

Budget & Budgetary Control

BASIC CONCEPTS AND FORMULAE

Basic Concepts

- 5.1 Strategic Planning:** Strategic planning is concerned with preparing long-term action plans to attain the organization's objectives by considering the changes at horizon.
- 5.2 Budgetary Planning:** Budgetary planning is mainly concerned with preparing the short to medium term plan of the organisation. It will be carried out within the framework of the strategic plan as already set. An organization's annual budget is considered as an intermediary step towards achieving the strategic plan.
- 5.3 Operational Planning:** It concerns with the short-term or day-to-day planning process. It plans the utilisation of resources and will be carried out within the framework of the budget. Each step in the operational planning process is an interim step towards achieving the budget.
- 5.4 Preparation of Budgets :** The process of preparing and using budgets will differ from organisation to organisation. However, there are a number of key requirements in the design of a budgetary planning and control process.
- 5.4.1 Co-ordination: The budget committee:**
- Budgets provide a **means of co-ordination** of the business as a whole. In the process of establishing budgets, the various factors like production capacity, sales possibilities, and procurement of material, labour, etc. are balanced and co-ordinates so that all the activities proceed according to the objective.
- 5.4.2 Participative budgeting:**
- CIMA defines participative budgeting as: A budgeting system in which all budget committee members are given the opportunity to apply their own budgets in practice.
- 5.4.3 Budget Manual:**
- A budget manual is a collection of documents that contains key information for those involved in the planning process.
- 5.4.4 Identification of the principal budget factor:**
- The principal budget factor is the factor that limits the activities of functional

budgets of the organization. The early identification of this factor is important in the budgetary planning process because it indicates which budget should be prepared first.

5.5 Zero Base Budgeting (ZBB)

ZBB is defined as 'a method of budgeting which requires each cost element to be specifically justified, as though the activities to which the budget relates were being undertaken for the first time. ZBB is prepared and justified from zero, instead of simple using last year's budget as a base.

5.6 Traditional Budgeting vs Zero- based budgeting.

Traditional budgeting	Zero Based Budgeting
Accounting Oriented	Responsibility Accounting oriented
Reference is past budget. Some managers only inflate them.	Fresh approach without any previous reference. Nothing is taken into account without justification.
Routine Approach	Investigative approach

5.7 Performance Budgeting (PB)

Performance Budgeting provide a meaningful relationship between estimated inputs and expected outputs as an integral part of the budgeting system. 'A performance budget is one which presents the purposes and objectives for which funds are required, the costs of the programmes proposed for achieving those objectives, and quantities data measuring the accomplishments and work performed under each programme.

5.8 Traditional budgeting vs. Performance budgeting

1. The traditional budgeting (TB) gives more emphasis on the financial aspect than the physical aspects or performance. PB aims at establishing a relationship between the inputs and the outputs.
2. Traditional budgets are generally prepared with the main basis towards the objects or items of expenditure i.e. it highlights the items of expenditure, namely, salaries, stores and materials, rates rents and taxes and so on. In the PB latter the emphasis is more on the functions of the organisation, the programmes to discharge these function and the activities which will be involved in undertaking these programmes.

5.9 Budget Ratio

These ratios provide information about the performance level, i.e., the extent of

5.3 Advanced Management Accounting

deviation of actual performance from the budgeted performance and whether the actual performance is favourable or unfavorable. If the ratio is 100% or more, the performance is considered as favourable and if ratios is less than 100% the performance is considered as unfavourable.

Basic Formulas

- i) Efficiency Ratio = (Standard hours , Actual hours) × 100
- ii). Activity Ratio = (Standard hours , Budgeted hours) × 100
- iii) Calendar Ratio = (Available working days , budgeted working days) × 100
- iv) Standard Capacity Usage Ratio = (Budgeted hours , Max. possible hours in the budgeted period) × 100
- v). Actual Capacity Usage Ratio = (Actual hours worked , Maximum possible working hours in a period) × 100
- vi). Actual Usage of Budgeted Capacity Ratio=(Actual working hours, Budgeted hours) × 100

Question 1

A company manufactures two products X and Y. Product X requires 8 hours to produce while Y requires 12 hours. In April, 2004, of 22 effective working days of 8 hours a day, 1,200 units of X and 800 units of Y were produced. The company employs 100 workers in production department to produce X and Y. The budgeted hours are 1,86,000 for the year.

Calculate Capacity, Activity and Efficiency ratio and establish their relationship.

Answer

	Standard hours produced		
	Product X	Product Y	Total
Out put (units)	1,200	800	
Hours per unit	8	12	
Standard hours	9,600	9,600	19,200
Actual hours worked			
100 workers ´ 8 hours ´ 22 days =			17,600
Budgeted hours per month			
1,86,000/12 =			15,500
Capacity Ratio = $\frac{\text{actual hours}}{\text{Budgeted hours}} \times 100 = \frac{17,600}{15,500}$		=	113.55 %

$$\text{Efficiency Ratio} = \frac{\text{Standard Hours Produced}}{\text{Actual hours}} \times 100 = \frac{19,200}{17,600} \times 100 = 109.09\%$$

$$\text{Activity Ratio} = \frac{\text{Standard Hours Produced}}{\text{Budget hours}} \times 100 = \frac{19,200}{15,500} \times 100 = 123.87\%$$

Relationship : Activity Ratio = Efficiency Ratio × Capacity Ratio

$$\text{or} \quad 123.87 = \frac{109.09 \times 113.55}{100}$$

Question 2

Kitchen King Company makes a high-end kitchen range hood 'Maharaja'. The company presents the data for the year 2003 and 2004:

		2003	2004
1.	Units of maharaja produced and sold	40,000	42,000
2.	Selling Price per unit in ₹	1,000	1,100
3.	Total Direct Material (Square feet)	1,20,000	1,23,000
4.	Direct material cost per square feet in ₹	100	110
5.	Manufacturing Capacity (in units)	50,000	50,000
6.	Total Conversion cost in ₹	1,00,00,000	1,10,00,000
7.	Conversion cost per unit of capacity (6)/(5)	200	220
8.	Selling and customer service capacity	300 customer	290 customer
9.	Total selling and customer service cost in ₹	72,00,000	72,50,000
10.	Cost per customer of selling and customer service capacity (9)/(8)	24,000	25,000

Kitchen King produces no defective units, but it reduces direct material used per unit in 2004. Conversion cost in each year depends on production capacity defined in terms of Maharaja units that can be produced. Selling and Customer service cost depends on the number of customers that the selling and service functions are designed to support. Kitchen King has 230 customers in 2003 and 250 customers in 2004.

