

CAPSTONE

Math Lecture#05

পেট্রোবাংলা স্পেশাল কোর্স



Topic: Arithmetic

- Profit Loss
- Interest

Name:

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Class Test on Lecture Sheet 4

Time: 10 minutes

Obtained Mark:

Total Marks: 10

- In a group of civil, mechanical and electrical engineers, all but 20 are civil engineers, all but 15 are mechanical engineers, and all but 25 are electrical engineers. How many of them are electrical engineers? [IBA MBA December 2017]
A. 5 B. 10 C. 15 D. 20 E. None of these
- What percentage of numbers from 1 to 70 has either 1 or 9 in the unit's digit? [DBBL (Jr. Channel Officer)-2023]
A. 10% B. 14% C. 20% D. 21% E. None of these
- In the half yearly exam, Kabir scoring 40% marks fails by 10 marks, Hamid scoring 50% marks gets 10 more than the passing marks. What was the total mark in the examination?
A. 80 B. 140 C. 200 D. 100 E. 160
- In a shop, 80% of the articles are sold at a profit of 10%, and the remaining at a loss of 40%. What is the overall profit/loss?
A. 5% loss B. 10% loss C. 10% profit D. 4% profit E. No profit, no loss
- A school has raised 75% of the amount it needed for a new building by receiving an average donation of tk. 60 from the people already solicited. The people already solicited represent 60% of the people the college will ask for donation. If the college is to raise exactly the amount needed for the new building, how much the remaining people donate per person?
A. 25 B. 30 C. 40 D. 50 E. 20
- In a group of students, 80% of the students weight less than 60 kg and a total of 32 students weight less than 50 kg. If 60% of the students weight at least 50 kg, how many of the students weight at least 50 kg but less than 60 kg?
A. 32 B. 36 C. 40 D. 42 E. 34
- A number m is 8 times another number n . The percentage that n is less than m is- [IBA MBA June 2015]
A. 90% B. 87.25% C. 66.66% D. 12.50% E. None of these
- The work force of company X is 60% female. The company hired 20 additional male workers and as a result the percent of female workers dropped to 55%. How many employees did the company have after hiring the additional male workers?
A. 160 B. 220 C. 240 D. 360 E. 420
- In a box, 40% of the pens are red. If half of the red pens are removed, the percentage of red pens in the box will be: [IBA MBA December 2017]
A. 20% B. 22.5% C. 25% D. 30% E. None of these
- Two numbers individually are less than the third number by 60% and 74% respectively. By what percentage is the second number less than the first? [IBA MBA December 2017]
A. 18 B. 27 C. 30 D. 35 E. None of these

লাভ-ক্ষতি (Profit-Loss)

ক্রয়মূল্য (Cost Price বা C.P) : জিনিসপত্র বা দ্রব্য কেনা বা তৈরির সময় যে ব্যয় হয় তাকে ক্রয়মূল্য বলা হয়।

বিক্রয়মূল্য (Selling Price বা S.P) : জিনিসপত্র বা দ্রব্য বিক্রয় করলে যে দাম পাওয়া যায় তাকে বিক্রয়মূল্য বলা হয়।

মুদ্রিত মূল্য (List price বা L.P) : দ্রব্য বা পণ্যের গায়ে বা প্রাইস ট্যাগে যে দাম লেখা থাকে তাকে মুদ্রিত মূল্য বলা হয়। মুদ্রিত মূল্য থেকে ডিসকাউন্ট বা ছাড় বাদ দিলে ক্রয়মূল্য পাওয়া যায়।

◆ ক্রয়মূল্য অপেক্ষা বিক্রয়মূল্য বেশি হলে লাভ Profit হয়। লাভ (P) = বিক্রয়মূল্য (SP) – ক্রয়মূল্য (CP)

◆ ক্রয়মূল্য অপেক্ষা বিক্রয়মূল্য কম হলে ক্ষতি বা Loss হয়। ক্ষতি (L) = ক্রয়মূল্য (CP) – বিক্রয়মূল্য (SP)

SP > CP হলে,

1. $P = SP - CP$

2. $\%P = \left(\frac{SP-CP}{CP}\right) \times 100\%$

3. P% লাভ হলে, $SP = \left(\frac{100+P}{100}\right) CP$; $CP = \frac{100 \times SP}{100+P}$

SP < CP হলে,

4. $L = CP - SP$

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

6. L% ক্ষতি হলে, $SP = \left(\frac{100-L}{100}\right) \times CP$; $CP = \frac{100 \times SP}{100-L}$

7. X সংখ্যক পণ্যের ক্রয়মূল্য ও y সংখ্যক জিনিসের বিক্রয়মূল্য সমান হলে শতকরা লাভ, $P = \frac{(x-y)}{y} \times 100\%$

1. ১টি বই ২৭০ টাকায় বিক্রয় করলে ১০% ক্ষতি হলে ক্রয়মূল্য কত?

