Management Accounting
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Lec 32 Material Variances 1

Welcome students, so now we will discuss some problems with regard to the material variances and after knowing about the different formulas for calculating the different variances material variances, now we will have to calculate these variances learn about that in difficult situations in different problems how to calculate the different variances and how to find out the solutions to those variances. So, for example, these are some problems.

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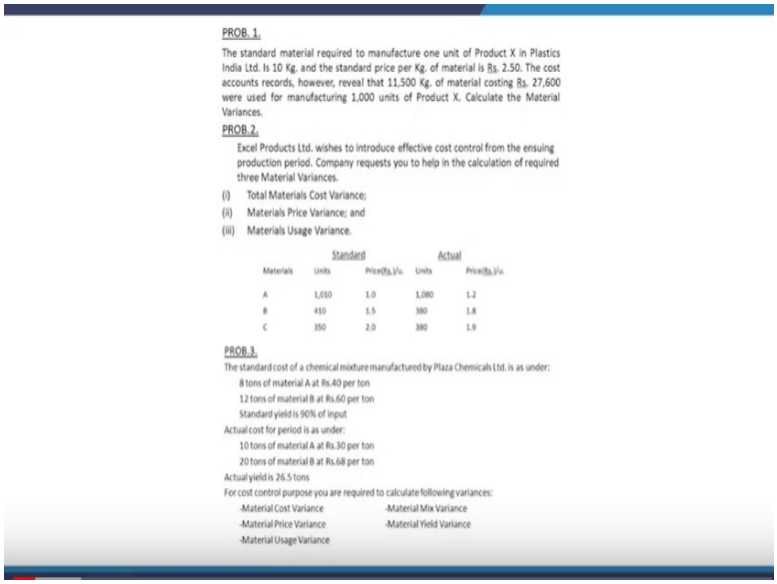

So, 3-4 problems I have found out which we will be covering almost all the aspects of all our material variances. First problem is very simple where we have to calculate only. Whatever information is given in the first problem only 3 variances can be calculated. So, we will calculate the 3 variances because it is not required all the times that from the given information all the 5 variances can be calculated. It is not necessary if the total information is available we can calculate maximum 5 variances right.

But if the information is not available for example the information with regard to the mixes is not available so you will calculate only the first three variances that is material cost, usage, and price variance right and if the mixes information is also available if the yield information is also

available then we will calculate the material, cost, price, usage, material mix, and the material yield variances.

So in this case, first case is very simple the problem, very simple case. In this case, so, for example, it is given here is that the standard material required to manufacture one unit of the product x in the plastic India limited is 10 kg and the standard price per kg of material is 2.5 rupees. 2 rupees and 50 paise. The cost accounts records, however, reveal that 11,500 kgs of material costing rupees 27,600 were used for manufacturing 1000 units of the product x right.

So, it means you are given the information like that is the standard information is given to us that is the 10 kgs of the standard material is required to manufacture the 1 unit of the finished product. So it means 1 unit of the finished product to manufacture the 1 unit of the finished product, that is product x, you need to have the 10 kgs of the material at the price of standard price of the material of 2.5 rupees per kg right and actually, it says that how much material has been used. Material used is 11, 500 kgs costing rupees 27, 600. So, how and what is the total production. The total production is 1 unit of the product x which have actually been produced.

Calculate the material variances. So, in this case, for example, you look at we are given only a very simple information. We are not given the information about the multiple materials. We are not given any information about the material mixes. We are not given any information about the material yield. No informations are available right. So, it means very simple information is that is only product x we want to manufacture, we require 10kgs of a material that is a standard for manufacturing the 1 unit of the finished product and how many units have been manufactured 1000 units of the finished product have been manufactured.

Standard price per unit is 2.5 per kg and now we have to find out the total variances means the three variances which can be calculated MCV, MPV, and MUV right. MCV, MPV, and MUV we will have to calculate these three variances. So, let us see how to calculate these three variances and for calculating these three variances let us now try to find out here as first so first of all what you have to do is you note down the information clearly and then you go for applying the formula for calculating the information.

