After meeting with your reporting officer , you mailed to various concerned department and requested for data.
The following information has been obtained in relation to the contract:
Today, 10.05 A.M.
You got an e-mail from Production Manager, it has been informed that 40 tonnes of material Dx would be required . This material is in regular use by AUS and has a current purchase price of 380 per tonne. Currently , there are 5 tonnes in inventory which cost 350 per tonne. The resale value of the material in inventory is 240 per tonne.

Further, with regards to components , it has been informed that 4,000 components would be required. These could be bought externally for 15 each or alternatively they could be supplied by ANZ Ltd. The variable cost of the component if it were manufactured by ANZ Ltd. would be 8 per unit. ANZ Ltd. has sufficient capacity to produce 2,500 components without affecting its ability to satisfy its own external customers. However, in order to make the extra 1,500 components required by AUS Ltd., ANZ Ltd. would have to forgo other external sales of 50,000 which have a contribution to sales ratio of 40%. To have uniformity in the quality of the component, it is assumed that AUS Ltd. would procure its entire requirement of 4,000 components either externally or from ANZ Ltd. The transfer pricing policy of Aditya Group for sales between units aims at goal congruence . The unit selling the goods would be allowed to charge any opportunity cost on account of catering to internal demand, while the purchasing unit should ensure that the company is not at a loss.

Today, 10.45 A.M.
You got an e-mail from Personnel Manager, it has been informed that 2,000 high skilled labour hours would be required. The grade of labour required is currently paid 5 per hour. Highly skilled labour is in short supply and cannot be increased significantly in the short -term. This labour is presently engaged in meeting the, demand for product 'G', which requires 4 hours of highly skilled labour. The contribution from the sale of one unit of product L is 24.
It has also been informed that the contract would require a specialist machine. The machine could be hired for 15,000 or it could be bought for 50,000 . At the end of the contract if the machine were bought, it could be sold for 30,000. Alternatively, it could be modified at a cost of 5,000 and then used on other contracts instead of buying another essential machine that would cost 45,000. The operating costs of the machine are payable by AUS whether it hires or buys the machine. These costs would total 12,000 in respect of the new contract.
Supervisor
The contract would be supervised by an existing manager who is paid an annual salary of 50,000 and has sufficient capacity to carry out this supervision . The manager would receive a bonus of 5,000 for the additional work.

Development Time

15 hours of development time at a cost of 30,000 have already been worked in determining the resource requirements of the contract.

Fixed Overhead Absorption Rate

AUS uses an absorption rate of 20 per direct labour hour to recover its general fixed overhead costs . This includes 5 per hour for depreciation.

Today, 11.15 A.M: Ms. Fiona called you in her place as asked you the following:

Required

(i) CALCULATE the relevant cost of the contract to AUS. You must present your answer in a schedule that clearly shows the relevant cost value for each of the items identified above . You should also EXPLAIN each relevant cost value you have included in your schedule and why any values you have excluded are not relevant. Ignore taxation and the time value of money.

(ii) DISCUSS two problems that can arise as a result of setting prices using relevant costing.

Business Situation- 2

Today, 5.26 P.M: A memo from Managing Director of the group has been circulated to all officers of the group which stated "My objective for the forthcoming year is to reduce our quality costs in each of the primary activities in our value chain". The company is keen to build a reputation for quality and gives a five-year guarantee with all of its products .

Today, 5.37 P.M: Ms. Fiona, called you in her place and asked the following:

Required

(iii) EXPLAIN, by giving examples , how each of the four types of quality cost could be reduced. You should also IDENTIFY in which primary activity each one of your examples would occur in Aditya Group's value chain.

Solution

Statement Showing Relevant Cost

Type of Cost	Explanation	Amount (t')
Material Ox (40 tonnes x 380)	1	15 ,200
Components	2	52 ,000
Direct labour (2 ,000 hrs. x11)	3	22 ,000
Specialist machine	4	10 ,000
Machine operating cost	5	12 ,000
Super vision	6	5,000
Development time	7	Nil
General fixed overhead	8	Nil
Total relevant cost		1,16 ,200

Explanation

1. Material Ox is in regular use by AUS Ltd. and must be replaced. Consequently , its relevant value is its replacement cost. The historical cost is not relevant because it is a past cost and the resale value is not relevant because AUS Ltd. is not going to sell it because the material is in regular use.
2. AUS Ltd. would like to procure 4,000 components either from ANZ Ltd. or externally from the market. At the current production level, ANZ Ltd. (seller) has available capacity to accommodate part of AUS Ltd's request to the extent of 2,500 components . At this point, ANZ Ltd. would be operating at its maximum capacity.

   To cater to the remaining demand of 1,500 units from AUS Ltd., ANZ Ltd. has to forego external sales of 50,000 to its own customers. Given that the contribution to sales ratio is 40%. Therefore, ANZ Ltd. has to forego contribution of 20 ,000 (40% of external sales foregone 50,000) in order to cater to AUS Ltd.'s request. Fixed cost at ANZ Ltd. is irrelevant, since it would be incurred irrespective of whether AUS Ltd.'s order to catered to or not.

   Therefore , in spirit of goal congruence, the transfer price that ANZ Ltd. would charge AUS Ltd. would be the variable cost of 8 per unit and 20,000 towards lost contribution as explained above. Therefore, the transfer price

   = (8 per unit x 4,000 components) + 20,000

   = 32,000 + 20,000

   = 52,000 for 4,000 components

   Therefore , per component, the price charged would be 52,000 / 4,000 = 13 per component. This is lower than the external market price of 15 per unit. Therefore, in the interest of goal congruence the cheaper option is preferred. AUS Ltd. should source its components from ANZ Ltd, for a total procurement cost of 52,000 .
3. Skilled labour is in short supply and can only be obtained by reducing the production of product 'G' , resulting in a loss of contribution of 24 (given) or 6 per hour of skilled labour. Hence the relevant labour cost will be 6 (contribution lost per hour) + 5 (hourly rate of skilled labour) i.e. 11 per hour.
4. AUS Ltd. has a number of options: (a) If the machine were to be hired it would have a cost of 15,000; (b) if the machine were bought and then sold at the end of the work it would have a net cost of 20,000; or (c) if the machine were bought and then modified to avoid the need to buy the other machine it would have a net cost of Rs.10,000 (Rs.50,000 plus Rs.5,000 modifications less Rs.45,000 cost of another machine) . Thus, the most economic approach is buy the machine and then modify it so the relevant cost is Rs.10,000
5. The machine operating costs are future costs of doing the work and therefore are relevant.
6. The supervisor's salary is irrelevant, but the bonus needs to be included because it is dependent on this work and therefore is relevant.

7. The development time has already been incurred. Therefore , it is a past cost and not relevant.
8. General fixed overhead costs and their absorption are not relevant because they will be incurred whether the work goes ahead or not. Depreciation is also not relevant because it is an accounting entry based on the historical purchase of assets. It is not affected by the work being considered.

(ii) Two main issues arise when pricing work based on relevant costs: Profit reporting; and Pricing of future work.

With regard to profit reporting, the decision as to whether to proceed with the work will have been based on the use of relevant costs, but the routine reporting of the profit from the work will be based on the company's normal accounting system. Since this system will be based on total cost, it is probable that the costs of the work reported will be greater than its relevant cost. Consequently, the amount of profit reported have been made on this order will be lower than expected and may even be a loss . This may cause difficulties for the manager who accepted the work as an explanation will be required of the reasons why there is such a difference in profit.

With regard to the pricing of future work the difficulty lies in increasing the price for similar items for the same customer in future. Once a price is set, customers tend to expect that any future items will be priced similarly. However, where a special price has been offered based on relevant cost because of the existence of spare capacity the supplier would not be able to continue to price on that basis as it does not recover its long term total costs. There may also be difficulties created by this method of pricing as other customers are being charged on a full cost basis and if they were to discover that a lower price was offered to a new customer they would feel that their loyalty was being penalised.

(ii) Prevention

Operations: Preventative maintenance and checking of the calibration of machinery . This would reduce the number of potentially faulty products being produced and therefore reduce guarantee claims.

Appraisal

Inbound Logistics: Reduce cost of incoming inspections by building close links with suppliers and getting them to adopt TQM. If suppliers can guarantee their quality, then inbound inspections could be eliminated .

Internal Failure

Operations: Reduce cost of re-works by training employees on a continual basis e.g. quality circles . This would reduce failure costs and also improve quality.

External Failure

Service: Design quality into the product, try to prevent guarantee claims and therefore the cost of servicing/repairing the product.

29. CASE STUDY 1 – ETHICAL & NON-FINANCIAL CONSIDERATIONS (ICAI MODULE CS # 14)

Star Limited is in the business of manufacturing copper rods. The copper rods are sold to various cable wires manufacturers across the country. The growth in economy, especially the power sector, has led to a sharp increase in demand of cable wires and copper rods. The company is considering an opportunity to set up its own copper wire manufacturing plant and gain a share of cable wire's market. A detailed study was carried out to understand the market of cable wires, market growth, competitive landscape, financial feasibility etc. The Chairman has asked the Director of Finance to review the financial feasibility study and highlight concerns, if any.

The following paragraphs contain summarised information of financial study carried out:

- The project of setting up a new cable wire manufacturing plant is expected to yield a Net Present Value of Rs200 crores considering a project life of 20 years. The initial cost of setting up the plant is Rs500 crores which is readily available with the company. The project would yield an IRR of 17.5% which is higher than the IRR of other plants under operation.
- The plant would employ about 70% of labour on contractual basis. These labours would mostly comprise immigrants from neighbouring countries. The feasibility study has assumed that the immigrants labours would be paid 15% less wage than that paid to other workers. However, the wage paid to immigrants would still be higher than the minimum wage requirements. The contribution to retirement funds is also not considered in the project evaluation. The company feels that immigrant workers would not stay beyond a period of a year and thus there is no requirement to contribute to retirement funds.
- The existing plants of the company do not have free space available and hence the company will need to buy land adjacent to its existing plant. A part of the proposed land to be acquired falls under the forest reserve area where no commercial activity is allowed. The company officials are in liaison with the government officials to get the land parcel approved. A certain amount of the value of land would be paid to certain government officials through a consultant. This cost is not a part of the project evaluation report.
- The new plant would also produce certain chemically harmful waste which would be disposed off into a nearby river after treatment. The company however does not have any technology to treat the waste fully. A new treatment plant would cost about Rs100 crores.

The finance director has forwarded the entire report to you for comments.

Required:

- LIST Various non-financial and ethical consideration in decision making.
- EVALUATE the impact of the various issues in the financial study and give your RECOMMENDATION.

Solution

Issue

Star Limited manufactures copper rods and is considering commencing a new plant for manufacturing of cable wire. A financial evaluation has been carried out and the project appears to be financially viable. The project has a positive NPV of Rs200 crores and an IRR of 17.5%. Though the project is financial viable, there are certain concerns relating to the project.

Non-Financial and Ethical Consideration in Decision Making

Capital Budgeting or Investments decisions are generally made based on the various financial evaluation like Net Present Value, Internal Rate of Return, Payback Period etc. The financial considerations in capital budgeting decisions are important because the end objective of every for-profit business is maximisation of shareholders wealth. However, an important aspect of capital budgeting is that investment decisions cannot be purely based on financial analysis; there are other soft non-financial aspects of the investment appraisal that need to be thoroughly looked into. Some of the non-financial considerations that a company factors for capital budgeting or investment decisions are listed below:

Student Notes:

Environmental Factors -

Environmental factors like pollution, deforestation, impact on climate and weather, greenhouse effects etc. must be considered by companies while selecting a project for implementation. Any project which adversely affects the environment is not taken positively by common public and environmentalists. A lot of projects have been stalled or delayed due to the protests by proenvironment groups leading to cost and time overrun. The government through ministry of environment could impose penalties on projects which are violating environmental norms or green norms.

Staff Motivation -

Staff motivation and satisfaction is another important factor which companies might consider while choosing projects. If, for example, a company decides to implement automation in its plants for operations which would result in redundancy in labour, the overall staff motivation would come down. Staff and workers would resort to strikes and lockouts to protest against such decisions. The company should adopt a participative approach while taking such decisions considering the impact it would have on the labours'

Government Regulations -

The companies must comply with relevant government regulations while implementing projects. Some projects might be profitable and yield excellent returns. However, if the profits and cashflows are generated by violating government regulations, it could be harmful in the longer run for the company and its brand. The companies must ensure that all relevant laws and regulations are complied with.

Availability of Resources -

The evaluation of any project must also consider availability of key resources like raw material, manpower, logistics infrastructure, electricity etc. If there is any constraint on any of the key resources at a future date, a financially viable and excellent project could well turn into a failed project. It is thus important that the requirements and availability of key resources are analysed in advance .

Availability of Project Site -

Site selection involves measuring the needs of a new project against the merits of potential locations. This indicates the practice of new facility location, keeping in mind project requirements. A wrong or unsuitable project location may mar the very benefits of a financially lucrative investment proposal.

Ethics -

Ethics are a set of guiding moral principles for individuals and corporates. Every company has a duty of care to various stakeholders (shareholders, employees, suppliers, customers etc.). A company is expected to act in a fair and transparent manner and be honest in all its dealings with stakeholders.

Corporate Social Responsibility -

Corporate social responsibility refers to "the ethical principle that an organisation should be responsible for how its behaviour might affect society and the environment". The companies do not function in silos but are a part of the larger society and environment. They have a responsibility towards the society and environment to use the various resources judiciously and ensure a sustainable development. Companies are expected to uplift the well being of the society at large and to not harm the environment through operations. The aspects of corporate social responsibility must also be considered while deciding the project to be implemented.

Issues in the Financial Study

As discussed earlier, the project is financial viable with a very good NPV and IRR. The amount required to build the plant is also available with the company. Financially, the project must be accepted. However, there are certain non-financial issues which must be addressed before a decision to build the plant is taken.

Payment to Labour and Ethics -

As explained earlier, every company has a duty of care to all its stakeholders and the stakeholders must be treated fairly. Labours are a key stakeholder for the construction and running of the plant. The company has chosen to pay 15% lower wage to immigrant workers and not contribute anything towards their retirement benefits.

The company is paying a higher wage to the labours than required by law and hence there is nothing illegal in such payments. However, the company must not discriminate between workers who are doing same nature of work just because the workers are immigrants. The reputation of the company might be affected because of the lower wages paid to immigrants. There is a possibility that these labours go on protests and strikes or decide not to work for the company.

The company has also decided not to contribute to retirement funds for these workers. This could have a legal implication as well. The financial impact of paying wages at par with other workers and contributing to the retirement fund for immigrant workers is not known. However, the company should reconsider this decision and pay all the workers the same level of wages. The company should also contribute to the retirement fund of employees.

Availability of land and bribery -

The existing plant does not have sufficient space to build a new plant and hence the company is planning to acquire additional land which falls under the forest reserve area where no commercial activity is allowed. The company is in liaison with government officials to get the land acquisition approved. The company would also be paying bribes indirectly to the government officials to get the land allotment approved.

The payment of bribes to government officials, whether directly or indirectly would be unethical. The company could face litigation for acquiring land by unfair means and in future, there is a possibility of such allotments being cancelled. The company's reputation would also be dented if news of bribery is published by the media. The company also has a responsibility towards the environment and must contribute towards a sustainable development. The society at large would not take acquisition of forest land by unfair means positively. This impact the overall goodwill and brand image of the company. The company must evaluate if land at other sites can be acquired for construction of the plant. Such acquisition would be at a higher cost but would be beneficial to the company in the longer run.

Chemical waste and technology -

The proposed plant is likely to emit chemically harmful waste which would pollute the environment. The technology available with the company can treat such waste partially. The company has to incur an additional cost of Rs100 crores to build a new treatment plant. This means that the NPV of the project would be reduced by Rs100 crores and IRR would also be lesser if the new treatment plant is built. As discussed earlier, the company must operate in a socially responsible manner and consider implication of its action on the environment. The pollution caused by plants affects the surrounding environment and might lead to protests by local residents. Sometimes such protests are backed by NGOs as well. The commissioning of environmentally sensitive projects

is difficult at times and can cause project delays as well .

The company should consider acquiring a new chemical waste treatment plant to ensure that there is no discharge of harmful waste from the company's plant. Though, there is an additional cost involved in building a new plant, it is important that the society at large perceives that the company is operating in a socially responsible manner. The company operates in a society and is an integral part of it and hence, it has certain responsibilities towards the society as well.

Conclusion -

The ultimate objective of a company is to maximise shareholders wealth. The company must, however, operate in a socially responsible manner in achieving the objective of wealth maximisation. The company has a duty of care to other stakeholders like employees, society at large etc. In some cases, there may be conflict between different stakeholder's objectives. For instance, a new waste treatment plant would be good for the environment and society at large but would be adverse for shareholders as an additional cost of Rs100 crores would be incurred. The company must definitely consider non-financial factors along with financial factors while deciding on whether to build a new plant or not.

Make or buy

30. (ICAI - Additional Question - BOS - Question 4) (The Chartered Accountant Journal)

About Problem	Target Verb/ (s)
Make or Buy	Comment, Assess

Mr. Venkatesh, who recently joined the Tirupati Casting and Forge Limited (TCFL) as assistant manager in the management accounting division is collecting, estimating, and arranging the information required for make vs. buy decision and pricing decision; using which chief management accountant can consider the best way to go while taking uncertainties into account and advise the management accordingly.

X-104

Balaji Enterprises (BE) ready to deliver product X-104 (in a semi- furnished state) for R40 under a continuous supply agreement. TCFL insists on inserting a stable price clause in the supply agreement, to which BE responds that variation will be pass on to TCFL. Finally, it was decided if the agreement entered then the price (which is currently R40/-) shall be subject to periodical (after each quarter) review.

Y-29

TCFL is producing the product Y-29 (at full capacity) and able to sell the entire production through a network of distributors (and through retailers, in those areas where there is no distributor appointed). TCFL contacted by an e-retail platform, with a proposal; wherein the platform shows interest in offering the product Y-29 to its customers (members/ subscribers). The E-retail platform has two types of customers, "the plus" category and others. The E-retail platform
will charge R1,300/- from "plus" category and R1,350/- from others, E-retail platform has the policy to keep margin (to meet its cost and
earn a profit) of 8.33% and 12.50% on the procurement cost for the sale made to "plus" category and other customers respectively. In the proposal, the E-retail platform also states the price which it can pay to TCFL; according to the requirements stated above.

Mr. Venkatesh compiled the following tables, for product X-104 and Y-29 respectively on a per unit basis–

X-104

Particulars	In-house production	Purchased from BE, there -after furnishing and re-labelling at TCFL
Selling price of product	115	112
Variable costs	73	25
Fixed costs	18	18
External purchase cost	NA	40

Y-29

Particulars	Amount in R
List Price	1,400
Price charge from distributors	1,225
Variable cost incurred by TCFL	870

Required

(i) COMMENT how TCFL should respond to the proposal of the e-retail platform regarding product Y-29 and ASSESS the sensitivity of such decision.

(ii) COMMENT on the make vs. buy decision regarding product X-104 and ASSESS the sensitivity of such decision to the external purchase price.

Solution

(i) Pricing (Decision on the proposal by E-retail platform) & Sensitivity

Decision on the proposal by E-retail platform – Since the TCFL is producing the product Y-29 at full capacity and able to sell entire production through a network of distributors at R1,225 (results in a contribution of R355), hence shall not accept the proposal of the E-retail platform at the stated price of R1,200 (results in a contribution of R330) (see the statements below for the calculations).

Student Notes:

Price stated by E-retail platform

Particulars	Plus Customer	Others
Sale price	1,300	1,350
Less- margin kept on the procurement cost	100 (i.e.8.33%)	150 (12.5%)
Procurement cost (price stated by E-retail platform)	1,200	

Comparable Contribution

Particulars	If sold through distributors	If sold through E-retail platform
Selling price for TCFL	1,225	1,200
Less- Variable costs	870	870
Contribution	355	330

Sensitivity of the decision on the proposal by E-retail platform

If the contribution from each unit of Y-29 sold to the E-retail platform increased to 355 and beyond then TCFL will be indifferent, among the distributors and E-retail platform. Thus, the price stated by the E-retail platform needs to increase by R25 per unit (from R1,200 to R1,225) i.e., 25/1,200 which come out to be 0.02083 or 2.083% (25/1,200×100)

Hence, if the price stated by the E-retail platform in the proposal increase by more than 2.083% then the original decision would be reversed (because beyond that point selling through the E-retail platform will become more profitable for TCFL).

(ii) Make vs. Buy Decision & Sensitivity Analysis

Make vs. Buy Decision – Since the contribution is R47 when the product X-104 is purchased from BE and then furnishing and re-labelling done at TCFL, in comparison to R42 when it is produced in-house (see the calculation below); hence it is beneficial to buy the product X-104.