ক. ২৪৩ টাকা খ. ২৭০ টাকা গ. ২৭৯ টাকা ঘ. ৩০০ টাকা

সমাধান: ক্রয়মূল্য ১০০ টাকা হলে ১০% ক্ষতিতে বিক্রয়মূল্য = (১০০ - ১০) = ৯০ টাকা।

বিক্রয়মূল্য ৯০ টাকা হলে ক্রয়মূল্য ১০০ টাকা

∴ " ১ " " " $\frac{১০০}{৯০}$ "

∴ " ২৭০ " " " $\frac{১০০ \times ২৭০}{৯০} = ৩০০$ টাকা

শর্টকাট: $CP = \frac{100 \times SP}{100-L} = \frac{100 \times 270}{100-10} = \frac{100 \times 270}{90} = 300$ টাকা (উত্তর: ঘ. ৩০০ টাকা)

2. একটি বইয়ের ক্রয়মূল্য ১৫০ টাকা হলে কত টাকায় বিক্রয় করলে ৩০% লাভ হবে?

ক. ১৮০ টাকা খ. ১৯৫ টাকা গ. ২০০ টাকা ঘ. ২১০ টাকা

সমাধান: ৩০% লাভে, ক্রয়মূল্য ১০০ টাকা হলে বিক্রয়মূল্য = (১০০ + ৩০) = ১৩০ টাকা।

ক্রয়মূল্য ১০০ টাকা হলে বিক্রয়মূল্য ১৩০ টাকা

∴ " ১ " " " $\frac{১৩০}{১০০}$ টাকা

∴ " ১৫০ " " " $\frac{১৩০ \times ১৫০}{১০০} = ১৯৫$ টাকা

শর্টকাট: $SP = \left(\frac{100+P}{100}\right) CP = \frac{100+30}{100} \times 150 = \frac{130 \times 150}{100} = 195$ টাকা (উত্তর: খ. ১৯৫ টাকা)

◆ একটি পণ্য SP_1 টাকায় বিক্রি করলে $P_1\%$ লাভ (বা ক্ষতি) হয়। $P_2\%$ লাভ (বা ক্ষতিতে) বিক্রি করলে বিক্রয়মূল্য SP_2 হলে,

$SP_2 = \frac{SP_1 \times (100+P_2)}{(100+P_1)}$ [লাভ হলে P এর মান ধনাত্মক (+) এবং ক্ষতি হলে P এর মান ঋনাত্মক (-) ধরতে হবে।]

3. একটি খাতা ৫৫ টাকায় বিক্রি করলে ১০% লাভ হয়। কত টাকায় বিক্রি করলে ২০% ক্ষতি হবে?

ক. ৮০ টাকা খ. ৮০ টাকা গ. ৩৫ টাকা ঘ. ৫০ টাকা

সমাধান: ক্রয়মূল্য ১০০ টাকা হলে, ১০% লাভে বিক্রয়মূল্য = (১০০ + ১০) = ১১০ টাকা

এবং ২০% ক্ষতিতে বিক্রয়মূল্য = (১০০ - ২০) = ৮০ টাকা

১০% লাভে বিক্রয়মূল্য ১১০ টাকা হলে ২০% ক্ষতিতে বিক্রয়মূল্য ৮০ টাকা

১০% " " ১ " " ২০% " " $\frac{৮০}{১১০}$ "

১০% " " ৫৫ " " ২০% " " $\frac{৮০ \times ৫৫}{১১০} = ৪০$ টাকা

শর্টকাট: $SP_2 = \frac{SP_1 \times (100+P_2)}{(100+P_1)} = \frac{55 \times (100-20)}{(100+10)} = \frac{55 \times 80}{100} = 40$ [২০% ক্ষতি তাই $P_2 = -20$] (উত্তর: খ. ৪০ টাকা)

- ◆ CP টাকায় n_1 টি এর দ্রব্য ক্রয় করে n_2 টি দ্রব্য SP টাকায় বিক্রি করলে $p\%$ লাভ (বা ক্ষতি) হলে, $SP = \frac{CP \times n_2 (100 + P)}{100n_1}$ [লাভ হলে P এর মান ধনাত্মক (+) এবং ক্ষতি হলে P এর মান ঋণাত্মক (-) হবে]

4. এক ডজন কলা ২৪ টাকায় ক্রয় করে কুড়িটি কলা কত টাকায় বিক্রয় করলে ২৫% লাভ হবে?

ক. ৩৬ টাকা খ. ৩০ টাকা গ. ৪৫ টাকা ঘ. ৫০ টাকা

সমাধান: ১২টি কলার দাম = ২৪ টাকা।

$$২০টি \text{ " " } = \frac{২৪ \times ২০}{১২} = ৪০ \text{ টাকা।}$$

২৫% লাভে,

ক্রয়মূল্য ১০০ টাকা হলে বিক্রয়মূল্য $(১০০ + ২৫) = ১২৫$ টাকা।

$$\text{" " } ১ \text{ " " " } = \frac{১২৫}{১০০} \text{ " "}$$

$$\text{" " } ৪০ \text{ " " " } = \frac{১২৫ \times ৪০}{১০০} = ৫০ \text{ টাকা।}$$

শর্টকাট: $SP = \frac{CP \times n_2 (100 + P)}{100n_1} = \frac{24 \times 20 (100 + 25)}{100 \times 12} = \frac{24 \times 20 \times 125}{100 \times 12} = 50$ টাকা। (উত্তর: ঘ. ৫০ টাকা)

- ◆ n সংখ্যক বস্তুর বিক্রয়মূল্য m সংখ্যক বস্তুর ক্রয়মূল্যের সমান হলে,

$$\text{লাভের হার (P\%)} = \frac{100}{n} (m - n) \text{ [যখন } m > n]$$

$$\text{ক্ষতির হার (L\%)} = \frac{100}{n} (n - m) \text{ [যখন } n > m]$$

5. টাকায় ৪টি করে লিচু কিনে ৫টি করে বিক্রয় করলে শতকরা কত ক্ষতি হবে?

