

TRADE AND CASH DISCOUNT

Prepared by:

Mathematical Science Department

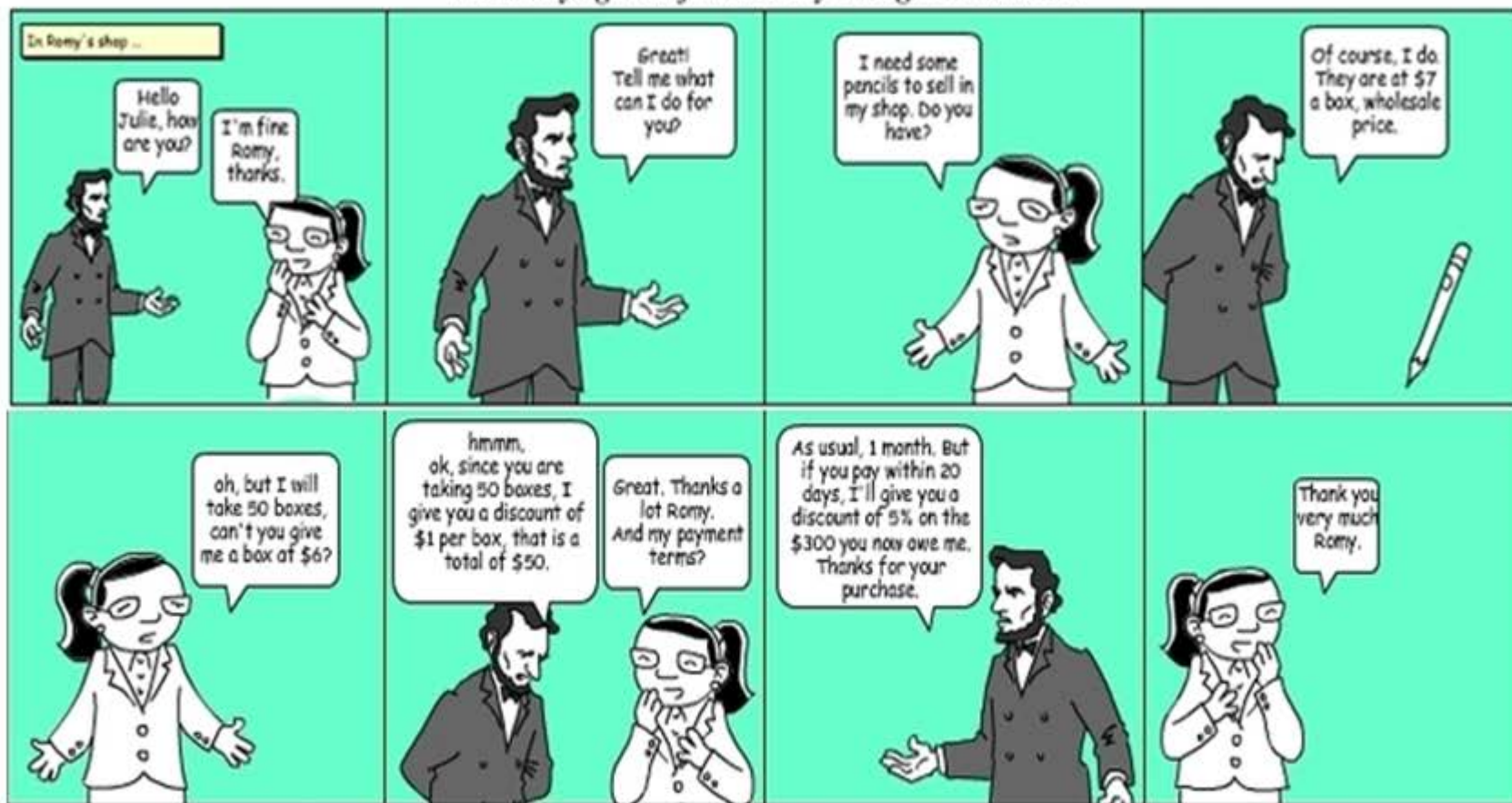
LEARNING OUTCOMES

By the end of this chapter, student should be able to :

- explain trade discount terms,
- calculate trade discount and the net price of goods purchased,
- explain chain discount,
- find a single discount that is equivalent to a chain discount,
- explain cash discount terms,
- identify situations where a trader can take a loan to take advantage of cash discounts, and
- solve problems involving trade and cash discounts.