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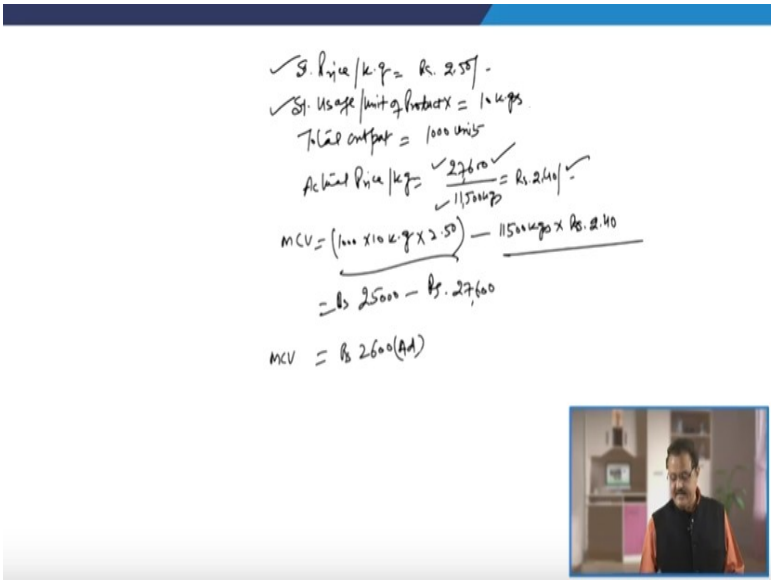

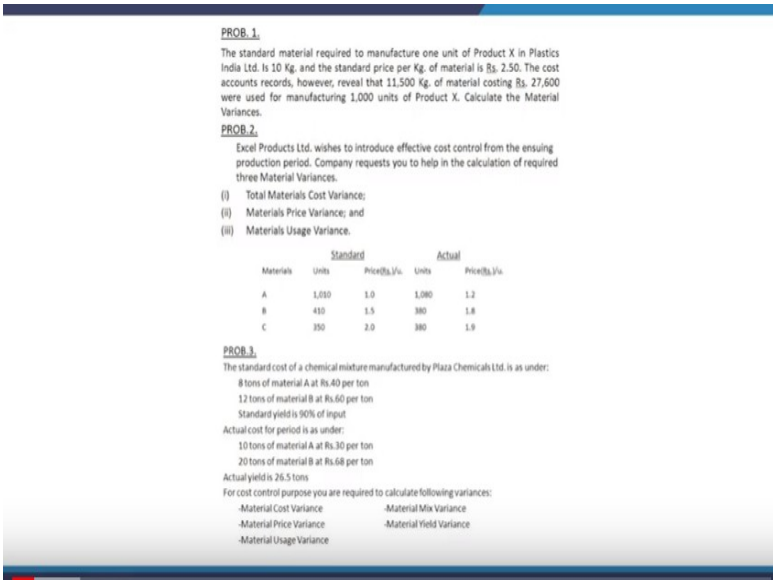

PROB. 1.

The standard material required to manufacture one unit of Product X in Plastics India Ltd. Is 10 Kg. and the standard price per Kg. of material is Rs. 2.50. The cost accounts records, however, reveal that 11,500 Kg. of material costing Rs. 27,600 were used for manufacturing 1,000 units of Product X. Calculate the Material Variances.

PROB.2.

Excel Products Ltd. wishes to introduce effective cost control from the ensuing production period. Company requests you to help in the calculation of required three Material Variances.

(i) Total Materials Cost Variance;
(ii) Materials Price Variance; and
(iii) Materials Usage Variance.

	Standard		Actual	
Materials	Units	Price(Rs.)/u.	Units	Price(Rs.)/u.
A	1,010	1.0	1,080	1.2
B	410	1.5	380	1.8
C	350	2.0	380	1.9

PROB.3.

