

Chapter - 5  
Profit, loss and discount

Formulas of Profit and Loss

1.  $CP > SP$

$$\text{Loss} = CP - SP$$

2.  $SP > CP$

$$\text{Profit} = SP - CP$$

3.  $\text{Profit}\% = \frac{\text{Profit} \times 100}{CP}$

4.  $\text{Loss}\% = \frac{\text{Loss} \times 100}{CP}$

5.  $SP = \frac{CP \times (100 + P\%)}{100}$

6.  $SP = \frac{CP \times (100 - L\%)}{100}$

7.  $CP = \frac{SP \times 100}{100 + \text{Profit}\%}$

8.  $CP = \frac{SP \times 100}{100 - \text{Loss}\%}$

WS-1

Q1: SP of bedsheet = ₹640  
 Profit% = 28%

$$CP = \frac{S.P \times 100}{100 + P\%}$$

$$C.P = \frac{640 \times 100}{100 + 28}$$

$$= \frac{640 \times 100}{128}$$

$$= ₹500$$

∴ CP of Bedsheet = ₹500

Q2: CP of 1 Packet = ₹8

CP of 250 packets = ₹8 × 250 = ₹2000

70% of 250 =  $\frac{70}{100} \times 250 = 175$  packets

SP of 1 packet = ₹11

SP of 175 packets = ₹11 × 175 = ₹1925

Remaining packets = 250 - 175 = 75

∴ SP of 1 packet = ₹9

SP of 75 packets = ₹9 × 75 = ₹675

Total SP = ₹1925 + 675 = ₹2600

Total CP = ₹2000

$$S.P > C.P$$

$$\text{Profit} = SP - CP$$

$$= ₹2600 - 2000$$

$$= ₹600$$

$$\text{Profit}\% = \frac{\text{Profit} \times 100}{C.P}$$

$$= \frac{600 \times 100}{2000}$$

$$= 30\%$$

$$\therefore \text{Profit}\% = 30$$

Q3: SP of 1 Jean = ₹990

Case I

Gain% = 10%

$$CP = \frac{SP \times 100}{100 + P\%}$$

$$= \frac{990 \times 100}{100 + 10}$$

$$= \frac{990 \times 100}{110}$$

$$CP = ₹900$$

Case II

Loss% = 10%

$$CP = \frac{SP \times 100}{100 - L\%}$$

$$= \frac{990 \times 100}{100 - 10}$$

$$= \frac{990 \times 100}{90}$$

$$CP = ₹1100$$

$$\text{Total CP} = ₹900 + 1100 = ₹2000$$

$$\text{Total SP} = 2 \times 990 = ₹1980$$

CP > SP, There is loss

$$\text{Loss} = CP - SP$$

$$= ₹2000 - 1980$$

$$= ₹20$$

$$\text{Loss \%} = \frac{\text{Loss} \times 100}{\text{CP}}$$

$$= \frac{20 \times 100}{2000}$$

$$= 1\%$$

$$\therefore \text{Loss} = 1\%$$

Q4: CP of 1 Saree = ₹ 2150

$$\text{Loss \%} = 8\%$$

$$\text{SP of 1 Saree} = \frac{\text{CP} \times (100 - \text{Loss \%})}{100}$$

$$= \frac{2150 \times (100 - 8)}{100}$$

$$= \frac{2150 \times 92}{100}$$

$$= 1978$$

$$= ₹ 1978$$

$$\text{SP of 1 saree} = ₹ 1978$$

$$\text{Total gain} = ₹ 1230$$

$$\text{Total CP} = 2150 \times 2 = ₹ 4300$$

$$\text{Total SP} = \text{Total CP} + \text{Total Profit}$$

$$= 4300 + 1230$$

$$\text{Total S.P} = ₹ 5530$$

$$\therefore \text{selling Price of 2nd saree} = \text{Total SP} - \text{SP of 1st saree}$$