You are required

- Describe briefly key elements that would include in Kitchen King's Balance Score Card.*
- Calculate the Growth, Price-recovery and productivity component that explain the change in operating income from 2003 to 2004.*

5.5 Advanced Management Accounting

Answer

Kitchen King's Score card should describe its product differentiation strategy. The key points that should be included in its balance score card are

- Financial Perspective – Increase in operating income by charging higher margins on Maharaja.
- Customer Perspective – Market share in high-end kitchen range market and customer satisfaction.
- Internal business Perspectives: Manufacturing quality, order delivery time, on time delivery and new product feature added.
- Learning and Growth Perspective: Development time for designing new end product and improvement in manufacturing process.

Operative Income:

	(Amount in 000 ₹)	
	2003	2004
Revenue (40000×1000: 42000×1100)	40000	46200
Direct Material	12000	13530
Conversion cost	10000	11000
Selling and Customer service	7200	7250
Total cost	29200	31780
Operative Income	10800	14420

Change in operating Income 36, 20,000 (F)

A. Growth Component

- (a) Revenue effect = Output Price in 2003{Actual units sold in 04 – Actual units sold in 03}
= ₹ 1, 000 (42,000 units – 40,000 units) = ₹ 20, 00,000 (F)
- (b) The cost effect = Input price in 2003{Actual units of input to produce 2003 output less Actual units of input which would have been used to produce year 2004 output on the basis of 2003}
- (i) Direct Material = ₹ 100 [1, 20,000sqft – 1, 20,000sqft × $\frac{42,000 \text{ units}}{40,000 \text{ units}}$]
= ₹ 6, 00,000 (A)
- (ii) Conversion cost and selling and customer service will not change since adequate capacity exists in 2003 to support 2004 output and customers. Hence variance

Conversion cost	= 200(50000 – 50000)	= 0
S & Customer Service	= 25000 (300 – 300)	= 0
Increase in operating effect of Growth component is ₹ 14, 00,000 (F)		

B Price recovery Component:

- (i) Revenue effect = Actual output in 2004 [Selling price per unit in 2004 less Selling price per unit in 2003]
= 42,000 units (₹ 1, 100 – ₹ 1, 000) = ₹ 42, 00,000 (F)
- (ii) Cost effect = Unit of input based on 2003 actual that would have been used to produce 2004 output {Input prices per unit in 2003 less Input prices per unit in 2004}
- (a) Direct material = 1, 26,000 sqft (₹ 100/sqft – ₹ 110/sqft) = ₹ 12, 60,000 (A)
- (b) Conversion Cost = 50,000 units (₹ 200/unit – ₹ 220/unit)
= ₹ 10, 00,000 (A)
- (c) S & Cust Service = 300 customers (₹ 24, 000 – ₹ 25,000)
= ₹ 3,00,000 (A) = ₹ 25, 60,000 (A)

Increase in Operating income due to Price Recovery is ₹ 16, 40,000 (F)
{ ₹ 42, 00,000 – ₹ 25, 60,000 }

C Productivity Component

Productivity component = Input Prices in 04{Actual units of input which would have been used to produce year 2004 output on the basis of 2003 actual less Actual Input

- (i) Direct Material: ₹ 110/sqft (1, 26,000 units – 1, 23,000 units) = ₹ 3, 30,000(F)
- (ii) Conversion Cost: ₹ 200/unit (50,000 units – 50,000 units) = 0
- (iii) Selling & Customer = ₹ 25, 000 (300 customers–290 customers)= ₹ 2,50,000 (F)
- = ₹ 5,80,000 (F)

The change in operating income from 2003 to 2004 is analysed as follows:

	2003	Growth component	(Amount in 000 ₹)		
			Price recovery	Cost effect of productivity component	2004
Revenue	40000	2000 (F)	4200 (F)	-----	46200
Cost	29200	600 (A)	2560 (A)	580 (F)	31780
Operating Income	10800	1400(F)	1640 (F)	580 (F)	14420

5.7 Advanced Management Accounting

Question 3

Explain briefly the major components of a balanced score card.

Answer

An ideal Balanced score card combines financial measures of past performance with measures of the firm's drivers of future performance. The following perspectives are evaluated:

- (i) Customer perspective - Measures of price / delivery / quality / support.
- (ii) Internal perspective – Measures of efficiency / sales penetration and new product introduction.
- (iii) Innovation and learning perspective - Measures of technology / cost leadership.
- (iv) Financial perspective - Sales / Cost of sales / Return on capital employed etc.

Question 4

Describe the process of zero-base budgeting.

Answer

The zero Base Budgeting involves the following steps:

- (i) Corporate objectives should be established and laid down in details.
- (ii) Decide about the techniques of ZBB to be applied.
- (iii) Identify those areas where decisions are required to be taken.
- (iv) Develop decision programmes and rank them in order of preferences.
- (v) Preparation of budget, that is translating decision packages into practicable units/items and allocating financial resources.

Question 5

"In many organisations, initiatives to introduce balanced score card failed because efforts were made to negotiate targets rather than to build consensus."

Required:

Elucidate the above statement.