ক. ৫% খ. ২০% গ. ২৫% ঘ. ৪০%

সমাধান: ৪টির ক্রয়মূল্য ১ টাকা

$$১টির \text{ " } \frac{১}{৪} \text{ টাকা}$$

৫টির বিক্রয় মূল্য ১ টাকা

$$১টির \text{ " " } \frac{১}{৫} \text{ টাকা}$$

$$\text{সুতরাং ক্ষতি} = \frac{১}{৪} - \frac{১}{৫} = \frac{৫-৪}{২০} = \frac{১}{২০}$$

$$\frac{১}{৪} \text{ টাকায় ক্ষতি হয় } \frac{১}{২০} \text{ টাকা}$$

$$১ \text{ " " " } \frac{১}{৪} \text{ টাকা}$$

$$১০০ \text{ " " " } \frac{১}{২০} \times ১০০ = ২০ \text{ টাকা।}$$

শর্টকাট: ক্ষতির হার $= \frac{100}{n} (n - m) = \frac{100}{5} (5 - 4) = 20\%$ (উত্তর: খ. ২০%)

6. A suit marked at \$80 is sold for \$68. What is the rate of discount?

A. 15% B. 12% C. 17% D. 20%

Solution: Marked price = 80 & Selling price = 68

$$\text{Discount} = 80 - 68 = 12$$

$$\text{Discount \%} = \frac{12}{80} \times 100 = 15\% \text{ (Answer: A. 15\%)}$$

7. A manufacturer sells an article to a wholesale dealer at a profit of 10%. The wholesale dealer sells it to a shopkeeper at 20% profit. The shopkeeper sells it to a customer for 5610 Tk at a loss of 15%. Then what is the cost price of article to the manufacturer?

A. 4000 B. 4500 C. 5000 D. 5500

Solution: $x(1.1)(1.2)(0.85) = 5610 \Rightarrow 1.122x = 5610 \Rightarrow x = \frac{5610}{1.122} \Rightarrow x = 5000$ (Answer: C. 5000)

8. The selling price of 15 items equals the cost of 20 items. What is the % profit earned by the seller?

A. 15 B. 2 C. 25 D. 33.3

Solution: $15 \times SP = 20 \times CP$

$$\frac{SP}{CP} = \frac{20}{15} = \frac{4}{3}$$

Since $SP > CP$, we can say its profit and profit % would be same as you are buying a product for 3\$ and selling it for 4\$.

$$P\% = (4 - 3) \div 3 \times 100 = 33.3\%$$

Shortcut: $P\% = \frac{100}{n} (m - n) = \frac{100}{15} (20 - 15)\% = \frac{100 \times 5}{15}\% = 33.3\%$ (Answer: D. 33.3%)

9. A clothing store offered a flat 25% off on all the products. If a pair of shoes was already on 10% sale, what is the percentage decrease from the original to the final selling price?
A. 23% B. 27.5% C. 32.5% D. 35%

Solution: Let us assume the original price of the shoe be 100.

$$\text{Upon 10\% sale, the selling price} = 100 \left(1 - \frac{10}{100}\right) = 90$$

$$\text{Then a 25\% off, thus final selling price} = 90 \left(1 - \frac{25}{100}\right) = 67.5$$

$$\text{Decrease from original price} = 100 - 67.5 = 32.5$$

$$\text{Decrease percentage} = \frac{\text{Decrease}}{\text{Original}} \times 100 = \frac{32.5}{100} \times 100 = 32.5\%$$
 (Answer: C. 32.5%)

10. The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x ?

- A. 15 B. 16 C. 18 D. 25

Solution: Let, CP of each article be tk. 1 CP of x articles = x tk.

$$\text{SP of x articles} = 20$$

$$\text{Profit} = (20 - x)$$

$$\therefore \frac{20-x}{x} \times 100 = 25$$

$$\Rightarrow 2000 - 100x = 25x$$

$$\Rightarrow 125x = 2000$$

$$\Rightarrow x = 16$$
 (Answer: B. 16)

সুদ/ মুনাফা (Interest)

P = আসল বা মূলধন (Principal/ Capital) = প্রথমে যে টাকা জমা রাখা হয় বা ঋণ দেয়া হয়।

I = মুনাফা বা সুদ (Interest) = মূলধনের অতিরিক্ত যে টাকা বিনিয়োগকারীকে দেয়া হয়।

r = মুনাফার হার (rate of interest) = নির্দিষ্ট পরিমাণ টাকার উপর নির্দিষ্ট সময়ের জন্য মুনাফা দেওয়া হয়। সাধারণত ১০০ টাকার ১ বছরের মুনাফাকে মুনাফার হার বলে।

n = সময়।

A = সুদ-আসল/ মুনাফা-মূলধন।

সরল মুনাফা (Simple Interest):

$$1. I = Pnr\% = \frac{Pnr}{100} \quad 2. n = \frac{I \times 100}{Pr} \quad 3. r = \frac{I \times 100}{Pn} \quad 4. A = I + P = Pnr + P = P(1 + nr) = P \left(1 + \frac{nr}{100}\right)$$

