Section A: Percentage (10 Questions)

1. A number increases by 20% and then decreases by 20%. What is the net percentage change?
   A. 0%
   B. 4% increase
   C. 4% decrease
   D. 2% decrease

2. The population of a city increases by 10% annually. If the population is 1,21,000 after 2 years, what was it 2 years ago?
   A. 100000
   B. 110000
   C. 99000
   D. 101000

3. A's salary is 25% more than B's salary. By what percent is B's salary less than A's?
   A. 25%
   B. 20%
   C. 30%
   D. 15%

4. In an election, 10% of the votes were declared invalid. A candidate got 60% of the valid votes and won by 1800 votes. What was the total number of votes polled?
   A. 10000
   B. 12000
   C. 15000
   D. 18000

5. A student scored 25% marks and failed by 30 marks. If he had scored 40% marks, he would have got 20 marks more than the pass marks. What are the maximum marks to the nearest tens?
   A. 430
   B. 330
   C. 350
   D. 530

6. If the price of an article increases by 20%, by how much percent must the consumption be reduced to keep the expenditure the same?
   A. 16.67%
   B. 20%
   C. 25%
   D. 15%

7. A value is first increased by 30% and then decreased by 30%. What is the net percentage change?
   A. 9% increase
   B. 9% decrease
   C. No change
   D. 10% decrease

8. Two numbers are respectively 25% and 40% more than a third number. What percent is the first number of the second?

    A. 87.5%

    B. 95.6%

    C. 89.3%

    D. 85.7%

9. A number is increased by x% and then decreased by x%. The result is 2025. What was the original number if x = 10?

    A. 2200

    B. 2345

    C. 2250

    D. 2045

10. A student needs 36% to pass. He gets 85 marks and fails by 15 marks. Find the total marks (find the answer in the nearest tens).

    A. 250

    B. 300

    C. 280

    D. 275

Section B: Simple and Compound Interest (10 Questions)

11. Find the compound interest on ₹10000 at 10% per annum for 2 years compounded annually.

    A. ₹2100

    B. ₹2000

    C. ₹2200

    D. ₹2100

12. What is the difference between simple and compound interest on ₹5000 at 10% p.a. for 2 years?

    A. ₹50

    B. ₹100

    C. ₹105

    D. ₹110

13. In how many years will ₹4000 become ₹4840 at 10% p.a. compound interest, compounded annually?

    A. 1 year

    B. 2 years

    C. 3 years

    D. 4 years

14. A sum of ₹10000 becomes ₹12100 in 2 years at compound interest. Find the rate of interest.

    A. 10%

    B. 9%

    C. 11%

    D. 12%

15. At what rate of interest will a sum double in 4 years at compound interest, compounded annually?
    A. 26%
    B. 18%
    C. 15%
    D. 18.92%

16. If a sum of money doubles in 3 years at compound interest, then in how many years will it become eight times?
    A. 6
    B. 9
    C. 8
    D. 10

17. A person lent ₹12000 at 8% simple interest and ₹8000 at 10% simple interest. What is the average rate of interest?
    A. 8.8%
    B. 9%
    C. 8.5%
    D. 9.2%

18. The difference between the CI and SI on ₹4000 for 2 years at 10% p.a. is?
    A. ₹40
    B. ₹42
    C. ₹44
    D. ₹48

19. A man invested ₹16000 in two parts at 10% SI. In one part he invested for 3 years and the other for 5 years. The total interest received was ₹6400. Find the amount invested for 5 years.
    A. ₹6000
    B. ₹8000
    C. ₹10000
    D. ₹12000

20. The compound interest on a certain sum for 2 years at 5% is ₹512.50. Find the principal.
    A. ₹5000
    B. ₹4800
    C. ₹4900
    D. ₹4600

Section C: Profit, Loss & Discount (10 Questions)

21. A shopkeeper sells an article at a loss of 10%. Had he sold it for ₹100 more, he would have made a 5% profit. What is the cost price?
    A. ₹667
    B. ₹947
    C. ₹333
    D. ₹1133

