.51,102 in quality costs. However there may be *other factors* to consider as the company may enhance its reputation as a company that cares about quality products and this may increase the company's market share.

On balance the company should accept the proposal to improve its *long-term* performance. **(2 marks)**

Answer 4:

(A)

Working

Statement Showing Computation of Standard Cost/ Actual Cost/ Revised Actual Quantity

Input	Standard Cost			Actual Cost			Revised Actual quantity [RAQ] (Kg.)	Std. Cost of Actual Qty. [AQ × SP] (Rs.)
	Quantity [SQ] (Kg.)	Price [SP] (Rs.)	Amt. [SQ × SP] (Rs.)	Quantity [AQ] (Kg.)	Price [AP] (Rs.)	Amt. [AQ × AP] (Rs.)		
Q	2,15,625	18.00	38,81,250	2,21,000	18.10	40,00,100	2,10,000	39,78,000
	$\left(\frac{69,000kg}{96\%} \times 3\right)$							
R	5,03,125 $\left(\frac{69,000\ k}{96\%} \times 7\right)$	6.00	30,18,750	4,79,000	5.80	27,78,200	4,90,000	28,74,000

	7,18,750	69,00,000	7,00,000			67,78,300	7,00,000	68,52,000

(2 marks)

Computation of Variances

Sales Price Variance = Actual Sales – Standard Sales

= AP × AQ – BP × AQ

OR

= AQ × (AP – BP)

= 71,000 kg × (Rs. 203 - Rs. 200)

= Rs. 2,13,000 (F) **(1 mark)**

Sales Volume Variance * = Standard Sales – Budgeted Sales

= BP × AQ – BP × BQ

OR

= BP × (AQ – BQ)

= Rs. 200 × (71,000 kg – 72,000 kg)

= Rs. 2,00,000 (A) **(1 mark)**

Material Price Variance = Standard Cost of Actual Quantity – Actual Cost

= (SP × AQ) – (AP × AQ)

OR

= (SP – AP) × AQ

Q = (Rs. 18.00 – Rs. 18.10) × 2,21,000 kg

= Rs. 22,100 (A)

R = (Rs. 6.00 – Rs. 5.80) × 4,79,000 kg

= Rs. 95,800 (F)

Total = Rs.22,100 (A)+ Rs. 95,800 (F)

= Rs. 73,700 (F) **(3 marks)**

Material Mix Variance = SP × (RAQ – AQ)

Q = Rs. 18 × (2,10,000 kg. – 2,21,000 kg.)

= Rs. 1,98,000 (A)

R = Rs. 6 × (4,90,000 kg. – 4,79,000 kg.)

= Rs. 66,000 (F)

Total = Rs. 1,98,000 (A) + Rs. 66,000 (F)

= Rs. 1,32,000 (A) **(3 marks)**

Alternative

Material Mix Variance = Total Actual Quantity (units) × (Average Standard Price per unit of Standard Mix – Average Standard Price per unit of Actual Mix)

= 7,00,000 kg. $\times\left(\frac{Rs.69,00,000}{7,18,750\ kg.} - \frac{Rs.68,52,000}{7,00,000\ kg.}\right)$

= Rs. 1,32,000 (A)

Material Yield Variance = SP × (SQ – RAQ)

= Rs. 18 × (2, 15,625 Kg. – 2,10,000 Kg)

= Rs. 1,01,250 (F)

R = Rs. 6 × (5,03,125 kg. – 4,90,000 kg.)

= Rs. 78,750 (F)

Total = Rs. 1,01,250 (F) + Rs. 78,750 (F)

= Rs. 1,80,000 (F) **(3 marks)**

Alternative

Material Yield Variance = Average Standard Price per unit of Standard Mix × [Total Standard Quantity (units) – Total Actual Quantity (units)]

= $\left(\frac{Rs.69,00,000}{7,18,750\ kg.}\right) \times (7,18,750\ kg. - 7,00,000\ kg.)$

= Rs. 1,80,000 (F)

FO Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads.