SITUATION OF TRADE DISCOUNT

Julie buys goods from Romy and gets discounts

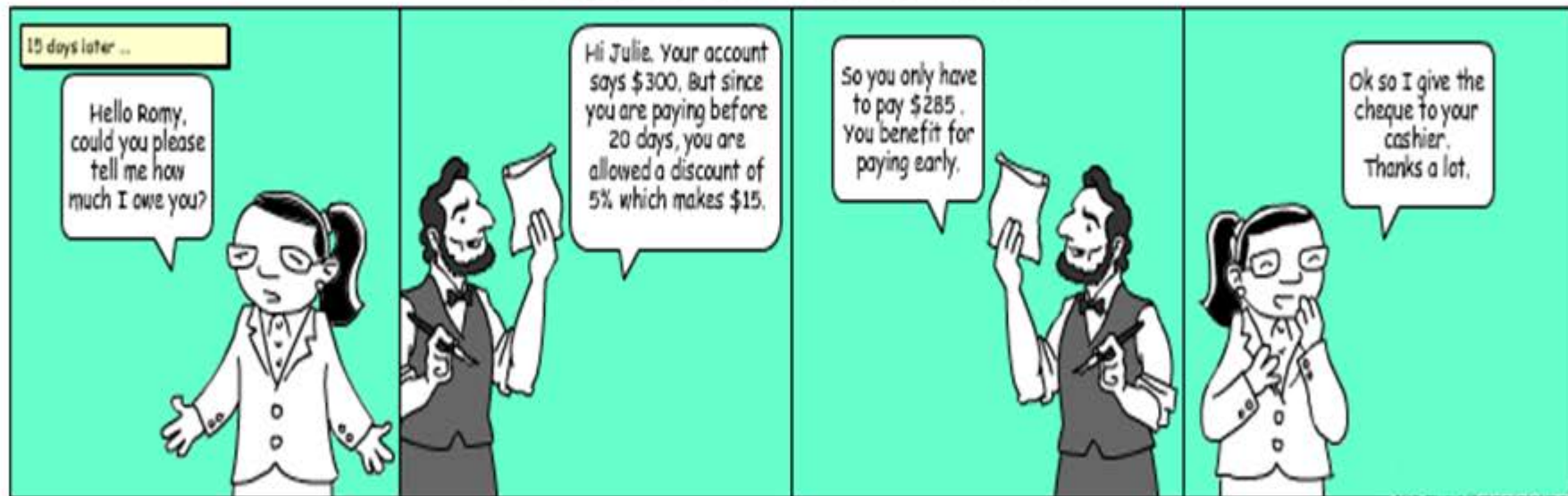


Created by Nayaz on <http://www.makebeliefscomix.com>

<http://principlesofaccounts.weebly.com>

SITUATION FOR CASH DISCOUNT

Julie pays Romy and receives a discount



Created by Nayaz on <http://www.makebeliefscomix.com>

<http://principlesofaccounts.weebly.com>

TRADE DISCOUNT PROCESS



BASIC CONCEPT OF TRADE DISCOUNT

- Net price = The prices that retailers pays after the reduction in prices.
- Trade discount = The different between the list price and the net price.

$$\text{TRADE DISCOUNT} = \text{LIST PRICE} - \text{NET PRICE}$$
$$\text{TD} = \text{LP} - \text{NP}$$

- A manufacturer quotes a discount rate in percentage to the retailer.
- This is called trade discount rate and must be calculated on the list price.

$$\text{AMOUNT OF TRADE DISCOUNT} = \text{LIST PRICE} \times \text{TRADE DISCOUNT RATE}$$
$$\text{TD} = \text{LP} \times d$$

Example 1

The list price of handbag is RM1200. A trade discount of 40% is offered.
What is the net price of the handbag?

$$\text{List price} = \text{RM}1200$$

$$\begin{aligned}\text{Trade discount} &= 40\% \times \text{RM}1200 \\ &= \text{RM}480\end{aligned}$$

$$\begin{aligned}\text{Net price} &= \text{List Price} - \text{Trade Discount} \\ &= \text{RM}1200 - \text{RM}480 \\ &= \text{RM}720\end{aligned}$$

As an alternative method discussed earlier, this formula can be used to find the net price.

$$NP = LP(1 - d)$$

The derivation from this formula is:

Let, Net price = NP

List price = LP

Trade discount rate = $d\%$

From Net Price = List Price – Trade Discount, thus we get

$$NP = LP - LPd$$

$$NP = LP(1 - d)$$

Example 2

A bill of RM500 including prepaid handling charge of RM50 is offered a trade discount 15%. What is the net price?

