Dr.Babasaheb Ambedkar Open University

DACA
DIPLOMA IN ADVANCE COST ACCOUNTING

Block

4

Variance Analysis and Other Aspects of Cost Accounting

Unit –12

AUTHORS

1) **Shri Urvish B.Shah**
(M.Com.C.A)
I-6, Bhavna Flats,
Narayan Nagar Road, Paldi,
Ahmedabad- 07.

2) **Shri Milan Shah**
(B.Com. C.A)
23, Amul Society,
Sharda Nagar Road,
Paldi, Ahmedabad-07.

3) **Shri Mihir D. Khatri**
(B.Com.LLB. C.A)
D1/44, Arjun Tower,
Nr. C.P.Nagar, Ghatlodia,
Ahmedabad.

4) **Shri Ketul Shah**
(B.Com.C.A.)
I-1,Bhavna Flats,
Narayan Nagar Road, Paldi,
Ahmedabad- 07.

5) **Shri Hareshkumar B. Vadhel**
(M.Com. M.Ed.)
B/3-401, Vishwas App. Sola Road,
Opp. Gulab Towar,
Ahmedabad.

CONTENT EDITOR

6) **Shri Tejas Shah**
(B.Com.C.A.)
4-Saptsati Society,
Nr. Malav Talao, Jivraj Park,
Ahmedabad-51.

LANGUAGE EDITOR

7) **Shri Hitendra Vyas**
(M.A.)
8, Vadigam Society,
Ranip,
Ahmedabad.

PUBLISHER :
Shri S. H. Barot
(I/C. Director & Registrar.)
Dr.Babasaheb Ambedkar Open University, Dafnala, Ahmedabad.
August, 2004 (Print)

Further information on the Dr.Babasaheb Ambedkar Open University courses may be obtained from the University's office at Govt. Bunglows, No-9. Dafnala, Shahibaug, Ahmedabad – 380003. Ph : (o) : 22869690, Fax : 22869691

Printed by : Shree Neminath Printers, Shahibaug, Ahmedabad. Mobile : 9825042651

Unit : 12 : Standard Costing And Variance Analysis

Introduction:

In a business, when manufacturing and trading activities are carried on, various standards of expenses and revenues are set, at the end of the year when actual results are obtained, this standards are compared with the actual results and attempt is made to find the reasons for differences in the results in comparison with standards. The intension of carrying this process is to find the self deficiencies in actual operations and seeing that this mistakes previous periods should not be repeated in future.

Structure of the chapter:

12.1 Objectives:

By the end of this chapter, the student will learn about

- Meaning and establishment of standards
- Material variances
- Labour variances
- Overhead variances
- Sales variances
- Profit variances
- Reconciliation of budgeted and actual profits
- Reporting of variances
- Disposal of variances

12.2 Meaning of Standards

Standards are set for each and every phase of lifes. Certain people set income standards. Students set mark standards. Starandards may be defined as goals or performance expectations. In other words, standards may be defined as measured quantities, which should be attained in connection with some particular operation or activity. Stated in terms of a test of efficiency, a standard is a precise measure of what should occur if the performance is efficient. For example, a certain number of words per minute is a standard for an efficient steno-typist. Thus, in a sense, a standard describes an approach to implement and achieve the goals of the firm. The standards are generally set by management in accordance with the best of their judgement.

The mean variance choice is one of the oldest finance areas, dating back to work of Markowitz. The basic assumption is that risk is measured by variance, and that the decision criterion should be to minimize variance given expected return, or to maximize expected return for a given variance.

Standard cost may, therefore, be defined as a criterion or measure of acceptable cost performance. That is to say, whether the cost incurred by a firm is reasonable or not, can be judged in relation to the standard costs.

A system of costing using standard costs. The major purpose of standard costing system is in-proved control over operations but it also be used to save record-keeping costs.

Predternmined measures of what costs should be under specified conditions. Ideal standard costs are the abosolute minmum costs possible under the best conceviable operting conditions. Currently attainable standard costs are the costs that should be attained under very efficient operating conditions. allowance being made for normal spoilage, ordinary machine breakowns and lsot time. They are more widely used than ideals standards because they can be used similataneously for product costing, budegeting and motivation.

12.3 Establishing Cost Standards

Deciding standards is not somewhat easier task. In deceding standards various factors will have to be kept in mind. The effectiveness of standard cost, as a tool, will ultimately depend upon how the standards themselves have been established. There are several ways to devise standards: (i) Engineering estimates (ii) Observed behaviour and (iii) Desired behaviour.

Engineering Estimates

One basis of setting up cost standards is engineering estimates. Technically, a standardised relationship between, say, a given unit of output and given units of input (say, raw materials) can be estimated fairly accurately depending upon the specifications of the machinery.

Observed Behaviour

Another technique to establish cost standards is past experience. Here, the approach is to treat the achievements of the past as standards for the future. If the processes and procedures of the past have not changed and are likely to operate in future also, this can provide a reliable guide for the future.

Desired Behaviour

Desired behaviour can also affect standard cost. The term "desired behaviour" means what management desires. The desire of the management may be based on the experience of similar concerns or the industry as a whole. This basis will bring the cost standards of the company in line with those of the industry as a whole.

In brief, while several techniques are available to establish cost standards, it is basically based on management's judgement. In setting up of standards, management should be careful. Standards should be set at a level at which they are attainable with reasonable efforts. If they are too strict and too high, they may be difficult to achieve, leading to all-round demoralisation. If, on the other hand, cost standards are set low, there may not be sufficient motivation to achieve them.

12.4 Components of Standard Cost

From the preceding discussion standard costs may be defined as costs that should be reasonably incurred in the manufacturer of a product. The main components of standard costs are: (i) Standard direct material cost, (ii) Standard direct labour cost, and (iii) Manufacturing overheads.

Standard Direct Material Cost

The standard direst material cost of a product is based upon price and quantity standards.

Direct Materials Price Standard

This standard shows the price to be paid for the purpose of acquiring materials. One of the most important items of cost is the cost of direct materials used in the manufacture of goods. To exercise control over the cost, therefore, an important element of cost control is the price paid for the purchase of materials.

Materials Quantity (Usage) Standard

This standard shows the standard quantity to be used for the purpose of manufacturing a product. The quantity of the materials used is the second factor affecting cost of material. The standards of the quantity of consumption of raw materials is referred to as materials quantity standards or materials usage standards. Such standards can be determined on the basis of two factors: (i) The necessary input-output relationship between materials and products and also upon observation of actual experience, (ii) The inherent loss of materials in the production processes owing to factors such as weight losses due to scrapping and smoothing, shrinkage and evaporation, and so on.

Standard Direct Labour Cost

The second component of total standard cost is direct standard labour cost. It is calculated by multiplying Labour rate standards by Labour time standards.

Labour Rate/Price Standards

This standard is related with the rate of wage to be paid to the different categories of workers like skilled workers, semi skilled workers etc. The payment to labour for carrying on production is wages, which is paid either on a time basis (monthly, weekly, daily) or on a piece basis (per piece of production). The wage rate standards are normally either a matter of company policy, or more often, the result of negotiations between management and union. Moreover, in most cases, there will be several different wage rates depending upon the degree of skill, the element of danger, seniority of workers, and so on.

Labour Time Standards

This standards deals with the standard time that should be taken by the worker to make a unit. The quantity (amount) of labour is measured in terms of time devoted to the completion of a particular operation. Therefore, labour time standards may be defined as the amount of time which a particular operation should take.

e.g. Assuming that engineering studies in Hypothetical Ltd show that in one of its departments one unit of output should be produced in one-fourth of an hour, whereas in the other department it is one-half of an hour, the total labour time standard is three quarter-hour.

Overheads Standards

The third component of cost standard is overheads. There is no functional relationships exists between the units produced and total overheads cost. And so, determination of standards for material and labour is somewhat different from determination of standards of overheads.

For these reasons, standard costs for overheads are generally based on budget and not upon standards. The overheads are, for purposes of planning and control, classified into: (i) Variable, and (ii) Fixed. The standard variable rate is set directly per unit of volume just as a normal variable rate. The volume measure is some measure of input, such as direct labour cost or hours. The determination of the standard fixed

overhead is slightly different from that of the normal fixed overhead. This difference lies in the volume at which they are set.

Variances:

In simple words, variances means the deviations from the standards. Variances may be favourable or unfavourable. Variances can be found out by comparing actual results with the budgeted results. Variances, as a control device, are calculated to assign/fix responsibility for deviations from the standard cost (SC) and, thus, to control the cost. For purposes of control, variances are classified as controllable and uncontrollable cost variances.

If a variance can be traced with the responsibility of a particular individual, it is said to be a "controllable" variance. If variance stems from causes beyond the control of responsible individuals, it is said to be "uncontrollable". Thus, uncontrollable variance arises when the responsibility for the variance cannot be attributed to any individual in an organisation. For instance, the increase in the price of materials and increase in the wage rates are commonly referred to as un/non-controllable variances, whereas excessive usage of materials in production, more than standard hours taken by labourers in production, are examples of controllable variances. This distinction of variances into controllable and uncontrollable is extremely important. Controllable variances are carefully analysed and reported to the management to enable it to pursue corrective action.

A complete list of the different types of variances is given below.

12.5 Material Variances

Material variances are more popularly known as material cost variances (MCV). The MCV is the difference between the standard cost of materials that should have been incurred in manufacturing the actual output (TSMC) and the cost of materials that has been actually incurred (TAMC). Symbolically,

MCV = (SQ x SP x AO) - (AQ x AP x AO) (on per unit basis)
MCV = (TSMC - TAMC) (on aggregate basis)

SQ = Standard usage of materials per unit
SP= Standard price of materials per unit
AO = Actual output in units
TSMC = Total standard cost-of actual output
AQ = Actual usage of materials per unit
AP = Actual price of materials per unit
TAMC = Total actual cost incurred

12.5.1 Material Price Variance (Mpv)

Material price variance is the differnce between the actual price paid for acquiring the material and the price to be paid for the purchased material on the basis of standards. MPV will occur when the actual price paid for the purchase of materials is different from the standard price. This variance arises at the time of purchase and

logically should be identified at that point. A more appropriate title for this type of MPV would be the material purchased price variance. Obviously, the total amount of variance should depend on the number of units purchased; the greater the number of units purchased, the larger should be the size of MPV. Thus, the MPV is a function of (i) the difference between the actual price (AP) and the standard price (SP) per unit of material; and (ii) the actual number of units purchased (AQ). Symbolically,

$$MPV = (SP - AP) \times AQ$$

When actual price exceeds standard price, the variance is unfavourable (U/A); favourable variance (F) results when standard price is greater than actual price. There will be no variance if both the prices are equal For the facts, in Example 16.1, the MPV would be: (Rs 15 - Rs 14) x 220 kgs = Rs 220 (unfavourable/A)

Responsibility for MPV

Material price variance is mainly the responsibility of the purchase officers who are in charge of making the entire purchases of the firm.

12.5.2 Material Usage/Quantity Variance (Muv)

Material usage variance is found by comparing the actual quantity used with the standard quantity to be used for the actual production. The second component of MCV, material quantity/usage variance (MUV), measures how well the materials in production are utilised. This variance occurs when actual usage of material differs from standard usage. The data for actual usage of materials is collected from a summary of materials issue reports during the relevant period, while the standard quantity of materials in production would simply be the product of standard quantity of materials required for each unit of product and the number of units produced during the period. Since the MPV has already taken into account price differences, the MUV ignores such differences and the difference of quantities is multiplied by the standard price per unit. Symbolically

$$MUV = [(SQ \times AO) - (AQ \times AO)] \times SP$$

the MUV would be: = [(2 x 100) - (2.2 x 100)] x Rs 14 = Rs 280 (unvarouable).