Student Notes:

Comparable Contribution

Particulars	In-house production	Purchased from BE, there-after furnishing and re-labelling at TCFL
Selling price of product	115	112
Less- Variable costs	73	25
Less- External purchase cost	-	40
Contribution	42	47

Sensitivity to the external purchase price

To be indifferent, among the in-house production and buying from BE, the contribution from the product X-104 when it is purchased from BE needs to fall to R42 per unit. Thus, the external purchase cost needs to increase by R5 per unit (from R40 to R45) i.e., 5/40 which come out to be 0.125 or 12.5% (5/40×100). Hence, if the external purchase price increased by more than 12.5% the original decision would be reversed (because beyond that point buying from BE will not remain beneficial).

Concept Insight

Sensitivity analysis is capable to incorporate uncertainty into decision making (by taking each uncertain factor in turn), and also calculates the change (percentage change – relative measure hence comparison of importance among factors become easy) that is minimally required in factor(s) before the original decision is reversed.

Since sensitivity analysis considers uncertainly related to each factor in turn, hence where multiple factors changing simultaneously; it has no utility. Apart from this, sensitivity analysis only calculates the change that is minimally required in factor before the decision is reversed; but it does not consider or calculates the probability of such a change.

Student Notes:

Q.	Concept	Resource	Pg
31	True Economic value	Module	106
32	Profit maximise	RTP May 21	107-109
33	Combo sums (Master All Inclusive)	Past paper may 19	110-114
34	Learning curve with pricing policy	Module	115-116

CHAPTER 6 REVISION VIDEO

SCAN QR OR CLICK HERE

True Economic value

TRUE ECONOMIC VALUE

Question 31 : (ICAI Module Question)

A customer wants to buy a System for a single year (after which it will be scrapped) with plans to use it for 2,500 hrs.

Cost Structure (similar products):

Particulars	System-X	System-X^2
Operating Cost/ hour	**Rs 5**	**Rs** 7.50
Probability of System Crash	10%	0.5%
Price	Rs 37,500	?

Find the TEV for the System-X^2 if the cost of a System Crash to the buyer is 1,00,000.

TEV=

Particulars	Rs
Operating Cost	Rs 6,250 2,500 hrs. × (Rs 5.00 - Rs 7.50)
System Crash Savings	Rs 9,500 Rs 1,00,000 × (10.00% - 0.50%)
Price of Next Best Alternative	Rs 37,500
TEV	Rs 40,750

Profit maximise

Question 32 (RTP May 21 Question 8)

Zutus Ltd. is a leading Indian Pharmaceutical company which is a fully integrated, global healthcare provider. With in-depth domain expertise in the field of healthcare, it has strong capabilities across the spectrum of the pharmaceutical value chain. Zutus has earned reputation worldwide amongst pharmaceutical companies for providing comprehensive and complete healthcare solutions.

One of the drugs, Rifmn is an antibiotic used to treat contagious disease "Tbis". Rifmn is a patented medicine. The patent for which is now going to expire, and several other competitors are expected to enter in the market for selling the medicine using the same components of chemicals, under different other name. In order to reposition itself in the market, the company is reviewing its pricing policy considering the market change and other threat.

The market research for Rifmn indicates that for every Rs.4 decrease in price, demand would be expected to increase by 8,000 batches, with maximum demand for Rifmn being one million batches.

Each batch of Rifmn is currently made of using chemical salts:
Salt X: 367.50 gm at Rs.0.08 per gm
Salt Y: 301.50 gm at Rs.0.40 per gm

Each batch of Rifmn requires 30 minutes of machine time to make and the variable running costs for machine time are Rs.40 per hour. The fixed production overhead cost is expected to be Rs.35 per batch for the period, based on a budgeted production level of 3,00,000 batches.

The skilled workforce who has been working on Rifmn until now are being shifted onto the production of Zutus company's new antiviral drug (injection) for Viral Disease-19 which costs millions of to develop. Zutus has obtained patent for this revolutionary drug and it is expected to save millions of lives all across the world. The launch of this drug is excitedly anticipated all over the world, while its demand in unknown and no other similar specific drug exists. The average labor cost (outsourcing) of each batch of Rifmn is Rs.38.60.
The management of Zutus considers that pricing decision of Rifmn should be based on each batch.

Required

(i) CALCULATE the optimum (profit-maximizing) selling price for Rifmn and the resulting annual profit which Zutus will make from charging this price.

(ii) RECOMMEND the pricing strategy for launching of new antiviral drug.

[Note– If P = a - bQ, then MR = a - 2bQ]

solution

(i) Demand function

b = change in price/change in quantity b = ₹4/8,000 units = 0.0005

The maximum demand for Rifmn is 10,00,000 units, so where P = 0, Q = 10,00,000,

so 'a' is established by substituting these values for P and Q into the demand function:

0 = a – (0.0005 × 10,00,000)

0 = a – 500

Therefore, a = 500

Demand function is therefore: P = 500 – 0.0005Q

Marginal cost

		Total (Rs)
Salt X	367.50g × Rs.0.08	29.40
Salt Y	301.50g × Rs.0.40	120.60
Labour	Given in ques	38.60
Machine running cost	(30/60 × Rs.40.00)	20
Total marginal cost per batch		208.60

Marginal revenue function: MR = a – 2bQ

Equate MC and MR and insert the values for 'a' and 'b' from the demand function in step 1

⇒ 208.60 = 500 – (2 × 0.0005 × Q)

Solve the MR function (to determine optimum quantity, Q)

⇒ 208.60 = 500 – 0.001Q

⇒ 0.001Q = 291.4

⇒ Q = 291,400 batches

Calculate the optimum price

⇒ P = 500 – (0.0005 × 291,400)

⇒ P = ₹354.30

Calculate Profit

	Rs.
Revenue (2,91,400 batches × Rs. 354.3)	10,32,43,020
Less: Variable costs (2,91,400 batches × Rs. 208.60)	6,07,86,040
Less: Fixed costs (3,00,000 batches × Rs. 35)	1,05,00,000
Profit	3,19,56,980

Firms often use different pricing strategies when their products are first launched into the market. The most two common approaches are price skimming and penetration pricing.

In **penetration pricing,** low price is charged initially, thought behind this is that low price will make the product accessible to large number of buyers, so high sales will compensate the low price being charged getting the benefits of economy of scale. This approach works best when customers are price sensitive, R & D and marketing expenses are low, or when competitors will quickly enter the market.

In this case, medicines are highly inelastic in nature so any reduction in price will not increase the demand of the drug, which clearly indicates that market penetration pricing will not help.

Skimming Pricing refers to charging high price initially than lower the prices. High price in the early stage of the product's life cycle is expected to generate high initial cash flows, which will help the company to recover high development cost. This would enable the company to take advantage of unique nature of the product.

In present case, the unique nature of drug, entry barrier (since company has taken patent) requires huge initial investment and considering this market skimming pricing strategy would be more favorable pricing strategy. However, this strategy only works as long as drug is protected by patent.

In addition, a drug firm is required to consider the expected reactions from national price controllers who in turn may be influenced by political factors and public opinion.

Practical Insight

Most of the people in developing countries buy medicines through out-of-pocket payments, high prices of medicines might force people to forego treatment or go into debt. As a result, price of the medicines may be regulated by the health organisations/ agencies.

Combo Sums

Question 33: **(May 19, Q.2 -20 Marks) (Very Important- Cover all Major Concepts)**

Amber Ltd. is a leading company in the Footwear Industry. The company has four factories in different locations with state of the art equipments. Due to competition in the market, company is continually reviewing its product range and enhancing its existing products by developing new models to satisfy the demands of its customers.

The company currently has a production facility which has a capacity of 3,500 standard hours per week.

Product 'Comfort' was introduced to the market six months ago and is now about to enter the maturity stage of its life cycle.

However, research by the marketing department indicates that demand of the product 'Comfort' in the market is price sensitive. The likely market responses are as follows:

Selling price per unit (\")	1,750	1,600	1,525	1,450	1,300
Sales demand per week (units)	550	725	1,000	1,150	1,200

The variable cost per unit of manufacturing 'Comfort' is Rs. 750.

Standard hours used to manufacture one unit is 2 hours.

Product 'Sports' was introduced to the market two months ago using a penetration pricing policy and is now about to enter its growth stage. Each unit has a variable cost of Rs.545 and takes 2.50 standard hours to produce. Market research has indicated that there is a linear relationship between its selling price and the number of units demanded, of the form P = a - bx. At a selling price of Rs. 1,000 per unit demand is expected to be 1, 000 units per week. For every Rs. 100 increase in selling price the weekly demand will reduce by 200 units and for every Rs. 100 decrease in selling price the weekly demand will increase by 200 units.

Product 'Ethnic' is currently being developed and which is about to be launched in the market. This is a highly innovative designer product which the company believes that it will have a revolutionary impact on the market and consumer behaviour. The company has decided to use a market skimming approach to pricing this product during its introduction stage.

Required

(a) (i) ADVISE which of the above five selling prices should be charged for product 'Comfort', in order to maximize its contribution during its maturity stage.

(ii) CALCULATE the number of units to be produced of product 'Sports' in order to utilize all of the spare capacity from your answer to (i) above and the selling price per unit of product 'Sports' during its growth stage

(b) COMPARE penetration and skimming pricing strategies during the introduction stage, using product 'Ethnic' to illustrate your answer.

(c) EXPLAIN with reasons, for each of the stages of 'Ethnic's product life cycle, the changes that would be expected in the

(i) average unit production cost

(ii) unit selling price

Solution

(a) (i) Selling Price for "Comfort" that would maximize its contribution at Maturity stage:

Contribution per unit of "Comfort" = Selling Price per unit - Variable Cost per unit

Total Contribution = Contribution per unit x Units sold

All figures in Rupees

Sales (units) per week	550	725	1,000	1,150	1,200
Selling Price per unit	1,750	1,600	1,525	1,450	1,300
Less: Variable Cost per unit	750	750	750	750	750
Contribution per unit	1,000	850	775	700	550
Total Contribution	5,50,000	6,16,250	7,75,000	8,05,000	6,60,000

Total contribution is maximum when sales are 1,150 units. Therefore , the selling price per unit of "Comfort" should be 1,450 per unit.

(ii) Production Number of "Sports" and Selling Price per unit

Amber Ltd. has a production capacity of 3,500 hours per week. As explained in (i) above , it would manufacture 1,150 units of "Comfort" per week. Each unit of "Comfort" requires 2 hours of production. Therefore , total production hours for Comfort would be 1,150 units x 2 hours = 2,300 hours per week .

Production capacity remaining to manufacture "Sports" = 3,500 hours - 2,300 hours = **1 , 200 hours per week.** Each unit of "Sports" requires 2.5 hours of production. Therefore , the number of "Sports" units that can be produced = 1,200 hours / 2.5 hours = **480 units per week.**

Linear relationship between Selling Price and Number of Units Demanded has been given to be P= a - bx.

P = Selling Price per unit

a = Selling Price when demand will be zero

b (slope) = Change in Price / Change in Quantity x = Quantity Demanded

Given, at a Selling Price of 1.000 per unit, Quantity Demanded will be 1,000 units per week.

For every 100, per unit increase / decrease in Selling Price,
the Quantity Demanded will decrease / increase by 200 units per week respectively.
A 500 per unit increase in Selling Price will result in fall of 1,000 units of Sales per week . The Selling Price at which Sales will be Zero i.e. a = Rs. 1.500 per unit.
b (slope) = Change in Price / Change in Quantity = 100 / 200 = 0.50
Penetration pricing is most commonly associated with a marketing objective of increasing market share or sales volume , rather than short term profit maximization .
Thus, substituting the values in the equation to find the Selling Price of "Sports" when the Quantity Sold is 480 units:
P = a - bx
= 1,500 - 0.50 x (480)
= 1,500 - 240
= 1,260
Sports should be sold at Rs. 1,260 per unit during the growth stage.

Alternative

Hours after production of Product 'Comfort ' (3,500-1, 150x2) =1,200 hours to be utilized to produce product 'Sports'.
1,200 hours/ 2.5 = 480 units
10% increase in selling price will lead to 20% decrease in demand of units of product "Sports". Here we can produce only 480 units which amounts to 52% decrease in units so the selling price should be increased by 26% as per given price demand function. So, the selling price per unit will be 1,260 for 480 units of product "Sports".

(b) (i)"Ethnic" is given to be a highly innovative product that is about to be launched into the market. The product with unique features that will differentiate it from other products leading to a revolutionary impact on market and customer behavior. There seem to be no competitors providing similar products.

Skimming Price Strategy is adopted to charge high prices in the introduction stage in order to recover costs. Skimming Price will be suitable for "Ethnic" because:

- Market for the product is not yet established. Initially high promotional expense may have to be incurred to create customer awareness and build a market for the product.
- Due to its innovative feature, the customers would not mind paying a premium for the unique product offering. Demand would be inelastic.
- The market demand is unknown. Initial capital outlay to produce this product may be high, resulting in high cost of production.
  Production and promotional costs in the initial years is likely to be high. Therefore , a higher selling price would help Amber Ltd. to recover the costs. Since demand is likely to be inelastic, charging a premium may not be a problem.

- The price can be gradually reduced once the market for the product is established. Competitors may reverse engineer and offer similar products , due to which price may have to be lowered in the long run to retain customers.

Penetration Pricing is adopted to charge a low price in the initial stage for penetrating the market as quickly as possible. For a new product, this low-price strategy will popularize the product. Once the market is established , the price may be increased. Penetration pricing will be suitable when :

- Demand for the product is elastic, more demand when prices are low.
- Large scale production of the product yields economies of scale.
- Threat of competition requires prices to be set low. It serves as an entry barrier to prospective competitors as well.

Product "Ethnic" is an innovative product that the manufacturer believes will change the whole market once it is launched. A strategy of penetration pricing could be effective in discouraging potential new entrants to the market. However, the product is believed to be unique and as such demand is likely to be fairly inelastic. In this instance a policy of penetration pricing could significantly reduce revenue without a corresponding increase in sales. Thus, this strategy is not suitable for "Ethnic".

(ii) Impact on Unit Selling Price and Average Cost of Production per unit at each stage of "Ethnic" Product Lifecycle

Introduction Stage

As explained in (b) above, at the Introduction Stage of Lifecycle, due to high cost of production and initial promotion expenditure , the unit cost of production will be high. Using Skimming Price Policy, the unit selling price will also be high.

Growth Stage

This is the second phase of the Life-Cycle, product awareness among customers would result in increased demand. Therefore , scale of production likely to increase. The new market segment would attract competitors , who are like to reverse engineer and offer similar products in the market. Promotional activities and marketing activities need to continue to maintain and gain market share.

Accordingly , the unit selling price would reduce from the introduction stage on account of the following reasons:

- Competitors offering similar product would take away the uniqueness feature of "Ethnic".
- Again , to gain market share, the unit selling price may have to be lowered to make it attractive to a larger segment of customers.

The unit cost of production is also likely to reduce due to the following reasons:

- Increased production would result in increased material procurement from suppliers.
  Bulk purchasing discounts can be negotiated with them to lower cost of production.
- Learning curve and experience would enable the labor force to become more efficient. This leads to higher production with the same level of resources leading to cost savings.
- Larger production batches due to increase in scale of operations will reduce the unit variable overhead cost.
- Economies of scale would result due to fixed overhead cost being spread over larger number of units.

Maturity Stage

The third phase of Product Life-Cycle that is characterized by an established market for "Ethnic". After rapid growth in sale volume in the previous stages, growth of sales for the product will saturate. Competition would be high due to large number of rivals in the market, this may lead to decreasing market share.

It is likely that the price of the product will be lowered further at the maturity stage in a bid to preserve sales volumes. The company may attempt to preserve sales volumes by employing an extension strategy rather than reducing the selling price. For example, they may introduce product add-ons to the market that are compatible with "Ethnic".

Unit production cost will remain constant:

- Direct material cost will remain constant. If procurement is lower than the growth phase, it might even lead to slightly higher prices since supplier may not extend bulk discounts.
- The benefits of efficient production due to the effect of learning and experience may also have waned . Therefore , unit labour cost is also likely to remain constant.
- Since scale of production is no longer increasing, the unit variable overhead costs are also likely to remain constant.

Decline Stage

This last stage in the product cycle is characterized by saturated market, declining sales, change in customer's tastes etc. Profitability may slowly start decreasing with fall in sales.

At the decline stage, Product "Ethnic" is likely to have been surpassed by more advanced products in the market and consequently will become obsolete. The company will not want to incur inventory holding costs for an obsolete product and is likely to sell "Ethnic " at marginal cost or perhaps lower.

Sales volumes at the decline stage are likely to be low as the product is surpassed by new exciting products that have been introduced to the market. Furthermore, the workforce may be less interested in manufacturing a declining product and may be looking to learn new skills. For both of these reasons, unit production costs are likel y to increase at the decline stage.

Learning curve with pricing policy

Question 34: (ICAI Module Question)
Bosch Ltd. has developed a special product. Details are as follows: The product will have a life cycle of 5,000 units. It is estimated that market can absorb first 4,500 units at Rs 64 per unit and then the product will enter the "decline" stage of its life cycle.

The company estimates the following cost structure:

Direct Labour.....Rs 6 per hour

Other variable costs.....Rs 19 per unit

Fixed costs will be Rs 40,000 over the life cycle of the product. The 'labour rate' and both of these costs will not change throughout the product's life cycle.

The first batch of 100 units will take 1,000 labour hours to produce. There will be an 80% learning curve that will continue until 2,500 units have been produced. Batches after this level will each take the same amount of time as the 25th batch. The batch size will always be 100 units.

Required

CALCULATE average selling price of the final 500 units that will allow the company to earn a total profit of Rs 80,000 from the product if average time for 24 batches is 359.40 hours.

(Note: Learning coefficient is -0.322 for learning rate of 80%). The values of Logs have been given for calculation purpose:
log 2 = 0.30103; log 3 = 0.47712; log 5 = 0.69897; antilog of 2.534678 = 342.51; antilog of 2.549863 = 354.70; antilog of 2.555572 = 359.40; antilog of 2.567698 = 369.57

Solution

Average 'Selling price' of the first 500 untis

Particulars		Amount (Rs)
Direct Labour [(8,867.50 hrs. + 241.90 hrs. × 25 batches) × Rs 6]		89,490
Add: Other Variable Costs (5,000 units × Rs 19)		95,000
Add: Fixed Costs		40,000
Total Life Cycle Cost		2,24,490
Add: Desired Profit		80,000
Expected Sales Value (5,000 units × Rs 19)		3,04,490
Less: Sales Value (4,500 units × Rs 64)		2,88,000
Sales Value (Decline Stage)	...(A)	16,490
Sales Units (Decline Stage)	...(B)	500
Average Sales Price *per unit*	...(A)/ (B)	32.98

Workings

(i)The cumulative average time per batch for the first 25 batches

The usual learning curve model is $=ax^b$ ***Where***

y=Average time per batch (hours) for x batches a=Time required for first batch (hours)

x=Cumulative number of batches produced

b=Learning coefficient

The Cumulative Average Time ***per batch*** for the first 25 batches

$$y = 1{,}000 \times (25)^{-0.322}$$
$$\log y = \log 1{,}000 - 0.322 \times \log 25$$
$$\log y = \log 1{,}000 - 0.322 \times \log (5 \times 5)$$
$$\log y = \log 1{,}000 - 0.322 \times [2 \times \log 5]$$
$$\log y = 3 - 0.322 \times [2 \times 0.69897]$$
$$\log y = 2.549863$$
$$y = \text{antilog of } 2.549863$$
$$y = 354.70 \text{ hours}$$

(ii) The time taken for the 25th batch

Total Time for first 25 batches = 354.70 hours × 25 batches

= 8,867.50 hours

Total Time for first 24 batches = 359.40 hours × 24 batches

= 8,625.60 hours

Time taken for 25th batch = 8,867.50 hours – 8,625.60 hours

= 241.90 hours

Q.	Concept	Resource	Pg
35	Compute of ROI/RI	RTP May 22	117-120
36	EVA	Module	121-125
37	Balance Score Card	RTP	126-129
38	Performance prism	Module	130-131
39	Building Block model	Cas study Digest	132-135
40	Sub optimal decision making	Module	136-138
41	EVA + BSC	Case study Digest	139-144

CHAPTER 7 REVISION VIDEO

SCAN QR OR CLICK HERE

Compute of ROI/ RI

Question 35: (RTP May 22)

Integrity Limited engaged in the manufacturing of water pumps, pipes (of all types and range), and sanitary fittings. These three businesses (pump, pipe, and fittings) are managed separately as distinct investment centres. Integrity Limited named these as division GG, YY, and NN. Since the performance evaluation of divisional head and employees working under him/her is linked with performance (using financial measure ROI) of division, hence divisional head as well as employees trying their level best to improve divisional ROI (return on investment).

Integrity Limited in recent fiscal only started a practice of thorough component-wise (Profitability rate and Investment turnover) analysis of ROI; so that appropriate corrective measures can be applied. Management of Integrity Limited is of the firm belief that ROI is the best-used performance measurement tool, hence they completely ignore the newly appointed CFO's advice to use Residual Income (RI) in addition to some non-financial performance measures, for performance evaluation. CFO also said accounting profit has its own set of limitations, but the board is not convinced with this remark too.