Answer

Balanced score card is a set of financial and non-financial measures relating to a company's critical success factors. It is an approach which provides information to management to assist in strategy implementation. Therefore, the components to be included in the balanced score

card must flow from strategy. The targets should be measurable and must flow from strategy and corporate plan of the company. It is necessary that managers should agree to the components and targets because in absence of a consensus, managers may not commit to the targets established by the top management / the board of directors. Moreover, the functions are interdependent and results in one functional area/perspective (e.g. innovation and learning) have direct bearing on the results in other functional area / perspective (e.g. customer perspective). Therefore, it is not sufficient that individual managers agree to their targets. Successful implementation requires that the top management builds an overall consensus on the components and targets of the balanced score card. Negotiation undermines the fundamental principle that the components and targets should flow from strategy. As a result, an approach to establish targets through negotiation defeats the very purpose of balanced score card.

Question 6

What do you mean by a flexible budget? Give an example of an industry where this type of budget is typically needed?

Answer

A flexible budget is a budget which, by recognizing the difference between fixed, semi-variable and variable costs, is designed to change in relation to the level of activity attained.

E.g. seasonal products – e.g. soft drink industry

industries in make to order business like ship building

industries influenced by change in fashion.

Industries which keep on introducing new products / new designs.

Question 7

Describe the four types of bench marking of critical success factors.

Answer

The Benchmarking is of following types:

- (i) **Competitive benchmarking:** It involves the comparison of competitors products, processes and business results with own.
- (ii) **Strategic benchmarking:** It is similar to the process benchmarking in nature but differs in its scope and depth.
- (iii) **Global benchmarking:** It is a benchmarking through which distinction in international culture, business processes and trade practices across companies are bridged and their ramification for business process improvement are understood and utilized.

5.9 Advanced Management Accounting

- (iv) **Process benchmarking:** It involves the comparison of an organisation critical business processes and operations against best practice organization that performs similar work or deliver similar services.
- (v) **Functional Benchmarking or Generic Benchmarking:** This type of benchmarking is used when organisations look to benchmark with partners drawn from different business sectors or areas of activity to find ways of improving similar functions or work processes.
- (vi) **Internal Benchmarking:** It involves seeking partners from within the same organization, for example, from business units located in different areas.
- (vii) **External Benchmarking:** It involves seeking help of outside organisations that are known to be best in class. External benchmarking provides opportunities of learning from those who are at the leading edge, although it must be remembered that not every best practice solution can be transferred to others.

Question 8

- (a) *What are the advantages and limitations of Zero base Budgeting?*
- (b) *What are benchmarking code of conduct?*
- (c) *A Company manufactures two Products A and B by making use of two types of materials, viz., X and Y. Product A requires 10 units of X and 3 units of Y. Product B requires 5 units of X and 2 units of Y. The price of X is ₹2 per unit and that of Y is ₹3 per unit. Standard hours allowed per product are 4 and 3, respectively. Budgeted wages rate is ₹8 per hour. Overtime premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 150 workers.*

The Sales Manager has estimated the sales of Product A to be 5,000 units and Product B 10,000 units. The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct worker in actually manufacturing the product is 80%, in addition, the non-productive downtime is budgeted at 20% of the productive hours worked. There are twelve 5-day weeks in the budget period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product A 800 units; Product B 1,680 units. The targeted closing stock expressed in terms of anticipated activity during the budget period are Product A 12 days sales; Product B 18 days sales. The opening and closing stock of raw material of X and Y will be maintained according to requirement of stock position for Product A and B.

You are required to prepare the following for the next period:

- (i) *Material usage and Material purchase budget in terms of quantities and values.*

- (ii) *Production budget.*
- (iii) *Wages budget for the direct workers.*

Answer**(a) Advantage of ZBB**

- (i) It provides a systematic approach for evaluation of different activities and ranks them in order of preference for allocation of scarce resource.
- (ii) It ensures that the various functions undertaken by the organisation are critical for the achievement of its objectives and are being performed in the best way.
- (iii) It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit analysis.
- (iv) The area of wasteful expenditure can be easily identified and eliminated.
- (v) Departmental budgets are closely linked with corporate objectives.
- (vi) The technique can also be used for the introduction and implementation of the system of 'management by objective'.

Limitations of ZBB

- (i) Various operational problems are likely to be faced in implementing the technique.
- (ii) The full support of top management is required.
- (iii) It is time consuming as well as costly.
- (iv) It requires properly trained managerial staff.

(b) Benchmarking code of conduct

Benchmarking is the process of identifying and learning from the best practices anywhere in the world. It is a powerful tool for continuous improvement. To contribute to efficient, effective and ethical benchmarking, individuals agree for themselves and their organisation to be abided by the following principles for the benchmarking with other organisations.

Suggested benchmarking code of conduct:

- (i) Principle of legality
- (ii) Principle of exchange
- (iii) Principle of confidentiality
- (iv) Principle of use

5.11 Advanced Management Accounting

- (v) Principle of first party contact
- (vi) Principle of third party contact
- (vii) Principle of preparation

(c) (i) Material usage budget

	<i>Products A (units)</i>	<i>Products B (units)</i>	<i>Total material usage units</i>	<i>Cost per unit (₹)</i>	<i>Total cost of materials (₹)</i>
Estimated sales	5,000	10,000			
Material X : 10 units per product A and 5 units per product B	50,000	50,000	1,00,000	2	2,00,000
Material Y : 3 units per product A and 2 units per product B	15,000	20,000	35,000	3	1,05,000
Total	65,000	70,000	1,35,000		3,05,000

Material Purchase Budget

	<i>X Units</i>	<i>Y Units</i>	<i>Total</i>
Required for sales	1,00,000	35,000	
Add: desired closing stock			
Product A:			
1,000 units (A) ´ 10 units (X) =10,000 units of X	25,000		
3,000 units (B) ´ 5 units (X) =15,000 units of X.			
Product B:			
1,000 units (A) ´ 3 units (Y) = 3000 units of Y		9,000	
3,000 units (B) ´ 2 units (Y) = 6,000 units of Y.			
	1,25,000	44,000	
Less: Opening stock			
Product A:			
800 units (A) ´ 10 units (X) = 8,000 units of X			
1,680 units (B) ´ 5 units (X) = 8,400 units of X	16,400		