Since the actual consumption of materials is more than the standard quantity required for producing 100 units of output, the MUV is unfavourable.,

Responsibility for MUV

The overall responsibility for this variance lies mainly with the production personnel.

The MUV can be further subdivided into (i) Material mix sub-variance and (ii) Material yield sub-variance.

12.5.3 Material Mix Subvariance (Mmsv)

Material mix variance can be found by comparing the actual mix of material used with the standard mix of material to be used for actual production. It is possible that a product may use more than one type/grade of raw materials or combination of materials. This combination is called the material mix. In such a situation, it may be possible to alter the mix of materials used from the pre-determined standard mix (ratio) set, the reasons being non-availability or inadequate supply of one or more types of raw material, or the price of a particular type of material may have gone up making it uneconomical in the given price situations of its finished product: the availability of a new substitute for one or more types of raw materials already being used either because they are cheaper and/or better in quality.

Thus, substituting one raw material for another, even though the total input quantity of all materials does not exceed the standard amount, merits a separate computation. This is determined by a material mix variance. It may be stressed that the material mix variance is not an additional variance; it is a sub-variance of material usage/quantity variance and, therefore, it 'is more appropriately designated as material mix sub-variance (MMSV). Thus, the MMSV is a function of the difference between the standard mix and the actual mix input/quantities of all grades of materials actually used and their corresponding standard prices. Such a variance is to be calculated for each type of material. Symbolically,

MMSV = (Standard mix of actual total quantity of material used) - (Actual mix of actual quantity of material used) x SR

For the sake of abbreviation, standard mix may be referred to as revised standard quantity (RSQ) and actual mix(AM). Accordingly,

MMSV = (RSQ - AQ) X SR

12.5.4 Material Yield Sub-Variance (Mysv)

The material usage variance (revised) can be more appropriately designated as material yield sub-variance (MYSV). Excess or under material usage from the standard clearly reflects that actual production (yield) is more or less than standard production (yield) expected out of the actual materials input. "The world 'yield' denotes 'output', but this facts is not always directly recognised in the calculations used to ascertain the sub-variance. Often inputs of materials for a specific' output are considered."[6] In other words, if the actual material usage is more than the standard, the yield variance would be negative or unfavourable. On the other hand, if standard material quantity exceeds the actual usage, the yield is favourable in that actual production is more than standard production.

Keeping in view the meaning of yield as production, it will be more logical to determine MYSY on the basis of outputs, that is, standard and actual production (yield). It is determined as follows:

MYSV = (Standard yield - Actual yield) X Standard material cost per unit of finished output

Alternatively, MYSV = (Standard loss of final product in units - Actual loss of final product of units) x Standard material cost unit of finished output

The concept of MYSV is particularly useful in the case of process industries like sugar, chemicals, and so on where a certain specified yield is expected from a given input of materials.

12.6 Labour Variance

Labour variance is popularly known as labour cost variance. Labour, unlike materials, cannot be stored. therefore, the purchase and usage of labour services go hand in hand. However, labour cost variance (LCV) is computed like material cost variance. It is the difference between the standard labour costs and the actual labour costs of the period. Symbolically,

LCV = (SH x SR x AO) - (AH x AR x AO) (on per unit basis)

LCV = (TSLC - TALC) (on aggregative basis)

Where

SH = Standard labour hours required per unit
SR = Standard wage rate per hour
AO =, Actual output achieved during the period
AH = Actual labour hours spent per unit
AR = Actual wage rate per hour
TSLC =Total standard labour cost of actual output
TALC = Total actual labour cost of actual output

12.6.1 Labour/Wage Rate Variance (Lrv)

Labour rate variance can be found by comparing the actual rate of labour paid with the standard rate of labour to be paid. This arises when there is a difference between the actual wage rate paid and the pre-determined standard wage rate. The LRV ignores the question of whether the actual labour-hours worked during the period were more or less than the standard labour-hours required to complete the work; it is concerned only with actual worked hours. Thus, the LRV is a function of the difference between the actual wage rate (AR) and the standard wage rate (SR) and the actual total labour-hours worked. Symbolically,

LRV = (SR - AR) x AH x AO

It is important to note here that if the mode of wage payment is on a product basis, the LRV would be equal to the difference between the standard piece wage rate and the actual piece wage rate multiplied by the actual units produced during a period. The LRV should be determined for each grade of labour, namely, skilled, semi-skilled and unskilled separately.

Responsibility for LRV

From the reasons outlined above, it is very clear that the LRV, often, will "Be an uncontrollable variance for rates are usually determined by supply and demand conditions in the labour market, wage awards by Wage Tribunals/Boards, and so on. The departmental executives may be held responsible only for that portion of the LRV which arises due to employment of wrong grades of labour. It does not mean that the LRV is of no significance to the management. Being largely uncontrollable in nature, the management should revise the wage rate standard for future periods.

12.6.2 Labour Efficiency Variance (Lev)

Labour effienciecy variance can be found by comparing the actual hours worked for manufacteing the product with the standard hours to be worked for the actual production. This is similar to the material usage variance. The time required by the labour force is an index of its efficiency. Accordingly, the variance which seeks to isolate the impact of working greater or lesser number of hours than the standard hours in production is called the labour efficiency variance (LEV) or labour time variance. Like material usage variance, LEV is concerned only with the standard wage rate. Thus, LEV is a function of the difference between the hours workers should have consumed in actual production and the actual hours worked and the standard wage rate. Symbolically,

$$LEV = [(SH \times AO) - (AH \times AO)] \times SR$$

However, if the method of piece wages payment is followed in the organisation, there will be no labour efficiency variance.

This variance is of prime significance to the production managers. It is the best indication of labour efficiency. Hence, its causes should be carefully thought over and reported so that prompt action can be initiated to overcome the cause. This variance, unlike LRV, is largely controllable in nature, is more amenable to managerial action and management's prompt action can lead to large savings. To overcome an unfavourable LEV, management's endeavour should be to provide a conducive environment in terms of the introduction lit new equipment or tools and their proper maintenance, proper lighting and ventilation facilities, and so on. These measures will help in improving the general efficiency of the workers.

The labour efficiency variance can be sub-divided into (a) Idle time variance; (b) Labour revised efficiency variance consisting of (i) Labour mix sub-variance and (ii) Labour yield sub-variance.

12.6.3 Idle Time Variance

This variance can be found by comparing the hours worked with hours paid for. This variance is always shows unfavourable results. This variance represents that segment of the LEV which arises due to the standard cost of those actual hours for which the workers have been paid but during which they remain idle due to non-availability of raw materials, breakdown of machines, failure of power and such other abnormal Circumstances: This variance, by definition, is unfavourable and is calculated as follows:

(Idle time in hours x Standard wage rate)

Therefore, it will be more coherent to compute the true labour efficiency variance after making an adjustment for this factor. In the absence of that, the LEV is likely to be misunderstood. The management may regard the labour force inefficient which in fact may not be the case. In other words, employees will be blamed for inefficiency when the true cause may have been beyond their control, such as breakdown in power supply, and so on.

12.6.4 Labour Revised Efficiency Variance

Sometimes a change in the grade of labour employed on an operation has to be made from the standard labour-mix due to shortage of one grade of labour during a certain period. The variance which isolates the impact of such a change in gang composition (labour-mix) on the labour cost variance is designated as the labour-mix variance of gang composition variance. Like the material -mix sub-variance (MMSV), this variance is a function of the difference between the actual labour-mix and standard labour-mix and the standard wage rate. Symbolically,

LEV-= [Standard mix of actual labour hours worked (RSH) - Actual mix of actual hours worked (AH)] x SR

12.6.5 Labour Mix Sub-Variance

To determine the labour mix sub-variance (LMSV), we are required to calculate the values of revised standard hours for two grades of labour. The revised standard hours for skilled and unskilled labourers respectively would be: Actual total hours x Proportion of skilled hours to the total standard hours.

12.6.6 Labour Yield Sub-Variance

Like the material yield sub-variance, it is determined after taking away the materials mix sub-variance. The basis of computation of labour yield sub-variance (LYSV) would be to find out how many more or less than the total absolute standard hours (and not their break-up) are used in making the actual production.

LYSV = (TSHs - TAHs) X Weighted average SR

The above method of determining the LYSV is based on the input basis. The LYSV like the MYSV can be determined on the output basis also. The formula is:
(Standard yield in units expected from the actual hours worked-Actual yield) x Standard labour cost per unit

This information indicates to the management that on account of employing more unskilled labourers, the LMSV turned out to be favourable. But it had an adverse bearing on the overall efficiency as the actual hours used were considerably larger than standard hours required to complete the work.

Overhead Variances:

At the outset, it may be noted that unlike direct materials and labour, the manufacturing overhead is not entirely variable with the level of production. Therefore, standard costs for factory overheads are based upon budgets and not on standards. Being so, the analysis concerning manufacturing overhead variances is materially; different from that of variances relating to materials and labour. However, like material and labour variances, manufacturing overhead/factory overhead/overhead/variance is

the difference between the actual overhead cost incurred and standard overhead cost charged to production.

12.7.1 Variable Overhead Variances (Vov)

These are also called variable overhead cost variances (VOCV). In fact, the VOCV parallels the material and labour cost variances. The reason is that variable overheads by definition should change with production volume. Therefore, the standard variable overhead cost (SVOC) per unit will be uniform, production volume notwithstanding. Thus, the VOCV is the difference between the actual and standard variable overhead costs for actual output. Symbolically,

VOCV = (SVOC x AO) - (AVOC x AO) (on unit basis)

VOCV = TSVOC - TAVOC (on aggregative basis)

Where

SVOC = Standard variable overhead cost per unit

AVOC = Actual variable overhead cost per unit (Total variable overheads incurred -f- Actual output in units)

TAVOC = Total standard variable overhead costs to achieve actual production.

TAVOC = Total actual variable overhead costs incurred.

Variable Factory Overhead Efficinecy Variance (VFOEV)

The VFOEV is the function of-the difference between the standard hours and actual hours and the standard variable factory overhead rate per hour (SVFOR). Symbolically,

VFOEV = [AO x SHs per unit) - AHs] X SVFOR

It may be recalled that VFOEV is like the labour efficiency variance inasmuch as the formula is the same with the obvious difference of the multiplying factor. Therefore, *the actual factors for the variable factory overheads efficiency would be identical with the causes for labour efficiency variance.* For this reason, some firms club together the labour efficiency and variable factory overhead efficiency variances.[7] The formula for this variance would require modification only in terms of the multiplying factor as shown below:

[(AO x SHs per unit) - AHs] x [SVFOR + Standard wage rate per hour]

The above formula will be valid only if the company employs direct labour-hours as the basis of measuring cost variability. In the case of machine-hours, the formula would be:

VFOEA = [(Actual output X Standard machine-hours per unit) - (Actual machine hours X Standard variable factor overhead rate)]

The causes for such variances include lack of repairs and maintenance of tools, plant, machinery and equipment, causing more frequent break-down.

Variable Factory Overhead Spending Variance (VFOSV)

The VFOSV is the difference between the actual overhead costs incurred and the amount that the flexible budget indicates should have been incurred for the actual production volume. To determine the standard costs, actual hours should be taken into account because the actual amount spent would be in relation to the actual hours worked. Thus, the standard hours are irrelevant.