The standard cost of a chemical mixture manufactured by Plaza Chemicals Ltd. is as under:

8 tons of material A at Rs.40 per ton
12 tons of material B at Rs.60 per ton
Standard yield is 90% of input

Actual cost for period is as under:

10 tons of material A at Rs.30 per ton
20 tons of material B at Rs.68 per ton

Actual yield is 26.5 tons

For cost control purpose you are required to calculate following variances:

-Material Cost Variance
-Material Price Variance
-Material Usage Variance
-Material Mix Variance
-Material Yield Variance

So what is the standard price per kg? Standard price per kg is which is given to us rupees 2.5 right and you can call it as standard usage, standard usage per unit. Standard usage per unit of product x. Standard usage per unit of product x is how much that is 10 kgs that is the requirement. Standard usage per unit of product x is is 10 kgs right. So, now we have to calculate is something like and what is the net production or the total production. Total output is 1000 units. Total output is 1000 units. So, it means now we have to find out the say something which

is not available in this case is what is not available standard price is available but the actual price per unit is not available.

So we have to find out that. First of all the actual price per kg. So, for calculating the actual price, actual price per kg what is the formula here that is how much is the actual material used 27600 kg right and how much is the sorry how much is the total cost means actual price. For calculating the actual price per kg what is the total cost. This is the 27,600 rupees worth of the material has been purchased and how much is the quantity that has been purchased. Quantity purchased is 11,500 kgs. So, it means what is the actual price per kg that is rupees 2.4; 2 rupees and 40 paise.

So you got to know all the informations. Standard price per kg is available, standard usage per unit of product x is available, then the total usage is also given to us that is 11,500 units, total cost of the material is also given to us that is 27, 600 units. One thing which was required is the actual price per kg of the input that was not available so we have found it out. Once, all these requirements. All this kind of information which was actually required. If it is available with us now then let us see how to calculate these variances.

So, for calculating these variances what we have to do here is that we have to go for calculating these variances and for calculating of these variances let us calculate the material cost variance. First of all material cost variance. What is the formula? Standard cost of material – actual cost of the material. So, what is the standard cost of the material? We are using 10,000 kgs of the material means how much material was required? 10kg input 10 kg of the input to manufacture the 1 unit of the finished product. So, how much is the finished product? 1000, so, 1000 into 10 that is the 1000 into 10 kgs and multiplied by what that is standard price is 2.5 rupees this is the one component.

Second is standard cost, this is the standard cost and what is the actual cost of the material? If you look at the actual cost of the material we have used the actual cost actual quantities 11,500 kgs and what is the price rupees 2.4 per kg. This is the price that is rupees 2.4 per kg, so this is price say so this becomes the standard cost, this becomes the actual cost. So, what is the standard cost now? If you multiply this, this becomes sorry this has not to be 10,000, this has to be 1000. It is 1000 units of the finished products we have manufactured. Requirement is the 10 kg. So, it

means in this case what we have to do is? We have to calculate the unit. 1000 into 10 kg multiplied by 2.5 – 11,500 kg which is given to us already and the actual price is 2.4. So, it means now what is the output here. What is the standard cost? Rupees 25000, rupees 25,000- rupees how much here if you multiply this 11,500 with 2.4 so it works out as already we have this cost available with us and this cost works out how much 27,600; 27,600.

So, it means now what is the material cost variance? Material cost variance here is that is it is how much it is 2600 rupees. 2600 adverse, you can write either adverse in the bracket or unfavorable in the bracket. This is the material cost variance. We have calculated from this information. Very simple information. You are given the output that is 1000 unit, you are given the standard input that is the 10kg for 1 unit so total input in terms of unit is 10,000 units. Price per unit is 2.5 and in the second case, we have got the actual information also.

Actual input given is the 11,500 kgs and the actual price that we have paid is rupees 2.4. So what has happened in case of standard the requirement was 10,000kg and the price was 2.5. In the actual what has happened input quantity has increased but the price per unit has decreased but still, the variance ultimately is negative that is 2600 rupees. Cost, material cost has gone up by 2600 rupees more than the standard cost. So, this means this is the variance which is adverse or which is unfavorable. Right, now first we will calculate all the variances and then we will try to find out the reasons for these variances.