Solution:

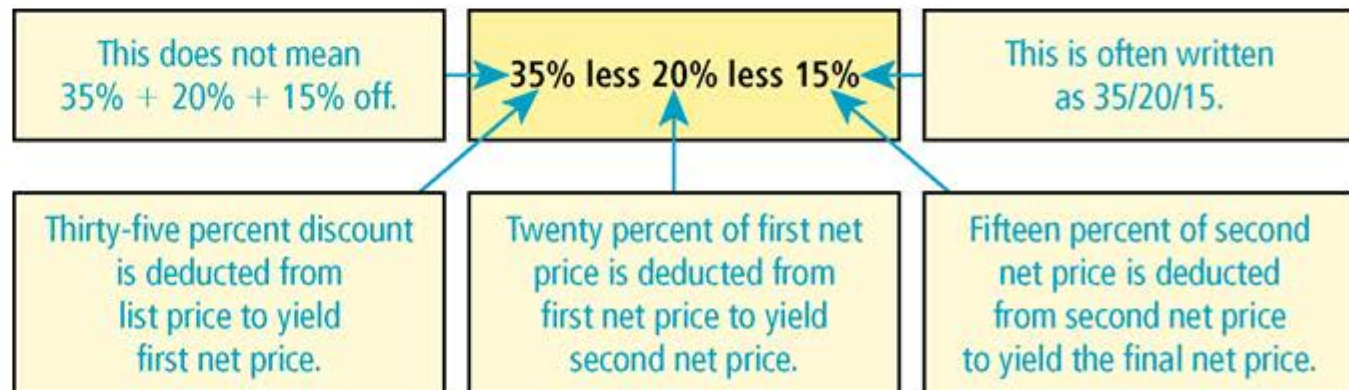
$$\text{Trade discount} = 0.15 \times \text{RM}450 = \text{RM}67.50$$

(It should be noted that the discount is based on the cost of the goods, excluding any other costs.)

$$\begin{aligned}\text{Net price} &= (\text{RM}450 - \text{RM}67.50) + \text{RM}50 \\ &= \text{RM}432.50\end{aligned}$$

CHAIN DISCOUNT

- Prices of goods may go up and down within a time of period due to supply and demand.
- As such, multiple discounts are offered to the retailers on the same goods by the manufacturers or wholesalers.
- For example, a wholesaler may offer trade discounts of 35%, 20% and 15%.
- These multiple discounts are called as chain discount or series discount.
- In a chain discount, each discount rate is calculated on the successive net amount as illustrated in the diagram.



NET PRICE OF CHAIN DISCOUNT

We can calculate the final Net Price of a chain discount directly. For example, as an item listed at LP ringgit less a trade discount of $d_1\%$, $d_2\%$ and $d_3\%$, the net price is given by:

$$NP = LP(1 - d_1)(1 - d_2)(1 - d_3)$$

If there are only two discount rates, $d_1\%$ and $d_2\%$ in the chain discount, the formula becomes: $NP = LP(1 - d_1)(1 - d_2)$.

Example 3 (October 2016)

Ali bought a computer listed at RM5,000. He was given trade discounts of 20%, 10% and 5%. Find the net price of the computer.

From

$$NP = LP(1 - d_1)(1 - d_2)(1 - d_3),$$

we get

$$\begin{aligned}\text{Net price} &= 5,000(1 - 20\%)(1 - 10\%)(1 - 5\%) \\ &= 5,000(0.8)(0.9)(0.95) \\ &= \text{RM}3,420\end{aligned}$$

Alternatively, the net price can be obtained by calculating the trade discount at each stage as follows.

List price	= RM5,000
Less 20%: $0.2 \times \text{RM}5,000$	= <u>1,000</u> –
	4,000
Less 10%: $0.1 \times \text{RM}4,000$	= <u>400</u> –
	3,600
Less 5%: $0.05 \times \text{RM}3,600$	= <u>180</u> –
Net price	= <u>RM3420</u>

SINGLE DISCOUNT EQUIVALENT TO CHAIN DISCOUNT (SDER)

- Means a single discount which is equivalent to a chain discount.
- The single discount equivalent $SEDR$, for a chain discount of $d_1\%$, $d_2\%$ and $d_3\%$, given by

$$SEDR = 1 - (1 - d_1)(1 - d_2)(1 - d_3)$$

Example 4

A wholesaler gives trade discounts 20%, 10% and 3% to his regular customers. Find the single discount equivalent to the given trade discounts.