12.7.2 FIXED FACTORY OVERHEAD VARIANCES (FFOV)

The treatment of FFOV is significantly different from that of VFOV. The reason is that fixed factory overheads do not vary with production volume. Various fixed factory overhead variances are stated below.

Fixed -Overhead Cost Variance (FOCV)

This variance represents the difference between the actual fixed overhead cost incurred and the standard fixed overheads charged to production. Symbolically,

FOCV = TAFOC - (SFOR per unit X AO)
In the case of hours basis: FOSV
= TAFOC - (SFOR per hour x SHs per unit x AO)
WhereTAFOC = Total actual factory overhead cost incurred
SFOR = Standard fixed overhead rate

Fixed Factory Overhead Spending Variance (FOSV)

This variance is the difference between the planned level of fixed overheads expenditure and the actual level of fixed overheads incurred. Symbolically.

FOSV = (Actual fixed overhead costs) - (Budgeted fixed costs)

The causal factors for the FOSV are at least as many as there are distinct cost items. The budget provides a certain amount per period for each fixed cost item. These budgeted amounts are based upon expected prices, consumption rates of various fixed items and a variety of other operating conditions. Any one or combination of these budget expectations may prove to be inaccurate. For instance, indirect materials may be more costly than budgeted; rise in property tax rates, power charges, insurance, factory rent and such other fixed items. To have a meaningful analysis of spending variance (as also variable overheads), we must take into account individual cost items. It is likely to be a non-controllable variance,

Fixed Overhead Efficiency Variance (FOEV)

Like other efficiency variances, this variance is based on the actual hours and standard hours. Symbolically,

FOEV = [(AO X SHs per unit) - AHs] X SFOR (per hour)

Volume –Variance

As mentioned earlier, volume variance pertains only to the fixed overheads and is not applicable to variable overheads. Therefore, the volume variance is not pre-fixed with "fixed-overheads".

The volume variance is concerned with the difference between normal hours and actual hours multiplied by the SFOR

Volume variance = (SHs - AHs) X SFOR

It may be noted that the actual hours worked is less than the standard hours and still the variance is unfavourable, while in the case of efficiency variance such a variance is considered favourable. The reason for this difference is that in the case of efficiency variance the interest is to determine the standards hours required to achieve actual production and then to compare with actual hours. But the volume variance is concerned with the hours worked irrespective of the output achieved. In operational terms, volume variance, here, indicates that the plant has not been used up to its full capacity: In brief,

FOCV = FOSV + FOEV + Volume variance

It is important to mention here that volume variance should be determined on the basis of hours, otherwise it will not be a true indicator of excess or under-utilisation of plant's capacity. Moreover, if computed, on a units basis, it will submerge in it the fixed overhead efficiency variance. Management will not be supplied with the figure of the FOEV—a variance figure of utmost interest to management from the point of view of controlling future costs. Therefore, it will be another serious shortcoming of measuring volume variance on a unit basis. Thus, an hourly approach is recommended for determining FOCV.

(Normal production - Actual produciton) X SFOR per unit

Volume variance (output basis) in order to be used to the management should be split up into sub-variances. The important sub-variances are: (i) Fixed overhead efficiency variance (explained above); (ii) Calendar variance; (iii) Capacity variance.*)*

Calendar Variance

This variance should be calculated only when the actual number of working days are more or less than the standard number of working days scheduled for that period. This may be the result of unexpected public holidays being declared. If working days worked are more, the plant capacity will be greater in the sense that there is an increase in the number of hours (volume). The calendar variance will be favourable. Likewise, if the work is. done for a lesser number of working days, the plant capacity will be reduced and so *also* the number of hours actuary *available for* production. Obviously, the calendar variance will be unfavourable. Therefore, in order to compute the correct capacity variance, it will be necessary to adjust the budgeted hours available for production.

The calendar variance can be computed by the following formula:

[Number of standard working days (SD) - Number of actual working days (AD)] X Standard fixed overheads per day (SFOD)

Standard fixed overheads per day = Total budgeted fixed overheads ÷ Standard number of working days Symbolically,

Capacity Variance

The terms "capacity" and "volume variances" are indiscriminately used in common practice. But in view of the fact that we are calculating efficiency and calendar variances separately, capacity variance here would be sub-variance of volume variance.

Since the difference between actual and standard hours has already been taken care of by the overhead efficiency variance, the capacity variance will not be concerned with this difference. The capacity variance will be the function of the difference between the budgeted hours available on the basis of actual working days (budgeted hours per day x actual days worked) and the actual hours worked multiplied by the standard fixed overhead rate per hour:

(Budgeted hours on the basis of actual days worked - Actual hours worked) X SFOR per hour

We now take a comprehensive example to calculate all overhead variances — variable and fixed

12.8 Sales Variances-Revenue Variances

Up to now, we studied about the cost variances but now, we shall study about the revenue variances. The principal sales variances are sales revenue variances. They are divided into (a) Sales price variance, (B) Sale volume variance sub-divided into (i) Sales mix sub-variance, and (ii) Sale volume sub-variance.

12.8.1 Sales Revenue Variance

Like material cost variance, sales revenue variance (SRV) is the aggregate variance or net variance. It is determined by the difference between the standard sales value (SSV) and actual sales value (ASV). The formula may be abbreviated as follows:

SRV = SSV - ASV (unfavourable)
SRV = ASV - SSV (favourable)

12.8.2 Sales Price Variance

The sales price variance (SPY) is a sub-variance of SRV. This variance, like material price variance, is obtained by the difference between actual selling price (ASP) and standard selling price (SSP) multiplied by actual units (AQ) sold. Like the SRV, the SPY formula can be abbreviated as follows-:

SPV = (ASP - SSP) x AQ (favourable)
SPV = (SSP - ASP) x AQ (unfavourable)

In the case of multi-product firms, the SPV is to be determined for each line of the product sold.

12.8.3 Sales Volume Variance

Sales volume variance (SVV) emanates from the difference in the actual product units sold and the planned sales of product units. The formula for determining SVV can be stated as follows:

SVV = [(Actual volume (AQ) - Standard volume (SQ) X Standard selling price (favourable)

SVV = (SQ - AQ) X Standard selling price (unfavourable)

To have a complete picture, sales volume variance should be determined for each line of the product sold.

In the case of a single-product firm, SPV and SVV together will account for total SRV. However, in the case of multi-product firms, it is necessary to have a break-up of sales, volume variance into two sub-variances: (1) Sales mix sub-variance, and (2) Sales volume sub-variance.

12.8.4 Sales Mix Sub-Variance

Sales mix sub-variance, or sales-mix variance (SMV) originates when the actual sales-mix deviates from the standard sales-mix. SMV will be present only when the proportion of actual units sold differs from the standard proportion. Therefore, this variance does not bear any relationship whatsoever with the sales volume variance. It may be quite possible that actual total quantity sold varies very significantly from the planned sales quantity. Yet. there is no SMV. Likewise, there is a possibility of a reverse situation also.

The net SMV is likely to be favourable, when in actual sales there is a larger proportion of such products which have higher selling prices, as compared to their corresponding standard proportions. When there is a larger proportion of lower selling price products in the actual units sold, the emerging net SMV is likely to be unfavourable. However, it is important to note that in net SMV some product(s) will have favourable SMV, while other(s) will have unfavourable SMV.

12.8.5 Sales Volume Sub-Variance

Sales volume sub-variance (SVSV) is the second part of sales volume variance. Like material yield variance, it is based on the *aggregate* figures of budgeted sales and actual sales, the difference so obtained being multiplied by average selling price. The following are the formulae for determining sales volume sub-variance:

SVSV (favourable) = [Total actual units sold - Total budgeted unit sales] X Average standard selling price

SVSV (unfavourable) = [Total budgeted unit sales - Total actual units sold] X Average standard selling price

12.9 Profit Variances

Sales variances are significant as they have a direct bearing on profits earned by the organisation. In fact, sales variances can be used as the basis of determining profit variance.

Profit variance = Sales revenue variance - Standard cost of sales of products not sold (The formula will hold true when there are no cost variances).

The importance of the determination of profit variance lies in the fact that it helps management to take the necessary remedial actions to achieve its profit target. It enables management to assign responsibility to the heads of various responsibility *centres.* In fact, it may provoke management to probe into the matter by looking into the sales performance territory-wise, or market-channel-wise. Above all. it permits scrutiny of the performance of individual sales managers.

The principal profit variance is *overall profit variance.* It is divided into: (a) Sales price variance, (b) Sales volume variance sub-divided in to (i) Sales mix sub-variance, (ii) Sales volume sub-variance, and (c) Cost variance.

Overall Profit Variance

Standard/budgeted profit - Actual profit (unfavourable)
Actual profit - Standard/budgeted profit (favourable)

Standard profit can be determined in either of the following ways:

(i) *Profit Basis:* Number of budgeted units sold for each product X Standard profit per unit of the concerned-product
(ii) *Cost Basis:*-Under both the methods = [Standard sales revenue of budgeted sales of each product -Standard cost of budgeted sales of each product]

In the case of multi-product firms, a product-wise break-up should be made.

The calculation of actual profit is simple, that is, (Actual quantity sold X Actual profit per unit) or (Actual sales revenue - Actual costs incurred).

Sales Price Variance The formula is the same as the difference in selling prices directly affects the profits or losses of the firm.

Sales Volume Variance The formula, from the point of view of determining profit variance, needs minor modification. The amended formula is:

(AQ - SQ) X Standard profit per unit (favourable)
(SQ - AQ) X Standard profit per unit (unfavourable)

Sales Mix Variance and Sales Volume Sub-Variances The expression, standard price. would be substituted for standard profit and average standard profit respectively.

Sales mix variance = (RSQ - AQ) X Standard profit per unit
Sales volume sub-variance = [Total budgeted safes - Total actual sales] X Average standard profit

12.10 Actual Profit And Budgeted Profit: Reconciliation

The ultimate intension of doing variance analysis is to know the variations in standards set and to take the remedical stepts. As stated earlier, the primary objective of variance analysis is to enable management to know the responsibility centres which can be held accountable for various variances. In operational terms, management should be informed about various cost and revenue variances so that it may know the various reasons why actual profits Have differed from the budgeted profits. At the end of the period it is not enough to know what is the actual profit or loss during the period rather actual profits should be compared with the standard profit to see the variations and find the reasons for such variantions so that remedical steps can be taken for the purpose. So, for the purpose a reconciliation statement is prepared which reconciles standard profits and actual profits.

Proforma Income Statement (Reconciliation)

Budgeted sales revenue :			
Sales variance adjustment (Product-wise details may be given):	Favourable	Unfavourable	
Sales price variance			
Sales mix variance			
Sales volume sub-variance			(+) or (-) as the case may be
Actual sales revenue:			
Less: *standard cost in units sold:*			
Material (direct)	.....		
Labour (direct)	.....		
Other direct expenses (if any)	.....		
Variable overheads (main details may be given)			
Fixed overhead (main details may be given.	.....	.....	
Budgeted profit			
Cost variances:			
Material			
Price variance			
Yield variance			
Mix variance			
Labour variances:			
Rate Variance			
Mix variance			
Efficiency variance			
Idle time variance			
Variable overhead variances:			
Spending variance			
Efficiency variance			
Fixed overhead variances:			
Spending variance			
Efficiency variance			

Capacity variance			
Calendar variance			
			(+) or (-) as the case may be
Actual profit			

12.13 Practical:

1. Adarsh Ltd. has adopted standard costing furnishes the following information:

Standard :

Materials for 70 kg. finished products	100 kg.
Price of materials	Re. 1 per kg.
Actual :	
Output	2,10,000 kg.
Materials used	2,80,000 kg.
Cost of materials	Rs. 2,52,000

Calculate :

(a) Material usage variance

(b) Material price variance

(c) Material cost variance.