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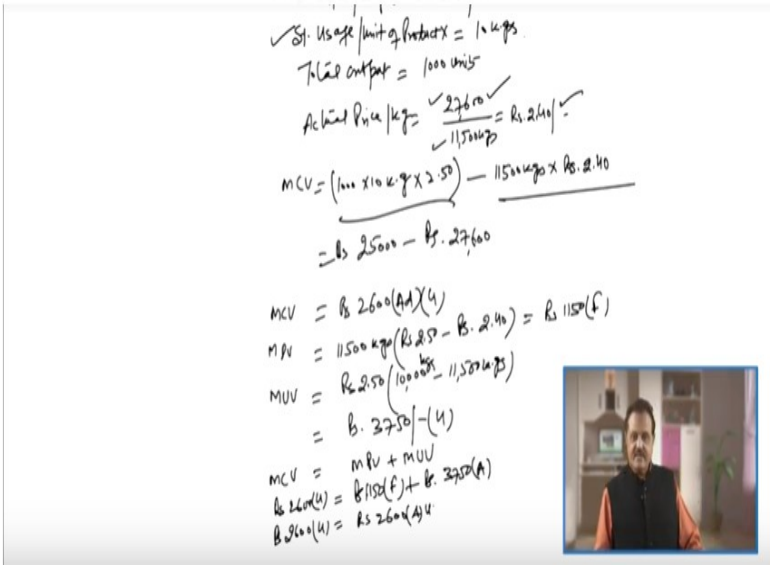

So, let us calculate the second variance. Material price variance. In case of the material price variance, what is the formula here given to us? The formula for the material price variance is actual usage. So, what is the actual usage here is 11500 kgs, 11,500 kgs and what is the inside the bracket. Standard price per unit. What is the standard price per unit? That is the rupees 2.5 – Rs.2.4; 2.5 –Rs.2.4. So, this is the variance. So, how it is a variance is. It is a variance of 10 paise and if you multiply by this, this works out is how much. This is equal to rupees. This works out as rupees 1150 and this variance is what. It is favorable or unfavorable because standard was more actual is less. So price variance we have paid here is that is the 1150 and this variance is favorable. This variance is favorable so it is 1150 is favorable. You can put F in the bracket.

So, price variance is favorable but the cost variance is negative so what is the reason here. Why it has become negative. Let us search the reason by calculating the material usage variance. So, for calculating this material usage variance what was the formula here. If you look at the formula given to us then the formula is standard price per unit, standard price per unit is how much rupees 2.5 into standard quantity is how much 10,000 and actual quantity is how much 11,500 kgs, 11,500 kgs. Now it shows this variance will be negative. Usage variance will be negative. So, how much extra material we have used here is 1500 units and total multiplying that extra 1500 units by 2.5 that works out as how much rupees 3750; 3750. This is the unfavorable variance or adverse variance.

So, now you will go for the comparison. You now verify the material cost variance is equal to material price variance + material usage variance. So what is the material cost variance? Material cost variance is rupees 2600 adverse that is equal to material price variance rupees 1150, favorable + rupees rupees 3750 adverse. So it means finally it becomes as favorable – adverse. So, this is equal to rupees 2600 unfavorable this is 1150 – 3750 that is equal to rupees 2600 adverse. So, there or you can call it as unfavorable. What is you want to call it as adverse or unfavorable?

So, we have proved it that your material cost variance is unfavorable by rupees 2600 and the material the sum of material price and the material usage variance are also means the sum of these two variances is also negative that is 2600 that is unfavorable or adverse. It means we have we can be sure about that whatever these 3 variances we have calculated. These 3 variances are

correct variances because you can apply the check also. Once, you calculate all these variances you have to now compare these variances with each other.

Material cost variance has to be is equal to material price variance + material usage variance and the material usage variance is equal to material mix variance and material yield variance. So, in a way, material cost variance will be equal to material price variance + material mix variance + material yield variance not usage variance but yield variance. So, either way, you can check it. You can apply the check and can find out whether your question is correct or not whether you have rightly calculated the variances or not and once you have calculated these variances, whether favorable or unfavorable. Now, we will have to find out the reasons for these variances.