Product B 800 units (A) ´ 3 units (Y) = 2,400 units of Y 1,680 units (B) ´ 2 units (Y) = 3,360 units of Y.			
Units to be purchased	1,08,600	38,240	1,46,840
Cost per unit	₹2	₹3	
Cost of purchase (₹)	2,17,200	1,14,720	3,31,920

(ii) Production Budget

	<i>Product A Units</i>	<i>Product B Units</i>
Sales	5,000	10,000
Add: Closing stock**	1,000	3,000
	6,000	13,000
Less: Opening stock	800	1,680
Production	5,200	11,320

**Calculation of closing stock:

Budgeted period is 12 weeks of 5 days each =60 days.

$$\text{Product A} = \frac{5,000 \times 12}{60} = 1,000 \text{ units}$$

$$\text{Product B} = \frac{10,000 \times 18}{60} = 3,000 \text{ units}$$

(iii) Wages budget for direct workers

	<i>Product A (hrs)</i>	<i>Product B (hrs)</i>	<i>Total (hrs.)</i>
Standard hours (budgeted) 5,200 units (A) ´ 4 hours per unit and 11,320 units (B) ´ 3 hours per unit.	20,800	33,960	54,760
Standard hours at 80% efficiency ratio			68,450
Add: non productive time (20% of 68,450)			13,690
			82,140
Labour hours required (150 workers ´ 8 hours per day ´ 60 days)			72,000
Overtime			10,140

5.13 Advanced Management Accounting

Wages for normal hours(72,000 ÷ 8)	= ₹ 5,76,000
Wages for overtime (10,140 ÷ 8 × 1.5)	= ₹ 1,21,680
Total wages	= ₹ 6,97,680

Question 9

The budgeted and actual cost data of M Ltd. for 6 months from April to September, 2008 are as under:

	Budget	Actual
Production units	16,000	14,000
Material cost	₹ 25,60,000 (1,600 MT @ ₹ 1,600)	₹ 41,60,000 (at ₹ 1,650)
Labour cost	₹ 16,00,000 (at ₹ 40 per hour)	₹ 15,99,840 (@ ₹ 44 per hour)
Variable overhead	₹ 3,00,000	₹ 2,76,000
Fixed overhead	₹ 4,60,000	₹ 5,80,000

In the first half of financial year 2009-10, production is budgeted for 30,000 units, material cost per tonne will increase from last year's actual by ₹ 150, but it is proposed to maintain the consumption efficiency of 2008 as budgeted. Labour efficiency will be lower by 1% and labour rate will be ₹ 44 per hour. Variable and fixed overheads will go up by 20% over 2008 actuals.

Prepare the Production Cost budget for the period April-September, 2009 giving all the workings.

Answer

Production Cost Budget (for 6 months ending 30th September, 2009)

	30,000 units	
	Cost per unit	Total
	₹	₹
Material cost	180	54,00,000
Labour cost	115.21	34,56,420
Variable overhead	23.65	7,09,500
Fixed overhead	<u>23.2</u>	<u>6,96,000</u>
	<u>342.06</u>	<u>1,02,61,920</u>

Assumption: Here, difference in actual and standard time is also considered for calculating the lower efficiency i.e. 3.74% + 1% = 4.74%

Working Notes:

I. Material cost

$$\text{Material consumption per unit} = \frac{1,600 \text{ MT}}{16,000} = 0.10 \text{ MT}$$

Consumption for 30,000 units = 3,000 MT.

Cost of 3,000 MT @ ₹ 1,800 per MT = ₹ 54,00,000.

II. Labour cost can be calculated as follows:

Time required for 30,000 units = 75,000 hours

Add: $\ast(3.74\% + 1\%) = 4.74\%$ for lower efficiency = 3,555 hours

= 78,555 hours

$$\ast 3.74\% = \frac{\text{Difference in actual and standard hours}}{\text{Actual hours}} \times 100 = \frac{1,360 \text{ hours}}{36,360 \text{ hours}}$$

Labour cost = 78,555 hours $\times$ 44 per hour = 34,56,420.

III. Variable overhead

$$\text{Actual rate} = \frac{\text{₹ } 2,76,000}{14,000 \text{ units}} = 19.71 \text{ per unit}$$

Add: 20 = 3.94

New rate = 23.65

Total variable overhead = 30,000 $\times$ 23.65 = ₹ 7,09,500

IV. Fixed overhead

Actual = ₹ 5,80,000

Add: 20% = ₹ 1,16,000

= ₹ 6,96,000

According to above the production cost budget will be as follows:

Alternative

Production Cost Budget
(for 6 months ending 30th September, 2009)

	30,000 units	
	Cost per unit	Total
	₹	₹
Material cost	180	54,00,000
Labour cost	111.1	33,33,000
Variable overhead	23.65	7,09,500
Fixed overhead	<u>23.2</u>	<u>6,96,000</u>
	<u>337.95</u>	<u>1,01,38,500</u>

5.15 Advanced Management Accounting

Working Notes:

I. Material cost

$$\text{Material consumption per unit} = \frac{1,600 \text{ MT}}{16,000} = 0.10 \text{ MT}$$

Consumption for 30,000 units = 3,000 MT.

Cost of 3,000 MT @ ₹ 1,800 per MT = ₹ 54,00,000.

II. Labour Cost:

$$2008 - \text{Total Budgeted Hour} = \frac{16,00,000}{40} = 40,000 \text{ hours}$$

$$\text{Labour hour budget for each unit} = \frac{40,000}{16,000} = 2.5$$

$$\text{Actual time paid} = \frac{15,99,840}{44} = 36,360 \text{ hours}$$

$$\text{Less: Standard labour hours for 14,000 units (i.e. } 14,000 \times 2.5) = 35,000 \text{ hours}$$

$$\text{Difference in actual and standard hours} = \underline{1,360}$$

$$\text{Time required for 30,000 units (30,000 } \times 2.5) = 75,000 \text{ hours}$$

$$\text{Add: 1\% for lower efficiency} = 750 \text{ hours}$$

$$= \underline{75,750 \text{ hours}}$$

$$\text{Labour cost} = 75,750 \text{ hours } \times 44 \text{ per hour} = \underline{33,33,000}$$

III. Variable overhead

$$\text{Actual rate} = \frac{\text{Rs. } 2,76,000}{14,000 \text{ units}} = 19.71 \text{ per unit}$$

$$\text{Add: 20} = \underline{3.94}$$

$$\text{New rate} = \underline{23.65}$$

$$\text{Total variable overhead} = 30,000 \times 23.65 = \underline{\text{₹ } 7,09,500}$$

IV. Fixed overhead

$$\text{Actual} = \text{₹ } 5,80,000$$

$$\text{Add: 20\%} = \underline{\text{₹ } 1,16,000}$$

$$= \underline{\text{₹ } 6,96,000}$$

Question 10

What are the various formulae used in calculating budget ratios?