যৌগিক বা চক্রবৃদ্ধি মুনাফা (Compound Interest):

যৌগিক বা চক্রবৃদ্ধি মুনাফায় প্রত্যেক বছর আসলের সাথে মুনাফা যোগ করা হয়। ফলে যৌগিক মুনাফায় প্রতিবছর আসল বা মূলধন বৃদ্ধি পায়।

$$\text{চক্রবৃদ্ধি মূলধন, } C = P \left(1 + \frac{r}{100}\right)^t$$

$$\text{চক্রবৃদ্ধি মুনাফা, } I = c - p$$

$$\text{বাৎসরিকভাবে চক্রবৃদ্ধি না হলে, } C = P \left(1 + \frac{r}{100 \times n}\right)^{t \times n}$$

r = সুদের হার; c = চক্রবৃদ্ধি মূলধন; p = প্রারম্ভিক মূলধন; t = সময়/বছর; n = বছরে চক্রবৃদ্ধির সংখ্যা

প্রতি মাসে চক্রবৃদ্ধি মুনাফা হিসাব করলে, n = 12

প্রতি 3 মাসে চক্রবৃদ্ধি মুনাফা হিসাব করলে, n = 4

প্রতিদিন চক্রবৃদ্ধি মুনাফা হিসাব করলে, n = 365

11. শতকরা বার্ষিক কত হার সুদে ৪৫০ টাকার ১২ বছরের সুদ ১৬২ টাকা হবে?

ক. ২% খ. ৩% গ. ৩.৫% ঘ. ৫%

সমাধান: ৪৫০ টাকার ১২ বছরের সুদ ১৬২ টাকা।

$$\begin{array}{ccccccc} 1 & " & 1 & " & " & \frac{162}{850 \times 12} & " \\ 100 & " & 1 & " & " & \frac{162 \times 100}{850 \times 12} & = 3\% \end{array}$$

সূত্র প্রয়োগে: $r = \frac{I \times 100}{p \times n} = \frac{162 \times 100}{450 \times 12} = 3\%$ (উত্তর: খ. ৩%)

12. কোনো আসল ৩ বছরে সরল মুনাফাসহ ৪৬০ টাকা এবং ৫ বছরে সরল মুনাফাসহ ৬০০ টাকা হলে শতকরা মুনাফার হার কত?

ক. ২০% খ. ২৫% গ. ২৮% ঘ. ৫০%

সমাধান: ৫ বছরে সুদ + আসল = ৬০০ টাকা

৩ বছরে সুদ + আসল = ৪৬০ টাকা

২ বছরের সুদ = ১৪০ টাকা [বিয়োগ করে]

১ " " = $\frac{140}{2}$ টাকা

৩ " " = $\frac{140}{2} \times 3 = ২১০$ টাকা।

∴ আসল, P = ৪৬০ - ২১০ = ২৫০ টাকা।

২৫০ টাকার ১ বছরের সুদ = ৭০ টাকা

১০০ " ১ " " $\frac{৭০ \times ১০০}{২৫০} = ২৮\%$ (উত্তর: গ. ২৮%)

13. বার্ষিক শতকরা কত মুনাফায় কোনো আসল ৪ বছরে মুনাফা-আসলে দ্বিগুণ হবে?

ক. ১০% খ. ১২.৫% গ. ১৫% ঘ. ২০%

সমাধান: $I = \frac{pnr}{100}$

$\Rightarrow p = \frac{p \times 8 \times 12}{100}$

$\Rightarrow r = 12.5$

∴ মুনাফার হার ১২.৫%

এখানে, $n = 8$

$A = 2p$

$\therefore P + I = 2p$

$\Rightarrow I = p$

Shortcut: n বছরে মুনাফা আসলে দ্বিগুণ হলে মুনাফার হার = $\frac{100}{n}$ (উত্তর: খ. ১২.৫%)

14. 1000 টাকা ১২% চক্রবৃদ্ধি মুনাফা হারে বিনিয়োগ করলে ২ বছর পর লাভসহ কত হবে?

ক. 1240 টাকা খ. 1250 টাকা গ. 1254 টাকা ঘ. 1264.8 টাকা

সমাধান: $C = p \left(1 + \frac{r}{100}\right)^t = 1000 \left(1 + \frac{12}{100}\right)^2 = 1000 \times (1.12)^2 = 1254.4$ টাকা (উত্তর: গ. 1254 টাকা)

15. If tk. 20,000 was deposited into an account yields x percent annual interest compounded quarterly the total value after 6 months was tk. 20808, what is the value of x?

ক. 0.08 খ. 2 গ. 4 ঘ. 8

সমাধান: When compounded quarterly (every 3 months), $n = 4$

We need to find the rate ($r = x\%$) at which the principal of tk. 20,000 became tk. 20,808 over a period of 6 months.