Solution :

Standard quantity (working note 1)	(SP)	3,00,000 kg.
Actual quantity	(AP)	2,80,000 kg.

Standard price	(SP)	Re. 1 per kg.
Actual price (working note 2)	(AP)	Re. 0-90 per kg.
(a) Material usage variance	=SP×(SQ-AQ)	
	= 1 × (3,00,000—2,80,000)	
	=Rs. 20,000 (Favourable)	
(ft) Material price variance	=AQ × (SP-AP)	
	= 2,80,000 × (1.0 – 0.9)	
	=2,80.000 × 10	
	=28,000 (Favourable)	
(c) Material cost variance	= Standard cost — Actual cost	
	=(SQ×SP)-(AQ×AP)	
	==(3,00,000 × 1)- (2,80,000×0.90)	
	=Rs. 48,000 (Favourable)	

Working Notes:

(1) Standard quantity:

Material for : 70 kg. of finished products: 100 kg.

2,10,000 kg. of finished products :

2,10,000 × (100/70) 3,00,000kg.

(2) Actual price per kg. = Rs. 2,52,000 / 2,80,000 = Re. 0.90

2. Mitshu Ltd. turns out only one article, the prime cos; standards for which have been established as follows :

	Per Completed Piece
Materials— 51bs. @ Rs. 4.20	Rs. 21
Labour— 2 Hours @ Rs. 3	Rs. 9

The production schedule for the month of July, 1983 required completion of 5,000 pieces. However, 5,120 pieces were actually completed.

Purchases for the month July 1983 amounted to 30,000 lbs of material at the total invoice price of Rs. 1,35,000.

Production records for the month of July, 1983 showed the following actual result

Materials requisitioned and used 25,700 lbs.

Direct Labour—15,150 hours Rs. 48,480

Calculate appropriate material and labour variances.

Solution

DIRECT MATERIAL VARIANCES

DMCV =Std. cost for actual output—Actual cost

= 5,120 × 5 × 4.20-25,700 × 4.50

= 1,07,520-1,15,650

= 8,130 (Adverse)

DMPV = Actual Qty. used × (SR- AR)

=25,700 × (4-20-4-50)

=25,700× .30=Rs. 7,710 (Adverse)

DMUV =SR× (Std. Qty. for actual output—Actual Qty.)

= 4.20 × (5,120X5 -25,700)

=4.20 × (25,600-25,700)

=4.20 ×100==420 (Adverse)

Verification:

DMCV = DMPV+DMUV

Rs. 8130(A) = Rs. 7,710 (A)+420(A)

DLCV = Std. cost for actual output — Actual cost

= 5,120×3X3-48,480

= 46,080-48,480

= 2,400 (Adverse)

DLRV = Actual time × (SR—AR)

= 15,150 × (3-3.20)

= 15,150 × .20

= Rs. 3,030 (A)

DLEV = SR × (Std. time for actual output—Actual time)

= 3× (5,120×3-15,150)

= 3 × (15,360- 15,150) =3×210=Rs. 630 (Favourable)

Verification

DLCV=DLRV+DLEV

2,400 (A) = 3,030(A) +630 (F)

3. The standard cost of a certain chemical mixture for Niku Ltd. is ;

35% Material *A* at Rs. 25 per kg.

65% Material *B* at Rs. 36 per. .kg.

A standard loss of 5% is expected in production.

During a period there is used :

125 kg of Material *A* at Rs. 27 per kg. and

275 kg of-Material *B* at Rs. 34 per kg.

The actual output was 365 kgs. Calculate :

(a) Material Cost Variance

(b) Material Price Variance

(c) Material Mix Variance

(d) Material Yield Variance

Solution.

Material	*Standard*			*Actual*		
	Kg.	*Rate*	*Amt-*	*Kg.*	*Rate*	*Amt.*
A	140	25	3,500	125	27	3,375
B	260	36	9,360	275	34	9,350
	400		12,860	400		12,725

Standard output : 400 - 20 =380 kg.

Actual output = 365 kg.

Standard Cost per kg. = 12.860/380=Rs. 33.84

The various variances can now be calculated as follows :

(a) DMCV = Standard cost for actual output—Actual Cost

= 365×33.84-12,725

= 12,352-12,725 =Rs. 373 (Adverse)

(b) DMPV = Actual Quantity ×(SR—AR)

A = 125×(25-27)=250 (A)

B =275 × (36-34)=550 (F)

Rs. 300 (Favourable)

(c) DMMV =Standard rate × (RSQ—AQ)

Material *A*=*25* × (140--125) = 375 (F)

Material, 5=36 ×(260-275)=540 (A)

165 (Adverse)

(d) W1T = Standard cost per kg. × (Standard output for actual mix - Actual output

= 33.84 ×*(380*—365)

=Rs. 508 (Adverse)

Verification

DMCV=DMPV+DMMV+DMYV

Rs. 373 (A)=300 (F)+165 (A) + 508 (A)

Working Notes

1. Standard Quantity for Actual Mix

Material *A* : 400x35/100=140 kg.

Material *B* : 400x65/100=260 kg.

2. Since Standard Mix and Actual Mix are the same, the Revised Standard Quantity and Standard quantity will also be the same.

4. From the following data, calculate fixed overhead expenditure and volume variances for Shriji Ltd.:

Fixed overhead budget for November	Rs. 1,00,000
Budgeted production for the month	50,000 units
Actual production for the month	54,000 units
Actual Axed overhead incurred	Rs. 1,20,000

Solution

Fixed overheads :

Expenditure variance =Budgeted overheads — Actual overheads

= Rs. 1,00,000 - Rs. 1,20,000=Rs. 201000 (A)

Volume variance = Recovered overheads - Budgeted overheads

Recovered overheads = (Budgeted overheads / Budgeted output) × Actual outPut

= (1,00,000 / 50,000) / 54,000

=Rs. 1,08,000

∴ Volume variance =Rs. 1,08,000 - Rs. 1,00,000

=Rs. 8,000 (F)

Overhead cost variance=Recovered overheads — Actual overheads

= Rs. 1,08,000 — Rs. 1,20,000

=Rs. 12,000 (A)

Verification :

Overhead cost variance=Expenditure variance + Volume variance

= Rs. 20,000 (A)+Rs. 8,000 (F)

=Rs. 12,000 (Adverse)

5. The budgeted and actual sales of a concern manufacturing and marketing a single product are furnished below for Jaipal Ltd.:

Budgeted sales	10,000 units at Rs. 4 per unit
Actual sales	5.000 units at Rs. 35 per unit
8,000 units at	Rs. 4 per unit

Calculate : (a) Sales price variance and

(a) Sales volume variance.

Solution :

(a) Sales price variance	=Standard sales - Actual sales
Standard sales	= Standard price × Actual quantity
	=Rs. 4 × 13,000
	= Rs. 52,000
Actual sales	= Actual price × Actual quantity
	= Rs, 3.5×5,000+Rs. 4×8,000
	==Rs. 17,500+Rs. 32,000
	=Rs. 49,500

∴ Sales price variance = Rs. 52,000— Rs. 49,500

= Rs. 2,500 (Adverse)

(b) Sales volume variance =Budgeted sales - Standard sales

=Rs. 40,000 - Rs. 52,000

=Rs. 12,000 (Favourable)

Sales value variance =Budgeted sales - Actual sales

= Rs. 40,000 - Rs. 49,500

= Rs. 9,500 (Favourable)

6. Raviraj Ltd. operates a budgetary control and standard costing system. From the following data calculate :

(i) Sales variance

(ii) Sales volume variance

(iii) Sales price variance

Product	*Sid. cost of sales per unit*	*Std. selling price per unit*	*Budget*		*Actual*	
			Units to be sold	*Sales value*	*Units sold*	*Sales volume*
A	10.00	12.00	100	1,200	100	1,100
B	9.40	12.00	50	600	50	600
C	7.50	9.00	100	900	200	1,700
D	4.00	6.00	75	450	50	300
		Total	325	3,150	400	3,700

Solution : Sale (value) variance = Budgeted sales— Actual sales

=Rs. 3,150 — Rs. 3,700

= Rs. 550 (Favourable)

Sales price variance = Standard sales- Actual sales

= Actual qty. × (Std. Price- Actual price)

A =100 × (12 -11) = Rs. 100 (Adverse)

B =50×(12- 12) = Nil

C =200 × (9 - 8-50) =Rs. 100 (Adverse)

D = 50×(6 - 6) = Nil

Total Rs. 200 (Adverse)

Sales volume variance = = Budgeted sales - Standard sales-

E = Std. price × (Budgeted qty. - Actual qty.)

A =Rs. 12 × (100 - 100)=Nil

B = 12 ×(50- 50)=Nil

C 9 × (100 - 200) = 900 (Favourable)

D 6 × (75 - 50) = 1 50 (Adverse)

Total 750 (Favourable)

Verification :

Sales value variance = = Sales price variance + Sales volume variance

= Rs. 200(A)+Rs. 750 F)

=Rs. 550 (Favourable)

7. Don Ltd. gives *you* the following standard and actual data relating to a Batch of the Chemical *X-46L* You are required to calculate :

(a) Material Cost Variance, *(b)* Material Price Variance, (c) Material Yield Variance, *(d)* Labour Cost Variance, *(e)* Labour Rate Variance, (f) Overhead Cost Variance, *(g)* Overhead Expenditure Variance.

Standard data :

Material *A* 450 kgs.	@ Rs. 20	Rs. 9,000
Material *B* 360 kgs.	@ Rs. 10	3,600
Labour— :2,400 hours	@ Rs. 2.50 per hour	6,000
Fixed overheads	@ Rs. 6 per hour	14,400
		33,000

Actual Data :

Material *A* 450 kgs. @ Rs. 19	Rs. 8,550
Material *B* 360 kgs. @ Rs. 11	3,960
Labour — 2,500 hours @ Rs. 3 per hour	7,500
Fixed overheads actually spent	11,500
	31,510

Actual process loss being 100 units, actual output=710 units.

Solution. Since the question does not state about the standard output or standard loss hence it has been presumed that standard output and the actual output are the same.

Material	*Standard*			*Actual*		
	Qty.	*Rate*	*Amount*	*Qty.*	*Rate*	*Amount*
	Kg.	Rs.	Rs.	*Kg.*	Rs.	Rs.
A	450	20	9,000	450	19	8,550
B	360	10	3,600	360	11	3,960
	810		12,600	810		12,510

(a) Material Cost Variance = Std. cost for actual output — Actual cost
=Rs. 12,600— Rs. 12,510
=Rs. 90 (Favourable)

(b) Material Price Variance = Actual qty. × (Std. rate — Actual rate)
Material *A* =450×(20- 19)=Rs. 450 (F)
Material *B* =360 × (10— 11)= 360 (A)
Rs. 90 (A)

(c) Material Yield Variance. The question does not state about the standard loss, hence it has been presumed that the standard loss and the actual loss are the same. Thus, the material yield variance is *NIL.*

(d) Labour Cost Variance	=Std. cost for actual output— Actual cost
	= Rs. 6,000 - Rs. 7,500
	=Rs. 1,500 (Adverse)
(e) Labour Rate Variance	= Actual time × (Std. Rate- Actual rate)
	= 2,500 hrs.×(Rs. 2.50-3)
	=Rs. 1,250 (Adverse)
(f) Overhead Cost Variance	=Recovered overheads - Actual overheads
	= Rs. 14,400- Rs. 11,500
	=Rs. 2,900 (Favourable)
(g) Overhead Expenditure Variance	=Budgeted overheads - Actual overheads
	=Rs. 14,400- Rs. 11,500
	= Rs. 2,900 (Favourable)

8. The following information is available from the records of Mahavir Ltd.:

	Budget	***Actual***
Fixed overhead for June (Rs.)	**10,000**	**12,000**
Production in June (units)	**2,000**	**2,100**
Standard time per unit (hours)	**10**	
Actual hours worked in June		**22,000**

Compute :

(i) Fixed overhead cost variance

(ii) Expenditure variance

(iii) Volume variance

(iv) Capacity variance

(v) Efficiency variance.