Answer

Type of budgeted ratio used are:

1. Efficiency Ratio = $(\text{Standard hours} + \text{Actual hours}) \times 100$

2. Activity Ratio = $(\text{Standard hours} + \text{Budgeted hours}) \times 100$
3. Calendar Ratio = $(\text{Available working days} \div \text{budgeted working days}) \times 100$
4. Standard Capacity Usage Ratio = $(\text{Budgeted hours} \div \text{Max. possible hours in the budgeted period}) \times 100$
5. Actual Capacity Usage Ratio = $(\text{Actual hours worked} + \text{Maximum possible working hours in a period}) \times 100$
6. Actual usage of Budgeted Capacity Ratio = $(\text{Actual working hours} \div \text{Budgeted hours}) \times 100$.

Question 11

Explain goals and performance measure for each perspective of Balance Score Card.

Answer

Goals and performance measures for each perspective of balance scorecard.

Customer Perspective

Goals	Performance Measures
Price	Competitive price
Delivery	Number of on time delivery, lead time from receipt of order to delivery to customer.
Quality	Own quality relative to industry standards, number of defects or defect level.
Support	Response time, customer satisfaction survey.

Internal Business Perspective

Goals	Performance Measures
Efficiency of manufacturing process	Manufacturing cycle time
Sales penetration	Sales plan, Increase in number of customer in a unit of time.
New Product introduction	Rate of new product introduction.

Innovation and Learning Perspective

Goals	Performance Measures
Technology leadership	Performance of product, use of technology
Cost leadership	Manufacture overhead per quarter
Market leadership	Market share in all major markets
Research and development	Number of new products, Patents

5.17 Advanced Management Accounting

Financial Perspective

Goals	Performance Measures
Sales	Revenue and profit growth
Cost of Sales	Extent in remain fixed or decreased each year
Profitability	Return on capital employed
Prosperity	Cash flows

Question 12

JBC Limited, a manufacturing company having a capacity of 60,000 units has prepared a following cost sheet:

<i>Direct material (per unit)</i>	<i>₹12.50</i>
<i>Direct wages (per unit)</i>	<i>₹5.00</i>
<i>Semi-variable cost</i>	<i>₹30,000 fixed plus 0.50 per unit</i>
<i>Factory overhead (per unit)</i>	<i>₹10.00 (50% fixed)</i>
<i>Selling and administration overhead (per unit)</i>	<i>₹8.00 (25% variable)</i>
<i>Selling price (per unit)</i>	<i>₹40</i>

During the year 2008, the sales volume achieved by the company was 50,000 units.

The company has launched an expansion program as under

- (a) The capacity will be increased to 1,00,000 units.*
- (b) The cost of investment on expansion is ₹5 lakhs which is proposed to be financed through financial institution at 12 per cent per annum.*
- (c) The depreciation rate on new investment is 10 per cent based on straight line.*
- (d) The additional fixed overheads will amount to ₹2.00 lakhs up to 80,000 units and will increase by ₹80,000 more beyond 80,000 units.*

After the expansion, the company has two alternatives for operating the expanded plant as under:

- (i) Sales can be increased up to 80,000 units by spending ₹ 50,000 on special advertisement campaign to explore new market.*
- (ii) Sales can be increased up to 1,00,000 units subject to the following:*
 - (a) Reduction of selling price by ₹4 per unit on all the units sold.*

- (b) The direct material cost would go down by 4 per cent due to discount on bulk buying.
- (c) By increasing the variable selling and administration expenses by 4 per cent.

Required.

- (i) Construct a flexible budget at the level 50,000 units, 80,000 units and 1,00,000 units of production and select best profitable level of operation.
- (ii) Calculate break even point both before and after expansion.

Answer

Flexible Budget

Output level (units)	50,000 (₹ in lakhs)	80,000 (₹ in lakhs)	1,00,000 (₹ in lakhs)
Sales	20.00	32.00	36.00
Direct Material 12.5 per unit (reduction for 1,00,000 units by ₹0.50)	6.25	10.00	12.00
Direct wages (5.00 per unit)	2.50	4.00	5.00
Semi variable cost (variable)	0.25	0.40	0.50
Factory overhead (V) ₹5 per unit	2.50	4.00	5.00
Selling and Adm. (25% variable)	<u>1.00</u>	<u>1.60</u>	<u>2.08</u>
Total variable cost	<u>12.50</u>	<u>20.00</u>	<u>24.58</u>
Contribution	<u>7.50</u>	<u>12.00</u>	<u>11.42</u>
Fixed factory overheads (5×60,000)	3.00	3.00	3.00
Selling and adm. (6 × 60,000)	3.60	3.60	3.60
Semi variable fixed part	.30	.30	.30
Increase due to expansion		2.00	2.80
Interest		.60	.60
Depreciation		.50	.50
Special Advertisement exp.	<u>—</u>	<u>.50</u>	<u>—</u>
Total fixed costs	<u>6.90</u>	<u>10.50</u>	<u>10.80</u>
	<u>0.60</u>	<u>1.50</u>	<u>0.62</u>

Therefore activity level 80,000 units is most profitable level.

