**Question**

RT plc manufactures a chemical product and has operated a standard costing system to control the variable costs of the product.

The standard cost for the chemical product is:

|  |  |  |
| --- | --- | --- |
|  |  | £ |
| Direct materials A | 2 kg at £4 | 8.00 |
| Direct materials B | 4 kg at £3 | 12.00 |
| Direct labour | 2 hours at £12 per hour | 24.00 |
| Variable overheads | 2 hours at £7 per direct labour hour | 14.00 |

The company’s annual production budget is for 60,000 units produced evenly over the year.

The first quarter shows the following results:

Production volume was 14,000 units.

|  |  |
| --- | --- |
|  | £ |
| Direct materials A - 28,500 kg | 108,300 |
| Direct materials B – 56,000 kg | 168,000 |
| Direct labour – 29,000 hours | 319,000 |
| Variable overheads | 200,000 |
| Total variable production costs | 795,300 |

The management are modestly pleased with the actual results for the quarter. While some seem under control, others significantly differ from those set out in the standard costing system.

**Required:**

**a) Prepare a full variance analysis statement of the variable cost elements.**

**b) From the available information suggest possible explanations for the variances identified.**

**Answer**

**a)**

**Actual variable production costs = £**795,300

**Standard variable production costs**

**= Standard variable production costs per unit x Actual quantity produced**

**= £58 per unit x 14,000 units**

**= £812,000**

**Total variable production cost variance = £812,000 - £795,300 = £16,800 [favourable]**

**Calculation of variances**

**Direct materials cost variances: Direct materials USAGE variance + Direct materials PRICE variance**

**For direct material A**

**Direct materials USAGE variance**

**= [Standard usage – Actual usage] x Standard price**

= [14,000 units x 2 kg – 28,500 kg] x £4

= [28,000 kg – 28,500 kg] x £4

= 500 kg (Adverse) x £4

= £2000 (Adverse)

**Direct materials PRICE variance**

**= [Standard price – Actual price] x Actual quantity used**

**= [£4 x** 28,500 - £108,300]

= [£114,000 - £108,300]

**= £5700 [Favourable]**

**Direct materials cost variances**

**= Standard materials cost – Actual materials cost**

= £8 per unit x 14,000 units - £108,300]

= £112,000 - £108,300

= £3,700 [F]

**Proof: Direct materials cost variance**

**= Usage variance + Price variance**

**= £2000 (Adverse) + £5700 [Favourable] = £3700 [F]**

**For direct material B**

**Direct material cost variance**

**= Standard materials cost – Actual materials cost**

= £12 x 14,000 units - £168,000

= £168,000 - £168,000

**= 0 or nil variance**

**Material Price variance**

**= [Standard price – Actual price] x Actual quantity used**

= £3 x 56,000 kg - £168,000

= £168,000 - £168,000

**= 0 or nil variance**

**Material Usage variance**

**= [Standard usage – Actual usage] x Standard price**

= [4 kg x 14,000 units – 56,000 kg] Standard price

= [56,000 kg – 56,000 kg] x £3

**= 0 or nil variance**

**For direct labour**

**Direct labour efficiency variance**

**= [Standard hours – Actual hours] x Standard rate**

= [14,000 units x 2 standard hours per unit – 29,000 hours] £12 per hour

= [28,000 standard hours – 29,000 hours] x £12

**= £12,000 [A]**

**Direct labour rate variance**

**= [Standard rate – Actual rate] x Actual hours**

= [£12 per hour x Actual hours – Actual rate x Actual hours

= £12 x 29,000 hours - £319,000

= £348,000 - £319,000

**= £29,000 [F]**

**Direct labour cost variance {Rate variance + Efficiency variance = £29,000 [F] + £12,000 [A] = £17,000 [F]}**

**= Standard labour cost – Actual labour cost**

= £24 per unit x 14,000 units - £319,000

= £336,000 - £319,000

**= £17,000 [F]**

**For variable overhead cost**

**Variable overhead cost variance**

**= Standard variable overhead cost – Actual variable overhead cost**

= £14 per unit x 14,000 units - £200,000

= £196,000 - £200000

**= £4000 [A]**

**Variable overhead efficiency variance**

**= [Standard hours – Actual hours] x Standard variable overhead rate**

= [14,000 units x 2 standard hours per unit – 29,000 hours] x £7

= [28,000 standard hours – 29,000 hours] x £7

**= £7000 [A]**

**Variable overhead expenditure variance**

**= [Standard rate – Actual rate] x Actual hours**

= [£7 x 29,000 hours - £200,000]

= £203,000 - £200,000

**= £3000 [F]**

**Variance analysis statement of the variable cost elements for the first quarter**

|  |  |
| --- | --- |
|  | **£** |
| **Standard variable production costs** | **812,000** |
| **[14,000 units x £58]** |  |
| **Direct materials A** |  |
| **Price variance** | **5700 [F]** |
| **Usage variance** | **2000 [A]** |
| **Direct materials B** |  |
| **Price variance** | **0** |
| **Usage variance** | **0** |
| **Direct labour** |  |
| **Rate variance** | **29,000 [F]** |
| **Efficiency variance** | **12,000 [A]** |
| **Variable production overheads** |  |
| **Expenditure** | **3000 [F]** |
| **Efficiency** | **7000 [A]** |
| **Total variable production cost variance** | **16,700 [F]** |
| **Actual variable production cost** | **795,300** |

**Total favourable variance = £37,700**

**Total adverse variance = £21,000**

**Total variance = £16,700 [F]**

**b) From the available information suggest possible explanations for the variances identified.**

**Direct materials price variance**

**Adverse -------** Better quality materials costs; careless purchasing management; purchased substitute materials with a higher price

**Favourable ---** Lower quality materials**;** Efficient purchasing management; bulk discounts; new contract with the existing/new supplier with a lower purchase price; took advantage of promotions in the market for the material; purchased substitute materials with a lower price

**Direct materials usage variance**

**Adverse. ----- Low quality materials [excessive/abnormal wastage; the use of trainees on the production floor has produced abnormal wastage**

**Favourable----- better quality materials [savings in usage/ less than normal wastage; better trained workforce has reduced normal wastage**

**Direct labour rate variance**

**Adverse: Hired better skilled workforce; Union representatives negotiated a better rate with the management**

**Favourable: Hired trainees at lower rates.**

**Direct labour efficiency variance**

**Adverse – Trainees hired require more time on the production floor; lack of proper supervision; low quality materials with excessive wastage**

**Favourable – Better skilled workforce; Good/effective supervision; better quality materials**

**Variable overhead expenditure variance [indirect materials, indirect labour & indirect expenses]**

**Adverse – requires an examination of the individual overheads where more money was spent**

**Favourable - requires an examination of the individual overheads where less was spent**

**Variable overhead efficiency variance [usually related to labour efficiency]**