= Rs. 5,60,000 – Rs. 5,08,000

= Rs. 52,000 (F)

FO Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

= Rs. 8 × 69,000 kg. – Rs. 5,60,000

= Rs. 8,000(A)

Sales Volume Variance * can also be computed on margin basis. (3 marks)

(B)

Environmental Management Accounting (EMA) is the **process of collection and analysis of the information relating to environmental cost for internal decision making.** EMA identifies and estimates the cost of **environment related activities** and seek to control theses cost.

In Gulf Oil, during refinery operations, waste water, fugitive emissions, flue gases and solid wastes are generated. Due to this excess waste and gas emission, environmental cost rises. Scarce natural resources should be used in such a way so that their consumption is sustainably optimized. In order to cutback environmental cost, EMA can be applied as follows: **(1 mark)**

Waste

Gulf Oil should measure, manage and monitor waste from operations in order to minimise impact on people and the environment. **'Mass balance' approach** can be used to determine how much material is wasted in production, whereby the weight of materials bought is compared to the product yield. From this process, **potential cost savings may be identified**. In Gulf Oil, wastes are oily / chemical / biological sludge, scrape batteries, e–waste, chemical containers, effluent etc. Waste generated in operations is either treated within the premise or disposed through approved waste

treatment, storage, and disposal facility. To avoid the usage of chemical drums/ containers in large quantity, separate storage tanks can be created for bulk storage of additives to reduce the drum procurement and disposal.

Further, refineries in operation should be upgraded from time to time to minimize waste. **(2 marks)**

Water Management

Businesses **pay for water twice – first, to buy it and second, to dispose of it**. If savings are to be made in terms of reduced water bills, it is important for Gulf Oil to identify where water is used and how consumption can be decreased.

For water conservation, **sustainable water management techniques should be adopted**. In refining operation, water is mainly used in boilers and cooling units. Collective efforts should be made to optimize water consumption and maximum reuse of used water. Advanced treatment system like rain water harvesting, ultra-filtration, reverse osmosis etc. may be used for water purification for further use. This would lead to substantial reduction in intake of fresh water.

In addition, Gulf Oil staff should be alerted for water conservation through **seminars, presentations, conference, awareness campaigns.** **(2 marks)**

Energy

Often, energy costs can be reduced significantly at very little cost. Environmental Management Accounts may help to **identify inefficiencies and wasteful practices** and, therefore, opportunities for cost savings. Some of energy conservation initiatives may be taken by Gulf Oil like:

- Conducting periodic energy audits for identifying energy saving opportunities.
- Phasing out conventional lights and replacement with LED lights/induction lights.
- Power factor improvement by installation of capacitor banks.
- Installation of 5 star rated energy equipment.
- Prevention of idle running of equipment.
- Installation of solar lights.
- Use of Nano molecular thermal additives in ACs.
- Installation of efficient energy monitoring system for energy intensive equipment.
- Capacity improvement for batteries. **(2 marks)**

Consumables and Raw Material

Refineries 'refine' crude oil in massive quantities, to produce the fuels need. There should be **continuously monitoring on optimum utilization of crude oil to improve gross refining margin.** The gross refining margin is the **difference between the total value of petroleum products coming out of an oil refinery (output) and the price of the raw material, (input) which is crude oil**. Even not only crude oil there should also be optimum and sustainable utilization of resources like additives, chemicals etc. from procurement to production stages.

Gulf Oil may use recyclable technology for raw material and consumable wastages which provides sustainability in terms of environmental protection and reduction in carbon footprint. Periodic testing should be performed to assess the health of

equipment and pipelines as to have better process of raw materials and consumables.