Solution

From the *Single Discount Equivalent* formula:

$$\begin{aligned} SEDR &= 1 - (1 - d_1)(1 - d_2)(1 - d_3), \text{ we get} \\ &= 1 - (1 - 0.2)(1 - 0.1)(1 - 0.03) \\ &= 1 - 0.6984 \\ &= 0.3016 \text{ or } 30.16 \% \end{aligned}$$

CASH DISCOUNT

- Wholesalers, manufactures and even retailers offer reductions on the amount due to customers who pay their bills within a stipulated period of time.
- The credit terms which comprise the cash discount rate and the credit period are usually shown in the invoice.
- For instance, a supplier offer terms 5/10, n/20 which means that a 5% discount is given for payment within 10 days or the full payment is due in 20 days from the date of the invoice.
- Most business-to-business transactions begin with a purchase order from the buyer that identifies the goods ordered, the agreed upon price, and delivery terms.
- The purchase order may be written or verbal. After the order is filled, the seller issues a sales invoice. Both documents include the details of the purchase.


CASH DISCOUNTS

- Businesses frequently offer cash discounts as a way to encourage their business customers to **pay their invoices early**. Cash discounts are figured on the invoice price that is shown on the invoice as the **total due**. The terms of sale tell how much of a discount will be given.
- Due Date: To find the due date of the invoice and the last day for receiving a discount, count ahead, from the date on the invoice, the number of days shown in the terms. Buyers who do not pay their bills by the due date may be **charged interest** on the amount owed or a late payment fee.

TERMS OF THE SALE

- Terms of sale specify **how** and **when** an invoice will be paid. Usually businesses sell to other businesses on account. This means the customer will be billed later for purchases.
- The time a purchaser has to pay a bill, usually 30 to 90 days, is called the **credit period**. The credit terms which comprise the cash discount rate and the credit period are usually shown in the invoice.
- For instance, a supplier offer terms 5/10, n/20 which means that a 5% discount is given for payment within 10 days or the full payment is due in 20 days from the date of the invoice.

SAMPLE OF INVOICE

 BARBER SHOP SUPPLY 987 Industrial Blvd., Chicago, IL 12345				
Bill To: Tomas Mueller		Invoice #88765		
Hair Port Landing 111 Style Lane, Suite 15 Dallas, TX 99889				
P.O. NUMBER	INVOICE DATE	F.O.B. POINT	TERMS	
66554f8	MAY 11, 20X4	Dallas	2/10, n/30	
QTY.	PART #	DESCRIPTION	UNIT PRICE	TOTAL
4	A7786	Full Length Mirrors	\$ 90	\$ 360
1	C8876	Swivel Chair -- Brown Leather	370	370
1	M8776	Barber Pole Motor and Light Kit	140	140
4	T8870	Black Floor Mats	20	80
1	V9076	Small Shop Vacuum	50	50
Subtotal				\$1,000
Freight				-
THANK YOU FOR YOUR BUSINESS! TOTAL				\$1,000

Remit payment to:		Original invoice: GB4302			
Everyday Textures 2382 Bingham Road Fremont, OH 43420					
Shipping: <i>FOB Fremont</i>					
Sold to: <i>Farwell Paints</i>			Ship to: <i>Same address</i>		
231 Grove Avenue Clyde, OH 43410					
Refer to:					
	Order Number	Date Entered	Date Shipped	Invoice Date	Terms of Sale
	56827	06/07/20--	06/07/20--	06/10/20--	2/10, 1/30, n/60
Quantity	Unit	Description	Unit Price	Amount	
36	each	Brush, Nylon, 2 inch	2.90	104.40	
48	each	Brush, Bristle, 3 inch	4.52	216.96	
12	each	Ladder, wood, 6-foot	42.67	512.04	
50	pkg	Painting gloves, latex	3.84	192.00	
Total Due				\$1,025.40	
BUSINESS MATH © Thomson-South-Western Lesson 12.2 Slide 3					

CASH PRICE

If the customer **pays the invoice within the discount period** and deducts a cash discount from the invoice price, the amount paid is called the cash price

Example 5 (March 2016)

A washing machine that cost RM3,000 is given a trade discounts of 20% and 15%. A further 3% cash discount will be given if it is paid within 5 days. Find the total discounts obtained if the payment is made within the cash discount period.