Here, in this case, we have found out is material cost variance is negative by 2600 rupees. We have paid extra cost as compared to the standard cost by this amount of 2600 rupees right in this case right in this situation or in this case. Now, what can we do here? We have to find out the reasons for that. If you find out the reasons as I told you the cost is the function of price and quantity. If you look at the price variance individually this variance is positive, favorable. Standard price anticipated was rupees 2.5 per unit means it was allowed to be paid for the purchase of 1 unit of the raw material but actually the purchased department has used their own wisdom, their own efficiency, made some extra efforts and the actual price for the material paid for purchasing 1 unit of the material that is 2.4 that is they have saved for every kg of material they have saved 10 paise right.

So, it means this variance is favorable on the total purchase of the 11,500 kgs we have paid 10 paise less per kg of the material and there is a net saving of 1150 and this variance is favorable but the effect has been nullified by using more quantity of the material because anticipated or standardized quantity of the material was 10,000 kgs for manufacturing 1000 units of the finished product and we have utilized 11,500 kgs, 11,500 kgs against the standard requirement of 10,000 kgs. It means we have increased the usage by 1500 units. We have increased the usage by 1500 units and this is the bone of contention that your cost variance has become negative.

So, it may be possible, we have to find out the reasons that why the extra quantity of 1500 units have been used. It may be possible that when we reduce the price of the material from 2.5 per kg to 2.4 per kg it may be possible we have purchased the inferior quantity of the materials and

when you give the inferior inputs the outputs reduce, they go down. So, the purchase department has shown its efficiency by buying the material at a lesser price as compared to standard price but they bought the inferior quantity of the material which has shown its results in the production process. So, now we will have to find out that whose fault is it? Whether inferior quantity of the material was purchased just to show the false efficiency, pseudo efficiency by reducing the price, by 10 paise or the production department has caused more wastages. They have not used the material efficiently, meticulously and wastages have increased.

Who is responsible for this negative variance of the material cost by 2600 rupees that we have to look for, we have to find out. If the inferior quantity of the material was purchased, inferior quality of the material was purchased then the purchase department will be responsible. But, if the wastages have gone up then the production department, the processing department will be responsible and they will be fired for that. Action will be taken against them. Ultimately the objective is the variances should be not there and if they are there they should be within the permissible range.

So, we have to look for that this 2600 rupees of the material cost variance whether it is in the permissible range or beyond the permissible range. If it is within the permissible range no analysis is required. But, if it is beyond the permissible range, then the analysis will be done and whether the purchase department or the production department or the processing department will be held responsible and the action will be taken against the person who has caused this extra cost of the material by a sum of rupees 2600 right. So, you have to look for the causes and here the cause looks like that is the quantity used is more, price paid is less, so it means who is responsible for this negative variance. We will have to look for that and analyze these variances right.

Now, we will go for one more problem and if you do this problem again this is going to be a very simple problem and for solving this simple problem again we have to calculate these variances. So, look at this, the problem is.

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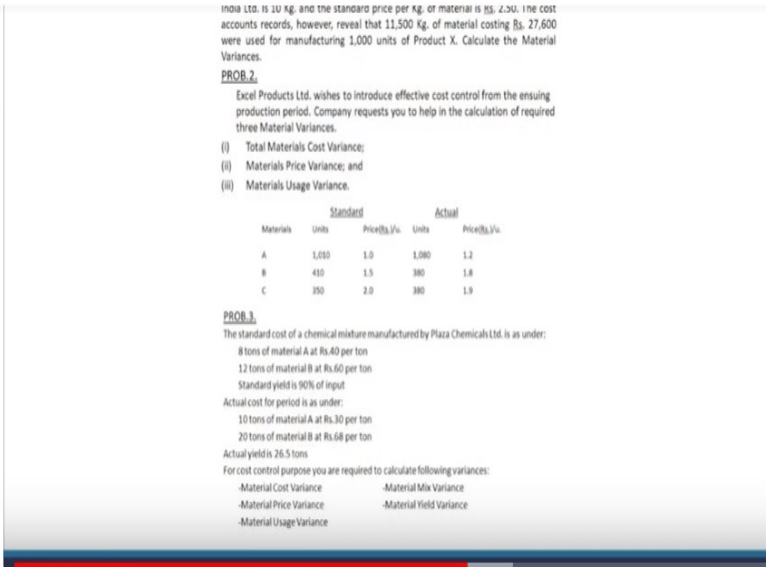