The Integrity Limited provides you following table (which is incomplete)–

Particular	Division GG	Division YY	Division NN
Investment	Rs. 4 Crores	Rs. 40 lacs	?
Revenue	?	Rs. 80 lacs	Rs. 60 lacs
Income	?	Rs. 8 lacs	Rs. 6 lacs
Profitability rate	5%	?	?
Investment turnover	2 times	?	?
Return on investment	?	?	12%

Required

(i) IDENTIFY the reason for poor performance along with ADVICE to improve the same.

(ii) If the required rate of return at Integrity Limited is 8%, then COMMENT on the performance of divisions using RI (residual income) with the same set of information and compare it against your findings in requirement (a) above.

(iii) STATE the benefit of using RI.

(iv) LIST major shortcomings of accounting profit, ROI, and RI.

(v) Why Integrity Limited needs to use non-financial performance measures? EXPLAIN.

Solution

(i) Advise

Division YY - Considering the ROI, division YY (20%) outperforms the division NN (12%) and GG (10%) by the margin. The reason for the better relative performance of division YY is the high rate of profitability i.e., 10% (income/revenue) as well as high investment turnover i.e., 2 times (revenue/investment).

Division GG despite having a turnover rotation of 2 times to its investment (at par to division YY) able to generate a return on investment only half a rate to division YY because of poor profitability rate (only 5%). Hence division GG **needs to focus on the value chain (either to enhance price by high perceived value to customers or reduction in cost by eliminating non-value-added activities and features) to enhance the profitability.**

Division NN despite having a profitability rate of 10% (at par with division YY) able to generate a return on investment at 60% (12%/20%) level to division YY because of poor investment turnover (only 1.2 times). Hence division **NN need to focus on its marketing mix as well as strategic trimming of the investments (identify non-revenue generating assets and liquidate them).**

Working Note

Particular	Division GG	Division YY	Division NN
Investment	Rs. 4 Crores	Rs. 40 Lacs	Rs. 50 Lacs
Revenue	Rs. 8 Crores	Rs. 80 Lacs	Rs. 60 Lacs
Income	Rs. 40 Lacs	Rs. 8 Lacs	Rs. 6 Lacs
Profitability rate	5%	10%	10%
Investment turnover	2 times	2 times	1.2 times
Return on investment	10%	20%	12%

(ii) Residual income (RI) is an excess of the controllable contribution over a predetermined organization-wide minimum hurdle rate (required rate of return) on the investment controllable by the divisional manager. So higher the residual income means the better the investment centre.

RI can be computed using the following formula-

net operating income – (average operating asset × minimum required rate of return)

1. Division *GG*

RI = 40 lacs – 8% of 4 crores = 40 lacs – 32 lacs = Rs. 8 lacs

2. Division YY

RI = 8 lacs – 8% of 40 lacs = 8 lacs – 3.2 lacs = Rs. 4.8 lacs

3. Division NN

RI = 6 lacs – 8% of 50 lacs = 6 lacs – 4 lacs = Rs. 2 lacs

Comment

Considering RI, the best performing division is 'division *GG*' that generated the residual income of ` 8 lacs followed by division YY (` 4.8 lacs) and then division NN (` 2 lacs). RI being absolute measure, largely impacted by the size of division in term of investment made and managed by it. Hence despite being the best performer division YY in terms of ROI earns less residual income than division *GG* whose ROI is lowest among the three.

Note - ROI is a relative measure, whereas RI is an absolute measure.

(iii) The benefit of using RI for performance evaluation

If residual income is used to measure the managerial performance of investment centres, there is a greater probability that managers will be encouraged, when acting in their own best interests, also to act in the best interests of t he company.

(iv) Major shortcomings–

1. While calculating the accounting profit, the cost of equity capital is ignored, unlike the cost of debt. A company can generate wealth, only when it earns the return in excess of the return required by providers of capital, which includes both equity and debt.
2. Accounting profits can easily be distorted by the manipulative choice of accounting policies
3. Accounting Profit is a short-term measure (apart from being historical in nature too), it ignores the longer perspective from the preview of the organisation as a whole.
4. ROI leads to a lack of goal congruence.
5. RI being an absolute measure, is not capable to be used as a tool for making the comparison between the divisional performances of different sizes.

(v) Reason- Why Integrity Limited needs to use non-financial measures too?

Since financial performance measures such as ROI are profit-oriented and can inspire managers to become short-term oriented, but the strategy needs to be sustainable apart from being just profitable; hence in order to overcome the inadequacy and unjustifiable nature of financial performance indicators, non- financial performance indicators need also to be applied.

Non-Financial Performance Indicators are sustainable action-based indicators. For example, employee training will increase the profit & let them feel empowered, putting effort into research and development will result in a high brand image & high intellectual property right.

EVA

Questio 36: (ICAI Module Question)

Beta Control (BC) is a global leader in manufacturing of commercial building control systems with over 250 distributors and many thousands of installations in more than 50 countries. Control systems involve air conditioning systems, facility management, energy and water management, access control and security controls etc. At BC, manufacturing is done at a number of factory sites where some products are easy and largely produced and have a long life while other products are intricated and have a short life due to changing technologies. BC's mission statement is 'to keep you ahead through control systems that improve productivity and save energy'.

A Newly appointed chief executive officer (CEO) is anxious about declining share price of BC in the last two years. She identified that the business has grown through acquisition and senior management have focused on making corporate deals but not on making control systems. She announced that the BC's focus must be on optimization and upgradation of its value generation rather than just getting bigger through acquisitions.

Assuming yourself as a performance management expert of BC, the CEO has asked you to aid her in her improvement programme. Firstly, she wants your views on the use of EVA as the key performance metric at BC. You are given the current EVA computation (Annexure1) but there is some suspicion about whether the assistant who has done this work is sufficiently well trained about this method. So, she requires you to examine his accuracy and the assumptions forming part of the calculation.

Required

Write a report to the chief executive officer to EVALUATE the accuracy of the EVA calculation and the assumptions.

Annexure 1

NOPAT

Particulars	Year ended 31st March 2021	
	Rs. in Lacs (L)	Notes
Operating Profit	1,102.80	
Add:		
Non-Cash Expenses	30.20	
Marketing Expenditure Capitalised	46.20	7
Less:		
Tax	269.60	9
Lost Tax Relief on Interest	48.96	
Net Operating Profit After Tax (NOPAT)	860.64	

Capital Employed

Particulars	Year ended 31st March 2021	
	Rs. in Lacs (L)	Notes
From the Statement of Financial Position	4,802.00	10
Add:		
Marketing Expenditure Capitalized	46.20	7
Adjusted Capital Employed	4,848.20	

WACC = (1/2 × 15%) + (1/2 × 7·8%)
= 11.40%
EVA = NOPAT – (WACC × Capital Employed)
= Rs. 860.64 L – Rs. 4,848.20 L × 11.40%
= Rs. 860.64 L – Rs. 552.69 L
= Rs. 307.95 L

Assumptions and Notes

1. Debt/Equity 1:1
2. Cost of Equity is 15.00%
3. Cost of Debt (pre-tax) is 7.80%
4. Tax Rate is 30.00%
5. Interest charged in the period was Rs. 163.20 L.
6. In current fiscal year, BC spend Rs. 80.00 L in Training and Development by leveraging the latest digital technologies including virtual classrooms to deliver highly relevant training to staff at the point of need.
7. Marketing Expenditure has been Rs. 46.20 L each year for the last two years to build the long- term brand.
8. The total R & D spending was Rs. 20 L during this year for in- depth study of the TCP/IP protocols. The TCP/IP based products have not been launched yet.
9. BC has paid Tax of Rs. 260 L while the tax charged per the accounts was Rs.269.60L.
10. Capital employed during the Period (from the statement of financial position):

Opening	4,564.00 L
Closing	4,802.00 L

Solution:

Report

To: CEO, Beta Control

From: Performance Management Expert Date: 31st May 2021

Subject: Evaluation of EVA at Beta Control

EVA provides a link between decisions, performance measures and rewards, which focuses managers on performing better. Incentive schemes based on EVA provide better quality information and motivation in making decision which in turn maximise shareholder's wealth. In other words, EVA links the operating returns to the assets that were used to generate those returns. The learning which flows from EVA analyses can be perceptive and can allow the manager not only to identify areas of weakness in performance but also to easily find solutions. BC is a multiproduct company having number of factory sites. EVA can help to appraise divisional contributors to or detractors from, overall profitability. Thus, managers may be educated through EVA and pursue such objectives that improve operating profits investing more capital.

In addition, this report deals with evaluation of the accuracy and assumptions used in the calculation of BC's EVA. There are many errors in the present calculation of EVA. These have been discussed below and revised calculations are enclosed.

WN 1: Non-Cash Expenses have been correctly added back to the profit as these are expenses which do not affect the cash flow of a given period.

WN 2: Addition back of Marketing Expenditure is also correct as spending contributes to future value-creation. For the same reason, the prior year spending is also added in to capital employed.

WN 3: Training and Development Expenses should be capitalised. Training and Development Expenses have been treated as an expense in the income statement, they should be added back to profit, and added to capital employed (at the end of the year).

WN 4: Research and Development (R & D) Expenses should be treated as marketing expenditure for long period.

WN 5: The tax expenses in the EVA calculation should be the tax paid with adjustment for lost tax relief on interest and not the adjusted amount of tax charged in the accounts.

- The WACC is incorrect because it should be based on post-tax cost of debt.
- Generally, a company takes, at least, a year's time to earn a return on investment. Thus, the capital employed figure should be based on the beginning numbers.

Particulars	Year ended 31st March Rs. in Lacs
Operating Profit (given)	1,102.80
Add:	
Non-Cash Expenses (given) (WN 1)	30.20
Marketing Expenditure Capitalised (given) (WN 2)	46.20
Training & Development Expenses (WN 3)	80.00
R & D Expenses (WN 4)	20.00
Less:	
Tax (WN 5)	260.00
Lost Tax Relief on Interest	48.96
Net Operating Profit After Tax (NOPAT)	970.24

Capital Employed

Particulars	Rs. in Lacs
From the Statement of Financial Position (Starting)	4,564.00
Marketing Expenditure Capitalized	46.20
Adjusted Capital Employed	4,610.20

WACC = (1/2 × 15%) + (1/2 × 7·8% × 70%)
= 10.23%
EVA = NOPAT – (WACC × Capital Employed)
= Rs.970.24 L – Rs.4,610.20 L × 10.23%
= Rs.498.62 L

The recomputed EVA has increased from Rs.307.95 Lacs to Rs.498.62 Lacs which shows a positive position for BC as it adds up the shareholder's wealth.

For calculating NOPAT, following most common adjustments to accounting profit as remarked by the Stern Stewart has been considered.

- For Advertising, Research and Development items expensed.
- Impact on Profit: Increase CY's profit, deduct economic depreciation on PY's EVA adjustment.
- Impact on Capital Employed: Increase capital employed at the end of the year, increase capital employed in respect of similar add backs of PY's investments not treated as such in financial statements (net of economic depreciation).
- For Depreciation
- Impact on Profit: Add accounting depreciation and subtract economic depreciation.
- Impact on Capital Employed: Alter value of non-current assets (and capital employed) to reflect economic depreciation not accounting depreciation.
- For Non- Cash Expenses
- Impact on Profit: Add back to profit.
- Impact on Capital Employed: Add to retained profits at the end of the year.
- For tax charge, this will be based on 'cash taxes' rather than the accruals based methods used in financial reporting.

Further, the revised calculation of EVA is largely based on the following assumptions:

- There is an implicit assumption that accounting depreciation (included in operating profit) is equivalent to economic depreciation (which should be used for EVA calculations). This assumption is doubtful, although there is no information for more accurate calculation.
- For Additional Marketing Expenditure, no estimation of economic life (expected period during which an asset remains useful) in building the brand and corresponding economic depreciation has been considered in the above calculation.
- No amortisation on the R & D Costs is required to be recognised as the product has not been introduced yet. This is in line with the accounting treatment of such items. There was no Research & Development expenditure in the previous year.

Balance Score Card

Question 37: (Nov 19 RTP Question 10) (Module)

B. Steels is a leading manufacturer of flat and long products and have state-of the-art plants. These plants manufacture value added products covering entire steel value chain right from coal mining to manufacturing Pig Iron, Billets , HR Coils, Black Pipe/GI Pipe, Cable Tapes etc. conforming to international standards. The rock-solid foundation combined with nonstop upgradation and innovation has enabled the B. Steels to surpass its goals constantly. Its vision and values for sustainable growth is balancing economic prosperity and social equality while caring for the planet. It is preparing its balanced scorecard for the year 2018-19 . It has identified the following specific objectives for the four perspectives.

•Improve post-sales service	•Improve employee morale	•Improve employee job satisfaction
•Increase gross margin	•Increase number of customers	•Increase profitability of core product line
•Increase plant safety	•Increase customer retention	

B. Steels has collected Key Performance Indicators (KPIs) to measure progress towards achieving its specific objectives . The KPIs and corresponding data collected for the year 2018-19 are as follows:

Key Performance Indicator	Goal	Actual
Average replacement time (number of days)	2	1.5
Gross margin growth percentage	15%	16%
Number of customers	15,000	15,600
Number of plant accidents	0	2
Percentage of repeat customers	83%	81%
Core product line profit as a percentage of core-product line sales	5%	4.4%
Employee turnover rate (number of employees leaving/ Average number of total employees)	2%	3%
Employees satisfaction rating (1-5 , with 1 being the most satisfied)	1	1.2

For preparation of Balanced Scorecard report, the following format has been developed :

B. Steels Balanced Scorecard Report For the year ended March 31, 2019					
Perspective	**Objective**	**KPI**	**Goal**	**Actual**	**Goal Achieved (Yes or No)**
Financial	×	×	×	×	×
Customer	×	×	×	×	×
Internal Business Process	×	×	×	×	×
Learning and Growth	×	×	×	×	×

Required

(i) PREPARE a balanced scorecard report using the above-mentioned format. Place objective under the appropriate perspective heading in the report. Select a KPI from the list of KPIs that would be appropriate to measure progress towards each objective.

(ii) B. Steels desires to integrate sustainability and corporate social responsibility related KPIs in their balance scorecard to adhere vision and values. ADVISE B. Steels , using TBL framework.

Solution;

Analysis line by line KPI and link it with the 4 BSC Penspective

B. Steels
Balanced Scorecard Report

Perspective	Objective	KPI	Goal	Actual	Goal Achieved (Yes or No)
Financial	Increase Gross Margin	Gross margin growth percentage	15%	16%	Yes
	Increase Profitability of Core Product Line	Core product line profit as a percentage of core product line sales	5%	4.4%	No
Customer	Increase number of customers	Number of Customers	15,000	15,600	Yes
	Increase customer retention	Percentage of repeat customers	83%	81%	No

Internal Business Process	Improve post sales service	Average replacement time (number of days)	2.0	1.5	Yes
	Increase plant safety	Number of plant accidents	0	2	No
Learning and Growth	Improve employee job satisfaction	Employees satisfaction rating (1-5, with 1 being the most satisfied)	1	1.2	No
	Improve employee morale	Employee turnover rate (Number of employees leaving/ Average number of total employees)	2%	3	No

(ii) "Triple Bottom Line" concept encourages companies to measure not only their financial profits , but also the impact that its operations have on the society and environment. Therefore , this framework measures the full cost of doing business by measuring the following bottom lines (i) Profit (ii) People and (iii) Planet.

Diminishing non-renewable resources have forced businesses to focus on sustainable manufacturing. This term refers to managing manufacturing processes such that they minimize any negative impact on the environment by conserving energy and natural resources. In many instances, improved operational efficiency not only reduces waste (thereby costs) but also improves product safety, it strengthens the brand 's reputation and builds public 's trust about the company. As a long- term strategy , this improves business viability and provides a competitive edge to the company. This concept is the "Planet Bottom Line" within the Triple Bottom Line framework. Metrics on the following aspects may be investigated to find out the environment impact of business operations:

- Material consumption
- Energy consumption
- Water utilization
- Emissions , treatment of effluents and waste (include emissions affecting air, water , and land)
- Fuel consumption by tracking freight and transportation costs
- Land utilization
- Recyclability and disposal of product

"Corporate Social Responsibility " enables the company to become conscious of the impact its operations has on the society. CSR programs, through philanthropy and volunteer efforts can forge a stronger bond between itself , its employees , and the wider community. Again , this improves both the brand image as well as builds public 's trust about the company . This concept is the "People Bottom Line" of the Triple Bottom Line framework. Metrics on the following aspects maybe investigated to find out the social impact of business operations:

- Work place environment and labour relations
- Occupational health and safety, accident rates

- Human rights practices - child labour, employee work-place security policies
- Training and education
- Equal opportunity employer - diversity of workforce and opportunities available for employees' growth
- Suppliers - local sourcing versus sourcing from external markets
- Philanthropy and volunteer programs organized
- Product safety in terms of customer health and safety
- Pricing of essential products to enable wider reach within the society
- Transparent and ethical business practices

B. Steels can study these aspects , determine the relevant metrics, and prepare periodic KPI reports that can help in measuring responsibilities towards sustainability and social impact.

Performance prism

Question 38 : (Module Question)

You are a paid assistant working in SBC LLP – an accounts consultancy firm. You have received the following email from one of SBC's senior partner:

To: DG
From: SB
Date: 22/06/20XX
Subject: PEL meeting this afternoon

As you are probably aware, we are meeting with the managers of PEL later this afternoon to discuss several key issues, and I need you to do some research for me. I need a report that covers the following:

Analysis of the new proposal for the period 2020to 2022 based on

- external effectiveness and
- internal efficiency

To help you with this, I've attached a copy of our forecast of PEL's financial and non-financial data for the period2020 to 2022. Please read it carefully and email me back as soon as possible so I have time to prepare before the meeting.

Thanks SB

----------***Attachment***----------

Background to PEL

Precision Engineering Ltd (PEL) specialises in engineering design and manufacture in the automotive and motorsport industry. PEL's design team has many years' experience in the design and development of engine components for the market and high performance engines.

PEL has identified a number of key competitors and intends to emphasis on close co-operation with its customers in providing products to meet their specific engineering design and quality requirements. Efforts will be made to improve the effectiveness of all aspects of the cycle, from product design to after-sales service to customers. This will require data from a number of departments in the achievement of the specific goals of the new proposal. Efforts will be made to improve productivity in conjunction with increased flexibility of methods.

Forecast of PEL's Financial and Non-Financial Data

Particulars	2020	2021	2022
Total Market Size (Rs in lacs)	110	115	120
PEL Sales (Rs in lacs)	18	21	23
PEL Total Costs (Rs in lacs)	14.10	12.72	12.55
Production Achieving Design Quality Standards	95.5%	98.0%	98.5%
Returns from Customers (% of Deliveries)	2.0%	1.0%	0.5%
Cost of After-Sales Service (Rs in lacs)	1.3	1.1	1.0
Sales Meeting Planned Delivery Dates	85%	90%	95%
Average Cycle Time (Customer Enquiry to Delivery) (weeks)	5 0	4 5	4 0
Components Scrapped in Production (%)	6.5%	4.0%	1.5%
Idle Machine Capacity (%)	9%	5%	1%

Required
Draft the email as requested by the partner.

Solution
To: SB
From: DG

Date: 22/06/20XX

Subject: Re: PEL Meeting this afternoon

Please find below my analysis of the points you wished me to examine for PEL. Please let me know if you wish to discuss any of these points in more detail.
Kind regards
DG

A) **External Effectiveness-** The marketing success of the proposal is associated with the achievement of customer satisfaction. The success will need an efficient business operating system for all aspects of the cycle from product design to after-sales service to customers. Customer satisfaction is linked with Improved quality and delivery.

Quantitative measures of these factors are as follows:

(i) Quality is expected to improve. The percentage of production achieving design quality standards is expected to increase from 95.5% to 98.5% between 2020 and 2022. In the same period, returns from customers for replacement or rectification should drop from 2% to 0.5% and the cost of after-sales service should drop from Rs1.3lacs to Rs1.0lacs.

(ii) Delivery efficiency improvement that is expected may be measured in terms of the rise in the percentage of goods achieving the planned delivery date. This percentage rises from 85% in 2020 to 95% in 2022

B. **Internal Efficiency-** The financial success of the proposal is linked to the achievement of high productivity. This should be helped through reduced cycle time and decreased levels of waste. Quantitative measures of these factors are as follows:

(i) The average total cycle time from customer enquiry to delivery should drop from 5 weeks in 2020to 4 weeks in 2022 .

(ii) Waste in the form of idle machine capacity is expected to drop from 9% to 1% between 2020and 2022. Also, component production scrap is expected to drop from 6.5% in 2020to 1 5% i 2022

Building Block model

Question 39 (ICAI - CSD - Case Scenario #2)

The Soup Ltd. offers a range of beauty parlor services like hair care, body care, manicures/ pedicures, skincare, etc. It has 150 Centre/s across the country. The business of beauty parlor is extremely competitive in all region. Each centre operates autonomously and managers are able to offer customize services.