$$= 5530 - 1978$$

$$= ₹ 3552$$

$$\therefore \text{SP of 2nd Saree} = ₹ 3552$$

Q5: Let SP of 1 card = ₹1

SP of 35 cards = ₹35

loss = S.P. of 5 cards

$$\text{loss} = 1 \times 5 = ₹5$$

CP = SP + loss

$$35 + 5$$

$$\text{CP} = ₹40$$

$$\text{loss \%} = \frac{\text{loss} \times 100}{\text{C.P}}$$

$$= \frac{5 \times 100}{40}$$

$$= \frac{25}{2} = 12 \frac{1}{2} \%$$

$$\text{loss } 12 \frac{1}{2} \%$$

Q6: CP of 10 bananas = ₹45

CP of 1 banana =  $\frac{₹45}{10} = ₹4.5$

1 dozen

SP of 12 bananas = ₹51

SP of 1 banana =  $\frac{₹51}{12} = ₹4.25$

Since CP > SP

$$\begin{aligned} \text{loss} &= \text{CP} - \text{SP} = ₹4.50 - ₹4.25 \\ &= ₹0.25 \end{aligned}$$

$$\text{L.P.} = \frac{\text{L}}{\text{CP}} \times 100 = \frac{0.25}{4.50} \times 100 = \frac{25}{450} \times 100$$

$$\text{loss} = \frac{50}{9} = 5 \frac{5}{9} \%$$

## ★ Formulas of Discount

$$\rightarrow \text{Discount} = \text{MP} - \text{SP}$$

$$\rightarrow \text{SP} = \text{MP} - \text{D}\%$$

$$\rightarrow \text{D}\% = \frac{\text{D}}{\text{MP}} \times 100$$

$$\rightarrow \text{SP} = \frac{\text{MP}(100 - \text{D}\%)}{100}$$

$$\rightarrow \text{MP} = \frac{\text{SP} \times 100}{100 - \text{D}\%}$$

WS-2

Q1:  $\text{MP} = ₹ 1250$

$$\text{D} = 8\%$$

$$\text{D} = 8\% \text{ of } 1250$$

$$= \frac{8}{100} \times 1250$$

$$\text{D} = ₹ 100$$

$$\text{SP} = \text{MP} - \text{D}$$

$$\text{SP} = 1250 - 100$$

$$= ₹ 1150$$

So discount is ₹ 100

$$\text{SP} = ₹ 1150$$

Q2:  $\text{MP} = ₹ 5400$

$$\text{D} = 20\%$$

$$\text{SP} = \frac{\text{MP}(100 - \text{D}\%)}{100}$$

$$100$$

$$\text{SP} = \frac{5400(100 - 20)}{100}$$

$$100$$

$$\frac{5400 \times 80}{100}$$

$$= ₹4320$$

$$\text{So SP} = ₹4320$$

$$\text{Q3: MP} = ₹4000$$

$$\text{SP} = ₹3700$$

$$D = \text{MP} - \text{SP}$$

$$= ₹4000 - ₹3700$$

$$= ₹300$$

$$D\% = \frac{D}{\text{MP}} \times 100$$

$$\frac{300 \times 100}{4000} = 15\%$$

$$= 7\frac{1}{2}\%$$

$$\text{Q4: SP} = ₹1175$$

$$D = ₹75$$

$$\text{MP} = ₹1175 + ₹75$$

$$= ₹1250$$

$$D\% = \frac{D}{\text{MP}} \times 100$$

$$= \frac{75 \times 100}{1250}$$

$$= 6\%$$

So rate of discount is 6%.