Now, you are given not the one type of material. You are given the three types of the materials that is A, B, and C and what is the actual problem given to us here is. The actual problem given to us is that Excel products Ltd. wishes to introduce effective cost control from effective ensuing production period. Excel products Ltd. wishes to introduce effective cost control from effective the ensuing production period. Company request to help in the calculation of required three material variances and the one is total material cost variance we have to calculate, material price variance, and the material usage variance. We have to calculate these three variances and they are only three variances which are possible to be calculated from this information and here are these information which is given to us about the standards and the about the actual we are given the three categories of the materials.

Inputs these are A, B, and C and the quantity estimated or standardized in terms of units is 1010 units of material A, 410 units of material B, 350 units of the product or the material C at the price of rupees 1, 1.5 and 2 rupees per unit. We have devised the standard at this quantity requirement and at this price. Now, the actual is that the actual quantity used is for A we have used 1080 against the standard requirement of 1010 and the price paid is also more that is 1.2 as against rupees 1 per unit. In case of B, 410 of standard units were required. We have used 380 units. So the material input has gone down but the price has further increased here in this case also from

1.5 per kg to 1.8 per kg and in case of the C here the standard requirement was 350 kgs and the price was rupees 2 per unit. Now the actual has gone up to 380 units and the price is 1.9 rupees per unit.

Now, this information is given to us and now we have to calculate these variances. So, what we will have to do in this case is. You have to calculate these variances product-wise. First, you will calculate the material cost variance for the product A, B, and C individually and then sum them up. Then we have to calculate the material price variances for A, B, and C, then sum them up and then we have to calculate the material usage variance for the material A, B, and C and then we have to sum up and after calculating these three variances material cost variance total, material price variance total, material usage variance total, sum them up and equate with each other and they should be equal to MCV should be equal to MPV and MUVand then we will have to found out whether these variances are positive or negative and then to find out the reasons for those variances.

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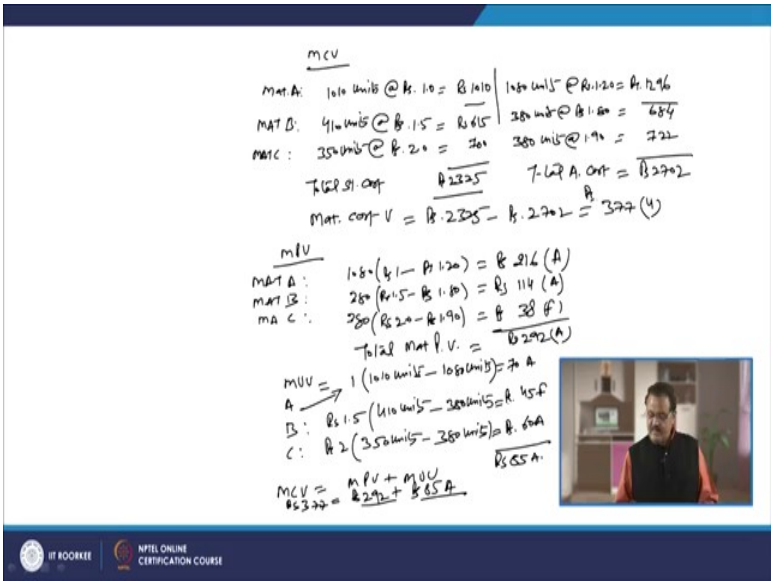

Now, let us do this problem. So, first of all, we have to calculate what that is the material cost variance and for calculating the material cost variance what we have to do here is for example first thing is material A. standard cost of material. How much is it in units? 1010 units at the rate of rupees how much. What was the rate given to us? Rupees 1. So, what is the standard cost here? Again rupees 1010 and after this what is the actual? Actual is 1080 units at the rate of, the

here the actual price we have paid is 1.2 so it means it is how much. This variance has come up as if you calculate this variance. This variance has come up as rupees how much. This is extra variance is how much or 1080 into 1.2 is. This works out as 1296 rupees 1296.