Solution :

Basic Calculations :	*Budgeted data*	*Actual data*
Fixed Overheads (Rs.)	10,000	12,000
Production in June (Units)	2,000	2,109
Standard time per unit	10	-
Total Hours in June	20,000	22,000
Standard Cost per Unit (Rs.)	5	
Standard Rate per hour (Rs.)	0.50	

(i) FOCV=Recovered Fixed Overheads—Actual Fixed Overheads

=2,100 × 5,12,000

= 10,500-12,000

=Rs. 1,500 *(A)*

(ii) FOEXPV=Budgeted Fixed Overhead—Actual Fixed Overheads

= 10,000-12,000 =2,000 *(A)*

(iii) FOVV=Recovered Fixed Overheads—Budgeted Fixed Overheads

= 10,500-10,000 =Rs. 500 (F)

(iv) FOCAPV=Std. Overheads—Budgeted Overheads

=Std. Rate Per hr × (Actual hours—Budgeted hrs.)

=Re. 0.50 × (22,000)

=Rs. 1,000 *(F)*

(v) FOEFFV=Recovered Overheads-Std. Overheads

=Std. Rate per hour × (Std. hrs. for actual output—Actual hrs) =

Rs. 0.50 × (21,000-22,000) =Rs. 500 *(A)*

9. Calculate: (1) Material Cost Variance (2) Material Price Variance (3) Material Usage Variance from following data of Sambhav Ltd.

Material	Standard		Actual	
	Quantity (Kg.)	Price Rs.	Quantity (Kg.)	Price Rs.
A	1,200	8	1,440	7.50
B	1,800	10	2,160	10.20
	3,000		3,600	

Solution :

(i) Material Cost Variance = (Std. Qty. × Std. Price) - (Actual Qty. × Actual Price)

A = (1,200 × Rs. 8) - (1,440 × 7.50)

= Rs. 9,600- Rs. 10,800

= - 1,200 (U)

B = (1,800 × Rs. 10) - (2,160× 10.20)

= Rs. 18,000 - Rs. 22,032

= - 4,032 (U)

A + B = - 1,200 – 4,032

= - 5,232 (U)

OR

Std. Cost:		Actual Cost :
A	1,200 × Rs. 8 = Rs 9,600	1,440× Rs. 7-50 = Rs. 10,800
B	1,800 × Rs. 10 = Rs 18,000	2,160× Rs. 10.20 = Rs. 22,032
	Rs. 27,600	Rs. 32.832

Material Cost Variance = (Std. Qty. × Std. Price) - (Actual Qty. × Actual Price)
= Std. Cost - Actual Cost
= Rs. 27,600- 32,832
= -Rs. 5,232 (U)

(ii) **Material Price Variance** = Actual Qty. (Std. Price - Actual Price)

A = 1,440 (8.00 - 7.50)
= 1,440 × 0.50 = + 720(F)

B = 2,160 (10 - 10.20)
= 2,160 (- 0.20)

-432 (U)
+ 288 (F)

(iii) **Material Usage Variance** = Std. Price (Std. Qty. - Actual Qty.)

A = 8 (1,200 – 1,440)
= 8 × - 240 = - 1,920 (U)

B =10 (1,800 –2,160)
= 10 × - 360

-3,600 (U)
-5,520 (U)

∴ **Material Cost Variance** = M. Price Variance + M. Usage Variance
= + 288- 5,520
= - 5,232 (U)

10. In Corpus Ltd., it is estimated that for the use of 1 ton of materials, 100 units are manufactured. The standard price of material is Rs. 10. During August, 2001, 100 tons of material was issued to production at Rs. 10-50 per ton. Actual production was 10,250 units.

Calculate: (1) Material Cost Variance (2) Material Price Variance (3) Material Usage Variance.

Solution:

Let us find out standard quantity for actual production. For 100 units 1 ton is used

∴ 10,250. -. 10,250 units (?) 10,250/100 = 102.5 tons

(1) Material Cost Variance = (Std. Qty. of Actual Prod. × Std. Price) - (Actual Qty. × Actual Price).
= (102.5 × Rs. 10) - (100 × Rs. 10.50)
= Rs. 1,025 - Rs. 1,050
= - 25 (U)

(2) Material Price Variance = Actual Qty. (Std. Price - Actual Price)
= 100 tons (10-10.50)
= 100 × 0.50
= - 50 (U)

(3) Material Usage Variance = Std. Price (Std. Qty. - Actual Qty.)
= Rs. 10 (102.5 - 100)
= 10 × 2.5
= + 25 (F)

11. Two materials X and Y are used in the production of a commodity in Gyani Ltd. The information about its production in August, 2001 is as under:

Standard Material Mix:	X 100 kg at Rs. 30 per kg.	Rs. 3,000
	Y 50 kg at Rs. 12 per kg.	Rs. 600
	150 kg.	Rs. 3,600
Actual Material Mix :	X 110 kg at Rs. 32	Rs. 3,520
	Y 40 kg. at Rs. 11	Rs. 440
	150 kg.	Rs. 3,960

Compute Material Variances.

Solution:

In this case, two variances are self-evident: one, there is a difference in the standard rate and actual rate for both materials, and hence the price Variance arises. Two, their relative amounts in the actual mix is also different. This gives rise, to mix variance. No doubt, the quantity of actual mix is same as the quantity of standard mix. Therefore Material mix variance can be calculated on the basis of the above formula.

(1) **Material Cost Variance** = Standard Cost - Actual Cost
= Rs. 3,600 - Rs. 3,960
= - Rs. 360 (U)

There are two parts of material cost variance :

(2) **Material Price Variance** = Actual Qty. (Std. Price - Actual Price)
X =110 (Rs. 30 - Rs. 32)
= - Rs. 220 (U)
Y =40 (Rs. 12 - Rs. 11)
= + Rs. 40 (F)
Total Material Price Variance = -220 + 40
= - Rs. 180 (U)

(3) **Material Mix Variance** = Std. Price (Std. Mix - Actual Mix)

	X	= Rs. 3,0 (100 kg. - 110 kg.)
		= Rs. 30 (-10)
		= - Rs. 300 (U)
	Y	= Rs. 12 (50 kg. - 40 kg.)
		= Rs. 12 (10 kg.)
		= + Rs. 120 (F)
Material Mix Variance		= - 300 + 120
		= - Rs. 180 (U)

12. Calculate Material Yield variance from the following information of Rupak Ltd.

Standard price: Rs. 13.50 per kg.
Standard quantity: 2,000 kg.
Normal loss: 10%
Actual Production: 1,700 kg.

SOLUTION:

First we find out standard cost per unit

$$\text{Standard cost per unit} = \frac{\text{Total Standard Cost}}{\text{Total Standard Output (Yield)}}$$

Total standard cost	= Std. Qty. × Std. Price
	= 2,000 kg. × Rs. 13.50
	= Rs. 27,000
Standard Yield	= Std. Qty. - Normal Loss
	= 2,000 kg. - 200 kg. loss (10% of 2,000)
	= 1,800 kg.
	Rs. 27,000
Standard cost per unit	= 1,800 kg.
	=Rs. 15
Material Yield Variance	= Std. cost per unit. (Actual Yield - Std. Yield)
	= Rs. 15 (1,700 kg. - 1,800 kg.)
	= Rs. 15 × - 1,00
	IL= - 1,500 (U)

12 The standard mix of labour for a job is as under (This job get; finished Within 50 hours)

5 male worker at Rs. 2.50 per hour
6 female workers paid at Rs. 2.00 per hour
2 child workers paid at Rs. 1.50 per hour

But, actually, 7 male workers, 5 female workers and 1 child are employed for this job. Compute labour mix variance.

Solution:

Labour Mix Variance = Standard Rate (Standard Mix - Actual Mix)

Males	= Rs. 2.50 (5 - 7)
	= Rs. 2.50 × - 2
	= - Rs. 5
	= - Rs. 5 × 50 hours
	=. - Rs. 250 (U)
Females	= Rs. 2 (6 - 5)
	= 2 × 1
	= Rs. 2
	= Rs. 2 × 50 hours
	= Rs. 100 (F)
Child	= Rs. 1.50 (2-1)
	= Rs. 1.50
	= Rs. 1.50 × 50 hours
	= Rs. 75 (F)
Total Mix Variance	= - 250 + 100 + 75
	= -75 (F)

13 Following labour mix had been provided in the budget of London Ltd. to produce 1000 units of a product :

			Total Standard Hours	Total Standard Cost (Rs.)
30 males	0.40 per hour	50 hours	1,500	600
20 females	0.30 per hour	30 hours	600	180
10 children	0.20 per hour	20 hours	200	40
			2,300	820

The information about actual hours of work and labour mix is as follows:

			Total Actual Hours	Total Actual Cost (Rs.)
25 males	0.45 per hour	50 hours	1,250	562-50
30 females	0.30 per hour	30 hours	900	270-00
10 children	0.20 per hour	15 hours	150	30-00
			2,300	862-50

Calculate: (1) Labour cost variance; (2) Wage rate variance, (3) Labour efficiency variance and (4) Labour mix variance.

SOLUTION:

(1) Labour Cost Variance = (Std. cost of labour - Actual cost of labour)

Males	= (1500 hours × 0.40) - (1250 × 0.45)
	= Rs. 600 - Rs. 562.50
	= + Rs. 37.50 (F)
Females	= (600 × 0.30) - (900 × 0.30)
	= Rs. 180-Rs. 270
	= -Rs. 90 (U)
Children	= (200 × 0.20) - (150 × 0.20)

= Rs. 40 - Rs. 30
=
Total =- + Rs. 10 (F) Rs.42.50(U)

OR

= Std. Wage Cost - Actual Wage Cost
= 820 - 862.50
= -42.50

(2) **Wage Rate Variance** = Actual Hours (Standard Rate - Actual Rate)

Males	= 1250 (0.40 - 0.45)		
	= 1250 (-0.05)	=	- Rs. 62.50 (U)
Females	=900(0.30-0.30)	=	0
Children	= 150 (0.20 - 0.20)	=	0
	Total Wage Rate Variance	=	-Rs. 62.50 (U)

(3) **Labour Mix Variance** = Standard Rate (Standard Mix - Actual Mix)

Males	= 40 paise (1500 - 1250)	
	= 40 paise × 250	= + Rs. 100 (F)
Females	= 30 paise (600 - 900)	
	= 30paise ×-300	=-Rs. 90 (U)
Children	= 20 paise (200- 150)	
	= 20 paise × 50	= + Rs. 10 (B
	Total labour mix variance :	= + Rs. 20 (F)

14. In Shantinath Ltd. there are 200 workers and the standard rate -of wage per hour is Rs. 2. Standard working hours per week is 42. During the 4 weeks of February, 2001, the factory worked for 4 weeks. The standard task per hour is 60 units. During February, 2001, wages were paid to 182 workers at Rs. 2 per hour, to 10 workers at Rs. 2.10 and to 8 workers at Rs. 1.75 per hour. Actual production was 10,200 units. The factory did not work for 2 hours due to breakdown of power.