Q5: SP of washing Machine = ₹8400

$$D = 16\%$$

$$MP = \frac{SP \times 100}{100 - D\%}$$

$$= \frac{8400 \times 100}{100 - 16}$$

$$= \frac{8400 \times 100}{84}$$

$$= ₹10000$$

Q6: SP = ₹2464

$$D = 12\%$$

$$MP = \frac{SP \times 100}{100 - D\%}$$

$$\frac{2464 \times 100}{100 - 12}$$

$$= \frac{2464 \times 100}{88}$$

$$= ₹2800$$

So MP is ₹2800

Q7: MP = ₹22000

$$D = 10\%$$

$$P = 20\%$$

$$SP = \frac{MP(100 - D\%)}{100}$$

$$SP = \frac{22000(100 - 10)}{100}$$

$$= \frac{22000 \times 90}{100}$$

$$= ₹19800$$

$$CP = \frac{SP \times 100}{100 + P\%}$$



$$CP = 19800 \times 100 + 20$$

$$CP = ₹16500$$

Q8: MP of double bed = ₹9575

$$D = 12\%$$

$$P = 10\%$$

$$CP = ?$$

$$SP = \frac{MP(100 - D\%)}{100}$$

$$= \frac{9575(100 - 12)}{100}$$

$$= \frac{9575 \times 88}{100} = \frac{846200}{100}$$

$$= ₹8462$$

$$CP = \frac{SP \times 100}{100 + P\%} = CP = \frac{8462 \times 100}{110}$$

$$CP = ₹7660$$

So cost price is ₹7660

Q9: CP of bicycle = ₹1250

$$MP = 1250 + 40\% \text{ of } 1250$$

$$1250 + 40 \times 1250$$
$$100$$

$$MP = 1250 + 500$$

$$MP = ₹1750$$

$$D = 8\%$$

$$(i) SP = \frac{MP(100-D\%)}{100}$$

$$SP = \frac{1750(100-8)}{100}$$

$$= \frac{1750 \times 92}{100}$$

$$= ₹1610$$

$$(ii) \text{ Profit} = SP - CP$$

$$1610 - 1250$$

$$= ₹360$$

$$P\% = \frac{P}{CP} \times 100$$

$$P\% = \frac{360}{1250} \times 100$$

$$= \frac{144}{5}$$

$$= 28.8\%$$

$$Q10: D = 8\%$$

$$P = 15\%$$

$$\text{Profit} = ₹156$$

$$MP = ?$$

$$P\% = \frac{P}{CP} \times 100$$

$$15 = \frac{156}{CP} \times 100$$

$$CP = \frac{156 \times 100}{100 - 12}$$

$$CP = ₹1040$$

$$\text{Profit} = 156$$

$$SP = CP + P$$

$$1040 + 156$$

$$= ₹1196$$

$$MP = \frac{SP \times 100}{100 - D\%}$$

$$MP = \frac{1196 \times 100}{100 - 8}$$

$$= \frac{1196 \times 100}{92}$$

$$= ₹1300$$

So MP is ₹1300

WS-3

Q1: Let cost before GST be ₹x

$$GST = 12\%$$

$$\text{Cost after GST} = ₹5400$$

ATQ

$$x + 12\% \text{ of } x = 5400$$

$$x + \frac{12x}{100} = 5400$$

$$\frac{100x + 12x}{100} = 5400$$

$$\frac{112x}{100} = 5400$$

$$112x = 54000$$

$$x = \frac{540000}{112} = 4821.42$$

Cost before GST be ₹4821.42

Q2: (i) Actual CP of chocolate = ₹150

$$\text{GST \%} = 28\%$$