(2 marks)

Transport

Again, EMA may be used to identify **saving in terms of transport of goods and materials**. At Gulf Oil, in order to cutback emission and fuel consumption due to transportation, route optimization activity may be used like allocation of customer on the basis of nearest depots and locations as to reduce distance, real time fleet tracking using GPS (to make sure that vehicles do not deviate from assigned shortest route) etc. **(1 mark)**

Answer 5:
(A)

Statement Showing Change in Profit

Particulars	**Large (Rs.)**	**Medium (Rs.)**	**Total (Rs.)**
I. Effect of Product Mix Changes			
Revised Estimated Sales Quantity (Ratio 40:60)	62,304	93,456	1,55,760
Revised Estimated Sales Quantity (Ratio 50:50)	77,880	77,880	1,55,760
Difference in Sales Quantity	(15,576)	15,576	NIL
Contribution Effect Thereon @ Rs.8.60 and Rs.10.60	(1,33,953.60)	1,65,105.60	**31,152**
II Effect of Volume Change			
Revised Estimate of Sales Quantity (50:50)	77,880	77,880	
Original Estimate of Sales Quantity (50:50)	60,000	60,000	
Difference in Sales Quantity	17,880	17,880	35,760
Contribution Effect Thereon @ Rs.8 and Rs.10	1,43,040	1,78,800	**3,21,840**
III. Effect of Price Change			
Revised Estimate of Sales Quantity (Ratio 40:60)	62,304	93,456	1,55,760
Difference in Price p.u.	0.60	0.60	0.60
Contribution Effect	37,382.40	56,073.60	**93,456**
IV. Effect of Expenses			
Sales Promotion Expenses			**(78,000)**
Savings in Interest			**9,000**
Overall Increase in Profit			**3,77,448**

(6 marks)

Total Improvement in Profit Rs.3,77,448 (11.51%).

Workings

Budget for Original and Revised Contribution

Particulars	Original Budget Estimate		Revised Estimate	
	Description	(Rs.)	Description	(Rs.)
Market- Sales Quantity	12,00,000 units		14,16,000	
Company's Share	1,20,000 units (10% of total)		1,55,760 units (11% of total)	
Sales Quantity				
Large	60,000 units (50% of mix)		62,304 (40% of mix)	
Medium	60,000 units (50% of mix)		93,456 (60% of mix)	
Contribution Earned				
Large	60,000 units × Rs.8	4,80,000	62,304 units × Rs.8.60	5,35,814.40
Medium	60,000 units × Rs.10	6,00,000	93,456 units × Rs.10.60	9,90,633.60
Particulars	**Original Budget Estimate**		**Revised Estimate**	
	Description	**(Rs.)**	**Description**	**(Rs.)**
Effect of Expenses				
Sales Promotion		---		-78,000
Interest		---		9,000
Revised Contribution		10,80,000		14,57,448

(5 marks)

This question can also be solved by computing Sales Contribution Price Variance, Sales Contribution Mix Variance, Market Size Variance, Market Share Variance.

(B)

JTC Ltd.

Cost Sheet of One Lot of 250 Croquet Mallets

Computation of Total Cost :	**Rs.**
Direct Material	
Handles (2.5 feet × 250 units × 50)	31,250
Heads (1.20 × 250 × 0.40 × Rs. 60) [W.N. – 1]	7,200
Less : Scrap Recovery (4% × 50 × Rs. 10)	(20)
Direct Labour (8 Hrs. × Rs. 6 × 250/120) [W.N. – 2]	100
Prime Cost	38,530
Factory & Other Overheads	
Variable, Finishing & Painting (20,000 × 250 / 20,000) [W.N. – 3]	250
Fixed (Rs. 72,000 × 250 / 18,000) [W.N. – 4]	1,000

Total Cost	39,780

(4 marks)

Price Quotation :	**(Rs.)**
Cost per mallet (Rs. 39,780/250 Units)	159.12
Add : Profit (50% on Cost)	79.56
Selling Price	238.68

(1 mark)

Working Notes:

1. Since 20% of completed heads are spoiled, output of 1 units requires input of 1.20 units (1 + 0.20); so, total heads processed, 300 (1.20 × 250), of which spoiled heads are 50.

2.

Total Time in a day	(8 × 60)	480 minutes
Less : Idle time	48 minutes	
Coffee Break	15 minutes	
Instructions	9 minutes	
Training	8 minutes	80 minutes
Productive Time per day :		400 minutes

Therefore, mallets to be produced per man per day, 120 units (400 / 40 × 12).