Soup's mission statement is "to inspire and enhance beauty by using knowledge and experience". To establish long term relationship of trust and commitment with clients, Soup wants to provide their client highest level of satisfaction with emphasis on-

- Service Customization
- Professionalism, Work, and Clinical Responsibility
- Client's Feedback

Company has developed a website where it creates blogs, post high-quality content related to beauty tips. Website is also connected to social media to reach customers. If a customer searches Soup's services on search engine, it automatically redirects to the place of nearest service center. Soup's all services are presently booking through online channel.

Results for one of the centre, "Roop", are given below. The column headed "Centre" shows the average figures for all Centre/s:

Particulars	Roop Oct'20	Centre Oct'20
Revenue (Rs.)	91,26,000	1,08,66,900
Gross profit (Rs.)	48,50,400	51,37,740
Number of senior Beauticians	90	110
Number of junior Beauticians	60	55
Number of website hits	15,010	19,260
Total number of services booked online & completed	9,915	12,270
Number of services taken from repeat customers	1,510	1,605
Total time spent completing jobs (hours)	24,120	25,880
Number of new service packages	3	2
Customer percentage in terms of feedback forms showing score of 9 or 10	86%	77%

Notes

(1) Beauticians are categorized as 'senior' if they have been qualified for more than three years.

(2) 'Junior' Beauticians includes both trainee beauticians and beauticians who have been qualified for less than three years.

(3) The Roop launched three new service packs during the year:
- free coupon of worth Rs. 600 for services over and above Rs. 1,200.
- a head massage costing only Rs. 240, instead of the usual Rs. 480, for 10 days advanced bookings.
- a haircut Rs. 120 will be charge, which usually costs Rs. 360, for all customers booking hair spa.

These three new service packs produced revenues of Rs. 7,92,000; Rs. 6,96,000 and 6,48,000 respectively. Two comparable new service packs developed by other centre/s produced revenues of Rs. 5,28,000 and Rs. 5,04,000.

(4) Customers to rate the particular centre from 1 to 10 in an online feedback form with 10 being the best.

Required

The Chief Executive Officer (CEO) of Soup has recently attended a webinar & heard about Building Block Model of Performance Management. The CEO is interested to know how the dimensions block could be applied at Soup Ltd.

(i) ANALYZE Roop's performance relative to the other Centre/s.

(ii) EXPLAIN how the Standards and Rewards blocks support the Dimensions block in case of Building Block Model.

Solution

(i) Analysis Competitiveness

	Roop	Centre/s Average
Website hits converted into orders (in percentage)	66.06% (9,915/15,010) x 100	63.71% (12,270/ 19,260) x 100

This ratio shows whether Roop's services are attractive compared to its competitors, which is essential if it is going to persist in such a competitive market. It has performed considerably better than Centre/s average, having converted 66.06% of website hits into jobs, compared to the 63.71% converted by other Centre/s. This is a good outcome.

Financial Performance

	Roop	Centre/s Average
Gross profit ratio	53.15% (48,50,400/ 91,26,000) × 100	47.28% (51,37,740/1,08,66,900) × 100

Gross profit ratio is the measure for financial performance. It indicates the percentage of revenue which exceeds the cost of goods sold.

Roop's gross profit ratio is 5.87% higher than the average, which is a good result. This could be because of new service pack sales. It is also likely to be because of ratio of senior beauticians to junior beauticians (1.5), which is lower than the average (2) and junior beauticians will invariably be paid less than senior ones.

Quality of Service

	Roop	Centre/s Average
Time taken per job (hrs.)	2.43 (24,120/ 9,915)	2.11 (25,880/ 12,270)

Quality is a key aspect of Roop's service to customers and if it is poor, customers will not return.

Again, Roop has surpassed the other Centre/s on average by 2.15 percentage points. Though, it has a lower ratio of senior beauticians to junior beauticians (1.5) than other Centre/s (2), it might be possible that Roop has a portfolio of enthusiastic staff. So, the quality of work is probably better, thus the higher level of repeat customers.

Flexibility

	Roop	Centre/s Average
Jobs from repeat customers (in percentage)	15.23% (1,510/ 9,915) × 100	13.08% (1,605/ 12,270) × 100

The comparison shows that Roop takes longer time to complete a job than the other Centre/s average, which is not really good, and is probably because of they have slightly less experienced staff on the whole, but it could also be that they do a more comprehensive job than other Centre/s. Given the fact that they have a higher % of return customers than the other Centre/s and they are also graded 9 or 10 by most of the customers (86%). Therefore, this cannot be viewed as too adversely.

	Roop	Centre/s Average
Revenue per beautician (Rs.)	60,840 (91,26,000/150)	65,860 (1,08,66,900/ 165)

The crucial resource in a service company is its staff and so these indicators measure how this resource is being utilized.

Roop's utilisation of its staff is lower than that of the other Centre/s by Rs. 5,020 per beautician. This clearly links in with the point that the average time to complete a job is longer at Roop than other Centre/s. However, given that Roop uses a slightly less experienced staff than other Centre/s and the fact that its gross margin is higher than the average, this should not also be viewed too adversely.

Innovation

	Roop	Centre/s Average
Revenue generated From new service packs (in percentage)	23.4% {(7,92,000 + 6,96,000 +6,48,000)/ 91,26,000} ×100	9.5% {(5,28,000 + 5,04,000)/ 1,08,66,900} × 100

Roop is offering a wide variety of service packs to its customers. The ratio of 23.4% indicates that Roop has really outperformed other Centre/s on this front, generating a far larger part of its revenue by the introduction of new service packs, which must have attracted customers. This is a really good performance.

(ii) The **standards** block fixes the target for the performance indicators chosen for each of the dimensions. The targets must meet three criteria – they must be achievable, fair and encourage employees to take ownership. The performance of the organization could suffer if the targets set do not meet these criteria.
The **rewards** block makes sure that employees are motivated to attain the standards. It also examines the properties of good reward schemes which are that they should be clear, motivating and based on controllable factors.
If standards and rewards are set appropriately, the staff will be engaged and motivated and it is then more likely that the goals, i.e., **dimensions,** of the organisation will be achieved.

Sub optimal decision making

Additional Module Question:

Question 40: (Video on Youtube) (ICAI Module Question)

BYD Alloy Ltd. first opened its door in 1990 for business and now it is a major supplier of metals supporting over a dozen different industries and employs experts to support each industry. These include Wood & Panel Products Manufacturing, Hearth Products , Site Furnishings, Commercial and Residential Construction etc. It has grown through devotion to its customers, dedication to customer service and commitment to quality products. The company has two divisions: Division 'Y' and Division 'D'. Each division work as an investment centre separately. Salary of each divisional manager is Rs.720,000 per annum with the addition of an annual performance related bonus based on divisional return on investment (ROI). A minimum ROI of 12% p.a. is expected to be achieved by each divisional manager. If a manager only achieves the 12% target, he will not be rewarded a bonus. However, for every whole 1% point above 12% which the division achieves for the year, a bonus equal to 3% of annual salary will be paid subject to a maximum bonus of 20% of annual salary. The figures belonging to the year ended 31 March 2019 are given below:

	Division 'Y' ('000)	Division 'D' ('000)
Revenue	29,000	17,400
Profit	5,290	3,940
Less: Head Office Cost	(2,530)	(1,368)
Net Profit	2,760	2,572
Non- Current Assets	19,520	29,960
Cash, Inventory, and Trade Receivable	4,960	6,520
Trade Payable	5,920	2,800
Manager Responsible	HAI	FAI

During the financial year 2018-19, FAI manager of Division 'D' invested Rs.13.6 million in new equipment including an advanced cutting machine, which will increase productivity by 10% per annum. HAI, manager of Division 'Y', has made no investment during the year, even its computer system needs updation. Division 'Y''s manager has already delayed payments of its suppliers due to limited cash & bank balance although the cash balance at Division 'Y' is still better than that of Division 'D'.

Required

(i) For each division, COMPUTE, ROI for the year ending 31 March 2019. Justify the figures used in your calculation.

(ii) COMPUTE bonus of each manager for the year ended 31 March 2019.

(iii) DISCUSS whether ROI provides justifiable basis for computing the bonuses of managers and the problems arising from its use at BYD for the year ended 31 March 2019.

Solution:

(i) ROI

Division 'Y'

Controllable Profit = Rs.5,290K

Net Assets = Rs.19,520k + Rs.4,960K – Rs.5,920K = Rs.18,560K

ROI = 28.5%

Division 'D'

Controllable profit = Rs.3,940K

Net Assets = Rs.29,960K + Rs.6,520K – Rs.2,800K = Rs.33,680K

ROI = 11.7%

In computation of ROI of both division, controllable profit has been taken into consideration. The reason behind this is that the Head Office costs are not controllable and responsibility accounting considers that managers should only be held responsible for costs over which they have control. The assets figures being used also depend on the same principal. Figures of current assets and the current liabilities have been taken into consideration as they are such items over which managers have complete control.

(ii) Bonus

Bonus to be paid for each percentage point = Rs.7,20,000 × 3% = Rs.21,600

Maximum Bonus = Rs.7,20,000 × 20% = Rs.1,44,000

Division 'Y'

ROI = 28.5% (16 whole percentage points above minimum ROI)

16 × Rs.21,600 = Rs.3,45,600

Therefore, manager will be paid the bonus of Rs.1,44,000 (max.)

Division 'D'

ROI = 11.7% (Zero, percentage point above minimum)

Therefore Bonus = NIL

(iii) Discussion

FAI will not receive any bonus since he has not earned any point above minimum percentage. This is due to the large asset base on which the ROI figure has been computed. Total assets of Division 'D' are almost double the total assets of Division 'Y'. The major reason behind this is that Division 'D' invested Rs.13.6 million in new equipment during the year. If this investment were not made, net assets would have been only Rs.20.08 million and the ROI for Division 'D' would have been 19.62% resulting in payment of a bonus Rs.1,44,000 (7 × Rs.21, 600 = Rs.1,51,200; subject to maximum of Rs.1,44,000) rather than the nothing. FAI is being penalized for making decisions which are in the best interests of his division. It is very surprising that he decided to invest where he knew that he would receive lesser bonus subsequently. He acted in the best interests of the BYD altogether. On the other hand, HAI has taken benefit from the fact that he has not invested anything even though it was needed for computer system updation. This is an example of sub-optimal decision making.

Further, Division 'Y"s trade payables are over double those of Division 'D'. In part, one would expect this due to higher sales (almost 66% more than Division 'D') and low cash levels at Division 'Y'. Higher trade payable leads to reduction in net assets figures. The fact that BYD is rewarding HAI with bonus, even though relationships with suppliers may be badly affected, is again a case of sub-optimal decision making.

If the profit margin (excluding head office cost) as percentage of sales is calculated, it comes to 18.24% for Division 'Y' and 22.64% for Division 'D'. Therefore it can be seen that Division 'D' is performing better if capital employed is ignored. ROI is simply making the division 'D"s performance worse.

FAI might feel extremely disappointed by getting nothing and in the future, he may opt to postpone the investment to increase the bonus. Non- investing in new technology and equipment will mean that the BYD will not be kept updated with industry changes and its overall future competitiveness will be affected.

Briefly, the use of ROI is resulting in sub-optimal decision making and a lack of goal congruence i.e. what is good for the managers is not good for the company and vice versa. Fortunately, Division 'D"s manager still seems to be acting for the benefit of the BYD but the other manager is not. The fact that one manager is receiving a much bigger bonus than the other is not justifiable here and may result in conflict in long run. This i s disappointing for the company especially in the situation when the divisions need to work in unison.

Student Notes:

Balance Scorecard + EVA

Question 41. (CSD - SBAQ #7)

NFC Limited is a company engaged in the manufacture and supply of forgings and castings for automotive and industrial applications. Automotive contributes to 60% of its revenues while the balance (40%) can be traced to industrial applications which amongst others include, Power, Oil and Gas and General Engineering. The company has an R&D set-up which includes new product development. The company recently concluded successfully a Long- Term Settlement with the workmen with an increase in productivity numbers in terms of output per man per day more than offsetting the increase in wages offered to workmen. The company has just completed (October 2018) its strategy and business planning exercise for Calendar year 2019 and beyond. The following is the data on 2018 (estimate) and the business plan for 2019.

Balance Sheet	Estimate 2018	Budget 2019
	Rs. Million	Rs. Million
Equity	3,000	3,000
Reserves (Opening)	1,000	2,250
Transfer (Current year surplus)	1,250	730
Debt @10% (pre-tax)	2,000	1,500
Trade Creditors	600	700
Total	**7,850**	**8,180**
Plant and Machinery	4,000	3,500
Inventories	1,500	1,630
Debtors	1,600	1,770
Cash	750	1,280
Total	**7,850**	**8,180**
Profit and Loss Account		
Sales	9,000	10,800
Less: Expenses	6,000	7,000
Less: Depreciation	500	500
Less: Interest	200	200
Profit	**2,300**	**3,100**
Less: Tax @ 30%	690	930
Profit After Tax	**1,610**	**2,170**
Less: Dividend and Dividend Distribution Tax	360	1,440
Transfer to Reserves	**1,250**	**730**

Assumptions/objectives drawn up in the making of the strategy and business plan document are as follows:

1. To improve shareholder value by attempting to grow EVA substantially over 2018.

2. To de-risk exposure to few sectors further by looking at other diverse applications through new technologies, tie-ups etc. This could be in the areas of Defense and Aerospace or even new areas like Electric Vehicles which would be the future in the mobility space.

3. To keep investing in R&D to ensure that the company keeps pace with changes in technologies and in meeting customer requirements by developing new products in accordance with their needs

4. Financials:
   a. An increase of 20% in Sales has been assumed over 2018. This includes an expected market growth of 12%, 3% from a new product "NP" to a large manufacturer (a new customer) for 9 months in 2019. It is expected that the new customer will approve the product by March 2019 (3 months from January 2019 when the approval process will start) so that 9 months sale can be realized. It normally takes 5 months for the approval. The company expects the balance 5% growth from normal new products, new customers, improved service levels in terms of delivery etc. Capacity is sufficient, also aided by the productivity improvement from the Long-Term Settlement with the workers.

   b. Inventories: A reduction in number of days inventory held by 5 days has been budgeted. Without this reduction, the inventories would have been Rs. 1,800 Million as against Rs. 1,630 Million budgeted.

   c. Debtors: A reduction in number of days sales outstanding by 5 days has been budgeted. Without this reduction, the debtors would have been Rs. 1,900 Million as against Rs. 1,770 Million budgeted.

   d. Expenses have been budgeted at Rs. 7,000 Million taking into consideration cost savings. It should have been Rs. 7,500 Million taking into consideration, increased activity levels (Sales), cost inflation including the wage increase from the Long-Term Settlement but without cost savings.

   e. No reduction or increase in creditors budgeted except for the increase in activity levels (Sales).

   f. Repayment of debt Rs. 500 Million on 31st Dec 2019.

Required

Your superior, the CFO of the company has asked you to:

(i) PREPARE a Balanced Score Card for Calendar year 2019 including objectives to be included for achieving long term goals of the company. He informs you that the company wants to use EVA as an overall performance measure and a driver to achieve improved shareholder value.

(ii) The CFO also wants you to indicate metrics where possible and but ignore weightages for the perspectives and clearly EXPLAIN the inclusion of the objectives in each perspective of the balance score card.

(iii) You have therefore been also entrusted with the task of PREPARING the Economic Value Added (EVA) with assumptions for the previous year 2018 (estimate) and also for the budget year 2019 and ensure that this forms the predominant basis for the balanced scorecard. Cost of Equity is 14%.

Answer

(i) Balanced Score Card

Perspectives	Objective	Measures	Targets	Initiatives
Financial				
EVA (Rs. Millions)	• Grow EVA	• Absolute	• Rs. 1,435 Million	• Repay 500 Million of debt • Reduce working capital • Improve profit through top line growth & cost reduction
Working Capital	• Reduce working capital	• Reduce inventory and debtors by 5 days each	• 300 Million reduction (170 + 130)	• MIS on inventory and debtors on real- time basis • Weekly short meetings on inventory and debtors to monitor and initiate actions to achieve targets.

Photo				
Perspectives	**Objective**	**Measures**	**Targets**	**Initiatives**
New Products	• Increase over 2018	• As a % to Sales	• From x % to y %	• Meet existing customers with new product offerings • Meet new customers & find out their requirements • Participate in exhibitions
On time Delivery	• Increase over 2018	• % of deliveries on time to total deliveries	• From x % to y %	• Strengthen production planning and control process • Leverage IT systems for accurate and timely information flow on orders, delivery dates
Internal Process				
Manpower Productivity	• Increase output per man per day	• As agreed under the long-term settlement	• From XX to YY	• Training of employees • Improved communication • Improved supervision
Cost Reduction	• Reduce cost of Production	• As agreed under the long-term settlement	• Raw material costs Outsourcing costs • Overheads	• Alternate sources for raw material • Improve yields through value engineering • Make or buy on certain high- cost outsourced components • Reduction in travel costs (use video conferencing), • Monitor other costs to save
New Product Approval by Customer	• For expediting approval of "NP"	• Reduction in time taken for approval	• By 2 months	• Form a task force • Weekly progress monitoring by CEO • Use of PERT/CPM tools

Learning and Growth				
Train senior technical staff in new technologies (products for defense, aerospace)	• To keep pace with changing technologies and to de risk exposure to few sectors	• Timeline	• By MMYY (eg: Dec 20)	• Specific training • Participation in seminars on new technologies
Explore possibilities for tie-ups on products for Electric Vehicles.	• Future growth Through products for Electric Vehicles	• Timeline	• By MMYY (e.g., Jun 20)	• Appoint a consultant • To look at possible partner • Prepare a road map to achieve the objective

(i) Rationale for each of the above perspectives:

a. EVA has been included under "Financial Perspective" as this is what the company intends to drive the same and it is a good measure of shareholder value as it takes into consideration cost of equity which a normal profitability metric ignores. Working Capital is included, as an improvement in the working capital measure would affect cost of capital and hence EVA.

b. New products and improvements in delivery times have been included under "Customer Perspective" as these have to be driven to achieve the sales volumes beyond normal industry growth. This will ultimately improve sales, profits and hence EVA.

c. Manpower productivity and cost reduction have been included under "Internal Perspective" as these have to be monitored and further efforts taken to reduce other costs to achieve the cost reduction planned to finally achieve the profits required to deliver the EVA.

d. As the balanced score card is just not a short-term measure, initiatives on new products, technologies and new markets have been included in the "Learning and Growth" perspectives to plan for long term sustained growth and to ensure that the company stays relevant in a changing business environment.

(ii) EVA Calculations

Particulars	2018 (Est.) Rs. Million	Budget 2019 Rs Million
PAT	1,610	2,170
Add: Interest adjusted for tax {Interest×(1 -0.3)}	140	140
NOPAT	**1,750**	**2,310**
Capital Employed (see assumptions below)		
Equity (14%)	3,000	3,000
Reserves	1,000	2,250
Debt (10%)	2,000	2,000
Cost of Capital		
Equity (14%)	420	420
Reserves (14%)	140	315
Debt {10%×(1 -0.3)}	140	140
Cost of Capital	**700**	**875**
EVA (NOPAT – Cost of Capital)	**1,050**	**1,435**

Assumptions

For 2018 estimated, Capital Employed is opening equity, reserves and debt. Similarly, for budget 2019, for calculating Capital Employed, opening equity, reserves have been considered.

Economic and accounting depreciation were assumed to be the same.

Q.	Concept	Resource	Pg
42	Market price & shared cout'n method	Module	145-148
43	International TP	Module	149-150
44	Dual rate & conflict	Module	151-155
45	TP with limiting factor	Module	156-158

CHAPTER 8 REVISION VIDEO

SCAN QR OR CLICK HERE

Market price & shared cout'n method

MARKET BASED PRICING:

Question 42: (ICAI Module Question)

Market Price and Shared Contribution Method

A manufacturer of cornflakes has two divisions, one producing the cornflakes and another packaging division that manufactures cartons. The production division purchases all the cartons from the packaging division. Cost of cartons from outside vendors would be:

Number of Cartons	(Rs)
5,000	77,000
8,000	95,000

Production cost incurred by the packaging division for similar volume of cartons:

Number of Cartons	(Rs)
5,000	75,000
8,000	80,000

The production and sale of the final product, cornflakes are as below:

Volume (Number of cartons of Cornflakes sold)	Total Cost (Excluding Cost of Cartons) Rs	Sales Value (Packed in Cartons) Rs
5000	1,20,000	200,000
8,000	180,000	300,000

An appropriate transfer pricing policy is being framed. As the corporate management accountant, Calculate-

(i) The transfer pricing based on (1) shared profit relative to cost method and (2) market method. Show the profitability of each division under both methods.

(ii) Discuss the effect of both methods on the profitability of the divisions.

Solution:

(i) Calculation of Profitability under both methods

Method 1: Shared Profit Relative to Cost Method

Methodology: Calculate the profit for both volume of cartons 5,000 units and 8,000 units. Information about sales and costs are given in the problem and tabulated as below.