Hence, $t = \frac{6}{12} = \frac{1}{2}$ year; $C = 20,808$; $P = 20,000$

We know, $C = P \left(1 + \frac{r}{100 \times n}\right)^{nt}$

or, $20,808 = 20,000 \left(1 + \frac{x}{100 \times 4}\right)^{4 \times \frac{1}{2}}$

or, $\frac{20,808}{20,000} = \left(\frac{400+x}{400}\right)^2$

or, $1.0404 = \left(\frac{400+x}{400}\right)^2$

or, $\frac{400+x}{400} = \sqrt{1.0404}$

or, $\frac{400+x}{400} = 1.02$

Solving for $x = 8$ (উত্তর: ঘ. 8)

16. Johnny borrows tk. 30,000 from Tony at 2% daily interest compounded daily. How much does Johnny owe Tony after 8 weeks?

ক. $30000 \times (1.02)^{56}$ খ. 30000×1.12 গ. $30000 \times (0.02)^{56}$ ঘ. 30000×2.12

সমাধান: $P = 30000$

$t = 8 \text{ weeks} = (8 \times 7) \text{ days} = 56 \text{ days}$ [Time period is in days as the interest is compounded daily]
 $r = 2\%$

$$\therefore C = P \left(1 + \frac{r}{100}\right)^t = 30000 \left(1 + \frac{2}{100}\right)^{56} = 30000 \times (1.02)^{56} \text{ (উত্তর: ক. } 30000 \times (1.02)^{56}\text{)}$$

Practice Math

- The interest charged in loan is 'P' per Tk. 1,000 for the first quarter (3 months), and 'Q' per Tk. 1,000 for each month after the first quarter. How much interest will be charged for the first year on Tk. 10,000?
 A. $10(P+Q)$ B. $10(P+9Q)$ C. $4P+9Q$ D. None [BB AD 2022]
- If the cost price of 20 articles is 5 times of the selling price of 4 articles, then what is the profit or loss percentage?
 A. No profit or loss B. 25% loss C. 20% profit D. 25% profit
- In a certain store the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant. approximately what percentage of the selling price is the profit?
 [ভিত্তাস গ্যাস ট্রান্সমিশন অ্যান্ড ডিস্ট্রিবিউশন কো. লি. (সহকারী ব্যবস্থাপক) 2021]
 A. 30 B. 70 C. 100 D. 250
- If 5 bananas are bought for 1 taka and 4 is sold for 1 taka then what is the profit or loss percentage?
 [আরডিএ বগুড়া (সহকারী পরিচালক) ২০২১]
 A. Profit 20% B. Profit 25% C. Loss 20% D. Loss 25%
- A tradesman sold an article at a loss of 20%. If the selling price had been increased by 100 taka, there would have been a gain of 5%. What was the cost price of the article?
 [দি সিকিউরিটি প্রিন্টিং কর্পোরেশন (সহকারী ব্যবস্থাপক) ২০২১]
 A. 375 টাকা B. 400 টাকা C. 425 টাকা D. 450 টাকা
- When an object is sold for Tk. 250 the seller makes 25% profit. What is the cost price of the object?
 [BB AD 2008]
 A. 200 B. 180 C. 220 D. 160
- A shopkeeper buys two books for tk. 300. He sells the first book at a profit of 20% and the second book at a loss of 10%. What is the selling price of the first book, if, in the whole transaction there is no profit no loss?
 A. tk. 110 B. tk. 115 C. tk. 120 D. tk. 125
- The profit earned by selling an article for tk. 832 is equal to the loss incurred when the same article is sold for tk. 448. What should be the sale price for making 50% profit?
 A. 860 B. 1060 C. 1020 D. 920 E. None of these
- A man sells a book at a profit of 20%. If he had bought it at 20% less and sold it for tk. 18 less, he would have gained 25%. The cost price of the book is-
 A. tk. 60 B. tk. 70 C. tk. 80 D. tk. 90
- Monika purchased a pressure cooker at $\frac{9}{10}$ th of its selling price and sold it at 8% more than its S.P. Find her gain percent.
 A. 15% B. 20% C. 25% D. 30%