5.19 Advanced Management Accounting

Calculation of Break even point

P/V ratio

$7.5/20.00 \times 100 = 37.5\%$, $12.00/32.00 \times 100 = 37.5\%$, $11.42/36.00 \times 100 = 31.72\%$ BEP (value)

$= 6.90/37.5\% = ₹18,40,000$, $10.50/37.5\% = ₹28,00,000$, $10.80/31.72\% = ₹34,04,792$

BEP (Units)

$\frac{6.90 \text{ lakhs}}{₹15}$	$\frac{10.50 \text{ lakhs}}{₹15}$	$\frac{10.80 \text{ lakhs}}{₹15}$
= 46,000 units	= 70,000 units	= 94,571 units

Alternative Solution (BEP in Sales)

Break Even Point in value of sales: $(F \times S) / (S - V)$

At 50000 units' level : $(6,90,000 \times 20,00,000)/7,50,000 = ₹18,40,000$

At 80000 units' level : $(10,50,000 \times 32,00,000)/12,00,000 = ₹28,00,000$

At 100000 units' level : $(10,80,000 \times 36,00,000)/11,42,000 = ₹34,04,553$

Question 13

Explain briefly stages involved in the process of Bench marking.

Answer

Process of Benchmarking: The process of benchmarking requires a Company to identify the areas i.e. processes, activity etc. which are central to its business and then selects the top-performing companies in those areas.

The benchmarking process is comprised of following stages. These stages are:

1. Planning:

- (i) **Determination of benchmarking goal statement:** This requires identification of areas to be benchmarked. In practice, one should start with the identification of those areas which have to be really good to be really successful.
- (ii) **Identification of best performance:** Once the benchmarked goal statement are defined, the step is seeking the best of the breed or best of the best.
- (iii) **Establishment of the benchmarking or process improvement team:** Ideally this should include the persons who are most knowledgeable about the internal operations and will be directly affected by changes due to benchmarking.
- (iv) **Defining the relevant benchmarking measurement:** Relevant measures will not include the measures used by the organisation today but they will be refined

measures that comprehend the true performance differences.

2. Collection of data and information:

The data gathering for benchmarking could be done through national/international clearing houses, mail surveys, suppliers, company visits, telephone, interviews etc. In recent years national and international clearing houses have been set up.

3. Analysing the findings: The analysing of finding of step (2) requires following:

- (i) Review the findings and produce tables, charts and graphs to support the analysts.
- (ii) Identify gaps in performance between our organisation and better performers.
- (iii) Seek explanations for the gaps in performance. The performance gaps can be positive, negative or zero.
- (iv) Ensure that comparisons are meaningful and credible.
- (v) Communicate the findings to those who are affected.
- (vi) Identify realistic opportunities for improvements.

4. Recommendations: This involves:

Making recommendation: This requires:

- (i) Deciding the feasibility of making the improvements in the light of the conditions that apply within own organisation.
- (ii) Agreement of the improvements that are likely to be feasible.
- (iii) Producing a report on the Benchmarking in which the recommendations are included.
- (iv) Obtaining the support of key stakeholder groups for making the changes needed.
- (v) Developing action plan(s) for implementation.

5. Monitoring and reviewing: This involves:

- (i) Evaluating the benchmarking process undertaken and the results of the improvements against objectives and success criteria plus overall efficiency and effectiveness.
- (ii) Documenting the lessons learnt and make them available to others.
- (iii) Periodically re-considering the benchmarks

Question 14

What are the various formulae used in calculating budget ratios?

5.21 Advanced Management Accounting

Answer

Type of budgeted ratio used are:

1. Efficiency Ratio = $(\text{Standard hours} + \text{Actual hours}) \times 100$
2. Activity Ratio = $(\text{Standard hours} + \text{Budgeted hours}) \times 100$
3. Calendar Ratio = $(\text{Available working days} \div \text{budgeted working days}) \times 100$
4. Standard Capacity Usage Ratio = $(\text{Budgeted hours} \div \text{Max. possible hours in the budgeted period}) \times 100$
5. Actual Capacity Usage Ratio = $(\text{Actual hours worked} + \text{Maximum possible working hours in a period}) \times 100$
6. Actual usage of Budgeted Capacity Ratio = $(\text{Actual working hours} \div \text{Budgeted hours}) \times 100$

Question 15

What are the steps involved in Zero-base budgeting?

Answer

Steps involved in the process of Zero Based Budgeting:

1. Determination of a set of objects is the pre-requisite and essential step in the direction of ZBB technique.
2. Deciding about the extent to which the technique of ZBB is to be applied whether in all areas of organization activities or only in few selected areas on trial basis.
3. Identify the areas where decisions are required to be taken.
4. Developing decision packages and ranking them in order of performance.
5. Preparation of budget that is translating decision packages into practicable units/items and allocating financial resources.

ZBB is simply an extension of the cost, benefit analysis method to the area of corporate planning and budgeting.

Question 16

The CEO of your company has been given the following statement showing the results for a recent month:

Particulars	Master Budget	Actual
Units produced & sold	10,000	9,000
	₹	₹
Sales	8,00,000	7,00,000

Direct material	2,00,000	1,84,000
Direct Wages	3,00,000	2,62,000
Variable overhead	1,00,000	94,000
Fixed overhead	1,00,000	98,000
Total Cost	7,00,000	6,38,000
Net Surplus	1,00,000	62,000

The standard cost of the product is as follows:

Direct material (1 kg @ ₹ 20/kg) ₹ 20.00 per unit

Direct Wages (1 hour @ ₹ 30/hour) ₹ 30.00 per unit

Variable overhead (1 hour @ ₹ 10/hour) ₹ 10.00 per unit

Actual results for the month revealed that 9,800 kg. of material was used and 8,800 labour hours were recorded.