Statement of Profitability - Shared Profit Relative to Cost Method

Volume (Number of Cartons)		5,000	8,000
		Figures in Rs	
Sales	...(a)	2,00,000	3,00,000
Less: Costs			
Production Division		1,20,000	1,80,000
Packaging Division		75,000	80,000
Total Costs	...(b)	1,95,000	2,60,000
Profit	...(a) - (b)	5,000	40,000

The next step is to distribute this profit between the divisions based on the cost incurred. This is done for both levels of production.

Distribution of Profit Based on Relative Cost

Volume (Number of Cartons)	5,000	8,000
	Figures in Rs	
Share of Production Division		
(5,000 × 1,20,000 / 1,95,000)	3,077	—
(40,000 × 1,80,000 / 2,60,000)	—	27,692
Share of Packaging Division		
(5,000 × 75,000 / 1,95,000)	1,923	—
(40,000 × 80,000 / 2,60,000)	—	12,308
Total Profit	5,000	40,000

The last step is to calculate transfer price of cartons that packing division will charge the production division = manufacturing cost of cartons + profit that is allocable to it under the shared profit method (refer workings above).

Transfer Prices of Cartons under the Shared Profit Relative to Cost Method

Volume (Number of Cartons)	5,000	8,000
	Figures in Rs	
Manufacturing Cost of Cartons	75,000	80,000
Profit Allocated *as per working above*	1,923	12,308
Transfer Price	76,923	92,308
Transfer Price p.u.	15.38	11.54

Method 2: Market Price Method

Methodology: Transfer price for the cartons is already given. It is the external market price of the cartons. This is viewed as an unbiased price, that the packaging division will charge the production division. The profitability statement will be as below:

Statement of Profitability - Market Price Method

Volume (Number of Cartons)	5,000	8,000
	Figures in Rs	
Packaging Division		
Market Price (transfer price basis)	77,000	95,000
Less: Manufacturing Cost	75,000	80,000
Profit of Packaging Division ...(a)	2,000	15,000
Production Division		
Sales	2,00,000	3,00,000
Less:		
Transfer-in Price	77,000	95,000
Product Cost	1,20,000	1,80,000
Profit of Production Division ...(b)	3,000	25,000
Total Company Profit ...(a+b)	5,000	40,000

Transfer price per unit will be based on the external market price given in the problem.

Volume (number of cartons)	5,000	8,000
Market Price of Cartons	77,000	95,000
Transfer Price *per carton p.u.* based on Market Price = Market Price/ Number of Carton	15.40	11.88

(ii) **Analysis of Results**

Overall company profits are the same under both methods. It is the distribution between the divisions that is different, depending on the method followed. Consequently, the transfer price per unit that the packaging division charges the production division will also be different.

When production volume is 5,000 cartons, transfer price per unit is approximately the same under both methods Rs15.38 and Rs15.40 shared profit and market price method respectively. This is because the cost of production for this volume is approximately the same as the outside procurement price. Similarly, when production volume is 8,000 cartons, transfer price per unit under the shared profit method has a slightly lower transfer price because lower profit has been allocated to packaging department.

When the volume increases to 8,000 cartons, in-house production has benefitted from economies of scale. The cost of manufacturing one carton is Rs15 p.u. for 5,000 carton (Rs 75,000/ 5,000 cartons) while it reduces to Rs10 p.u. when volume increases to 8,000 cartons (Rs 80,000 / 8,000 cartons). Cost reduction is almost 33% due to economies of scale.

On the other hand, at 8,000 carton volume, the production department has not benefitted much from economies of scale. Cost of manufacturing a carton of cornflakes excluding packing cost is Rs24 for 5,000 cartons (Rs 120,000/5,000 cartons) and is marginally lower at Rs22.50 p.u. for 8,000 cartons (Rs180,000/8000 units). Cost reduction is only 6% due to economies of scale.

Therefore, when production volume is 8,000 units, out of the total production cost of Rs260,000, major portion of the cost pertains to production department. Consequently, when profit gets allocated based on cost, more profit has been allocated to the production division and lesser percentage to packaging department. Hence the transfer price base is lower at Rs 92,308 under the shared profit method as compared to the market price method which is at Rs 95,000.

INTERNATIONAL TRANSFER PRICING

Question 43 : (ICAI Module Question)

A car manufacturing company has two manufacturing divisions in different countries. Division A in India manufactures engines for the cars. It has a capacity to manufacture 10,000 units each year. The variable cost of production is Rs8,000 p.u. and the division can sell 8,000 engines externally to customers within India at Rs 11,000 p.u. The other division, Division B is in Italy that requires 5,000 engines every year to assemble them further into cars. It purchases these engines from a vendor in Italy at a price that is equivalent to Rs 9,000 p.u.. If Division B were to purchase these units from Division A, the transfer price would be Rs10,000 p.u. Since no selling expenses need to be incurred on internal sales, variable cost of such transfers would be Rs7,000 p.u. If Division A accepts the internal order from Division B, it will have to curtail some of its external sales.

Given that the tax rate is 30% in India and 40% in Italy. Determine if the company will benefit overall if Division B purchases from Division A.

Solution

Problem Definition: If Division B buys from Division A, will it benefit the company as a whole?

Key Considerations: Contribution p.u. under external and internal sale options and the tax impact. Methodology:

Part 1 : Benefit to Division A

Currently external sales are 8,000 units. If Division A accepts to cater to Division B's requirements, external sales have to be curtailed by 3,000 units. The sales mix would be external sales 5,000 units and internal transfer 5,000 units. (refer working note 1).

Division A was previous producing 8,000 units. On accepting Division B's order, it is operating at full capacity of 10,000 units, an additional 2,000 units are being produced. As per working note 2, contribution from each option is the same at Rs3,000 p.u.

Additional Contribution

= 2,000 units × Rs 3,000 p.u.

= Rs6,000,000.

Division A pays tax in India at 30%. Hence the Net Tax Contribution

= Rs 6,000,000 × (100% - 30%)

= Rs 4,200,000.

Part 2: Net Additional Cost to Division B

Division B is currently purchasing the engine within Italy at Rs 9,000 p.u. (equivalent value). If it purchases from Division A, it will pay Rs 10,000 p.u.

Additional Purchase Cost

= 5,000 units × (Rs 10,000 - Rs 9,000)

= Rs 5,000,000.

However, this extra cost is tax deductible at a rate of 40%, the tax rate in Italy. Hence

Additional Cost (net of tax)

= Rs 5,000,000 × (100% - 40%)

= Rs 3,000,000.

Part 3: Overall benefit (after tax) to the company

As explained above, Division A benefits by Rs 4,200,000 while Division B incurs an extra cost of Rs3,000,000. Hence, the net after tax benefit to the company is Rs 1,200,000.

Therefore, Division B should purchase engines internally from Division A.

Working Notes

1. Statement of Capacity Utilization of Division A

Sr. No.	Particulars	Number of units
1	Maximum Capacity	10,000
2	External Sales	8,000
3 = 1 - 2	Spare Capacity	2,000
4	Division B's Requirement	5,000
5 = 4 - 3	External Sales Curtailed to meet B's Demand = B's Requirement - Spare Capacity Available = 5,000 units - 2,000 units	3,000

From the above table it can be seen that Division A has a spare capacity of 2,000 units currently. However, if it has to cater to Division B's requirements, external sales have to be curtailed by 3,000 units.

2. **Statement of Contribution p.u.**

Figures in Rs

Sr. No.	Options	External Sale	Internal Sale
1	Selling Price p.u.	11,000	10,000
2	*Less:* Variable Cost p.u.	8,000	7,000
3 = 1 – 2	Contribution p.u.	3,000	3,000

Dual rate & conflict

Question 44 (ICAI Module Question)

Great Vision manufactures a wide range of optical products including lenses and surveillance cameras. Division 'A' manufactures the lenses while Division 'B' manufactures surveillance cameras. The lenses that Division 'A' manufactures is of standard quality that has a number of applications. Due to huge demand in the market for its products Division 'A' is operating at full capacity. It sells its lenses in the open market for Rs.140 per lens, the variable cost of production for each lens is with a company, meeting the needs of a company in another country.110, while the total cost of production is with a company, meeting the needs of a company in another country.125 per lens.

The total production cost of a camera by Division 'B' is Rs.400 each. Currently Division 'B' procures lens from foreign vendors, the cost per lens would be Rs.170 each. The management of Great vision has proposed that to take advantage of in-house production capabilities and consequently the procurement cost of the lens would reduce. It is proposed that Division 'B' should buy an average of 5,000 lenses each month from Division 'A' at ` 120 per lens. The estimate cost of a surveillance camera is as below:

Other components purchased from external vendors	150
Cost of lens purchased from Division 'A'	120
Other variable costs	30
Fixed overheads	50
Total cost of a camera	350

Each surveillance camera is sold for Rs.410. The margin for each camera is low since competition in the market is high. Any increase in the price of a camera would reduce the market share. Therefore, Division 'B' cannot pay Division 'A' beyond Rs.120 per lens procured.

Great vision's management uses Return on investments (ROI) as a scale to measure the divisional performance and marginal costing approach for decision making.

Required

(i) ANALYZE the behavioral consequences of each division when Division 'A' supplies lenses to Division 'B' at Rs.120 per lens? Substantiate your answer based on the information given in the problem.

(ii) ANALYZE if it would be beneficial to the company as a whole for Division 'A' to supply the lenses to Division 'B' at Rs.120 per lens.

(iii) Do you feel that the divisional managers should accept the inter-divisional transfers in principle? If yes, CALCULATE the range of transfer price?

(iv) ADVISE alternate transfer pricing models that the chief executive of the company can consider in order to change the attitude of the divisional heads if they are against the transfer pricing policy.

(v) CALCULATE the range of transfer price, if Division 'A' has excess capacity and can accommodate the internal requirement of 5,000 lens per month within the current operations.

Solution:

(i) **Analysis of Behavioral Consequences**

Division 'A' has huge demand for its lenses enabling it to operate at full capacity. External sales yield a contribution of Rs.30 per lens sold (selling price of Rs.140 less variable cost of Rs.110 per lens). Likewise, each sale yields a profit Rs.15 per lens (selling price of Rs.140 less cost of production Rs.125 per lens). This yields an ROI of 12% (profit of Rs.15 per lens over a cost investment of Rs.125 per lens).

If Division 'A' sells lens to Division 'B' at Rs.120 per lens, it contribution reduces to Rs.10 per lens (transfer price ₹120 less variable cost Rs.110) while overall it shows a loss of Rs.5 per lens (transfer price Rs.120 less total cost of production is Rs.125 per lens). The loss of Rs.5 per lens is on account of (i) only partial recovery of fixed cost of production and (ii) opportunity cost in the form of loss of profit from external sales. This would therefore result in lower divisional profit for Division 'A'.

Consequently, the manager of Division 'A' would not accept the transfer price of Rs.120 per lens. Lower profitability due to internal sales may demotivate the division. Due to the benefits of internal procurement, the management of Great vision may want to increase the capacity of Division 'A' or infuse more investment to expand its operations. However, due to inability to recover fixed costs in its entirety from internal sales the ROI of the division is impacted, therefore divisional performance would be pe received to be lower. Therefore, it may oppose decisions as this would lead to higher fixed costs. At an overall level, such opposition may be detrimental to the company, leading to sub optimization of resources.

The current total cost of production for Division 'B' is Rs.400 per camera. Each sale yields a profit of Rs.10 per camera (Selling price Rs.410 less total cost of production Rs.400 per camera). Therefore, the current ROI is 2.50% (profit of Rs.10 over cost investment of Rs.400 per camera). If the lens is procured from Division 'A' at Rs.120 per lens, Division 'B' can get a benefit of Rs.50 per camera due to lower procurement cost. If lenses are procured from Division 'A', referring to the cost estimate given in the problem, Division 'B' can earn a contribution of Rs.110 per lens sold (sale price of Rs.410 per camera less variable cost of Rs.300 per camera) and a profit of Rs.60 per camera (sale price of Rs.410 per camera less total cost of production of Rs.350 per camera). Therefore, ROI improves to 17.14% (profit of Rs.60 over cost investment of Rs.350 per camera). By procuring the lenses internally, the profit of the division improves substantially. Consequently, the manager of Division 'B' would accept the transfer price of Rs.120 per camera.

(ii) **Analysis of Overall Benefit to the Company (from internal transfer)**

While calculating the benefit to the company, the fixed cost of each division is ignored. It is also given in the problem, that only marginal cost (variable cost) is considered for decision making.

As explained above, each external sale yields a contribution of Rs.30 to Division 'A'. The lost contribution each month from diversion of external sales of Division 'A' towards internal transfer to Division 'B' = 5,000 units × Rs.30 per lens = Rs.150,000 per month. This is an opportunity cost to the company.

The current procurement price for Division 'B' is Rs.170 per lens. The same lens can be manufactured at Rs.110 (variable cost) by Division 'A'. Therefore, cost of production reduces by Rs.60 for the company. Savings in procurement cost = 5,000 units × Rs.60 per lens = Rs.300,000 per month. This is a savings to the company.

Therefore, the net benefit to the company at an overall level = Rs.150,000 per month. Please note that the internal transfer price affects profitability of individual division but does not affect the company's overall profitability.

(iii) **Range of Transfer Price**

As explained above, the company gets a net benefit of Rs.150,000 per month by procuring the lenses internally. Therefore, the divisional managers should accept the transfer pricing model. At the same time, neither division should be at a loss due to this arrangement. When the transfer price is Rs.120 per lens, Division 'A' bears the loss, which will impact assessment of the division's performance.

Therefore, an acceptable range for transfer price should be worked out. This can be done as below:

When the supplying division operates at full capacity, the range for transfer pricing would be-.

(a) **Minimum transfer price = marginal cost p.u. + opportunity cost p.u.**

Since the supplying division is operating at full capacity, it has no incentive to sell the goods to the purchasing division at a price lower than the market price. If the internal order is accepted, capacity is diverted towards this sale. Hence the supplying division would additionally charge the lost contribution from external sales that had to be curtailed. By doing so, the division will be indifferent whether the sale is an external or internal one.

(b) **Maximum transfer price = Lower of net marginal revenue and the external buy-in price.**

Therefore, the minimum transfer price (which would be set by Division 'A', the supplier) = marginal cost per lens + opportunity cost per lens = Rs.110 + Rs.30 per lens = Rs.140 per lens. In other words, the minimum transfer price would be the external sale price of each lens.

The maximum transfer price (which would be determined by Division 'B', the procurer) = lower of net marginal revenue and the external buy-in price.

Net marginal revenue would be the revenue per one additional sale. Net marginal revenue per camera = marginal revenue – marginal cost (i.e. variable cost excluding the cost of the lens) to Division 'B' = Rs.410 - Rs.(150+30) = Rs.410 - Rs.180 = Rs.230 per camera. This is the maximum price that Division 'B' can pay for the lens, without incurring any loss. As mentioned before, fixed cost is ignored for this analysis.

The current external procurement price is Rs.170 per lens.

Therefore, the maximum price that Division 'B' would be willing to pay = lower of net marginal revenue (Rs.230 per camera) or external procurement cost (Rs.170 per lens). Therefore, Division 'B' would pay a maximum price, equivalent to the current external price of Rs.170 per lens. It will not pay Division 'A', price more than the external market price for a lens.

Therefore, the acceptable range for transfer price would range from a minimum of Rs.140 per lens and maximum of Rs.170 per lens. The managers may be given autonomy to negotiate a mutually acceptable transfer price between this range.

(iv) **Advise on Alternative to Current Transfer Pricing System**

Other alternative transfer pricing models that can be considered are:

Dual Pricing

The supplying division, Division 'A', records transfer price by including a normal profit margin thereby showing reasonable revenue. At the current market price per lens, transfer price for Division A would be Rs.140 per lens. The purchasing division, Division 'B', records transfer price at marginal cost thereby recording purchases at minimum cost. As per the current production cost, the transfer price for Division 'B' would the variable cost incurred by Division 'A' to manufacture one lens, that is Rs.110 per lens. 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.

Drawbacks of dual pricing include:

(a) It can complicate the records, thereby may result in errors in the company's overall records.

(b) Profits shown by the divisions are artificial and need to be used only for internal evaluations.**Two Part Pricing System**

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 a lower rate compared to the market price.

The proposed transfer price of Rs.120, is a two-part price that enables Division 'A' to recover the marginal cost of production of a lens as well as portion of the fixed cost. However, as explained in part (i) above, this price is insufficient to provide a reasonable return to Division 'A'. Therefore, the management of Great vision along with the divisional managers have to negotiate a price that is reasonable to Division 'A' while not exceeding the current procurement price of Rs.170 per lens for Division 'B'. As explained in part (iii) of the solution, in the given case, the range of Rs.140 to Rs.170 per lens, would help resolve this conflict.

(v) **Range of Transfer Price where Division 'A' has excess capacity**

When the supplying division has excess capacity, the range for transfer pricing would be

(a) **Minimum transfer price (determined by Division 'A') = marginal cost per lens = Rs.110 per lens.** This ensures that the Division 'A' is able to recoup at least its additional outlay of Rs.110 per lens incurred on account of the transfer. Fixed cost is a sunk cost hence ignored. Since capacity can be utilized further, it would be optimum for Division 'A' to charge only the marginal cost for internal transfer. Division 'B' gets the advantage getting the goods at a lower cost than market price.

(b) **Maximum transfer price (determined by Division 'B') = Lower of net marginal revenue and the external buy-in price.** As explained in part (iii) above, this would be lower of net marginal revenue of Rs.210 per camera or external buy-in price of Rs.170 per lens, Therefore, the maximum transfer price would be Rs.170, the external market price beyond which Division 'B' will be unwilling a higher price to Division 'A'.

Hence, when Division 'A' has excess capacity, the minimum transfer price would be Rs.110 per lens while the maximum transfer price would be Rs.170 per lens.

TP with limiting factor

Question 45 (ICAI Module Question)

A company has a division A producing three products called X, Y, Z. Each product can be sold in the open market in the following manner.

Maximum external sales are X 800 units, Y 500 units, Z 300 units. All figures in

Particulars	X	Y	Z
Selling Price *per unit*	96	92	80
Variable Cost of Production in Division A	33	24	28
Labour Hours Required *per unit* in Division A	6	8	4

Product Y can be transferred to Division B, but the maximum quantity that might be required for transfer is 300 units of Y.

Division B could buy similar product in the open market at a price of Rs.45 p.u.

(i) What should be the transfer price per unit for 300 units of Y, if the total labor hours available with Division A are:

(a) 13,000 hours (b) 8,000 hours and (c) 12,000 hours.

(ii) Indicate the transfer pricing range that can promote goal congruence.

Solution

Division A has two type of clientele, external customers and Division B. Capacity in Division A is defined by the number of labor hours available for production.

The total hours needed to meet external demand is 10,000 hours as explained below:

Statement of Hours Needed for External Sales

External Sales	Qty	Hours p.u.	Total Hours Needed
X	800	6	4,800
Y	500	8	4,000
Z	300	4	1,200
Hours Needed for External Sales			10,000

Case 1 : When 13,000 hours are available, after meeting the external demand requiring 10,000 hours, Division A will have surplus capacity of 3,000 hours.

Hours needed to produce 300 units of Y = 300 × 8 hours = 2,400 hours. Since Division A has surplus capacity, it can meet the demand of Division B also without curtailing its external sales. Hence, there is no opportunity cost on account of lost contribution.

Transfer price range:
Minimum Transfer Price p.u.
= Marginal Cost of Production p.u. of Y = Rs.24.
Maximum Transfer Price
= Lower of Net Marginal Revenue and the External Buy-in Price
The Maximum Transfer Price would be the External Procurement Price for Division B
= Rs.45 p.u.
Note: Additional cost information related to Division B would be needed to calculate net marginal revenue.

Case 2: When 8,000 hours are available, Division A has limited capacity as explained below.
The total hours needed for external sales is 10,000 and those need for internal transfer is 2,400 hours. In all, 12,400 hours are needed, when only 8,000 hours are available. There is a shortfall of 4,400 hours. Capacity is hence limited.
Therefore, labor hours have to be utilized optimally. This is determined by calculating the contribution per hour from sale each product that is sold externally. It determines how valuable each hour is product wise.

Statement of Product Wise Contribution per hour

Sr. No.	Particulars	X	Y	Z
1	Selling Price p.u.	96	92	80
2	*Less:* Variable Cost p.u.	33	24	28
3 = 1 - 2	Contributionp.u.	63	68	52
4	Labour hours needed p.u.	6	8	4
5 = 3 / 4	Contributionper hour	10.50	8.50	13.00
6	Ranking high to low	II	III	I

Product Z gives the maximum contribution per hour, hence ranked 1. Product X and Y follow at rank 2 and 3 respectively. This is the basis to allocate limited hours for optimal production in Division A.
The entire demand of Product Z will be produced first. This requires 1,200 hours. Out of the balance 6,800 hours, Product X will require 4,800 hours. This leaves a balance of 2,000 hours for Product Y. Product Y requires 8 hours p.u. Hence maximum production of product Y = 2,000 hours/ 8 = 250 units.