22. A dealer marks an article 30% above cost price and allows two successive discounts of 10% each. Find the gain or loss %.
    A. 4.3% loss
    B. 4.3% gain
    C. 7.3% gain
    D. 5.3% gain

23. If a man purchases 10 articles for ₹8 and sells them at ₹1.20 each, find the profit %.
    A. 50%
    B. 40%
    C. 60%
    D. 70%

24. A trader gives a discount of 20% and still makes a profit of 25%. Find the markup %.
    A. 56.25%
    B. 60%
    C. 65%
    D. 50%

25. A sells an article to B at a profit of 10%, and B sells it to C at a profit of 20%. If C pays ₹132, what did A pay?
    A. ₹100
    B. ₹110
    C. ₹120
    D. ₹115

26. If the marked price of an article is increased by 20% and the discount is increased from 10% to 20%, find the net effect on SP.
    A. 6.67% decrease
    B. 6.67% increase
    C. 3.33% decrease
    D. 3.33% increase

27. A person sells two items for ₹1000 each. He gains 20% on one and loses 20% on the other. What is the overall gain/loss %?
    A. 0%
    B. 1%
    C. 4% loss
    D. 5% loss

28. A dishonest shopkeeper uses a 900g weight instead of 1kg and sells at cost price. What is the gain %?
    A. 11.1%
    B. 9.9%
    C. 12.5%
    D. 10%

29. If a trader gives a 5% discount and still gains 20%, find the marked price of an item whose cost price is ₹100.
    A. ₹126
    B. ₹130

C. ₹133.33

D. ₹136

Section-A (percentage)

① ON = 100
 20% = increase
 ON = 120
 decrease of 20%
 20 of %.
 100 - 96 = 4% decrease

② $P \times 1.1 \times 1.1 = 12100$
 $P = \dfrac{121000}{1.21} = 10000$

③ $\dfrac{125 - 100}{125} \times 100 = 20\%$

④ 0.9V
 $0.6 \times 0.9V = 0.54V$

⑤ $0.25M + 30 = 0.80M - 20$
 $0.15M = 50$
 $M = 333.33$

⑥ $100\ell = 120 \times C$
 $\ell = \dfrac{100 \cdot C}{120}$
 Reduction $= \dfrac{20}{120} \times 100 = 20\%$

⑦ $\dfrac{125}{140} \times 100 \approx 89.3\%$

⑧ $N \times 1.1 \times 0.9 = 2025$
 $N = \dfrac{2025}{0.99} \approx 2250$

⑨ $80 + 15 = 0.36M$

 $M = \dfrac{000}{0.36} \approx 177.78$

11Ans:- C.I p (per anually)

$$= P\left(1+\frac{R}{100}\right)^n$$

Given → P = 10000

R = 10%

n = 2 yrs.