$$\text{GST Amount} = 28\% \text{ of } ₹150$$

$$= ₹ \frac{28}{100} \times 150$$

$$= ₹42$$

$$\therefore \text{Amount to be paid} = ₹(150 + 42) \\ = ₹192$$

(ii) Actual CP of laptop = ₹55,000

$$\text{GST \%} = 28\%$$

$$\text{GST Amount} = 28\% \text{ of } 55000$$

$$= \frac{28 \times 55000}{100}$$

$$= ₹15,400$$

$$\therefore \text{Total amount to be paid} = ₹(55000 + 15400) \\ = ₹70,400$$

(iii) Actual CP of Perfume = ₹580

$$\text{GST} = 28\%$$

$$\text{GST Amount} = 28\% \text{ of } 580$$

$$= \frac{28}{100} \times 580$$

$$812 \cdot 162.4$$

81

$$\therefore \text{Amount to be paid } ₹(162.4 + 580) \\ = ₹742.4$$

Q3: CP of ~~insect~~ insecticides including GST = ₹23,600

$$\text{Actual CP of insecticides} = ₹20,000$$

$$\text{GST Amount} = ₹(23600 - 20000)$$

$$= ₹3600$$

$$\text{GST \%} = \left( \frac{3600}{20000} \times 100 \right) \%$$

$$= 18\%$$

### Value Based Questions

Q1: (i) CP of shirt including GST = ₹1680

$$\text{GST \%} = 12\%$$

Let Actual CP of shirt = ₹x

ATQ

$$\text{CP} + 12\% \text{ of CP} = ₹1680$$

$$x + \frac{12}{100} \times x = ₹1680$$

$$x + \frac{3x}{25} = 1680$$

$$\frac{25x + 3x}{25} = 1680$$

$$28x$$

$$28x = 1680$$

$$25$$

$$x = \frac{1680 \times 25}{284}$$

$$x = 1500$$

∴ Actual CP of Shirt = ₹1500

$$\text{GST Amount} = ₹(1680 - 1500)$$

$$= ₹180$$

(ii) No, No

(iii) The amount of Tax is used by government for development of a country.

### Brain Teasers

Q1(A) Tick

a) Let CP be = ₹x

Let SP be = ₹2x

$$P = SP - CP = 2x - x$$

$$P = ₹x$$

$$P\% = \frac{P}{CP} \times 100$$

$$\frac{x}{x} \times 100 = 100\%$$

b)  $MP = ₹2590$

$SP = ₹2331$

$D = MP - SP$

$2590 - 2331$

$= ₹259$

$D.I. = \frac{D}{MP} \times 100 = \frac{259}{2590} \times 100$

$= 10\%$

c) Let CP of 1 pen be = ₹1

Let CP of 4 pens be = ₹4

SP of 5 pens = ₹4

SP of 1 pen =  $\frac{₹4}{5} = ₹0.8$

Loss =  $CP - SP = 1 - 0.8 = ₹0.2$

$L.I. = \frac{L}{CP} \times 100 = \frac{0.2}{1} \times 100$

$= 20\%$

d) Let Original Price be ₹x  
ATQ

$x + 5\% \text{ of } x = 420$

$x + \frac{5}{100} \times x = 420$

$x + \frac{1}{20} x = 420$

$\frac{20x + x}{20} = 420$

$\frac{21x}{20} = 420 \times 20$

$x = \frac{420 \times 20}{21} \quad x = ₹400$

(B)