So, we have calculated this one is the standard cost is this and the actual cost is this which is available with us, these two costs right. Then, we calculate the standard cost for the material B, material B. What is the standard cost 410 units at the rate of rupees how much is the rate 1.5 per unit. So, this works out as how much? This is rupees 615. Here it is 380 units at the rate of what is the price 1.8 so how much is the total, actual cost 684 and in case of the material C now the cost is how much units 350 units at the rate of rupees how much, it is 2 and how much is the cost we have paid here is 700 and in this case it is 380 units 380 units at the rate of rupees this is the information 380 units at the rate of what, at the rate of 1.90 so this is how much, 722 right. So, now you total it up.

If you total it up so, the total standard cost, total standard cost is how much rupees 2325 and what is the total actual cost is equal to 2702; 2702, so it is, now you calculate the material cost variance, material cost variance is how much. This is finally going to be how much rupees 2325 – rupees 2702. So, this works out as how much, rupees 377 unfavorable. Rupees 377 unfavorable. This is the material cost variance.

Now, similarly, you can calculate the material price variance. We will calculate the material price variance. So, if you calculate the material price variance this way, for the material A, material B, and material C. What is the price variance here? Material price variance here you can calculate is that is how much units 1080 multiplied by the price and the price here is rupees 1 – rupees 1.2 so what is this variance. This is rupees 216. You calculate this variance. This works out as adverse or unfavorable.

In case of the B, how much 380 into rupees 1.5 – rupees 1.80 that is equal to rupees how much, this is the difference of how many 30 paise and the net difference comes out as rupees 114 this is again adverse and material C is 380 into finally rupees how much 2 – rupees 1.90 so this is working out as rupees 38 favorable. 38 favorable. So, you calculate the total, if you calculate it out how much it is. This two are adverse, two are adverse means how much. They are are 330 and – 38 so net is the total material price variance is equal to rupees 292 adverse right.

Now, we talk about the material usage variance. Material usage variance. Same way if you calculate the material usage variance what will be here it is 1 into 1010 units – 1080 units. It is the standard quantity – actual quantity. So it is how much it is going to be? It is going to be 70 rupees unfavorable adverse for the A right and this is for the A. Now for the B we will calculate for the B and for the B how much is it. It is rupees 1.5 into how much units 410 units – here units are 380 units.

So what is the variance here? This works out as 410-380 rupees price usage variance is rupees quantity variance here is 45 favorable and then it is C, C is how much rupees 2 multiplied by 350 units minus 380 units, 380 units. So this is the total variance is how much rupees 60 adverse. So, again, in this case also, you have got the variances like two are adverse one is favorable.

So, what is the final variance? This comes out to be 85 adverse right. Now, you calculate the with the check. Material cost variance is equal to material price variance + material usage variance. So, what is the material cost variance here it is rupees 377 is equal to rupees price variance was how much rupees 292 + it is 85 which are equal to total if you take up that total is equal to rupees 377. So, 377 is also adverse and these two are also adverse, so they are equal to each other.

So, material cost variance is equal to material price variance + material usage variance. So we have found out here that these variances are adverse, unfavorable variances and unfavorable variance that is the material cost variance unfavorable has come up because of the both. Material price and material usage variance has been unfavorable or adverse. So, we have to find out the reasons for this. Why these two variances material price and material usage have become adverse or unfavorable causing the material cost variance as unfavorable and correct those reasons.

So, these are the two problems which we did here. Try to solve out here and then one or two more problems I will discuss with you or solve out of this problem sheet in the next class and by that time you will be fully clear about that how to adjust the different kinds of the problems, how to deal with the different kinds of the problems with regard to the material variances and then any problem comes to you, you will be able to do that, you will be able to find out those variances and find out the reasons for that. So, for the more problems with regards to the material variances, we will do in the next class. Thank you very much.