From the formula $NP = LP(1 - d_1)(1 - d_2)(1 - c)$, where c = cash discount

Hence, we get

$$\begin{aligned} NP &= 3000(1 - 20\%)(1 - 15\%)(1 - 3\%) \\ &= 3000(0.8)(0.85)(0.97) = \text{RM}1,978.80 \end{aligned}$$

$$\begin{aligned} \text{Net Price} &= \text{List Price} - \text{Total Discount, so} \\ \text{Total Discount} &= \text{List Price} - \text{Net Price} \\ &= \text{RM}3000 - \text{RM}1978.80 \\ &= \underline{\text{RM}1021.20} \end{aligned}$$

Note: The new NP obtained after deducting the cash discount is sometime called as the cash price excluding any additional charges. The cash price including all the additional charges (packaging, transportation, etc.) is called **Net Payment** or **Total Amount Paid**.

Trade Discount vs. Cash Discount

Trade Discount

- Discount (reduction) off list price granted to good customers
- Usually a high discount % (i.e. 30%, 40%, 50%, 60%)
- List price minus the trade discount equals the Net Invoice amount
- Record the Net Invoice amount only
- No G/L account for the Trade Discount (not recorded)

Cash Discount

- Discount offered for early payment on invoice
- Terms of purchase – 2/10, n/30
- Take 2% off if paid in 10 days or pay full balance in 30 days
- Recorded as a **Purchase Discount**
 - Contra account to Purchases
 - It has a 'Credit' balance

Trade discount	Cash Discount
1. It is a reduction granted by a supplier from the list price on goods	1. It is a reduction granted from the invoice price in consideration of immediate payment .
2. It is done to promote the sales	2. It is done to encourage early or prompt payment
3. Its entry is not done in the books of accounts.	3. It is shown as an expense in profit and loss account.
4. It vary with the quantity purchased	4. It varies with the period.

Example 6 (included transportation cost and other charges)

An invoice dated 11 March 2016 for RM5,300 inclusive of RM500 transportation charge was paid on 31 March 2016. If the trade discount were 20% and 15%, and the discount terms were 5/10, 4/30, n/60, find

- The trade discount offered
- The cash discount if entitled
- The amount of payment.

SOLUTION

a) Two methods:

i) Find the single discount equivalent:

$$r = 1 - (1 - 0.2)(1 - 0.15) = 0.32$$

$$\begin{aligned} \text{Trade discount offered} &= LP \times d \\ &= (5,300 - 500) \times 0.32 \\ &= \text{RM1,536} \end{aligned}$$

or,

$$\begin{aligned} \text{ii) } NP &= LP (1 - d_1)(1 - d_2) \\ &= (5300 - 500)(1 - 0.2)(1 - 0.15) = \text{RM3264} \\ TD &= LP - NP \\ &= (5300 - 500) - 3264 = \text{RM1,536} \end{aligned}$$

b) Cash discount

$$\begin{aligned} &= 3264 \times 0.04 \\ &= \text{RM130.56} \end{aligned}$$

c) Amount of payment

Two methods

$$\begin{aligned} \text{i) List Price} - \text{Amount of Trade Discount} - \\ \text{Amount of Cash Discount} \\ + \text{Transportation Cost} \\ &= 5300 - 500 - 1536 - 130.56 + 500 \\ &= \text{RM3,633.44} \end{aligned}$$

or,

$$\begin{aligned} \text{ii) Net Price} &= LP (1 - d_1)(1 - d_2)(1 - c) \\ &\quad + \text{Transportation cost} \\ &= (5300 - 500)(1 - 0.2)(1 - \\ &\quad 0.15)(1 - 0.04) + 500 \end{aligned}$$

$$= \text{RM3,633.44}$$

Note:

- remember, the list price **MUST NOT** include any additional cost or charges
- use Net Price after trade discount to calculate the cash discount
- the Cash Discount rate is 4% because, it takes 20 days (31/3-11/3) to paid the invoice
- the final amount paid must include all additional charges

Example 7

100 copies of IT books are purchased at RM69 each. The trade discounts given are 12% and 8%. The cash discount terms on the invoice are 5/10 and n/30.