11. A sells an article which cost him tk. 400 to B at a profit of 20%. B then sells it to C, making a profit of 10% on the price he paid to A. How much does C pay B?
A. tk. 472 B. tk. 476 C. tk. 528 D. tk. 532
12. The price of a TV was first discounted by a certain percent and then by another 20 percent of the discounted price. If these two discounts are equivalent to single discount of 32 percent of the original price, what was the first discount? [IBA MBA June 2016]
A. 10% B. 12.5% C. 15% D. 26% E. None of these
13. A store charges tk. 52 for a video game. This price is 30% greater than the store's cost to buy the game from its supplier. As an incentive to the store's clerks, the manager allows a clerk to purchase the video game for 10% less than the store's cost. How much would a store clerk have to pay for this video game? [IBA BBA 13-14]
A. tk. 15.60 B. tk. 20.80 C. tk. 31.20 D. tk. 32.76 E. tk. 36.00
14. The interest on a certain deposit at 4.5% p.a. (per annum) is taka 202.50 in one year. How much will the additional interest in one year be on the same deposit at 5% p.a.? [পুলী সঞ্চয় ব্যাংক (ক্যাশ অফিসার) ২০১৮]
A. 22.50 B. 20.25 C. 42.75 D. 25
15. Shalija earns 15 percent on an investment but loses 10 percent on another investment. If the ratio of the two investments is 3:5, then the combined loss percent is?
A. $\frac{5}{8}$ B. $\frac{8}{5}$ C. $\frac{4}{5}$ D. $\frac{5}{4}$
16. A sum of money lent out at simple interest amount to tk. 720 after two years and to tk. 1020 after a further period of 5 years. The sum is: [Janata Bank (EO)-2017]
A. tk. 600 B. tk. 500 C. tk. 700 D. tk. 710
17. 10000 taka is invested for 2 years in a compound interest rate of 20% bianually. What is the profit interest? [43rd BCS]
A. 12^4 B. 11^4 C. 10^4 D. 9^4
18. Your monthly mobile bill 420 taka. It increases 10% after 1 year and again increases 20% after 6 months. What is the bill after 18 months? [41st BCS]
A. Tk. 460.20 B. Tk. 554.40 C. Tk. 620.60 D. Tk. 730.80
19. One bought x number of pen at a rate of 7 tk and 2x number of another pen at rate of 10 tk. He sold them at 96 tk/ dozen and made loss 720 tk. How many pens he bought? [IBA MBA Dec' 2019]
A. 700 B. 620 C. 720 D. 750 E. None of these
20. Arif sold 100 pens of which 50 are red and 50 are black, at tk. 48 per pen. he made a profit of 20% on the black pens and made a loss of 20% on the red pens. What was the net gain on this sale in tk.? [IBA MBA June' 17]
A. 0 B. -50 C. -100 D. -200 E. None of these
21. Babu made a profit of 20% by selling a product. If he had purchased that product for 10% less and sold it at a profit of 40%, he would have received tk. 24 more. What was his original selling in taka? [IBA MBA Dec' 2017]
A. 400 B. 480 C. 520 D. 600 E. None of these
22. If selling price is doubles, the profit tripled, find the profit percent?
A. 66.5% B. 300% C. 200% D. 100% E. 120%
23. Nadia can buy a pen at the cost of Tk. 1. During a promotional event she would get 40% discount on the cost of 2nd pen when she buys 2 pens together. How many pens she can buy during that promotional even with Tk. 80? [IBA MBA Dec' 2020]
A. 96 B. 100 C. 106 D. 112 E. None of these

24. A salesperson bought an item for tk. X and marked it up by 50%. However, he could not sell the item during the first quarter and thus, decided to provide a discount of 20% on the marked up price. As the item remained unsold in the second quarter as well, he started to charge 70% of the discounted value. What is the latest sales price of the item in term of its buying price? [IBA MBA June 2018]
 A. 60X B. 84X C. 96X D. 105X E. None of these
25. A customer came to a shop and asked the shop manager to give a discount of 20% on listed price of pen. Moreover, for 10 pens purchased he wanted two pens free of cost. The manager agreed to the customers demand because he could still make a profit of 20% on cost price. If the cost price of a pen is x, what was the list price of the pen? [IBA BBA 14-15]
 A. 1.75x B. 1.8x C. 19x D. 2x E. None of these
26. By selling an article at 80% of its marked price, a merchant makes a loss of 12%. What will be the profit/ loss made by the merchant if he sells the article at 95% of its marked price? [IBA MBA Dec' 15]
 A. 5% profit B. 1% loss C. 5.5% profit D. 4.5% profit E. None of these
27. A shopkeeper marks an article at such a price that after allowing a discount of 30% on the tag price (including tax) he marks a profit of 40%. If the tag price of the article including tax is tk. 460, then the cost price of that article is: [IBA BBA 09-10]
 A. 232 B. 260 C. 230 D. 330 E. None of these
28. If an amount kept for a year gives 12.5% interest, then in how many years the cumulative interest generated will be equal to the principal amount? [IBA MBA Dec' 2020]
 A. 3 B. 5 C. 6 D. 7 E. None of these
29. An investor made a profit of tk. 420 plus 30% of the amount originally paid for a stock. If the cost of the stock was originally tk. 2800 what percent of the cost was the total profit? [IBA MBA June 2015]
 A. 35 B. 50 C. 45 D. 30 E. None of these
30. Tk 2000 is deposited in a savings account which pays 6% annual interest compounded semi-annually. To the nearest tk, how much is in the account at the end of the year?
 A. 2423 B. 2356 C. 2122 D. 2247 E. 2365

Home Task Math

31. X sells an item to Y at a profit of 28% on his cost and Y sells the same item to Z at a loss of 25% on his cost. If Y thus sold the item to Z a Tk. 2 less than the item to X, then what is the cost of the item to X?
 A. Tk. 200 B. Tk. 150 C. Tk. 100 D. Tk. 50 [BB AD 2022]
32. A merchant has 1,000 kg of sugar, part of which he sells at 8% and the remaining at 18% profit. He gains 14% on the whole. Find the quantity of sugar that he sold at 18% profit. [BB AD 2022]
 A. 400 kg B. 560 kg C. 600 kg D. 640 kg
33. By mixing two qualities of pulses in the ratio 2:3 and selling the mixture at the rate of Tk.22 per kilogram, a shopkeeper makes a profit of 10%. If the cost of the smaller quantity be Tk 14 per kg the cost in Tk per kg of the larger quantity is? [ভিতাস গ্যাস (সহকারী ব্যবস্থাপক) 2021]
 A. 23 B. 24 C. 25 D. 26
34. If the cost price is 25 of selling price, then what is the profit percent? [Agrani Bank (SO) 2017]
 A. 75% B. 100% C. 300% D. 400%
35. Selling 12 lemons in one 1 tk incures 4 percent loss. To avail 44 percent profit, how many lemons should be sold in one tk.? [বাংলাদেশ গ্যাস ফিল্ড (সহকারী ব্যবস্থাপক) ২০১১]
 A. 8 B. 10 C. 12 D. 14