(i) Prepare a flexible budget for the month and compare with the actual results. (6 Marks)

(ii) Calculate material volume and variable overhead efficiency variances. (2 Marks)

Answer

(i)

Particular	Master Budget		Flexible Budget	Actual	Variance	
Units	10,000		9,000	9,000		
	(₹)Total	(₹) Per Unit	(₹)	(₹)		
Sales	8,00,000	80	7,20,000	7,00,000	20,000	(A)
Direct Material	2,00,000	20	1,80,000	1,84,000	4,000	(A)
Direct Wages	3,00,000	30	2,70,000	2,62,000	8,000	(F)
Variable Overhead	1,00,000	10	90,000	94,000	4,000	(A)
Total Variable Cost	6,00,000	60	5,40,000	5,40,000	-	
Contribution	2,00,000	20	1,80,000	1,60,000	20,000	(A)
Fixed Overhead	1,00,000	10	1,00,000	98,000	2,000	(F)
Net Profit	1,00,000	10	80,000	62,000	18,000	(A)

(ii) **Calculation of Variances:**

Material Volume Variance: $SP (SQ - AQ) = 20 (9,000 - 9,800) = 16,000 (A)$

Variable Overhead efficiency variance $SR (SH - AR) = 10 (9,000 - 8,800) = 2,000 (F)$

5.23 Advanced Management Accounting

Question 17

A Company is engaged in manufacturing two products A and B. Product A uses one unit of component X and two units of component Y. Product B uses two units of component X and one unit of component Y and two units of component Z. Component Z which is assembled in the factory uses one unit of component Y.

Components X and Y are purchased from the market. The company has prepared the following forecast of sales and inventory for the next year:

	Product A	Product B
	(Units)	(Units)
Sales	80,000	1,50,000
Stock at the end of the year	10,000	20,000
Stock at the beginning of the year	30,000	50,000

The production of both the products and the assembling of the component Z will be spread out uniformly throughout the year. The company at present orders its inventory of X and Y in quantities equivalent to 3 months production. The company has compiled the following data related to the two components:

	X	Y
Price per unit (₹)	20	8
Order placing cost per order (₹)	1,500	1,500
Carrying cost per annum	20%	20%

Required:

- Prepare a budget for production and requirements of components for the next year.
- Suggest the optimal order quantity of components X and Y.

Answer

(i) Production Budget

	Product "A"	Product "B"
	Units	Units
Sales	80000	150000
Closing stock	10000	20000
Opening stock	30000	50000
Production Budget	60000	120000

Budget of Component Requirements

Components	X	Y	Z
Product A: Production 60000 units	60000	120000	
Product B: Production 120000 units	240000	120000	240000
Component Z : 240000 units		240000	
Total	300000	480000	240000

(ii) **Optimal order quantity of components X and Y**

Components	X	Y
Order placing costs ₹	1500	1500
Price of the component ₹	20	8
Carrying cost @ 20% ₹	4	1.60

$$EOQ = \sqrt{\frac{2 \times 300000 \times 1500}{4}} \quad \sqrt{\frac{2 \times 480000 \times 1500}{1.60}}$$

$$= 15000 \text{ components} = 30000 \text{ components}$$

Question 18

The budgeted and actual cost data of M Ltd. for 6 months from April to September, 2008 are as under:

	Budget	Actual
Production units	16,000	14,000
Material cost	₹ 25,60,000 (1,600 MT @ ₹ 1,600)	₹ 41,60,000 (at ₹ 1,650)
Labour cost	₹ 16,00,000 (at ₹ 40 per hour)	₹ 15,99,840 (@ ₹ 44 per hour)
Variable overhead	₹ 3,00,000	₹ 2,76,000
Fixed overhead	₹ 4,60,000	₹ 5,80,000

In the first half of financial year 2009-10, production is budgeted for 30,000 units, material cost per tonne will increase from last year's actual by ₹ 150, but it is proposed to maintain the consumption efficiency of 2008 as budgeted. Labour efficiency will be lower by 1% and labour rate will be ₹ 44 per hour. Variable and fixed overheads will go up by 20% over 2008 actuals.

Prepare the Production Cost budget for the period April-September, 2009 giving all the workings.

5.25 Advanced Management Accounting

Answer

Production Cost Budget (for 6 months ending 30th September, 2009)

	30,000 units	
	Cost per unit	Total
	₹	₹
Material cost	180	54,00,000
Labour cost	115.21	34,56,420
Variable overhead	23.65	7,09,500
Fixed overhead	23.2	6,96,000
	<u>342.06</u>	<u>1,02,61,920</u>

Assumption : Here, difference in actual and standard time is also considered for calculating the lower efficiency i.e. $3.74\% + 1\% = 4.74\%$

Working Notes:

I. Material cost

$$\text{Material consumption per unit} = \frac{1,600 \text{ MT}}{16,000} = 0.10 \text{ MT}$$

Consumption for 30,000 units = 3,000 MT.

Cost of 3,000 MT @ ₹ 1,800 per MT = ₹ 54,00,000.

II. Labour cost can be calculated as follows:

Time required for 30,000 units = 75,000 hours

Add: $*(3.74\% + 1\%) = 4.74\%$ for lower efficiency = 3,555 hours

= 78,555 hours

$$*3.74\% = \frac{\text{Difference in actual and standard hours}}{\text{Actual hours}} \times 100$$

$$= \frac{1,360 \text{ hours}}{36,360 \text{ hours}}$$

$$\begin{aligned} \text{Labour cost} &= 78,555 \text{ hours} \times 44 \text{ per hour} \\ &= 34,56,420. \end{aligned}$$

III. Variable overhead

$$\text{Actual rate} = \frac{\text{₹ } 2,76,000}{14,000} = 19.71 \text{ per unit}$$

$$\text{Add: 20} = \underline{3.94}$$

$$\text{New rate} = \underline{23.65}$$

$$\text{Total variable overhead} = 30,000 \times 23.65 = \text{₹ } 7,09,500$$

IV. Fixed overhead

$$\text{Actual} = \text{₹ } 5,80,000$$

$$\text{Add: 20\%} = \text{₹ } \underline{1,16,000}$$

$$= \text{₹ } \underline{6,96,000}$$

According to above the production cost budget will be as follows:

Alternative

Production Cost Budget
(for 6 months ending 30th September, 2009)