Work out the labour variances.

Solution

Here, we firstly calculate the standard hours of actual production. The std. production of 200 workers for 1 hour (= 200 labour hours), is 60 units, then

If for 60 units, the std. labour, hours are 200

Then for 10,200 units, the std. labour hours are (?) = 34,000

The Actual Labour hours and Actual Wages are:				Rs.
182 workers × 42 hours × 4 weeks	=	30,576 hours × Rs. 2	=	61,152
10 workers × 42 hours × 4 weeks	=	1,680 hours × Rs. 2.10	=	3,528
8 workers x 42 hours × 4 weeks	=	1,344 hours × Rs. 1.75	=	2,352
Total		33,600		67,032

(I)**Labour Cost Variance** = (Std. hours × Std. Rate) - (Actual hrs ×Actual Rate)
= (34,000 × Rs. 2) - (67,032)
= 68,000 - 67,032
= + 968 (F)

(II) Wage Rate Variance =

= 30,576 (2-2) = Zero
= 1,680 (2 - 2.10) = - 168 (U)
= 1.344 (2 - 1.75) = + 336 (F)
+ 168 (F)

(III) Labour Efficiency Variance

Actual hours Worked = Hours Paid - Idle Time

= Std. Rate (STD. HOURS - ACTUAL HOURS)
= Rs. 2 (34,2000 - 33,200)
= 33,600 - 400 = 2 (800)
= 33,200
= + 1,600

(IV) Idle Time Variance = Idle Time × Std. Rate
= 400 hours × Rs. 2
= - 800 (U)

Remember: The actual hours to be taken for computing efficiency variance, must be actual hours paid minus idle hours.

Verification:

Labour Cost Variance = Wage Rate Variance + Efficiency Variance + Idle time variance
= Rs. .168 + Rs. 1,600 - Rs. 800
= + Rs. 968 (F)

Calculate:

(a) Material Cost Variance (c) Material Mix Variance
(b) Material Price Variance (d) Material Yield Variance

15. The budgeted production is 2,000 units in Vinee Ltd. in March, 2001 and the budgeted variable overhead is Rs. 5,000. Actual production was 1,100 units; while actual variable overhead amounted to Rs. 5,400.

Calculate variable overhead variance.

SOLUTION

$$\text{Standard variable cost per unit} = \frac{\text{Rs 5 000}}{\text{1.000 units}} = \text{Rs. 5.}$$

Variable Overhead Variance = (Standard rate of variable OH. × Actual Production) - Actual Variable OH.
= (Rs. 5 × 1,100) - Rs. 5,400
= Rs. 5,500 - Rs. 5,400
= Rs. 100 (F)

16. The data from the Budget and Actual data of a factory for January 2004, for Super Ltd. are as follows:

Budgeted production 300 units
Budgeted variable overheads Rs. 6,000
Standard time for production of one unit : 20 hours
Actual production during the month : 250 units
Actual hours during the month 7,000 hours
Actual variable overheads Rs. 6,300
Calculate variable overhead variances from the above data.

Solution:

We shall calculate following three variances :
(1) Variable Overheads Cost Variance.
(2) Variable Overheads Expenditure Variance
(1) Variable Overheads Efficiency Variance

$$\text{(i)Std. Rate per unit} = \frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Production}}$$

= Rs. 6.000/300
= Rs. 20 per unit Std. Production hours
= 300 units × 20 hours
= 6,000 hours

Std. Rate of recovery per hour = Rs. 6,000 ÷ 6,000 hours = Re. 1

(ii) Actual Rate = Rs. 6,300/7,000 = 0.90
(ii) Std. hours of Actual Production = 250 units × 20 hours
= 5,000 hours

(I) Variable Overhead Cost Variance = (Actual Production × Std. Rate) - Actual Cost
= (250 units × Rs. 20) - Rs. 6,300
= 5,000 - 6,300
= -1,300 (U)

(II) Variable Overhead Expenditure Variance = Actual hours (Std. Rate - Actual Rate)
= 7,000 (Re. 1 - 0.90)
= 7,000 × 0.10
= + 700 (F)

(III) Variable Overhead Efficiency Variance = Std. Rate (Std. hours of Actual production - Actual hours)
= 1 (5,000 - 7,000) = Re. 1 × - 2,000
= -2,000 (U)

17. Following information is about production of Pestanji Ltd. for February, 2001. 'On the basis of this information, find out (1) Fixed overhead variance, (2) Expenditure variance and (3) Volume variance. [1] Budgeted fixed overheads Rs. 20,000

Budgeted production 10,000 units

Actual production during the month 10,500 units

. Actual fixed overheads during the month Rs. 20,800

Solution:

$$\text{Standard recovery rate of fixed overhead} = \frac{\text{Budgeted Fixed Overhead}}{\text{Budgeted Production}}$$

= Rs. 20,000/10,000 units = Rs. 2.

(1) Fixed Overhead Variance = (Actual production × Standard rate) - Actual fixed overhead
= (10,500 units × Rs. 2) - Rs. 20,800
= Rs. 21,000 - Rs. 20,800
= Rs. 200 (F)

(2) Expenditure Variance = (Budgeted fixed overhead - Actual fixed overhead)
= BC - AC
= Rs. 20,000 - Rs. 20,800
= - Rs. 800 (U)

(3) Volume Variance = Standard rate (Actual Volume - Budgeted Volume)
= Rs. 2 (10,500 units - 10,000 units)
= Rs. 2 × 500
= + Rs. 1,000 (F)

Now, fixed overhead variance = Expenditure Variance + Volume Variance
= - 800 + 1000
= + Rs. 200 (F)

18. Budgeted fixed overhead for the year is Rs. 62,400 in Rustmaji Ltd., while the working days fixed are 312. The production estimated for the whole year is 31,200 units. The actual working days are 24 in February. Calculate. calendar variance.

Solution

Let us first determine the workdays for each month.

12 months = 312 days, hence 1 month = 312/12 = 26 days

Production for the. whole year is 31,200 units.

Hence, for each month, 31,200 ÷ 12 = 2,600 units of production has been fixed.

But there are only 24 days in February. Hence actual production is : 26 days = 2,600 units

24 days (?). 2,600 × 24/16 = 2,400 units

Thus, on the basis of actual working days, production should be fixed at 2,400 units. This is what we mean by Revised Budget Quantity.

Now we calculate standard rate of recovery of the fixed overhead.

. 62 400

Standard rate of recovery = Budgeted Cost Rs / Budgeted Production
= Rs. 62,400/31,200 = Rs. 2.

Calendar Variance = Standard Rate (RBQ - BQ)
= 2 (2,400 units - 2,600 units)
= (2 × - 200)
= - Rs. 400 (U)

19. Following information is obtained from the cost accounts of Nagraj Ltd. Calculate fixed' overhead variances on the basis of this information.

	Standard	**Actual**
Hours during a month	3,000 hours	3,270 hours.
Days . in each month	25 days	27 days
Monthly fixed overhead	Rs. 1,500	Rs. 1,600
Monthly production	2,000 units	2,200 units

Solution

First, let us calculate some necessary figures :

(1) Standard Rate of recovery per unit = Rs. 1,500/2,000 units = 0.75.

(2) Revised budget quantity =

For 25 days, budget quantity	2,000 units	2,000 × 27/25
for 27 days	(?)	= 2,160 units

(3) Revised standard quantity^ Actual hours × Rate of production per hour

= 3,270 × 2,000 units/3,000 hours = 2,180 units

Now, we can calculate variances as under :

(1) **Fixed Overhead Variance** = (SR × AQ) - AFOH
= (0.75 × 2,200) - Rs. 1,600
= Rs. 1,650 - Rs. 1,600
= Rs. 50 (F)

(2) **Expenditure Variance** = Budgeted Cost - Actual Cost
= Rs. 1,500 - Rs. 1,600
= - Rs. 100 (U)

(3) **Volume Variance**

= **SR (AQ - BQ)**
= Rs. 0.75 (2,200 - 2,000)
= Rs. 0.75 × 200
= Rs. 150 (F)

(4) **Efficiency Variance**

= **SR (AQ - RQ)**
= 0.75 (2,200 units - 2,180 units)
= Rs. 0.75 × 20
= Rs. 15 (F)

(5) **Calendar Variance**

= SR (RBQ - BQ)
= Rs. 0.75 (2,160 units - 2,000 units)
= -Rs. 0.75 × 160
= Rs. 120 (F)

(6) Capacity Variance

= SR (RSQ - RBQ)
= Rs. 0.75 (2,180 units - 2,160 units).
= Rs. 0.75 × 20
= Rs. 15 (F)

20. Following is the information about sales by Sharp Ltd. in April, 2001.

	Standard				**Actual**	
	Quantity (Units)	**Price Rs.**	**Amount Rs.**	**Quantity (Units)**	**Price Rs.**	**Amount Rs.**
A	1,000	12	12,000	1,200	13	15,600
B	600	15	9,000	400	14	5,600
	1,600		21,000	1,600		21,200

Compute sales variances.

Solution

(1) **Sales Value Variance**

= (Actual Qty. × Actual Price) - (Std. Qty. × Std. Price)
= (Actual Value - Std. Value)
= Rs. 21,200 - Rs. 21,000
= + Rs. 200 (F)

(2) **Sales Price Variance**

A + B

= Actual Qty (Actual Price - Std. Price)
= 1,200 (13-12) + 400 (14-15)
= 1,200 (1) + 400 (-1)
= + 1,200 - 400
= + Rs. 800 (F)

(3) **Sales Volume Variance**

A + B

= **SP (AQ - SQ)**
= Std. Price (Actual Qty. - Std. Qty.)
= Rs. 12 (1,200 - 1,000) + Rs. 15 (400 - 600)
= (12 × 200) + (15 × - 200)

= 2,400 - 3,000
= - Rs. 600 (U)

(4) **Sales Mix Variance = SP (AM - SM)** = Std. Price (Actual Mix - Std. Mix)
A + B = Rs. 12 (1,200 - 1,000) + Rs. 15 (400 - 600)
= 2,400 - 3,000
= - Rs. 600 (U)

21. Figures of sales by Mona Ltd. in March, 2001 are as follows

	Quantity (Units)	Standard Price Rs.	Amount Rs.	Quantity (Units)	Actual Price Rs.	Amount Rs.
A	800	3	2,400	750	3.50	2,625
B	2.00	5	1,000	450	4.00	1,800
	1,000		3,400	1,200		4,425

Calculate sales variances.