Since mallets are produced at the rate of 120 mallets per man day, so total monthly production will be 18,000 mallets (120 units × 6 men × 25 days).

3. Finishing and painting overheads are assumed to be variable for the production of 20,000 mallets.

4. All the other expenses are fixed and are to be absorbed by 18,000 (120 units × 6 men × 25 Days) mallets of monthly production. **(1 mark x 4 = 4 marks)**

Answer 6:

(A)

Workings :

Statement Showing 'Inventory Holding Cost' under Current System

Particulars	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Opening Inventory* (A)	-	650	690	430	880	1,030
Add : Production *	3,800	3,800	3,800	3,800	3,800	3,800
Less : Demand *	3,150	3,760	4,060	3,350	3,650	4,830
Closing Inventory* (B)	650	690	430	880	1,030	-
Average Inventory $\left(\frac{A+B}{2}\right)$	325	670	560	655	955	515
Inventory Holding Cost @ Rs.70	22,750	46,900	39,200	45,850	66,850	36,050

(3 marks)

(*) in terms of standard labour hours

Inventory Holding Cost for the six months = Rs. 2,57,600

= (Rs. 22,750 + Rs. 46,900 + Rs. 39,200 + Rs. 45,850 + Rs. 66,850 + Rs. 36,050)

(1 mark)

Calculation of Relevant Overtime Cost under JIT System

Particulars	Jan	Feb	Mar	Apr	May	Jun
Demand *	3,150	3,760	4,060	3,350	3,650	4,830
Production *	3,150	3,760	4,060	3,350	3,650	4,830
Normal Availability*	3,800	3,800	3,800	3,800	3,800	3,800
Shortage (= Overtime*) (C)	--	---	260	--	---	1,030
Actual Overtime Hours $\left(\frac{C}{0.95}\right)$	---	---	273.68	-----	----	1,084.21
Overtime Payment @ Rs. 159.50 [110 + 45%]	---	----	43,652	----	-----	1,72,931

(*) in terms of standard labour hours **(3 marks)**

Total Overtime Payment = Rs. 2,16,583

(Rs. 43,652 + Rs. 1,72,931)

Therefore, saving in JIT System = Rs. 2,57,600 – Rs. 2,16,583 = Rs. 41,017

(1 mark)

Comments

Though YPL is saving Rs. 41,017 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 : -

(i) YPL 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.

(ii) 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.

(iii) YPL should also aim to improve quality at its process and design levels with the purpose of achieving "**Zero Defects**" in the production process.

(iv) YPL should also keep in mind the **efficiency of its work force**. YPL 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 retained and focused on a wide range of activities. **(0.5 mark x 4 = 2 marks)**

(B)

(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, ZPS can additionally manufacture 250 camera units, it is constrained by the maximum units that can be installed. Therefore, ZPS should focus on improving the installation process. **(2 marks)**

(ii) **Improving Capacity of Installation Technique :** Every camera sold increases the through put contribution by Rs. 1,500 per camera unit (sale price Rs. 2,500 per camera unit less direct material cost Rs. 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 Rs. 40,000. Hence, the incremental benefit would be :

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

Since the annual incremental benefit is Rs. 35,000 per annum, ZPS should implement this improvement to installation technique, the current bottleneck operation. **(3 marks)**

(iii) **Improving Manufacturing Capacity:** Every camera sold increases the throughput contribution by Rs. 1,500 per camera unit (sale price Rs. 2,500 per camera unit less direct material cost Rs. 1,000 per camera unit). By improving the current manufacturing technique an additional 150 camera units can produced. This would involve a cost Rs. 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 ZPS. In a year only 500 camera installations can be made, leading to an inventory pile up of 150 camera units. This is detrimental to ZPS, since it does not earn any contribution by holding inventory. Therefore, ZPS should not go ahead with the proposal to improve the manufacturing technique. **(3 marks)**

(C)

<u>4Ds of IT Cost Optimization Framework</u>

1. Defining organization Vision
2. Documentation of Current state
3. Delineation of target business architecture
4. Decision : Build vs. Buy **(0.5 mark x 4 = 2 marks)**