Statement of Optimum Mix

Total Hours Available 8,000					
Priority	External Sales	Qty	Hours p.u.	Total Hours Needed	Remaining Hours
1	Z	300	4	1,200	6,800
2	X	800	6	4,800	2,000
3	Y	250	8	2,000	-
Total Hours Needed for External Sales				8,000	

If Division A accepts to produce 300 units of Y for Division B, the total hours required for internal sales would be 2,400 hours. This can be catered to by curtailing its external sales. 2,000 hours from production of external sales of Product Y is first diverted and the balance 400 hours are diverted from production of Product X. Hence this results in lost contribution, an opportunity cost that has to be included in transfer pricing.

Contribution Lost from Reduced External Sales

= Product Y (2,000 hours × contribution per hour of Rs.8.5) + Product X (400 hours × contribution per hour of Rs.10.5)

= Rs.17,000 + Rs.4,200 = Rs.21,200

On a per unit basis, lost contribution works out to 21,200 / 300 units = Rs.70.66

Therefore, Transfer Price

= Marginal Cost p.u. + Contribution Lost from Reduced External Sales

= Rs.24 + Rs.70.66 = Rs.94.66

Since Division B can source at Rs.45, it would be cheaper to purchase the component from outside.

Student Notes:

Q.	Concept	Resource	Pg
46	DPP	Module	159-162
47	Manufacturing Cycle efficiency	Module	163-165
48	ABC/ABM	Module	166-169
49	Customer account profitability	Module	170-175
50	MCE (missing fig.)	RTP may 21	176-178

CHAPTER 9 REVISION VIDEO

SCAN QR OR CLICK HERE

DPP

Question 46: (ICAI Module Question)

Jigyasa India Ltd. (JIL) has 30 retail stores of uniform sizes 'Fruity & Sweety Retails' across the country. Mainly three products namely 'Butter Jelly', 'Fruits & Nuts' and 'Icy Cool' are sold through these retail stores. JIL maintains stocks for all retail stores in a centralised warehouse. Goods are released from the warehouse to the retail stores as per requisition raised by the stores. Goods are transported to the stores through two types of vans i.e. normal and refrigerated. These vans are to be hired by the JIL.

Costs per month of JIL are as follows:

	(Rs)
Warehouse Costs:	
Labour & Staff Costs	27,000
Refrigeration Costs	1,52,000
Material Handling Costs	28,000
Total	2,07,000
Head Office Cost:	
Salary & Wages to Head Office Staff	50,000
Office Administration Costs	1,27,000
Total	1,77,000
Retail Stores Costs:	
Labour Related Costs	33,000
Refrigeration Costs	1,09,000
Other Costs	47,000
Total	1,89,000

Average transportation cost of JIL per trip to any retail stores are as follows:

Normal Van	Rs 3,200
Refrigerated Van	Rs 4,900

The Chief Financial Manager asked his Finance managers to calculate profitability based on three products sold through Fruity & Sweety retail stores rather than traditional method of calculating profitability.

The following information regarding retail stores are gathered:

	Butter Jelly	Fruits & Nuts	Icy Cool
No. of Cartons per cubic metre (m^3)	42	28	40
No. of Items per cartons (units)	300	144	72
Sales per month (units)	18,000	4,608	1,152
Time in Warehouse (in months)	1	1.5	0.5
Time in Retail Stores (in months)	1	2	1
Selling Price per unit (Rs)	84	42	26
Purchase Price per unit (Rs)	76	34	22

Butter Jelly and Icy-Cool are required to be kept under refrigerated conditions.
Additional information:

Total Volume of All Goods Sold per month	40,000 m^3
Total Volume of Refrigerated Goods Sold per month	25,000 m^3
Carrying Volume of each van	64 m^3

Required
CALCULATE the Profit per unit using Direct Product Profitability (DPP) method.

Solution
Direct Product Profitability (DPP) Statement

(Amount in Rs)

	Butter Jelly	Fruits & Nuts	Icy Cool
Selling Price *per unit*	84.00	42.00	26.00
Less: Purchase Price *per unit*	76.00	34.00	22.00
Gross Profit ...(A)	8.00	8.00	4.00
Direct Product Costs:			
Warehouse Costs *per* m^3 [W.N.-1]	7.46	2.07	3.73
Retail Stores Costs *per* m^3 [W.N.-2]	6.36	4.00	6.36
Transportation Costs [W.N.-3]	76.56	50.00	76.56
Total DPP costs *per* m^3	90.38	56.07	86.65
Items *per* m^3 [W.N.-4]	12,600	4,032	2,880
Cost *per item* ...(B)	0.007	0.014	0.030
Direct Product Profit ...(A) – (B)	7.993	7.986	3.97

Working Notes

(1) Warehouse Related Costs

	General Costs (Rs)	Cost Related with Refrigerated Goods (Rs)
Labour & Staff Costs	27,000	-
Refrigeration Costs	-	1,52,000
Material Handling Costs	28,000	-
Total	55,000	1,52,000
Volume of Goods Sold	40,000 m^3	25,000 m^3
Cost *per* m^3 *per month*	1·38	6·08

Products	Time in Warehouse	Cost per m^3 per month (Rs)	Total Cost (Rs)
Butter Jelly	1 Month	7·46 (1.38 + 6.08)	7.46
Fruits & Nuts	1.5 Months	1·38	2.07
Icy-cool	0.5 Months	7·46 (1.38 + 6.08)	3.73

(2) Retail Stores Related Costs

	General Costs (Rs)	Cost Related with Refrigerated Goods (Rs)
Labour Related Costs	33,000	-
Refrigeration Costs	-	1,09,000
Other Costs	47,000	-
Total	80,000	1,09,000
Volume of Goods Sold	40,000 m3	25,000 m3
Cost *per* m^3 *per month*	2.00	4.36

Products	Time in Retail Stores	Cost per m^3 per month	Total Cost
Butter Jelly	1 Month	Rs 6.36	Rs 6.36
		(Rs 2.00 + Rs 4.36)	
Fruits & Nuts	2 Months	Rs 2.00	Rs 4.00
Icy-Cool	1 Month	Rs 6.36	Rs 6.36
		(Rs 2.00+ Rs 4.36)	

(3) Transportation Costs

	Normal Van Costs	Refrigerated Van Costs
Cost *per trip*	**Rs** 3,200	**Rs** 4,900
Volume of Van	64 m^3	64 m^3
Cost *per* m^3 *per trip*	Rs 50.00	Rs 76.56

(4) No. of Items per m3

Products	No. of Cartons (m^3)	No. of Items per Cartons (units)	No. of Items per m^3
Butter Jelly	42	300	12,600 (42 × 300)
Fruits & Nuts	28	144	4,032 (28 × 144)
Icy - Cool	40	72	2,880 (40 × 72)

Manufacturing Cycle efficiency

Question 47: (ICAI Module Question)

"W" specialises in engineering design and manufacture in the automotive and motorsport industry . "W"'s design team has many years' experience in the design and development of engine components for the market and high performance engines. Though "W" is performing well, but many a times, the customers complained that they had to wait for long after placing the orders. "W" is interested in cutting the amount of time between when a customer places an order and when the order is completed . For the last year , the following data were reported in respect of Division "D":

Inspection time	= 0.5 days per batch
Process time	= 2.8 days per batch
Wait time	= 16.0 days per batch
Queue time	= 4 .0 days per batch
Move time	= 0.7 days per batch

Required

(i) CALCULATE Manufacturing Cycle Efficiency (MCE) and INTERPRET the result.

(ii) STATE what percentage of the production time is spent in non-value added activities.

(iii) CALCULATE the delivery cycle time.

(iv) CALCULATE the new MCE if by using Lean Production all queue time can be eliminated.

Solution:

i) Manufacturing Cycle Efficiency (MCE)

$$= \frac{\text{Processing Time}}{\text{Inspection Time + Process Time + Queue Time + Move Time + Wait Time}}$$

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days} + 16.0 \text{ days}}$$

= 11.67%

Interpretation

In AKG, the MCE is 11.67%, which means that 88.33% of the time a unit is in process is spent on the activities that do not add value to the product. Monitoring the MCE helps companies to reduce non -value added activities and thus get products into the hands of customers more quickly and at a lower cost.

(ii) Percentage of Time Spent on Non- Value Added Activities

= 100% -11 .67%

= 88.33%

(iii) Delivery Cycle Time

= 0.5 days + 2.8 days + 4 .0 days + 0.7 days + 16 days

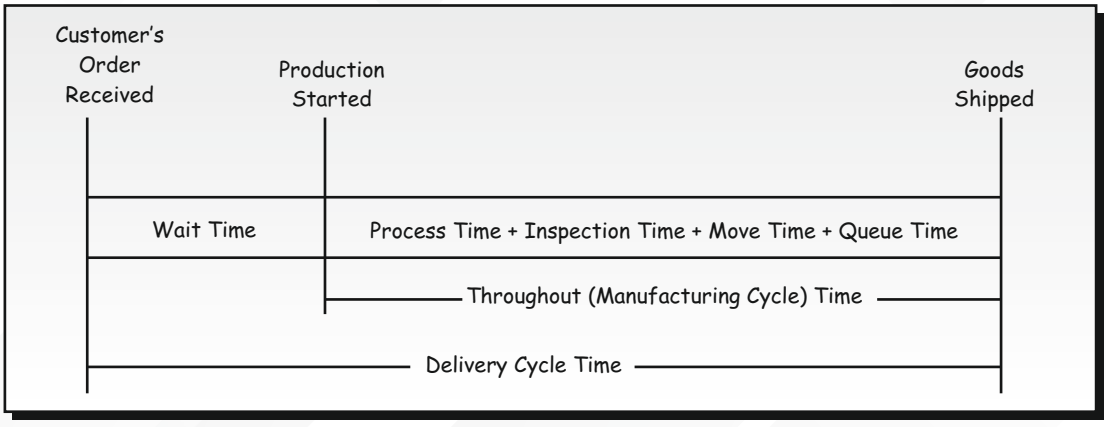
= 24 days

(iv) Revised MCE

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days} + 16.0 \text{ days}}$$

= 14%

Alternative



(i) Manufacturing Cycle Efficiency (MCE)

$$= \frac{\text{Value Added Time (Processing Time)}}{\text{Throughput (Manufacturing Cycle) Time}}$$

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days}}$$

= 35%

Interpretation

In AKG , the MCE is 35%, which means that 65% of the time a unit is in process is spent on the activities that do not add value to the product. Monitoring the MCE helps companies to reduce non -value added activities and thus get products into the hands of customers more quickly and at a lower cost.

(ii) Percentage of Time Spent on Non- Value Added Activities

= 100% -35%

= 65%

(iii) Delivery Cycle Time

= 0.5 days + 2.8 days + 4.0 days + 0.7 days + 16 days

= 24 days

(iv) Revised MCE

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 0 \text{ days} + 0.7 \text{ days}}$$

= 70%

Note that MCT does not include the waiting time before the "order is received by manufacturing" (i.e. receipt time) .

Examples of non value added cycle time include the time the product spends waiting for parts or for next stage in the production process, being inspected or repaired or being moved.

This question has been solved in two different ways

1) Wait time: from start of production to completion

In first way, "Waiting Time" has been considered as the time product spends waiting for parts etc. from the start of production to completion i.e. in the production process . In this case "Waiting Time" is a non- value- added activity and part of MCT and will reduce MCE.

2) Wait time: from order being placed to start of production

In second way , "Waiting Time" has been considered as the time between 'customer places order' and 'order received by manufacturing department' , in other words it is the time product spends before the product ion process starts. MCT does not include the waiting time before the 'order is received by manufacturing department' . Therefore , same has not been considered for the MCE calculations .

ABC/ABM

Question 48: (ICAI Module Question)

XYZ Ornamental Company has been a name to count on for quality and service. It has been designing wide range of ornamental products for more than two decades using the highest - quality standard. Such quality is achieved through years of experience and the integ rity that is maintained by its employees. They are known for their perfection. VGG approached XYZ to make inquiry of two products. The two products are indoor fountain known as 'The Star' and a large gnome known as 'Dwarfs' for garden. Mr. Bob, the management accountant of XYZ, has estimated the variable costs per unit of 'The Star' and 'Dwarfs' as being Rs.622.50 and Rs.103.75 respectively. He estimated his calculations based on the following information:

(1) Products Data

	The Star	Dwarfs	Other Products
Production/ Sales (units)	10,000	20,000	80,000
Total Direct Material Costs	Rs. 22,50,000	Rs. 7,50,000	Rs. 60,00,000
Total Direct Labour Cost	Rs. 15,00,000	Rs. 5,00,000	Rs. 60,00 ,000

(2) Total variable overheads for XYZ are Rs.120,00,000 out of which 30% belong to the procurement, warehousing and use of direct materials. While all other variable overheads are related to direct labour

(3) XYZ presently allocate variable overheads into products units using percentage of total direct material cost and total direct labour cost.

(4) VGG is willing to purchase 'The Star' at Rs.740 per unit and 'Dwarfs' at Rs.151 per unit.

(5) XYZ will not accept any work yielding an estimated contribution to sales ratio less than 28%.

The directors of XYZ are considering switching to an activity-based costing system and recently appointed a management consultants firm to undertake an in-depth review of existing operations. As result of that review, the consultants concluded that estimated relevant cost drivers for material and labour related overhead costs attributable to 'The Star' and 'Dwarfs' are as follows:

	The Star	Dwarfs	Other Products
Direct Material Related Overheads: (The volume of raw materials held to facilitate production of each product is the cost driver.)			
Material Ratio per product unit	5	8	5
Direct Labour related overheads: (The number of labour operations performed is the cost drivers			
Labour Operations per product unit	7	6	5

Required

(i) Give a financial ANALYSIS of the decision strategy which XYZ may implement about the manufacture of each product using the unit cost information available.

(ii) DISCUSS whether activity-based management should be adopted in companies lie XYZ.

Workings

(a) Direct Material Cost per unit

	The Star	Dwarfs
Total Costs (Rs.)	22,50,000	750,000
Production units	10,000	20,000
Cost per unit (Rs.)	225·00	37.50

(b) Direct Labour Cost per unit

	The Star	Dwarfs
Total Costs (Rs.)	15,00,000	5,00,000
Production units	10,000	20,000
Cost per unit (Rs.)	150·00	25·00

(c) Variable Overheads

Material Related

Overhead Cost = 30% × Rs.120,00,000 = Rs.36,00,000

Total Volume Factor

Particulars	Units	Required per unit	Total Volume
The Star	10,000	5	50,000
Dwarfs	20,000	8	1,60,000
Other	80,000	5	4.00,000
Total Volume Factor			6,10,000

Overhead per unit of volume = Rs.36,00,000/ 6,10,000 = Rs.5.90. Therefore, Overhead Cost per product unit will be as follows:

The Star	5	Rs. 5.90	29.50
Dwarfs	8	Rs. 5.90	47.20

Labour Related

Overhead Cost = 70% × Rs.120,00,000 = Rs.84,00,000

Total Operations Factor

Particulars	Units	Required per unit	Total Volume
The Star	10,000	7	70,000
Dwarfs	20,000	6	1,20,000
Other	80,000	5	4.00,000
Total Operations Factor			5,90,000

Overhead per operation = Rs.84,00,000/ 5,90,000 = Rs.14.24.
Therefore, Overhead Cost per product unit will be as follows:

The Star	7	Rs.14.24	99.68
Dwarfs	6	Rs.14.24	85.44

(d) Product Information (by unit) is as follows:

Particulars	The Star		Dwarfs	
	Current Scenario	ABC Basis	Current Scenario	ABC Basis
Selling Price ...(A)	740.00	740.00	151.00	151.00
Direct Material Cost	225.00	225.00	37.50	37.50
Direct Labour Cost	150.00	150.00	25.00	25.00
Variable Overhead Cost:				
Material Related	90.00	29.50	15.00	47.20
Labour Related	157.50	99.68	26.25	85.44
Total Variable Cost ...(B)	622.50	504.18	103.75	195.14
Contribution ...(A) - (B)	117.50	235.82	47.25	(44.14)
Contribution to Sales (%)	15.88	31.87	31.29	(29.23)

(i) Analysis

The product costs per unit along with the respective contribution per unit may be calculated either by employing an ABC approach or alternatively by using the existing basis for the allocation of variable overhead cost. The current scenario of product costing suggests that 'Dwarfs' should be produced as per the request of VGG because the contribution to sales ratio is 31 .29%. However, the current

scenario of product costing also suggests that XYZ should not undertake production of 'The Star' at a selling price of Rs.740 per unit since the estimated contribution to sales ratio is 15.88% is lower than the desired contribution to sales ratio of 28%.

Activity based costing approach ensures greater accuracy by using multiple cost drivers and determines areas generating the greatest profit or loss. Table [(d)] shows how much the contribution to sales (%) for each product changes when the overhead allocation method changes to ABC. As shown in Table, contribution to sales ratio on 'The Star' increased to 31.87% from 15.88% while contribution to sales ratio on 'Dwarfs' reduced from 31.87% to - 29.23%.Thus, XYZ should opt to produce 'The Star' for VGG as contribution to sales ratio is 31.87 which is higher than the desired one.

(ii) The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers and to improve strategic and operational decisions in an organisation. Kaplan and Cooper divide ABM into Operational and Strategic.

Operational ABM covers the actions that increase efficiency, lower cost (i.e. reduce the cost driver rate of activities) and lead to higher revenue through better resources utilisation- in short, the action required to do things right. In other words, it is all about 'doing things right', using ABC information to improve efficiency. It also helps in identifying and improving value added activities and removing non -value added activities as to reduce cost without distorting product value.

Strategic ABM is about 'doing the right things'. It uses ABC information to determine which products is to be manufactured and which activities is to be used. XYZ can also use this for customer profitability analysis, identifying that which customers are the most profitable and focusing on them more.

A risk with ABM is that some activities have an implicit value are not reflected in a financial value added to any product. For example, a good and pleasant working environment can attract and retain the best human resources, but might not be identified as value added activities in operational ABM.

ABM provides managers an understanding of costs and helps teams to make certain decisions that benefit the whole organizations and not just their own activities .

Therefore, some companies like XYZ may adopt ABM to improve their operations and obtain useful activity information.

Customer account profitability

Question 49: (ICAI Module Question)

Golden East Ltd., is a hob manufacturing company doing business through wholesalers and retailers. The company is following Activity Based Costing system. Average cost per hob is Rs.600 and the listed price is Rs.1,000. But hobs are sold at a discount of 25% on listed price on orders for above 200 units and at a discount of 20% on orders for 200 units or less. The company wants to analyze the profitability of two of its wholesale customers A and B and two of its retail customers X and Y on the basis of the business with them during last year. This is to explore the opportunities to increase the profitability from the customers. The relevant data pertaining to the last year are given below:

Customer	A	B	X	Y
No. of purchase orders	50	65	230	270
No. of hobs purchased per order	500	300	40	30
No. of visits to customer's place	10	15	25	22
No. of ordinary deliveries	45	50	175	200
No. of speed deliveries	5	15	50	65

The activity, cost driver and the rate are as follows:

Activity	Cost Driver	Cost per unit of Driver (Rs.)
Order processing	No. of purchase orders	1,300
Visiting customers	No. of customers visited	7,400
Ordinary delivery	No. of ordinary deliveries	2,000
Speed delivery	No. of speed deliveries	6,000

Required

(i) EVALUATE the customer profitability by calculating the profit per hob from each customer.

(ii) RECOMMEND steps to be taken to improve profitability from less profitable customers.

(iii) LIST down the service organizations for which customer profitability analysis is useful.

(iv) EXPLAIN the specific benefits of customer profitability analysis.

Solution:

(i) Statement Showing Profit per Customer per unit

Sr. No.	Particulars	A (Rs.)	B (Rs.)	X (Rs.)	Y (Rs.)	Total (Rs.)
1	Net Sale Proceeds (Refer Table 1)	187,50,000	146,25,000	73,60,000	64,80,000	472,15,000
2	Cost of Sales (Refer Table 1)	150,00,000	117,00,000	55,20,000	48,60,000	370,80,000
	Assignable Marketing and Administration Cost (Refer Table 2)					
3a	Order Processing Cost	65,000	84,500	2,99,000	3,51,000	7,99,500
3b	Customer Visit Cost	74,000	1,11,000	1,85,000	1,62,800	5,32,800
3	Total Assignable Marketing and Administration Cost (Step 3a + 3b)	1,39,000	1,95,500	4,84,000	5,13,800	13,32,300
	Distribution Cost (Refer Table 2)					
4a	Ordinary Delivery Cost	90,000	1,00,000	3,50,000	4,00,000	9,40,000
4b	Speed Delivery Cost	30,000	90,000	3,00,000	3,90,000	8,10,000
4	Total Assignable Distribution Cost (Step 4a + 4b)	1,20,000	1,90,000	6,50,000	7,90,000	17,50,000
5	Total Cost (Step 2+3+4)	152,59,000	120,85,500	66,54,000	61,63,800	401,62,300
6	Net Profit (Step 1 - Step 5)	34,91,000	25,39,500	7,06,000	3,16,200	70,52,700
7	Profit per Hob per Customer (Step 6 / Step 3 of table 1)	139.64	130.23	76.74	39.04	114.12

Table 1: Customer Sales Analysis - Net Sale Proceeds and Cost of Sales

Sr. No.	Particulars	A	B	X	Y	Total
1	No. of Purchase Order	50	65	230	270	615
2	No. of Hobs Purchased per Order	500	300	40	30	870
3	Total Hobs Sold in the year (Step 1 × 2)	25,000	19,500	9,200	8,100	61,800
4	Listed Price per unit (Rs.)	1,000	1,000	1,000	1,000	
5	Discount as per Policy (refer note 1)	25%	25%	20%	20%	
6	Net Sale Price per unit (Step 4 × (1- discount rate per Step 5) (Rs.)	750	750	800	800	
7	Net Sale Proceeds (Step 3 × Step 6) (Rs.)	187,50,000	146,25,000	73,60,000	64,80,000	472,15,000
8	Cost of Sales (Cost per Hob Rs.600 × Step 3)	150,00,000	117,00,000	55,20,000	48,60,000	370,80,000

Note 1

Golden East Ltd. has a policy of providing discount of 25% on listed price on orders above 200 units and 20% on orders less than 200 units. Each order of customers A and B is for more than 200 units while each order of X & Y is for less than 200 units. Therefore, A and B get a discount of 25% and X and Y get a discount of 20% on the listed price per order.