SOLUTION:

The standard mix quantity is 1,000 units, while actual mix quantity is 1,200 units.- Hence it is necessary to ascertain revised standard mix.

$$RSM = \text{Actual quantity} \times \frac{\text{Standard quantity of one product}}{\text{Total standard quantity}}$$

A = 1,200 × 800/1,000 = 960 units
B = 1,200 × 200/1,000 = 240 units
Total 1,200 units

(1) **Sales Value Variance** = Actual Sales Value - Std. Sales Value
= Rs. 4,425 - Rs. 3,400
= Rs. 1,025 (F)

(2) **Sales Price Variance** = Actual Qty. (Actual Price - Std. Price)
A =750 units (3.50 - 3)
= 750 × 0.50
= Rs. 375 (F)
B = 450 units (Rs. 4 - Rs. 5)
= - Rs. 450 (U)
Total Variance = + 375 - 450 = - Rs. 75 (U)

(3) Sales Volume Variance = Std. Price (Actual Qty. - Std. Qty.)
A = Rs. 3 (750 units - 800 units)
= Rs. 3 × - 50
= - Rs. 150 (U)
B = Rs. 5 (450 - 200 units)
= Rs. 5 × 250

= Rs. 1,250 (F)

Total Variance = - Rs. 150 + Rs. 1,250 = Rs. 1,100 (F)

(4) Sales Mix Variance = Std. Price (Actual Mix - Revised Std. Mix)

A = Rs. 3 (750 - 960)
= Rs. 3 (-210)
= - Rs. 630 (U)

B = Rs. 5 (450 - 240)
= Rs. 5 (210)
= Rs. 1,050 (F)

Total Variance = - 630 + 1,050
= + Rs. 420 (F)

(5) **Sales Sub-Volume Variance** = Std. Price (Revised Std. Mix - Std, Mix)

A = RS: 3 (960 units - 800 units)
= Rs. 3 × 160
= Rs. 480 (F)

B = Rs. 5 (240 - 200)
= Rs. 5 × 40
= Rs. 200 (F)

Total Variance = 480 + 200 = + 680 (F)

Verification:

Sales Volume Variance = Sales Mix Variance + Sales Sub-Vol. Variance
= Rs. 420 + Rs. 680
= Rs. 1,100 (F)

Sales Value Variance = Sales Price Variance + Sales Volume Variance
= -75 + 1,100
= + Rs. 1,025 (F)

This illustration on reconciliation of budgeted profit with actual profit is given just for the understanding of the students otherwise, it will not be asked in the examinations.

22. Calculate different variances of Ram Ltd. from the following data and reconcile the budgeted profit and the actual profit.

	Standard	Actual
Units sold	80,000	70,000
Selling Price Per Unit	Rs. 50	Rs. 65
Material Price per kg.	Rs. 5	Rs. 6
Materials consumed per unit	5 kgs.	5 kgs.
Labour hours per unit	8	7
Wages per hour	Re. 0.50	Rs. 0.60
Variable cost per labour hour	Rs. 1.00	Rs. 1.20

Fixed overhead per unit	Rs. 1.20	Rs. 1.50

Solution:

Out of the three group of items, the two are given: (1) Data relating to standard cost (2) Data relating to actual costs and sales. So we shall find out the third group of items viz. the Variances.

(I) Material Variances:

(1) Material Cost Variance:

= (Std. Price × Std. Qty. of Actual Output) -

(Actual Price × Actual Qty.)

= (5 × 3,50,000) - (6 × 3,50,000)

= - 3,50,000 (U)

Std. Qty. of Actual Output = 70,000 units × Rs. 5 kgs. Consumed per unit = 3,50,000 kgs.

Actual Qty. = 70,000 units × Rs. 5 kgs. Consumed per unit = 3,50,000 kgs.

(2) Material Price Variance = Actual Qty. (SP - AP)

= 3,50,000 (Rs. 5 - Rs. 6)

= -3,50,000 (U)

(3) Material Usage Variance = Std. Price (SQ - AQ)

Here, Standard Qty. = 70,000 × 5 = 3,50,000 kgs.

= Rs. 5 (3,50,000 - 3,50,000) = Zero

(II) Labour Cost Variances:

Std. Labour hours

(Based on Actual Production) = 70,000 units × 8 = 5,60,000 hours

Actual labour hours = 70,000 units × 7 = 4,90,000 hours

(1) Labour Cost Variance = (SH × SR) - (AH × AR)

= (5,60,000 × 0.50) - (4,90,000 × 0.60)

= Rs. 2,80,000 - Rs. 2,94,000

= - 14,000 (U)

(2) Wage Rate Variance = AH (SR - AR)

= 4,90,000 (0.50 - 0.60)

= - Rs. 49,000 (U)

(3) Labour Efficiency Variance = SR (SH - AH)

= 0.50 (5,60,000 - 4,90,000)

= 0.50 × 70,000

= + 35,000 (F)

(III) Variable Overhead Variance:

Std. Variable Cost = Std. hours × Std. overhead per hour

= 5,60,000 × Re. 1 = Rs. 5,60,000

Actual Variable Cost = Actual hours × Actual overhead per hour

= 4,90,000 × Rs. 1.20 = Rs. 5,88,000

(1) Variable OH Cost Variance = (SH × SR) - (AH × AR)

= (5,60,000 × 1) - 5,88,000

= 5,60,000 - 5,88,000

= - 28,000 (U)

(2) Variable OH

Expenditure Variance = AH (SR - AR)

= 4,90,000 (1 - 1.20)

= -98,000 (U)

(3) Variable OH Efficiency Variance = SR (SH - AH)

= 1 (5,60,000 - 4,90,000)

= + 70,000 (F)

Remember: (1) The last two variances of variable overhead can be computed on the basis of hours only.

(2) The formula for Variable Overhead Exp. Variable is similar to the formula of Wage Rate Variance and the formula for Var. OH. Efficiency Var. is similar to the formula of Labour Eff. Variance.

(IV) Fixed Overhead Variances:

Fixed Overheads as per Budget = Production × Std. Rate per unit

= 80,000 units × Rs. 1.20

= Rs. 96,000 Actual Fixed Overheads

= 70,000 × Rs. 1.50

= Rs. 1,05,000

(1) Fixed Overhead Variance = (AQ × SR) - AC

= (70,000 × 1.20) - 1,05,000

= 84,000 - 1,05,000

= -21,000 (U)

(2) Fixed OH Expenditure Variance = (BC - AC)

= -96,000 - 1,05,000

= -9,000 (U)

(3) Fixed OH Volume Variance = SR (AQ - BQ)

= 1.20 (70,000 - 80,000)

= 1.20 × - 10,000 = -12,000 (U)

(V) Sales Value Variances:

(1) Sales Price Variance = AQ (AP - SP)

= 70,000 (65 - 50)

= 70,000 ×. 15

= +10,50,000 (F)

(2) Sales Margin Volume Variance = SP (AQ - BQ)

= 11.80 (70,000 - 80,000)

= -1,18,000 (U)

Remember that the two variances (i) Sales Price Variance and (ii) Sale Margin Volume Variance affect the profit and so these two variances have td be taken into consideration for reconciliation of profits.

Now we calculate the profit as per Budget and Actual Profit and reconcile them :

(1) Std. Cost per unit = Materials + Wages + Variable Cost+ Fixed Cost

= Rs. 25 + Rs. 4 + Rs. 8 + Rs. 1.20 = Rs. 38.20

(2) Std. Profit per unit = Selling Price - Std. Cost per unit

Rs. 50 - Rs. 38.20 = Rs. 11.80

(3) Profit as per Budget = 80,000 units × Rs. 11.80 = Rs. 9,44,000

(4) Actual cost per unit = Rs. 30 + 4.20 + 8.40 + 1.50 = Rs. 44.10

(5) Actual Profit per unit = Rs. 65 - 44.10

= Rs. 20.90

(6) Actual Total Profit = 70,000 × Rs. 20.90

= Rs. 14,63,000

Statement showing Reconciliation of the Actual Profit and the Budgeted Profit

	Rs.	Rs.	Rs.
Profit as per Budget			9,44,000
Effect of Sales Variances:			
(i) Sales Price Variance		+ 10,50,000	
(ii) Sales Margin Volume Variance		-1,18,000	9,32,000
Standard Profit			18,76,000
Effect of Cost Variances:			
(i) Material Cost:			
Price	- 3,50,000		
Usage	Zero	-3,50,000	
(ii) Labour Cost			
Rate	-49,000		
Efficiency	+35,000	-14,000	
(iii) Variable OH Cost :			
Expenditure	-98,000		
Efficiency	+70,000	-28,000	
(vi) Fixed Overhead Cost:			
Budget	-9,000		
Volume	-12,000	-21,000	-4,13,000
∴ Actual Profit		14,63,000	

12.14 Practical Exercise:

1. Marqus Ltd. has implemented standard costing. The standard of usage fixed for production of 1,000 units of a product is 400 kg. at a price of Rs. 2-50 per kg. When 2,000 units were manufactured, it was found that 820 kgs. of materials were used at Rs. 2-60 per kg.

Calculate Material Variances?

2 In zodiac Ltd., the standard production during April, 2001 was fixed at 180 kgs. for which standard cost was as follows:

Materials O	: 120 kg. per Rs. 10	Rs. 1,200
Materials P	: 80 kg. per Rs. 50	Rs. 4,000
	200 kg.	Rs. 5,200
Less 10% loss	20	-
	180 kg. Production	Rs. 5,200

Details about actual production were as follows :

Materials	O	130 kg. per Rs. 12	Rs. 1,560
Materials	P	70 kg. per Rs. 50	Rs. 3,500
		200 kg. production	Rs. 5,060
Less :	Loss	30 kg.	-
		170 kg.	Rs. 5,060

Calculate Material Variances

3. Standard wage rate is Rs. 2 per hour and standard time is 10 hours. But actual wage rate is Rs. 2.25 per hour and actual hours used are 12 hours.
Calculate labour cost variance from above information.

4. The data regarding labour cost of production of Rani Ltd. in February 2001 in a factory are as follows:

Actual; direct wages paid Rs. 26,240
Standard hours 8,640
Standard wage rate per hour Rs. 3.00
Actual hours 8,200
Calculate labour cost variances

5. From the following data, calculate material variances for Rupal Ltd.

	Standard	Actual
Quantity	200 kg.	240 kg.
Price-	Rs. 2 per kg.	Rs. 1.75 per kg.
Total	Rs. 400	Rs. 420

6. Adani ltd. operates a system of standard costing. The standard determined specified that for the production of 8,000 units of a product, 40,000 kgs. of raw materials will be used at Rs. 5 per kg. When actually 8,000 units were produced, it was found that 44,000 kgs. of materials was used and actual price paid was Rs. 5.50 per kg. Calculate material variances.

7. From the standard cost card of Shalini Ltd., it is revealed that 3 kgs. of materials is needed at Rs. 2 per kg. to produce one unit of a product. During March 2001 when 400 units were produced, 1,240 kgs of materials were used at Rs. 1.80 per kg.

Compute Material Variances,

8. From the data given below, calculate Material Cost Variance, Material Pi ice Variance and Material Usage Variance for Nilesh Ltd.

Material	Standard		Actual	
	Quantity	Unit Price	Quantity	Unit Price
	Kg.	Rs.	Kg.	Rs.
A	360	12	420	11
B	540	15	630	16
	900		1,050	

9. Calculate material variances from the following information of Kanisha Ltd.:

Materials	Standard	Actual
A	120 units at Rs. 16	150 units at Rs. 15
B	90units at Rs. 12	95 units at Rs. 13
	210	245

10. Standard material for 100 kg. chemical No. 555 is given below :

	kg. :
	50 of material A @ Rs. 2.00 per kg.
	35 of material B @ Rs. 4.00 per kg.
	25 of material C @ Rs. 6.40 per kg.
	110
Standard Loss	10
	100

Actual Production data:

2,000 kgs. of chemical No. 555 produced and actual usage of materials was as under :

Kg.		Rs.
1,100	Material A @ Rs. 1.80 per kg.	1,980
650	Material B @ Rs. 4.50 per kg.	2,925
560	Material C @ Rs. 6.50 per kg.	3,640
2.310		8.545

Calculate:

(1) Material cost variance (2) Material price variance (3) Material usage variance (4) Material mix variance (5) Material yield variance for Nidhi Ltd..