36. There will be a loss of 10%. If a chair is sold for tk. 540. At what price should the chair be sold to make a profit of 20%? [Bangladesh Bank (Cash Officer) 2011]
 A. 600 B. 620 C. 630 D. 720
37. A retailer sold toys at a regular selling price of 25% greater than the retailer cost to buy the toys. If the relation reduces the regular selling price by 80%, what is the loss on each toy sold as a percent of the retailer's cost?
 A. 25% B. 30% C. 40% D. 75%
38. A man's investment doubles in every 5 years. If he invested Tk. 5,000 in each of the years 2010, 2015, 2020 then what will be the amount received by him in 2025? [BB AD 2022]
 A. Tk. 30,000 B. Tk. 70,000 C. Tk. 80,000 D. Tk. 1,50,000
39. A sum of money amounts to TK.9800 after 5 years and Tk.12005 after 8 years at the same rate of simple interest. The rate of interest per annum is: [প্রবাসী কল্যাণ ব্যাংক (সিনিয়র অফিসার) ২০২১]
 A. 5% B. 8% C. 12% D. 15%
40. An amount of money is invested in a savings account for two years. It increases by the Tk. 52.50 in two years. After annual compounding at the rate of 10% per year. What is the amount invested initially? [BB AD 2022]
 A. Tk. 400 B. Tk. 300 C. Tk. 250 D. Tk. 200
41. If a seller buys 3 Myrobolan for 1 taka and 5 Myrobolan for 1 taka and sells 4 Myrobolan for 1 taka, then what percent of profit or loss did he make? [41st BCS]
 A. 4.25% profit B. 5.25% loss C. 6.25% loss D. 7.25% profit
42. A fruit salad is made by mixing 3 kgs of mango costing tk. 120 per kg and 2 kgs of papaya costing tk. 100 per kg and 2 kgs of grapes costing tk. 140 per kg. At what price (in tk.) per kg should the mixture be sold to make a profit of 25 percent?
 A. 125 B. 130 C. 140 D. 150 E. 175
43. Albert invested an amount of tk. 8000 in a fixed deposit scheme for 2 years at compound interest rate 5% per annum. How much amount will Albert get on maturity of the fixed deposit? [DBBL (Officer) 2019]
 A. 8600 B. 8620 C. 8820 D. 9000
44. How much interest will tk. 1000 earn in 1 year at an annual interest rate of 20% if interest rate is compounded every 6 months? [BB AD 2010]
 A. 195 B. 200 C. 220 D. None of these
45. By selling 60 oranges at 624 taka, loss is equal to cost price of 8 oranges, the cost price of one orange is: [IBA MBA Dec 2019]
 A. 10 B. 10.5 C. 11 D. 11.5 E. None of these
46. A man purchased equal number of bananas at two different rates, one at the rate of 8 tk. per dozen and the other at the rate of 10 tk. per dozen. After that, he sold those bananas at an average rate of 11 tk. dozen and thus made a profit of 100 tk. How many dozen of banana did he purchase altogether?
 A. 60 B. 50 C. 55 D. 45 E. None of these
47. A man buys an article for 10% less than its value and sells it for 10% more than its value. His gain or loss percent is:
 A. no profit, no loss B. 20% profit C. less than 20% profit
 D. more than 20% profit E. None of these
48. Bashir bought an ordinary mobile and a cover for tk. 2000. Malek bought a smart phone and the same cover for tk. 2000 more than Bashir had paid. The price of the cover was one tenth of the combined cost of the two mobiles. What was the cost of the ordinary mobile? [IBA BBA 14-15]
 A. tk. 1000 B. tk. 1200 C. tk. 1500 D. tk. 1600 E. None of these