Table 2: Activity Based Costing Technique
(to allocate assignable marketing, administrative and distribution cost)

Particulars	Cost per Driver unit (Rs.)	A (Rs.)	B (Rs.)	X (Rs.)	Y (Rs.)	Total (Rs.)
Order processing cost (# of orders per customer × cost per order)	1,300	65,000	84,500	2,99,000	3,51,000	7,99,500
Customer visit cost (# of visits × cost per visit)	7,400	74,000	1,11,000	1,85,000	1,62,800	5,32,800
Ordinary delivery cost (# of ordinary deliveries × cost per delivery)	2,000	90,000	1,00,000	3,50,000	4,00,000	9,40,000
Speed delivery cost (# of speed deliveries × cost per delivery)	6,000	30,000	90,000	3,00,000	3,90,000	8,10,000

Evaluation of the Customer Profitability

From the above calculations, it can be concluded that the average profit per hob sold is Rs.114.12. Sales to all the concerned customers are profitable. However, it can be observed that, sales to customers A and B, who are wholesale buyers, yie ld above average profit per hob Rs.139.64 and Rs.130.23 respectively. While sales to customers X and Y, who are retail buyers, yield below average profit per hob Rs.76.74 and Rs.39.04 respectively. Therefore, it can be concluded that sales to wholesale buyers are more profitable than sales to retail buyers. In terms of units of hob sold, sales to A and B account for nearly 72% of the sales (Customer A 25,000 units, Customer B 19,500 units from total sales of 61,800 units). Therefore, Golden East Ltd. seems to have a profitable business. However, analysis to improve the profitability from sales to retail customers like customers X and Y, would enable Golden East to improve its overall bottom-line.

(ii) Recommendation

Steps to improve customer profitability of retail customers X and Y. Referring to Table 1, a major portion of the assignable marketing, administration and distribution cost can be traced to customers X and Y. Breaking this down into various cost heads:

(a) **Order Processing Costs:** A total 615 purchase orders relating to sale of 61,800 hobs have been raised by the four customers. Customer X has raised 37% of the orders to buy 9,200 (15%) hobs, Customer Y has raised 44% of the orders to buy (13%) of the hobs, while the balance 19% to buy 72% of the hobs have been

raised by Customers A and B. Therefore, the retail customers X and Y are raising proportionally far more purchase orders as compared to wholesale customers. To process these orders, Golden East has to incur order processing charges on a higher scale. While the nature of sale to retail customers may entail sales in much smaller lots as compared to wholesale customers, Golden East Ltd. may require retail customers to place a threshold of minimum order quantity to be ordered in each purchase order. Fewer orders with larger quantity will reduce resources that would be needed for order processing, which will contribute towards lowering the processing cost for Golden East Ltd.

(b) **Customer Visit Costs:** These are marketing costs incurred by the company towards to provide support by understanding customer's needs and sorting operational issues. A total 72 visits relating to the four customers show that majority of visits have been made to customers X (25 visits) and Y (22 visits). However, sales to these customers account only for 28% of the hobs sold (Customer X 9,200 units Customer Y 8,100 of a total of 61,800 units sold). These retail customers are in need of a lot of hand-holding from the company. Golden East Ltd. needs to understand the reasons for so many visits to these two customers. Despite having so many visits, the sales are not as much as the wholesale customers. Therefore, Golden East has to analyze why so many visits are required to be made? This may indicate any improvements that can be made to business operations that can provide the required level of customer support, without so many customer visits. If this can be understood and implemented, resources required for customer visits would reduce, thereby reducing these costs.

(c) **Ordinary Deliveries:** Out of a total of 470 deliveries to the four customers, Customer X has 175 deliveries and Customer Y has 200 deliveries. Again, as explained above in point (a), retail customer orders lesser quantity as compared to wholesale customers. Therefore, the number of deliveries will be more. However, if Golden East Ltd. requires customers to order a minimum quantity each time, this can reduce the number of deliveries. This would reduce the resources required for making deliveries, thereby reducing the costs as well.

(d) **Speed Deliveries:** These are rush orders placed by customers to meet their urgent and immediate requirements. Since demand is required to be met in a short time span, Golden East may have to employ faster means of delivery. In the given problem, the cost of speed delivery is thrice the cost of an ordinary delivery. Out of a total of 135 deliveries, Customer X has 50 and Customer Y has 65 speed deliveries. At the same time, they account for only 28% of hob sales. Golden East Ltd. can require these customers to place of minimum order amount as part of their regular orders. This could reduce the need for speed deliveries. It could also make speed deliveries chargeable, if the number of such orders

exceed a certain threshold say 10 orders in a year. This will enable Golden East Ltd. to recover some portion of the costs that it incurs to make these deliveries.

(iii) List of service organizations using customer profitability analysis:

(a) Financial institutions like Banks and Insurance Companies.
(b) Hospitality services like Hotels, Travel Agents, and Tour Operators.
(c) Professional services like Audit and Accounting Firms, Law Firms, Consultancy Firms like IT Consultancy, Management Consultancy.
(d) Hospitals and Healthcare providers.
(e) Logistics and Freight Companies that transport goods to various destinations.

(iv) Benefits of Customer Profitability Analysis:

(a) It helps the supplier to identify which customers are eroding overall profitability and which customers are contributing to it.
(b) It can help to provide a basis for constructive dialogue between buyer and seller to improve margins.

MCE (missing fig.)

QUESTION 50 (RTP, May 21)

Glen Electronics manufactures a wide range of electronic heaters and geysers. Glen was a popular name among retailers and customers, but it keeps on losing the market share; the major reason is emerging competitors are offering economical product customers with similar features and quality. The market where-in Glen operating is price sensitive, hence adding more features and establish itself as a premium brand is not the option. The only possible choice left with glen is to reduce prices for that it needs to reduce the cost to maintain the profit margin.

A cost management committee was constituted to study the scenario and recommend the solution to the board of directors. The committee based upon their study suggests a 3- phase solution, out of which phase one is 'stress on enhancing manufacturing cycle efficiency from its current level of 62.50%'. The committee collects the following data with help from the office of the Chief Management Accountant–

- Current batch wait time before the order getting process is 4 days.
- The time spent working on the products (batch processing time) is currently 20 days.
- Total time spent by the products waiting –to be processed, moved, inspected, and delivered (batch queue time) is currently 6 days.
- Currently, the time spent on making sure that the products are not defective (batch inspection time) is double that time spent in transferring products between workstations (batch move time).

The Board of directors based upon the committee's report decided to apply cellular manufacturing to reduce unnecessary move time. Based upon decision tasks are allocated to concerned functional managers.

Managers and workers showed their resistance by stating – "we are not convinced that cellular manufacturing reduces motions on the production floor". Some workers even mentioned they are not aware of what is current batch inspection time and batch move time.

Required

You are deputy to management accountant and was part of the committee, hence board approached you to convince the managers and workers as part for change management.

(i) CALCULATE current batch inspection time and batch move time.

(ii) CALCULATE manufacturing cycle time, and how much is non-value-added time? (in term of days)

(iii) CALCULATE revised manufacturing cycle efficiency if both batch inspection time and batch move time cut down to half of the current level and other elements remain constant.

(iv) What makes cellular manufacturing capable to reduce motions on the production floor and how benefit the workers? EXPLAIN.

SOLUTION

(i) Batch Inspection Time and Batch Move Time

It is given in the question that currently- MCE is 62.50%,

Batch process time is 20 days, and Batch queue time is 6 days.

Let presume batch move time 'x' then batch inspection time will be '2x' because currently double then batch move time.

Hence,

$$62.50\% \text{ or } 0.6250 = \frac{20 \text{ days}}{20 \text{ days} + x + 2x + 6 \text{ days}}$$

Solving linear equation

$$\Rightarrow 20 \text{ days} + x + 2x + 6 \text{ days} = \frac{20 \text{ days}}{.6250}$$

$$\Rightarrow 20 \text{ days} + x + 2x + 6 \text{ days} = 32 \text{ days}$$

$$\Rightarrow 3x + 26 \text{ days} = 32 \text{ days}$$

$$\Rightarrow 3x = 32 \text{ days} - 26 \text{ days}$$

$$\Rightarrow 3x = 6 \text{ days}$$

$$\Rightarrow x = 2 \text{ days}$$

So, **Batch move time** (x) is 2 days and **Batch inspection time** (2x) is 4 days

(ii) Manufacturing Cycle Time and Non-Value-Added Time (in days)

$$62.50\% \text{ or } .6250 = \frac{20 \text{ days}}{\text{Manufacturing cycle time}}$$

$$\Rightarrow \text{Manufacturing cycle time} = \frac{20 \text{ days}}{.6250}$$

$$\Rightarrow \text{Manufacturing cycle time} = 32 \text{ days}$$

Or

Manufacturing cycle time includes all form of time a product spends (in manufacturing department).

Hence, Manufacturing cycle time = 20 days + 2 days + 4 days + 6 days = 32 days

Non-Value Added Time is that component of manufacturing cycle time which does not lead to any value creation directly.

Hence, Non-value added time = 32 days – 20 days i.e., 12 days

Or

2 days + 4 days + 6 days = 12 days

Note – if the discussion is regarding **customer response time** then non-value added time also includes wait time before the order getting processed.

(iii) Revised Manufacturing Cycle Efficiency if both batch inspection time and batch move time cut down to half of the current level and other elements remains constant.
Hence,
Batch process time is 20 days, Batch queue time is 6 days,
Revised batch move time is 1 day (half of 2) and
Revised batch inspection time is 2 days (half of 4).

$$\text{MCE Revised} = \frac{20 \text{ days}}{20 \text{ days} + x + 2x + 6 \text{ days}}$$

$$\Rightarrow \text{MCERevised} = \frac{20 \text{ days}}{.6250}$$

$\Rightarrow$MCERevised = .6897 or 68.97%

Improvement is recorded from 62.50% to 68.97%, on account of cut down of batch inspection time and batch move time to half of current level.

(iv) Cellular manufacturing capable to reduce motions on the production floor. Cellular manufacturing is a **lean way** to enhance productivity by improving the performance in the context of time and motion involved in the production.
Cellular manufacturing is an application of **group technology** in manufacturing in which all or a portion of a firm's manufacturing system has been converted into **manufacturing cells** (a cluster of machines or processes located in close proximity and dedicated to the manufacturing of a family of parts). In this manner cellular manufacturing results in the reduction of move time by reducing material handling (through integrated cell) and transit time and using smaller batch sizes (even single unit).
Hence motion (movement) of material (& product) and worker on production is reduced on the production floor. This may also result in reduced queue time because batch size is small even single piece flow in some cases. This is beneficial to the worker as well in two ways, apart from enhancing the productivity for organisation; first, due to **less motion, fatigue will also be less** to the worker after working in a shift of the same tenure (if he is a piece-rate worker get more wages) and second since he is working on more than one machine and part hence may feel more empowered. So cellular manufacturing leads to win-win situation wherein organisation benefits reduced direct labour cost and the worker has heightened sense of participation.

Q.	Concept	Resource	Pg
51	Sum on Revised Budgeting	Module	179-181

CHAPTER 10 REVISION VIDEO

SCAN QR OR CLICK HERE

Sum on Revised Budgeting

51. CASE SCENARIO: (Very Important) (Module)

History of the company

Great Bus Tour Co. Ltd (GBTCL) is an open top – decker bus sightseeing company, particularly identified with its special red and cream colored buses. Its commenced operating in small town of Meghalaya in June 2013 with four buses and as 2017 operator over 44 buses in north east region of India. GBTCL operates five routes with stops at tourist destinations. The company runs hop-on, hop-off bus tours of various hills, with one 24- hour ticket valid for unlimited journeys on the route.

Budget Process/ Incentive Plan

As a part of management performance control and incentive scheme it has been following participative budgeting approach. In GBTCL, budgeting is a joint process in which functional divisions develop their plans in conformity with corporate goals for the next financial year. Based on these plans, divisions prepare functional budgets and send to the appropriate management for review and approval. The budgets after the incorporation of the feedback and suggestions received from the said management, are finalised for the implementation. Then, finalised budgets are used as yardstick for performance measurement. Comparing the actual performance with the yardstick, bonus and other performance related incentives are considered. The higher management believe that this performance control and incentive scheme is very helpful to measure the performance and fixing responsibilities for the responsibility centres.

Budgeted Income Statement (Rs'000)

Revenue	1,13,800
Less:	
Variable Costs-	
Direct Material (Fuel, Lubricants and Sundries)	13,600
Direct Labour	40,500
Variable Overheads	7,700
Fixed Costs-	
Operating Overheads (Buses, Garage, Salaries)	18,100
Marketing and Administration	10,700
Profit/(Loss) before taxes	23,200

Tabel-1

Current Year's Income Statement (Rs'000)

Revenue	93,500
Less:	
Variable Costs:	
Direct Material (Fuel, Lubricants and Sundries)	19,600
Direct Labour	37,700
Variable Overheads	6,200
Fixed Costs:	
Operating Overheads (Buses, Garage, Salaries)	20,150
Marketing and Administration	10,100
Profit/(Loss) before taxes	(250)

Tabel - 2

Other Information

Surprisingly above given current year's actual results were not up to the mark. Actual results were clearly showing adverse performance in comparison with budgeted figures. Managers of GBTCL were upset because they did not receive the bonus. Ms. Maggie, Tour Manager of Route No. 3, said -

"We lost 2 months revenue and fuel prices are almost doubled. We did our best but these circumstances were beyond our control and we should not penalize at all."

In support of her statement, Ms. Meggie provided following additional information -

(a) Rain is common in Northern Region. But, the past year set a record in numbers. In July the expected average was 1,577 mm and received was 1,810 mm, In August the expected average rain was 990 mm and actual received was 1,535 mm. Heavy rain in these two months disrupted normal life of theregion.

(b) The fuel prices has risen almost continuously since last year due to surge in global crude prices.

(c) Additional operational expenses Rs 22,00,000 also incurred to remove the milky appearance and give the stainlessa nice new look effected by heavy rain.

She claimed that -

"Revised budget with consideration of the above factors would give different results and lead to different conclusions"

Required

ANALYSE the tour manager's view.

Solution

Analysis of Issue

It appears that GBTCL has been badly hit by the weather- high rain in July and August have led to a slump in business. Revenue have seen a fall of 18% over the budgeted figure. Direct Material (most of the fuel) is 21% of the Sales (compared to 12% of budgeted level) because of hike in fuel price. Variable Overheads are almost same. However, interestingly, there is a saving ofRs 1,50,000 in Operating Overheads as compared to the budgeted figure after catering additional Operational Expenses of Rs 22,00,000 (for removal of milky appearance etc.). Furthermore, there is reduction in Marketing & Administration Cost. The ratio of Salary to Sales rose to 40% in 2017from 36% (as budgeted). This appears to be atypical. Instead, there should be a cut in this ratio due to slump in business.

Award of bonus in case of losses is not justified and managers should be held accountable for their operations. However, they should not be held accountable for the events beyond their control. A manager cannot control movements in fuel price, yet he/ she is supposed to have the most information and he/ she is expected to correctly forecast movements in theprices of fuel. Managers shouldn't be penalized for the uncontrollable events.

Accordingly, in GBTCL, there should be revision in the budget to account uncontrollable events.

Refer **Table -3.**
Revised Budgeted Income Statement (Rs '000)

Revenue *	94,833
Less:	
Variable Costs -	
Direct Material** (Fuel, Lubricants and Sundries)	19,879
Direct Labour	33,750
Variable Overheads	6,417
Fixed Costs -	
Operating Overheads (Buses, Garage, Salaries)	20,300
Marketing and Administration	10,700
Profit/(Loss) before taxes	3,787

Table -3
*10 months revenue; **at actual price levels
The Revised Profit Margin has come down to 4% as against the Target Profit Margin of 20%. This clearly indicates that the performance was benchmarked against the higher target. If original budget figure is used to measure the performance, it will punish employees for the reasons which are beyond their control.
GBTCL is not too far away from Revised Profit Margin. Therefore, at least some bonus may be considered to be awarded to the employees which may create more employee loyalty and may be beneficial for long term.
Further, continuous monitoring of Budget Performance (achievement/ failure) in GBTCL is essential to overcome this situation. This helps to identify where revisions are required in the budget to account changing conditions, errors, modification to company's plan etc. Monitoring of Budget Performance should be the responsibility of the managers in GBTCL. The essence of the effective monitoring of Budget Performance is that the managers should provide accurate, relevant, actionable information on time to the appropriate management level so that budget can give a realistic target to measure the performance.
It is also important to note that at the time of revising the budget, the primary budget as well as past information should not be ignored as they are the basis for preparing all budgets.

Student Notes:

Q.	Concept	Resource	Pg
52	Market size/market share	Module	182-183
53	Reconciliation Statement	RTP	184-185
54	Planning & operational variance	RTP	186-188
55	Standard costing with ABC	Module	189-191
56	Planning & operational variance with ABC	Module	192-194

CHAPTER 11 REVISION VIDEO

SCAN QR OR CLICK HERE

Market size/market share

Question 52: (RTP Nov'20 Similar Question) (Module)

Zed company manufactures two types of flooring rolls. Budgeted and actual data are-

	Static Budget			Actual Result		
	Industrial	Domestic	Total	Industrial	Domestic	Total
Unit Sales in Rolls ('000)	200	600	800	252	588	840
Contribution Margin (₹ in Lacs)	100.00	240.00	340.00	119.70	246.96	366.66

In late 2019, a marketing research estimated industrial volume for industrial and domestic flooring at 80 Lacs Rolls. Actual industry volume for 2020 was 70 Lacs Rolls.

Required

(i) Sales Mix Variance and Sales Quantity Variance by type of flooring rolls and in total.

(ii) Market Share Variance and Market Size Variance.