11..From the following information of Hima Ltd., calculate Material Variances:

		Standard			Actual		
		Qty. (kgs.)	**Price Rs.**	**Amount Rs.**	**Qty. (kgs.)**	**Price Rs.**	**Amount Rs.**
Material	O	200	2	400	180	2.20	396
Material	P	100	5	500	120	4.80	576
		300		900	300		972
Loss		20		-	30		-
		280		900	270		972

12. The data regarding direct wages of Asha Ltd. for March, 2001 is as follows :

Gross direct wages	Rs. 65,000
Standard hours produced	5,400
Standard rate per hour	Rs. 11
Actual hours worked	5,200

Calculate necessary labour variances.

13. The details regarding labour cost of Dhani Ltd. for March 2001 are given below. Calculate labour variances :

Standard hours	400 hours
Standard rate per hour	Rs. 3.40
Actual wages paid	Rs. 1,368
Actual hours	380 hours
Abnormal idle time	16 hour

14. Data relating to workers employed in Panna Ltd. for production of one unit of a product are as follows:

Typos	Hours	Wage Rate Rs.	Total Amount Rs.
Skilled	15	4.00	60.00
Unskilled	24	2.00	48.00
Semi-skilled	12	3.00	36.00
			144.00

Actual performance: Actual production 100 units.

Type	Hours	Wage Rate Rs.	Total Amount Rs.
Skilled	1,400	5.00	7,000
Unskilled	3,000	1.80	5,400
Semi-skilled	1,260	3.00	3,780
	5,660		16,180

Calculate following variances:

(a) Labour cost variance (b) Wage rate variance (c) Labour efficiency variance (d) Labour mix variance)

15. Standard labour hours and rate of production of Article C are *given* below :

	Per unit (Hour)	Rate per hour	Total Rs.
Skilled labour	6	3.50	21.00
Unskilled labour	9	1.00	9.00
Semi-skilled	4	2.00	8:00
			38.00

Actual performance (Actual production 2,000 units)

	Rate per hour	Rs.	Total Rs.
Skilled labour	11,000 hours	4.00	44,000
Unskilled labour	20,000 hours	0.80	16,000
Semi-skilled	8,900 hours	1.80	16,020

Calculate and explain following variances :, (1) Labour cost variance (2) Labour rate variance (3) Labour fficiency variance (4) Labour mix variance (5) Labour yield variance.

16.For unit of a product, the standard data are given below for Hiren Ltd.:

Materials:	
12 kg. at Rs. 10 per kg.	Rs. 120
Labour:	
40 hours at Re. 1 per hour	Rs. 40
	Rs. 160
Actual production 400 units.	
Material: 4,500 kg. at Rs. 11 per kg.	49,500
Labour: 15,600 hours at Re. 1.10 per hour	17,160
	66,660

Calculate Material and Labour Variances.

17.Data relating to cost of a factory are as follows for Punjab Ltd.

Input kg-	Standard	Rs.	Input kg-	Actual	Rs.
500	Material at Rs. 39 per kg.	19.500	500	Material at Rs. 42 per kg.	21.000
	Labour. 4,000 hours at Rs. 1.50 per hour	6.000		Labour 4,000 hours at Rs. 1.60	6.400
20	Normal loss		40	Actual loss	
480	Output	25.500	460		27.400

Calculate: (1) Material cost variance (2) Material price variance (3) Material yield variance (4) Labour cost variance (5) Wage rate variance (6) Labour yield variance

18. The standard cost of certain chemical mixture is :

35% material at Rs. 5,00 per kg.
65% material at Rs. 7.20 per kg.
A standard loss of 5% is expected in production. During the period materials used
250 kg. of material A at Rs. 5.40 per kg. and
550 kg. of material B at Rs. 6.80 per kg.

The actual output was 730 kgs.

19. Nayan Ltd. provides the following information from their records:—

For making 10 kgs. of GEMCO, the standard material requirment is

Material	Quantity (kgs.)	Rate per kg. (Rs.)
A	8	6.00
B	4	4.00

During April 1988, 1000 kgs. of GEMCO were produced. The actual consumption of materials is as under—

Material	Quantity (kgs.)	Rate per kg. (Rs.)
A	750	7.00
B	500	5.00

Calculate: (a) Material Cost Variance; (b) Material Price Variance; and (c) Material Usage Variance.

20. The standard mix of product O is as follows :

Kgs.	*Material*	*Price per kg. (Rs.)*
45	*X*	6.00
25	*Y*	4.50
30	*Z*	9.50

The standard loss in production is 10% of input. There is no scrap" value. Actual production for a month was 7,425 kgs. of O from 80 mixes. Actual purchases and consumption of material during the month were:

Kg-s.	*Material*	*Price per kg. (Rs.)*
4,200	*X*	6.50
1,700	*Y*	4.25
2,600	*Z*	9.75

You are required to calculate the following variances for presentation to the management:

(i) Material cost variance; (ii) Material price variance; (iii) Material mix variance; (iv) Material yield variance.

21. Dev. Ltd., manufactures BXE by mixing three raw materials For every batch of 100 kgs. of BXE, 125 kgs. of raw materials are used In April 1983, 60 batches were prepared to produce an output of 5,600 kgs. of BXE. The standard and actual particulars for April 1983 are as follows:

Raw Material	*Standard*		*Actual*		*Quantity of Raw Materials Purchased*
	Mix	*Price per Kg*	*Mix*	*Price per Kg*	
	%	*Rs.*	*%*	*Rs.*	*Kg*
A	50	20	60	21	5,000
B	30	10	20	8	2,000
C	20	5	20	6	1,200

Calculate all variance (16 marks)

22. Gyani Ltd., is engaged in producing a 'standard mix' using 60 kgs of chemical *X* and 40 kgs of chemical *Y*. The standard loss of production is 30%. The standard price of *X* is Rs. 5 per kg and of f is.Rs.10 per Kg.

The actual mixture and yield were as follows :

X 80 kgs @ Rs. 4'50 per kg and

Y 70 kgs @ Rs. 8-00 per kg.

Actual yield 115 Kgs.

Calculate Material Variances (price, usage, yield, mix).

23. The standard cost of Pir Ltd. For a chemical mixture 'PQ' is as follows :

40% of material P @ Rs. 400 per kg.

60% of material Q @ Rs. 600 per kg.

A standard loss of 10% is normally anticipated in production. The following particulars are available for the month of September 1984 :

180 kg. of material P has been used @ Rs. 360 per kg.

220 kg. of material Q has been used @ Rs. 680 per kg.

The actual production of 'PQ' was 369 kg.

Calculate the following variances :

(a) Material price variance *(b)* Material usage variance

(c) Material mix variance *(d)* Matetial yield variance.

Also show the reconciliation of Standard Cost with Actual Cost with (he help of above variances.

24. The following details are available from the records of Nawab Ltd. engaged in manufacturing Article 'A' for the week ended 28th September.

The standard labour hours and rates of payment per article 'A' were as follows :

	Hours	Rate per hour Rs.	Total Rs.
Skilled Labour	10	3.00	30
Semiskilled Labour	8	1.50	12
Unskilled labour	16	1.00	16
			58

The actual production was 1,000 articles 'A' for which the actual hours worked and rates are given below :—

	Hours	Rate per hour Rs.	Total Rs.
Skilled Labour	9,000	4.00	36,000
Semi-skilled Labour	8,400	1.50	12,600
Unskilled Labour	20,000	0.90	18,000
			66,600

From the above set of data you are asked to calculate :

(a) Labour Cost Variance *(b)* Labour Rate Variance

(c) Labour Efficiency Variance *(d)* Labour Mix Variance.

25. The following standards have been set to manufacture a product by Adab Ltd.:

Direct Material	Rs.
2 units of *A* @ Rs. 4 per unit	8.00
3 units of *B (a)*, Rs. 3 per unit	9.00
15 units of *C* @ Re. 1 per unit	15.00
	32.00
Direct labour 3 hrs. @ Rs. 8 per hour	24.00
Total standard prime cost	56.00

The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows :

12,500 units of *A* at Rs. 4.40 per unit

18,000 units of B at Rs. 2.80 per unit

88,500 units of *C* at Rs. 1.20 per unit

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours the company paid at Rs. 12 per hour while for the remaining the wages were paid at standard rate. Calculate materials price variances and usage variances and

labour rate and efficiency variances.

Calculate:

(a) Material Cost Variance (c) Material Mix Variance
(b) Material Price Variance (d) Material Yield Variance

26. The standard cost of Panipat Ltd. Of a certain chemical mixture is as under:

40% of Material A at Rs. 20 per tonne. 60% of Material *B* at Rs. 30 per tonne. A standard loss of 10% is expected in production. The following actual cost data is given for the period.

180 tonnes material A at a cost of Rs. 18 per tonne.

220 tonnes material *B* at a cost of Rs. 34 per tonne.

The weight producted is 364 tonne.

Calculate and present:

(a) Material Price Variance.

(b) Material Mix Variance.

(c) Material Yield Variance.

(d) Material Cost Variance.

(e) Material Usage Variance.

28. Pinkesh Ltd. produces an article by blending two basic raw materials. It operates a standard costing system and the following standards have been set for raw materials: .

Material	*Standard Mix*	*Standard Price (Rs. per kg.)*
A	40%	4
B	60%	3

The standard loss in processing is 15%.

During April, 1990 the company produced 1,700 kgs. of finished output.

The position of stock and purchases for the month of April, 1990 are as under :

Material	*Stock on , 1.4.1990 (Kgs.)*	*Stock on 30.4.1990 (Kgs.)*	*Purchased during April, 1990 (Kgs.)*	*(Cost in Rs.)*
A	35	5	800	3,400
B	40	50	1,200	3,000

Calculate the following variances :

(i) Material price variance;

(ii) Material usage variance;

(iii) Material yield variance;

(iv) Material mix variance; and

(v) Total material cost variance.

29. Bhumi Ltd. manufactures a simple product, the standard mix of which is :

Material *A*	60% at Rs. 20 per kg
Material B	40% at Rs. 10 per kg.

Normal loss in production is 20% of input. Due to shortage of Material A, the standard mix was changed. Actual results for March, 1989 were:

Material *A*	105 kg. at Rs. 20 per kg
Material *B*	95 kg at Rs. 9 per kg.
Input	200 kg
Loss	35 kg
Output	165 kg

Calculate :

(i) Material Price Variance,

(ii) Material Usage Variance,

(iii) Material Mix Variance,

(iv) Material Yield Variance.

30. Eskay Ltd. produces an article by blending two basic raw materials. The following standards have been set up for raw materials :

Materials	Standards Mix	Standard Price per kg.
A	40%	Rs. 4.00
B	60%	Rs. 3.00

The standard loss in processing is 15%. During September, 1990 the company produced 1700 kg of finished output.

The position of stock and purchases for the month of September, 1990 is as under

Material	*Stock on 7-9-90*	*Stock on 30-9-90*	*Purchased during September, 90*	
	kg	*kg*	*kg*	*Cost*
A	35	5	800	Rs. 3400
B	40	50	1200	3000

Calculate the following variances :

(a) Materials price variance :

(b) Materials usage variance;

(c) Materials yield variance;

(d) Materials mix variance;

(e) Total materials cost variance.

Assume first in first out method for issue of material. The opening stock is to be valued at standard price.

Exercise:

1. State the meaning of standards and factors to be kept in mind while setting standards?
2. Write a short note on material variances?
3. Write a short note on labour variances?
4. Write a short note on Overhead variances?
5. Write a short note on sales variances?
6. State the procedure to reconcile budgeted profits with actual profits?
7. Write a short note on variance reporting?
8. State the procedure for disposal of variances?