a)  $D = 8\%$

$SP = ₹414$

$$MP = \frac{SP \times 100}{100 - D\%} = \frac{414 \times 100}{100 - 8}$$

$$\begin{array}{r} 207 \\ \hline 414 \times 100 \\ 9246 \end{array}$$

$= ₹450$

$MP = ₹450$

b)  $SP = ₹650$

Let CP be ₹x

$$\text{Gain} = \frac{1}{4}x$$

$$\text{Gain}\% = \frac{\text{Gain} \times 100}{CP}$$

$$\checkmark \frac{x}{14x} = 25$$

$= 25\%$

c) Let CP of 1 Pencil = ₹1

CP of 10 Pencils = ₹10

SP of 8 Pencils = ₹10

$$\text{SP of 1 Pencil} = \frac{₹10}{8} = ₹1.25$$

$$P = 1.25 - 1$$

$$P = 0.25$$

$$P\% = \frac{P \times 100}{CP} = \frac{0.25 \times 100}{1}$$

$= 25\%$



$$d) MP = ₹ 5000$$

$$SP = ₹ 5900$$

$$GST = SP - MP = 5900 - 5000 \\ = ₹ 900$$

$$GST \% = \frac{900}{5000} \times 100 \\ = 18\%$$

$$e) SP = ₹ 2800$$

$$MP = ₹ 3500$$

$$D = MP - SP = 3500 - 2800 = ₹ 700$$

$$D \% = \frac{D}{MP} \times 100 = \frac{700}{3500} \times 100 \\ = 20\%$$

$$Q2: \text{ Let } MP = ₹ 100$$

$$D = 25\%$$

$$\text{Cost of purchase} = 100 - 25\% \text{ of } 100 \\ = 100 - \frac{25}{100} \times 100$$

$$= ₹ 75$$

$$SP = ₹ 100$$

$$SP > CP$$

$$\text{Profit} = SP - CP = 100 - 75 \\ = ₹ 25$$

$$P \% = \frac{P}{CP} \times 100$$

$$= \frac{25}{75} \times 100$$

$$= 33\frac{1}{3}\%$$

Q3: Let CP = ₹100

$$MP = 100 + 30\% \text{ of } 100$$

$$100 + 30 = ₹130$$

$$D = 25\%$$

$$SP = \frac{MP(100 - D\%)}{100} = \frac{130(100 - 25)}{100}$$

$$\frac{130 \times 75}{100} = ₹97.5$$

$$CP > SP$$

$$\text{Loss} = CP - SP = 100 - 97.5$$

$$= 2.5$$

$$L\% = \frac{L}{CP} \times 100 = \frac{2.5 \times 100}{100}$$

$$2.5\%$$

Q4: Let CP = ₹100

$$\text{Gain} = 12\%$$

$$SP = \frac{CP(100 + \text{Gain}\%)}{100} = \frac{100 \times 112}{100} = 112$$

$$D = 20\%$$

$$MP = \frac{SP \times 100}{100 - D\%} = \frac{112 \times 100}{100 - 20}$$

$$= \frac{112 \times 100}{80}$$

$$= 140$$

$$= 140$$

$$MP - CP$$

$$= 140 - 100 = 40$$

$$\text{Req}\% = \frac{40 \times 100}{CP} = \frac{40 \times 100}{100}$$

$$= 40\%$$

Q5: Let CP = ₹100  
MP = 100 + 40% of 100  
= 140

D = 5%

SP =  $\frac{MP(100-D)}{100}$  =  $\frac{140 \times 95}{100}$   
= ₹133

Actual SP = ₹1064

When SP is 133 then CP = ₹100

When SP is ₹100 then CP = 100/133

When SP is ₹1064 then CP =  $\frac{100 \times 1064}{133}$

So SP > CP

P = SP - CP = 1064 - 800  
= ₹264

- Q6: Cost of Saree = ₹12500  
Cost of Clothes = ₹9280  
Cost of Shirt = ₹10445  
Total CP = ₹32225

GST = 12% of 32225 =  $\frac{12}{100} \times 32225$   
=  $\frac{386700}{100}$  = 3867

Total Amount paid = ₹36902

## HOTS

$$MP = ₹ 3500$$

$$D = 20\%$$

$$P = 10\%$$

$$GST = 12\%$$

$$SP = \frac{MP(100 - D\%)}{100}$$

$$SP = \frac{3500 \times (100 - 20)}{100}$$

$$SP = 35 \times 80$$

$$= ₹ 2800$$

$$SP \text{ with GST} = ₹ 2800 + 12\% \text{ of } 2800$$

$$= ₹ 2800 + \frac{12}{100} \times 2800$$

$$= ₹ 2800 + 336$$

$$= ₹ 3136$$

$$\text{Original CP} = \frac{SP \times 100}{100 + P\%} = \frac{2800 \times 100}{110}$$

$$\frac{280000}{11} = ₹ 2545.45$$