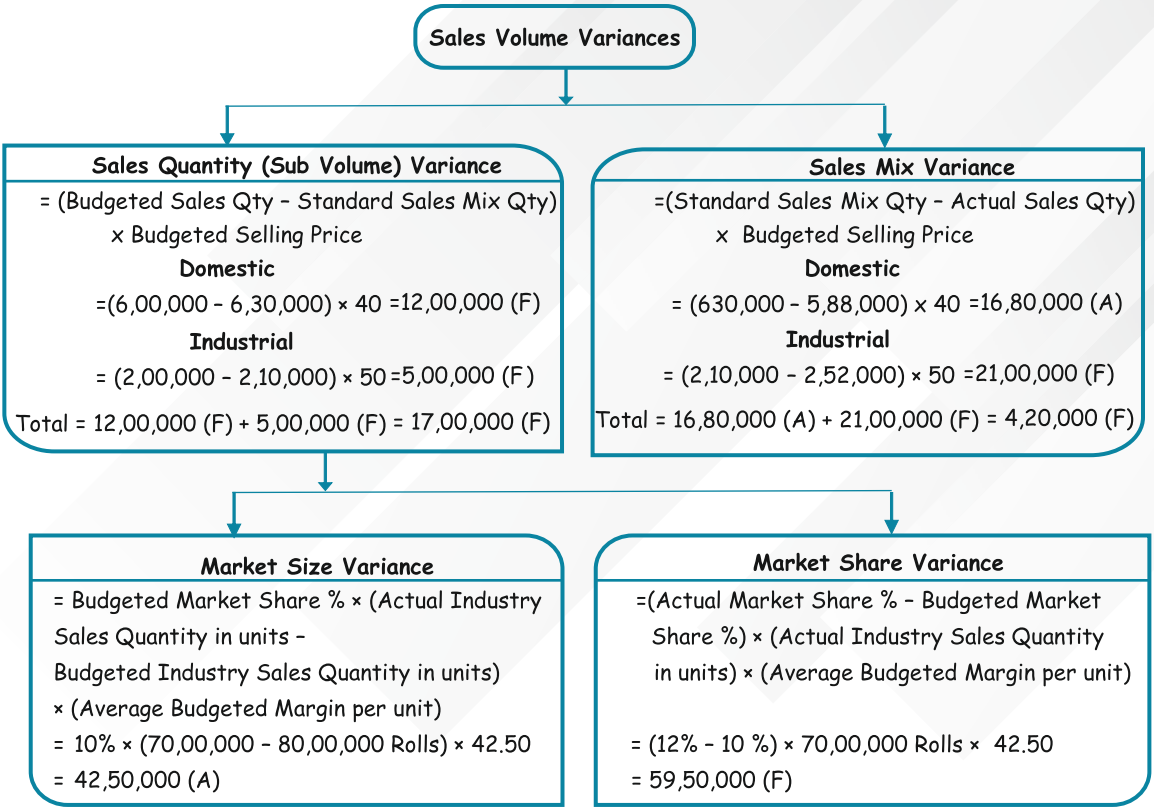
Product	Budgeted Qty. Rolls ('000) [BQ]	Budgeted Margin per Roll (₹) [BM]	Budgeted Margin (₹ 'in lacs)	Standard Sales Mix Quantity (SSMQ)	Actual Qty. Rolls ('000) [AQ]	Actual Margin per Roll (₹) [AM]	Actual Margin (₹ in) lacs
Domestic	600	40 ($\frac{240 \text{ Lacs}}{6 \text{ lacs}}$)	240.00	630	588	42	246.96
Industrial	200	50 ($\frac{100 \text{ Lacs}}{2 \text{ lacs}}$)	100.00	210	252	47.5	119.70
	800		340.00	840	840		366.66

in ratio of 6:2

Budgeted Market Share (in %) $= \frac{8,00,000 \text{ Rolls}}{80,00,000 \text{ Rolls}} = 10\%$

Actual Market Share (in %) $= \frac{8,40,000 \text{ Rolls}}{70,00,000 \text{ Rolls}} = 12\%$

Average Budgeted Margin (per Roll) $= \frac{\text{Rs.340 lacs}}{8,00,000 \text{ Rolls}} = \text{Rs. } 42.50$


Sales Volume Variances
Sales Quantity (Sub Volume) Variance
= (Budgeted Sales Qty – Standard Sales Mix Qty) x Budgeted Selling Price
Domestic
=(6,00,000 – 6,30,000) × 40 =12,00,000 (F)
Industrial
= (2,00,000 – 2,10,000) × 50 =5,00,000 (F)
Total = 12,00,000 (F) + 5,00,000 (F) = 17,00,000 (F)
Sales Mix Variance
=(Standard Sales Mix Qty – Actual Sales Qty) x Budgeted Selling Price
Domestic
= (630,000 – 5,88,000) x 40 =16,80,000 (A)
Industrial
= (2,10,000 – 2,52,000) × 50 =21,00,000 (F)
Total = 16,80,000 (A) + 21,00,000 (F) = 4,20,000 (F)
Market Size Variance
= Budgeted Market Share % × (Actual Industry Sales Quantity in units – Budgeted Industry Sales Quantity in units) × (Average Budgeted Margin per unit)
= 10% × (70,00,000 – 80,00,000 Rolls) × 42.50
= 42,50,000 (A)
Market Share Variance
=(Actual Market Share % – Budgeted Market Share %) × (Actual Industry Sales Quantity in units) × (Average Budgeted Margin per unit)
= (12% – 10 %) × 70,00,000 Rolls × 42.50
= 59,50,000 (F)

Reconciliation Statement

SALES VARIANCE

Question 53: (Module Question) (RTP)

Osaka Manufacturing Co. (OMC) is a leading consumer goods company. The budgeted and actual data of OMC for the year are as follows-

Particulars	Budget	Actual	Variance
Sales / Production (units)	2,00,000	1,65,000	(35,000)
Sales (Rs)	21,00,000	16,92,900	(4,07,100)
Less: Variable Costs (Rs)	12,66,000	10,74,150	1,91,850
Less: Fixed Costs (Rs)	3,15,000	3,30,000	(15,000)
Profit	5,19,000	2,88,750	(2,30,250)

The budgeted data shown in the table is based on the assumption that total market size would be 4,00,000 units but it turned out to be 3,75,000 units.

Required

PREPARE a statement showing reconciliation of budget profit to actual profit through marginal costing approach for the year in as much detail as possible.

Solution

Statement of Reconciliation – Budgeted Vs Actual Profit

Particulars	Rs
Budgeted Profit	5,19,000
Less: Sales Volume Contribution – Planning Variance (Adverse)	52,125
Less: Sales Volume Contribution – Operational Variance (Adverse)	93,825
Less: Sales Price Variance (Adverse)	39,600
Less: Variable Cost Variance (Adverse)	29,700
Less: Fixed Cost Variance (Adverse)	15,000
Actual Profit	2,88,750

Workings

Basic Workings

Budgeted Market Share (in %) $= \frac{2,00,000 \text{ units}}{4,00,000 \text{ units}}$

$= 50\%$

Actual Market Share (in %) $= \frac{1,65,000 \text{ units}}{3,75,000 \text{ units}}$

$= 44\%$

Budgeted Contribution = Rs21,00,000 – Rs12,66,000

= Rs8,34,000

Average Budgeted Contribution (per unit) $= \frac{\text{Rs } 8,34,000}{\text{Rs } 2,00,000}$

= Rs 4.17

Standard Sales Price per unit = Rs 21,00,000 / Rs 2,00,000
= Rs 10.50

Actual Sales Price per unit = Rs 16,92,900 / Rs 1,65,000
= Rs 10.26

Standard Variable Cost per unit = Rs 12,66,000 / Rs 2,00,000
= Rs 6.33

Actual Variable Cost per unit = Rs 10,74,150 / Rs 1,65,000
= Rs 6.51

CALCULATION OF VARIANCES

Sales Variances

Volume Contribution Planning* = Budgeted Market Share % × (Actual Industry Sales Quantity in units - Budgeted Industry Sales Quantity in units) × (Average Budgeted Contribution per unit)

= 50% × (3,75,000 units - 4,00,000 units) × Rs4.17

= 52,125 (A)

(*) Market Size Variance

Volume Contribution Operational** = (Actual Market Share % - Budgeted Market Share %) × (Actual Industry Sales Quantity in units)

= 93,825(A)

(**) Market Share Variance

Price = Actual Sales - Standard Sales
= Actual Sales Quantity × (Actual Price - Standard Price)
= 1,65,000 units × (Rs10.26 - Rs10.50)
= 39,600 (A)

Variable Cost Variances

Cost = Standard Cost for Production - Actual Cost
=(Standard Cost per unit - Actual Cost per unit) × Actual Production

= 1,65,000 units × (Rs6.33 - Rs6.51)

= Rs29,700(A)

Fixed Cost Variances

Expenditure = Budgeted Fixed Cost - Actual Fixed Cost

= Rs3,15,000 - Rs3,30,000
= Rs15,000 (A)

Planning & Operation Variance

Question 54 (RTP May 20)

KONY Ltd., based in Kuala Lumpur, is the Malaysian subsidiary of Japan's NY corporation, headquartered in Tokyo. KONY's principal Malaysian businesses include marketing, sales, and after-sales service of electronic products & software exports products. KONY set up a new factory in Penang to manufacture and sell integrated circuit 'Q50X-N'. The first quarter's budgeted production and sales were 2,000 units. The budgeted sales price and standard costs for 'Q50X-N' were as follows:

	RM	RM
Standard Sales Price per unit		50
Standard Costs per unit		
Circuit X (10 units @ RM 2.5)	25	
Circuit Designers (6 hrs. @ RM 2)	12	(37)
Standard Contribution per unit		13

Actual results for the first quarter were as follows:

	RM '000	RM '000
Sales (2,000 units)		158
Production Costs (2,000 units)		
Circuit X (21,600 units)	97.20	
Circuit Designers (11,600 hours)	34.80	(132)
Actual Contribution (2,000 units)		26

The management accountant made the following observations on the actual results –

"In total, the performance agreed with budget; however, in every aspect other than volume, there were huge differences. Sales were made at what was supposed to be the highest feasible price, but we now feel that we could have sold for RM 82.50 with no adverse effect on volume. The Circuit X cost that was anticipated at the time the budget was prepared was RM 2.5 per unit. However, the general market price relating to efficient purchases of the Circuit X during the quarter was RM 4.25 per unit. Circuit designers have the responsibility of designing electronic circuits that make up electrical systems. Circuit Designer's costs rose dramatically with increased demand for the specialist skills required to produce the 'Q50X-N', and the general market rate was RM 3.125 per hour - although KONY always paid below the normal market rate whenever possible. In my opinion, it is not necessary to measure the first quarter's performance through variance analysis. Further, our operations are fully efficient as the final contribution is equal to the original budget."

Required

COMMENT on management accountant's view.

Solution:

Comment

As the management accountant states, and the analysis (W.N.1) presents, the overall variance for the KONI is nil. The cumulative adverse variances exactly offset the favourable variances i.e. sales price variance and circuit designer's efficiency variance. However, this traditional analysis does not clearly show the efficiency with which the KONI operated during the quarter, as it is difficult to say whether some of the variances arose from the use of incorrect standards, or whether they were due to efficient or inefficient application of those standards.

In order to determine this, a revised ex post plan should be required, setting out the standards that, with hindsight, should have been in operation during the quarter. These revised ex post standards are presented in W.N.2.

As seen from W.N.3, on the cost side, the circuit designer's rate variance has changed from adverse to favourable, and the price variance for component X, while remaining adverse, is significantly reduced in comparison to that calculated under the traditional analysis (W.N.1); on the sales side, sales price variance, which was particularly large and favourable in the tra-ditional analysis (W.N.1), is changed into an adverse variance in the revised approach, reflecting the fact that the KONI failed to sell at prices that were actually available in the market.

Further, variances arose from changes in factors external to the business (W.N .4), which might not have been known or acknowledged by standard-setters at the time of planning are beyond the control of the operational managers. The distinction between variances is necessary to gain a realistic measure of operational efficiency.

W.N.1: KONY India Ltd.

Quarter-1: Operating Statement

Particulars	Favourable RM	Adverse RM	RM
Budgeted Contribution			26,000
Sales Price Variance [(RM 79 - RM 50) × 2,000	58,000	---	
Circuit X Price Variance [(RM 2.50 – RM 4.50) × 21,600 units]		43,200	
Circuit X Usage Variance [(20,000 units - 21,600 units) × RM 2.50]		4,000	
Circuit Designer's Rate Variance [(RM 2 - RM 3) × 11,600 hrs.]		11,600	
Circuit Designer's Efficiency Variance [(12,000 hrs. - 11,600 hrs.) × RM 2.00]	800		NIL
Actual Contribution			26,000

W.N.2

Statement Showing Original Standards, Revised Standards, and Actual Results for Quarter 1

	Original Standards (ex-ante)		Revised Standards (ex-post)		Actual	
Sales	2,000 units × RM 50.00	RM 1,00,000	2,000 units × RM 82.50	RM 1,65,000	2,000 units × RM 79.00	RM 1,58,000
Circuit X	20,000 units × RM 2.50	RM 50,000	20,000 units × RM 4.25	RM 85,000	21,600 units × RM 4.50	RM 97,200
Circuit Designer	12,000 hrs. × RM 2.00	RM 24,000	12,000 hrs. × RM 3.125	RM 37,500	11,600 hrs. × RM 3.00	RM 34,800

W.N.3

Statement Showing Operational Variances

Particulars	(Rs)	(Rs)
Operational Variances		16,500 (A)
Sales Price [(RM 79.00 - RM 82.50) × 2,000 units]	7,000 (A)	
Circuit X Price [(RM 4.25 - RM 4.50) × 21,600 units]	5,400 (A)	
Circuit X Usage [(20,000 units – 21,600 units) × RM 4.25]	6,800 (A)	
Circuit Designer Rate [(RM 3.125 - RM 3.00) × 11,600 hrs.]	1,450 (F)	
Circuit Designer Efficiency [(12,000 hrs.– 11,600 hrs.) × RM	1,250 (F)	

W.N.4

Statement Showing Planning Variances

Particulars	(Rs.)	(Rs.)
Planning Variance		16,500 (F)
Sales Price [(RM 82.50 - RM 50.00) × 2,000 units]	65,000 (F)	
Circuit X Price [(RM 2.50 - RM 4.25) × 20,000 units]	35,000 (A)	
Circuit Designer Rate [(RM 2.00 - RM 3.125) × 12,000 hrs.]	13,500 (A)	

Standard costing with ABC

Question 55: (ICAI Module Question)

SPS Limited uses activity based costing to allocate variable manufacturing overhead costs to products. The company identified three activities with the following information for last quarter :

Activity	Standard Rate	Standard Quantity per unit produced	Actual Costs	Actual Quantity
Indirect Materials	Rs. 20 per kilogram	0.5 kilogram per unit	Rs. 9,40,000	48,000 kilogram
Product Testing	Rs. 3 per test minute	10 minutes per unit	Rs. 22,50,000	7,40,000 test minutes
Energy	Rs. 0.20 per minute of machine time	4 minutes of machine time per unit	Rs. 70,000	3,60,000 minutes of machine time

The company produced 80,000 units in the last quarter. Company policy is to investigate all variances above 5% of the flexible budget amount for each activity.

Required

(i) CALCULATE variable overhead expenditure variance and variable overhead efficiency variance for each of the activities using activity based costing. Clearly indicate each variance as favourable or unfavourable I adverse.

(ii) INTERPRET the results of variable overhead efficiency variance as calculated in (i) above in respect of indirect materials and product testing activity.

(iii) IDENTIFY the variances that should be investigated according to company policy. Show calculations to support your answer.

Solution:

(i) Indirect Materials

Efficiency Variance = Cost Impact of undertaking activities more/ less than standard
= (0.50kg. x 80,000units - 48 ,000 kg.) x 20
= 1,60 ,000 (A)

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken
= 48 ,000kg. x 20 - 9,40,000
= 20,000 (F)

Product Testing

Efficiency Variance = Cost Impact of undertaking activities more/ less than standard
= (10 mins. x 80,000 units - 7,40,000 mins.) x 3
= 1,80,000 (F)

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken
= 7,40 ,000mins x 3 - 22,50,000
= 30,000 (A)

Energy

Efficiency Variance = Cost Impact of undertaking activities more/ less than standard
= (4 mins. x 80,000 units - 3,60,000 mins.) x 0.20
= 8,000 (A)

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken
= 3,60 ,000mins x 0.20 - 70,000
= 2,000 (F)

(ii) Indirect Materials

SPS actually spent 48,000 kg. or 8,000 kg. more than the standard allows. At a predetermined rate of 20 per kg., efficiency variance is 1,60 ,000 (A). Since actual quantity were higher than the standard, the variance is unfavorable. This adverse variance , could have been caused by the inferior quality, result of carelessness handling of materials by production workers or could as a result of change in methods of production , product specifications or the way in which quality of the product is checked or controlled.

Product Testing

Favorable efficiency variance amounting to Rs. 1,80,000 indicates that fewer testing minutes were expended during the quarter than the standard minutes required for the level of actual output. This may be due to employment of a higher skilled labor or improvement of skills of existing workforce through training and development leading to improved productivity etc.

(iii) Flexible Budget

Indirect	=	(0.50 kg. x 80,000 units) x	20	= 8,00,000x5%
Materials	=	8.00,000		= **40,000**
Product Testing	=	(10 mins. x 80,000 units) x	3	= 24,00,000x 5%
	=	24,00,000		= **1,20,000**
Energy	=	(4 mins. x 80,000) x 0.20		= 64,000 x 5%
	=	64,000		= **3,200**

Efficiency Variance for all the three activities are more than 5% of their flexible budget amount. So, according to the company policy, efficiency variances should be investigated.

Alternative

Statement Showing Identification of Variances to be investigated

	Calculation	Variance % of Flexible Budget	Criteria	Investigate Y or N
Indirect Materials				
Efficiency Variance	$\left(\frac{1,60,000}{8,00,000} \times 100\right)$	**20%**	5%	**Y**
Expenditure Variance	$\left(\frac{20,000}{8,00,000} \times 100\right)$	2.5%	5%	**N**
Product Testing				
Efficiency Variance	$\left(\frac{1,80,000}{24,00,000} \times 100\right)$	**7.5%**	5%	**Y**
Expenditure Variance	$\left(\frac{30,000}{24,00,000} \times 100\right)$	1.25%	5%	**N**
Energy				
Efficiency Variance	$\left(\frac{8,000}{64,000} \times 100\right)$	**12.5%**	5%	**Y**
Expenditure Variance	$\left(\frac{2,000}{64,000} \times 100\right)$	3.125%	5%	**N**

Planning & operational variance with ABC

Question 56: (ICAI Module Question)

JPY Limited produces a single product. It has recently automated part of its manufacturing plant and adopted Total Quality Management (TOM) and Just-in- Time manufacturing system. No inventories are held for material as well as for finished product. The company currently uses standard absorption costing system. Following are related to

	Budget	Actual
Production and Sales	1,00,000 units	1,10,000 units
Direct Materials	2,00,000 kg. @ 30/kg	2,50,000 kg. @ 31.20/kg.
Direct Labour Hours	25 ,000 hrs. @ 300/ hr	23,000 hrs. @ 300/ hr.
Fixed Production Overhead	3,20,000	3,60,000

Production overheads are absorbed on the basis of direct labour hours.

The CEO intends to introduce activity based costing system along with TOM and JIT for better cost management. A committee has been formed for this purpose. The committee has further analysed and classified the production overhead of fourth quarter as follows:

	Budget	Actual
Costs :		
Material Handling	96,000	1,24,000
Set Up	2,24,000	2,36,000
Activity:		
Material Handling (orders executed)	8,000	8,500
Set Up (production runs)	2,000	2,100

Revision of standards relating to fourth quarter were made as below:

	Original Standard	Revised Standard
Material Content per unit	2 kg	2.25 kg
Cost of Material	30 per kg	31 per kg
Direct Labour Hours	15 minutes	12 minutes

Required

(i) CALCULATE Planning and Operational Variances relating to material price, material usage, labour efficiency, and labour rate.

(ii) CALCULATE overhead expenditure and efficiency variance using Activity Based Costing principles .

Solution

(i) Workings

Factor	Original Standards (ex-ante)		Revised Standards (ex-post)		Actual (1,10,000 units)	
Material	1,10,000 units x 2 kgs. x 30	66,00,000	1,10,000 units x 2.25 kgs. x 31	76,72,500	2,50,000 kgs. x 31.20	78,00,000
Labour	1,10,000 x 15/60hrs. x 300	82,50,000	1,10,000 x 12/60hrs. x 300	66,00,000	23,000 hrs x 300	69,00,000

Material

Traditional Variances

Usage Variance = (2,20,000 Kgs. - 2,50,000 Kgs.) x Rs. 30 = 9,00,000 (A)

Price Variance = (30.00 - 31.20) x 2,50,000 Kgs. = 3,00,000 (A)

Total Variance = 9,00,000 (A) + 3,00,000 (A) = 12,00,000 (A)

Planning Variances

Usage Variance = (2,20,0000 Kg. - 2,47,500 Kg.) x Rs. 30 = 8,25,000 (A)

Price Variance = (30 - 31) x 2,47,500 Kgs. = 2,47,500 (A)

Total Variance = 8,25,000 (A) + 2,47,5000 (A) = 10,72,500 (A)

Operational Variances

Usage Variance = (2,47,500 Kg. - 2,50,000 Kg.) x Rs. 31 = 77,500 (A)

Price Variance = (31.00 - 31.20) x 2,50,000 Kg. = 50,000 (A)

Total Variance = 77,500 (A) + 50,000 (A) = 1,27,500 (A)

Labour

Traditional Variances

Efficiency Variance = (27,500 hrs. - 23,000 hrs.) x 300 = 13,50,000 (F)

Rate Variance = (300 - 300) x 23,000 hrs. = NIL

Total Variance = 13,50,000 (F) + NIL = 13,50,000 (F)

Planning Variances

Efficiency Variance = (27,500 hrs. - 22,000 hrs.) x 300 = 16,50,000 (F)

Rate Variance* = (300 - 300) x 22,000 hrs. = NIL

Total Variance = 16,50,000 (F) + 0 = 16,50,000 (F)

Operational Variances

Efficiency Variance = (22,000 hrs. - 23,000 hrs.) x 300 = 3.00,000 (A)

Rate Variance = (300 - 300) x 23,000 hrs. = NIL

Total Variance = 3.00,000 (A) + 0 = 3.00,000 (A)

(iii) Material Handling

Efficiency Variance = Cost Impact of undertaking activities more/ less than standard

= (8,800 orders* - 8,500 orders) x 12

= 3,600 (F)

(*) $\left(\frac{8000 \text{ orders}}{100{,}000 \text{ units}}\right)$ x 110,000 units

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken

= 8,500 orders x 12 - 1,24,000

= 22,000 (A)

Setup

Efficiency Variance = Cost Impact of undertaking activities more/ less than standard

= (2,200 runs* - 2,100 runs) x 112

= 11,200 (F)

(*) $\left(\frac{2000 \text{ runs}}{100{,}000 \text{ units}}\right)$ x 110,000 units

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken

= (2,100 runs x 112) - 2,36,000

= 800 (A)