49. The profit on sale of 100 pencils is equal to the selling price of 20 pencils. What is the profit margin in percentage?
 A. 20 B. 25 C. 33.33 D. 50 E. 2.5
50. At a certain bookstore, the regular price of each book is 20 percent less than its list price. If during a sale the price of each book at the store was 15 percent less than its regular price, then the price of a book during the sale was what percent less than its list price? [IBA MBA Dec' 16]
 A. 30% B. 32% C. 40% D. 42% E. None of these
51. A man sold his watch at a loss of 5%. had he sold it for tk. 56.25 more he would have gained 10%. What was the cost of the watch?
 A. 260 B. 275 C. 280 D. 375 E. None of these
52. Two chairs have been sold, each for tk. 3600. On one 20% profit has been earned and on the other 20% loss has been incurred, what is the total profit or loss?
 A. profit of tk. 100 B. loss of tk. 120 C. loss of tk. 300
 D. profit of tk. 300 E. None of these
53. The sales price of an item including the sales tax is tk. 616. The tax rate is 10%; If the shopkeeper made a profit of 12%, what was cost price of the item in tk.?
 A. 500 B. 515 C. 550 D. 575 E. None of these
54. A man sold an article for tk. 56 cost him tk. x. If he had gained x% his outlay, what was his cost?
 A. tk. 45 B. tk. 35 C. tk. 40 D. tk. 50 E. tk. 28
55. The price of the jewel, passing through three hands, rises on the whole by 65%. If the 1st and the 2nd sellers earn 20% and 25% profit respectively, find the percentage profit earned by the third seller.
 A. 12% B. 30% C. 40% D. 15% E. 10%
56. A dress on sale in a shop is marked at tk. Z. During the discount sale its price is reduced by 15%. Staffs are allowed a further 10% reduction on the discounted price. If a staff member buys the dress what will she have to pay in terms of Z?
 A. 0.75Z B. 0.76Z C. 0.765Z D. 0.77Z E. None of these
57. A retailer sells perfumes at a 10% discount. If a perfume cost him \$75 and he wants to make a profit of no less than twenty percent on the cost (after the discount) what is the minimum tag price he needs to put on a perfume?
 A. 90 B. 100 C. 120 D. 140 E. 150
58. A shopkeeper sold an article for tk. 450 at a discount of 10% on the labeled price. He would have earned a profit of 25%, had there been no discount. What was the profit earned in percentage, at the discounted price? [IBA June 2015]
 A. 10 B. 12 C. 12.5 D. 20 E. None of these
59. Syntax cement gives commission of 15% on the printed price of each sack of cement if sells to its dealers and gives a profit of 19%. If the commission is decreased to 10%, the new profit percentage will be? [IBA MBA June 2018]
 A. 21% B. 25% C. 26% D. 35% E. None of these
60. The sum of principle interest of a certain amount of money would be tk. 460 after 3 years from now and tk. 500 after 5 year from. What is the total interest rate?
 A. 3% B. 5% C. 10% D. 12% E. 15%

Written Math

1. Babu purchased 6 identical maple wood furniture and 7 identical birch wood furniture for his office. The regular price of each maple wood furniture was thrice the regular price of each birch wood furniture. However, Babu obtained a 20% discount off the regular price of each maple wood furniture. If the regular price of each birch wood furniture was Tk. 500, what was the total price of all 13 furniture?
[DBBL (Trainee Officer) 2023]
2. Ana runs a merchandiser store. She wants to buy 500 note book for her store. She will have 300 note book for Tk. 2500. Next 200 note book are for tk. 4 per notebook. If total cost for notebook is Tk. 3300 and 12% discount is given then total cost for notebooks is-
[IFIC (TSO) 2019]
3. A man buys 20 pens and 12 books for tk. 400. He sells pens at a profit of 40% and books at a gain of 25%. If his overall profit was Tk. 112, the cost price of the book is (in Tk.)-
[BSCIC (Extension Officer) 2019]
4. The cost, in taka, of manufacturing X microwaves is Tk. $(6000+300x)$. The amount received when selling these X microwaves is fTk. $700x$. What is the least number of microwaves that must be manufactured and sold so that the net profit is Tk. 2400?
[MTB (MTO) 2019]
5. Kalam bought two varieties of rice, costing Tk. 50/kg and Tk 60/kg each, and mixed them in same ratio. Then he sold the mixture at Tk. 70/kg making a profit of 20%,. What was the ratio of the mixture?
[BREB (AD) 2019]
6. Last year's Jaman bought two lamps. This year he sold them for BDT 2000 each. On one lamp he made 25% profit and on other lamp he has loss 25% loss. What was his net loss or profit? [BREB (AD) 2019]
7. A retailer buys pens in packs of 24 for tk. 336/pack and then resells them in packs of 5 for tk. 80/pack. If the retailer sold all the pens it purchased and made a profit of tk. 960, how many packs of pens did the retailer purchased?
[Biman Bangladesh Airlines (Ground Service Assistant) 2018]
8. Mr. X a sales person earns 5% commission on all sales between tk. 20000 and 40000, 8% on all sales exceeding tk. 40000 in a month. he does not earn any commission if sales in month amount to less than tk. 20000. His monthly salary is tk. 60000, he has to pay tax 20% on his basic salary but no tax in commission in April, 2001, the total net income (salary + commission) of the sales person was tk. 65000. How much were the sales in April?
9. A Video magazine distributor made 3500 copies of the May issue of the magazine at a cost of tk. 400000. He gave 500 cassettes free to same key video libraries. He also allowed a 25% discount on the market price of the cassette. In this manner, he was able to sell all of a cassettes was tk. 160, what is his gain or loss for the May issue of the video magazine?
10. Mr. Karim borrowed tk. 500 at 5% interest per year. After some time, he borrowed tk. 400 at $3\frac{1}{2}\%$ interest per year for the second time. Six months after the second time borrowing, he repaid both the borrowed money along with interest and the amount repaid was tk. 994.50. How many years after the first time borrowing Mr. Karim repaid the borrowed money?
[23rd BCS, Bank Asia (MTO) 2017]