- i) Determine the single trade discount rate that is equivalent to the given trade discounts.
- ii) Calculate the amount of payment to be made if the payment was made one week after the date of invoice.

SOLUTION

$$\begin{aligned}
 \text{i) } SEDR &= 1 - [(1 - d_1)(1 - d_2)] \\
 &= 1 - [(1 - 0.12)(1 - 0.08)] \\
 &= 1 - 0.8096 \\
 &= 0.1904 @ 19.04\%
 \end{aligned}$$

$$\text{ii) } LP = 100 \times 69 = \text{RM } 6900$$

Paid 1 week after date of invoice,
entitled for 5% cash discount

$$\begin{aligned}
 NP &= LP(1 - d_1)(1 - d_2) \\
 &= 6900(1 - 0.1904)(1 - 0.05) \\
 &= \text{RM}5306.93
 \end{aligned}$$

Amount of payment = RM5,306.93



Example 8

A salon owner buys 50 bottles of shampoo and receives an invoice of RM2550 including transportation cost of RM250. The date of invoice is 15 August 2016 and the cash discount term is 10/10, 8/20, n/30. If he receives trade discounts 7% and 5%, find

- i) The net price after trade discounts
- ii) the net payment if payment is made on 31st August 2016

SOLUTION

$$i) LP = 2550 - 250 = RM2300$$

$$\begin{aligned} NP &= LP(1 - d_1)(1 - d_2) \\ &= 2300(1 - 0.07)(1 - 0.05) \\ &= RM2,032.05 \end{aligned}$$

- ii) Pay on day 16 (31-15), entitled to get 8% cash discount.

$$\begin{aligned} NP &= LP(1 - d) \\ &= 2032.05(1 - 0.08) \\ &= RM1869.49 \end{aligned}$$

$$\begin{aligned} \text{Net payment} &= 1869.49 + 250 \\ &= RM2119.49 \end{aligned}$$



Exercises

Q1. Explain the cash discount terms 10/15, 5/20, n/30.

Ans :

10% cash discount received if payment made within the first 15 days of the invoice date. 5% cash discount received if payment made between day 16 to day 20. Full payment need to be paid by 30th day.

Q2. An invoice of RM4,500 and dated 23 July 2016 is offered 6% trade discount and cash discount terms of 9/10, n/30. Find the net payment if the invoice is paid on 29 July 2016.

Ans : RM3849.30

Q3. The total of an invoice with cash discount terms 5/10, n/30 amounts to RM2,200 which excludes a prepaid freight charge of RM200. Find the amount that is needed to pay the invoice within the cash discount period.

Ans : RM2290

SUMMARY

- Trade discount (TD) = List price (LP) – Net price (NP)

$$NP = LP - TD$$

- For single discount,

$$NP = LP (1-d)$$

- For chain discounts, d_1, d_2, d_3

$$NP = LP (1-d_1)(1-d_2)(1-d_3)$$

- Single discount equivalent (SEDR) for chain discount of d_1, d_2 and d_3 is

$$SEDR = 1 - [(1-d_1)(1-d_2)(1-d_3)]$$

- Cash discount 3/10, 2/20, n/30 means 3% of the net price may be deducted if the invoice is paid within ten days of the invoice date, 2% may be deducted if the invoice is paid between the 11th and 20th day, and the full amount must be paid by the 30th day.

SUMMARY

Discounts (trade and cash) are applied only on price of the goods (LP) not on the charges.

Amount to be paid/ Total payment/Net payment
= Net price + charges

Note : Aware the word of 'including' or 'excluding'
including --> LP - minus the charges
excluding --> LP - as given

Key Words to Know

list price - The price at which a business generally sells an item, also called the catalog price.

trade discount - A discount off the list price of an item.

trade discount rate - The amount of the discount of an item expressed as a percent of the list price.

net price - The price actually paid for a discounted item.

complement method - A way to find the net price of a discounted item by subtracting the discount rate from 100 percent.

chain discounts - A series of trade discounts a supplier may offer to sell out a discontinued item or to encourage a customer to place a larger order.

net price rate - The percent of the price paid for an item, found by multiplying the complements of the chain discounts.

single equivalent discount rate (SEDR) - One discount that is equal to a chain discount.

invoice - A bill listing the quantities and costs of items purchased.

cash discount - A discount a supplier grants if a bill is paid within a certain number of days.

ordinary dating - Terms of payment by a supplier which grants a cash discount if a bill is paid within a certain number of days.