	30,000 units	
	Cost per unit	Total
	₹	₹
Material cost	180	54,00,000
Labour cost	111.1	33,33,000
Variable overhead	23.65	7,09,500
Fixed overhead	<u>23.2</u>	<u>6,96,000</u>
	<u>337.95</u>	<u>1,01,38,500</u>

Working Notes:

I. Material cost

$$\text{Material consumption per unit} = \frac{1,600 \text{ MT}}{16,000} = 0.10 \text{ MT}$$

$$\text{Consumption for 30,000 units} = 3,000 \text{ MT.}$$

$$\text{Cost of 3,000 MT @ ₹ } 1,800 \text{ per MT} = \text{₹ } 54,00,000.$$

II. Labour Cost:

$$2008 - \text{Total Budgeted Hour} = \frac{16,00,000}{40} = 40,000 \text{ hours}$$

$$\text{Labour hour budget for each unit} = \frac{40,000}{16,000} = 2.5$$

5.27 Advanced Management Accounting

$$\text{Actual time paid} = \frac{15,99,840}{44} = 36,360 \text{ hours}$$

Less: Standard labour hours for 14,000 units (i.e. $14,000 \times 2.5$) = 35,000 hours

$$\text{Difference in actual and standard hours} = 1,360$$

$$\text{Time required for 30,000 units } (30,000 \times 2.5) = 75,000 \text{ hours}$$

$$\text{Add: 1\% for lower efficiency} = 750 \text{ hours}$$

$$= 75,750 \text{ hours}$$

$$\text{Labour cost} = 75,750 \text{ hours} \times 44 \text{ per hour} = 33,33,000$$

III. Variable overhead

$$\text{Actual rate} = \frac{\text{₹ } 2,76,000}{14,000} = 19.71 \text{ per unit}$$

$$\text{Add: 20} = 3.94$$

$$\text{New rate} = 23.65$$

$$\text{Total variable overhead} = 30,000 \times 23.65 = \text{₹ } 7,09,500$$

IV. Fixed overhead

$$\text{Actual} = \text{₹ } 5,80,000$$

$$\text{Add: 20\%} = \text{₹ } 1,16,000$$

$$= \text{₹ } 6,96,000$$

EXERCISE

Question 1

A company manufactures two products X and Y. Product X requires 5 hours to produce while Y requires 10 hours. In July, 1996, of 25 effective working days of 8 hours a day, 1,000 units of X and 600 units of Y were produced. The company employs 50 workers in the production department to produce X and Y. The budgeted hours are 1,02,000 for the year.

Calculate capacity ratio, activity ratio and efficiency ratio. Also establish their inter-relationship.

Answer

Inter-relationship:

$$\text{Capacity ratio} \div \text{Efficiency ratio} = \text{Activity ratio}$$

$$117.65\% \times 110\% = 129.41\%$$

Question 2

The Financial controller of ACE Ltd. has prepared the following estimates of working results for the year ending 31st March, 1999:

		Year ending 31.3.1999
Direct Material	₹ / unit	16.00
Direct wages	₹ / unit	40.00
Variable Overheads	₹ / unit	12.00
Selling Price	₹ / unit	125.00
Fixed Expenses	₹	6,75,000 per annum
Sales	₹	25,00,000 per annum

During the 1999-2000, it is expected that the material prices and variable overheads will go up by 10% and 5 % respectively. As a result of re-engineering of business processes, the overall direct labour efficiency will increase by 12%, but the wage rate will go up by 5%. The fixed overheads are also expected to increase by ₹1,25,000.

The Vice-President-Manufacturing states that the same level of output as obtained in 1998-1999 should be maintained in 1999-2000 also and efforts should be made to maintain the same level of profit by suitably increasing the selling price.

The Vice President-Marketing states that the market will not absorb any increase in the selling price. On the other hand, he proposes that publicity involving advertisement expenses as given below will increase the quantity of sales as under:

Advertisement Expenses (₹)	80,000	1,94,000	3,20,000	4,60,000
Additional units of Sales	2,000	4,000	6,000	8,000

Required:

Present an Income Statement for 1999-2000.

Find the revised price and the percentage of increase in the price for 1999-2000, if the views of the Vice-President. Manufacturing are accepted.

Evaluate the four alternative proposals put forth by the Vice-President – Marketing Determine the best output level to the budgeted and prepare an overall Income Statement for 1999-2000 at that level of output.

Answer

Additional units of sales	2,000	4,000	6,000	8,000
	₹	₹	₹	₹
Additional Profit/ (Loss)	34,600	35,200	23,800	(1,600)

5.29 Advanced Management Accounting

Evaluation of four alternatives: Since the additional profit is maximum at the additional sales of 4,000 units, therefore the second alternative is adjudged as the best out of the four alternatives proposed by the Vice President of Marketing. Hence the concern should produce and sell 24,000 units during the year 1999-2000.

Question 3

A Company is engaged in manufacturing two products 'X' and 'Y'. Product X uses one unit of component 'P' and two units of component 'Q'. Product 'Y' uses two units of component 'P', one unit of component 'Q' and two units of component 'R'. Component 'R' which is assembled in the factory uses one unit of component 'Q'.

Component 'P' and 'Q' are purchased from the market. The company has prepared the following forecast of sales and inventory for the next year:

	Product 'X'	Product 'Y'
Sales (in units)	80,000	1,50,000
At the end of the year	10,000	20,000
At the beginning of the year	30,000	50,000

The production of both the products and the assembling of the component 'R' will be spread out uniformly throughout the year. The company at present orders its inventory of 'P' and 'Q' in quantities equivalent to 3 months production. The company has compiled the following data related to two components:

	P	Q
Price per unit (₹)	20	8
Order placing cost per order (₹)	1,500	1,500
Carrying cost per annum	20%	20%

Required:

- Prepare a Budget of production and requirements of components during next year.
- Suggest the optimal order quantity of components 'P' and 'Q'.

Answer

- Budgeted requirements of components P, Q and R are 3,00,000, 4,80,000 and 24,000 respectively.
- EOQ: P = 15,000 components and Q = 30,000 components