$$A = 10000\left(1 + \frac{10}{100}\right)^2$$

$$= 10000\left(\frac{110}{100}\right)^2$$

$$= 10000\ (1.10)^2$$

$$= 10000\ (1.21)$$

$$= 12100 /\!/$$

$$\begin{array}{r} 110 \\ 110 \\ \hline 121000 \end{array}$$

$$\therefore CI = 12600 - 10000$$

$$= 2100 /\!/$$

121002 Ans:-

$$SI = \frac{P \times T \times R}{100}$$

$$1 = \frac{5000 \times 2 \times 10}{100}$$

$$= 1000 /\!/$$

$$A = P\left(1 + \frac{R}{100}\right)^2$$

$$= 5000\left(1 + \frac{10}{100}\right)^2$$

$$= 5000\left(\frac{110}{100}\right)^2$$

$$= 5000 \times 1.21 = 6050$$

$$C.I = 6050 - 5000 = 1050 /\!/$$

Diff $= 1050 - 1000 = 50 /\!/$

[8Ans] Given, $A = 4840$
$P = 4000$
$R = 10\%$
$T = ?$

$$A = P\left(1+\frac{R}{100}\right)^T$$

$$4840 = 4000\left(1+\frac{10}{100}\right)^T$$

$$\frac{4840}{4000} = \left(\frac{110}{100}\right)^T$$

$$4.21 = (1.10)^T$$

comparing square on b.s,

$$(1.1)^2 = (1.10)^T$$

$$\Rightarrow \boxed{T = 2 \text{ yrs}}$$

[14Ans] Given, $A = 12100$
$P = 10000$
$n = 2 \text{ yrs}$
$R = ?$

$$\therefore \text{Amount} = P\left(1+\frac{R}{100}\right)^n$$

$$10000 = 12100\left(1+\frac{R}{100}\right)^2$$

$$\frac{10000}{12100} = \left(\frac{100 + R}{100}\right)^2$$

$$\cancel{\text{to}} \quad 0.8264 = \frac{(100 + R)^2}{10000}$$

$$8264 = (100 + R)^2$$

$$10000 + 200R + R^2 = 8264$$

$$R^2 + 200R = 10000 - 8264$$

$$R^2 + 200R.$$

$$S.I \quad \cancel{C \cdot I} \quad 12100 = 10000\left(\frac{100+R}{100}\right)^2$$

$$\frac{12100}{10000} = \left(\frac{100 + R}{100}\right)^2$$

$$1.21 = \left(\frac{100 + R}{100}\right)2$$

Sq root on b.S

$$1.1 = \frac{100 + R}{100}$$

$$\Rightarrow 110 = 100 + R$$

$$\Rightarrow R = 110 - 100 = 10\%$$

15Ans:- Given T = 4 yrs

Let Amount is double the
principal

$$\Rightarrow A = 2P \quad R = ?$$

$$\therefore A = P\left(1 + \frac{R}{100}\right)^7$$

$$2P = P\left(1 + \frac{R}{100}\right)^4$$

$$2 = \left(1 + \frac{R}{100}\right)^4$$

quart root on both the side

$$\sqrt[4]{2} = \left(1 + \frac{R}{100}\right)$$

$$1.1892 = 1 + \frac{R}{100}$$

$$0.1892 = \frac{R}{100} \implies R = 18.92\%$$

$1 + \frac{1}{2}$

$1 + 0.5$

16 Ans:- Given, Sum double in 3 yrs at C.I

In C.I, If amount double in T years then,

It'll becomes 4 times in 2T yrs

It'll becomes 8 times in 3T yrs

$\therefore$ Time to double = 3 yrs.

So, time to be comes 8 times = 3×3 = 9
Years.

17 ANS: Given, $P_1 = 12,000$
$R_1 = 8\%$
$R_2 = 10\%$
$P_2 = 8000$

Assume time is same for both Sum TS
∴ Using S.I. Formula.

$$S.I._1 = \frac{12,000 \times 1 \times 8}{100}$$
$$= 960 \quad \text{①}$$

120
 8
960

$$S.I._2 = \frac{8000 \times 1 \times 10}{100}$$
$$= 800 \quad \text{②}$$

∴ Total S.I = 960 + 800 = ₹1760
Total Principal = 12000 + 8000
= ₹20000 ⁄

∴ Avg Rate = $\frac{1760 \times 100}{20000}$

$\left(\frac{Total\ Interest}{Total\ Prin} \times 100\right)$

$$= 8.8\% \quad \text{⁄⁄}$$

18 Ans :- $\text{Sum} = \text{Difference} \times \left(\frac{100}{R}\right)^2$

$$4000 = \text{Difference} \times \left(\frac{100}{10}\right)^2$$

$$4000 = \text{Diff} \times \frac{10000}{100}$$

$$\frac{4000 \times 100}{10000} = \text{Diff}$$

$$\text{Diff} = 40$$

20 Ans :- Given, $n = 2 \text{ yrs}$
$$R = 5\%$$
$$A = 2512.50$$
$$P = ?$$

② $\frac{+0+0}{2}$

$$CI - P\left(1 + \frac{R}{100}\right)^n - P$$

$$512.50 = P\left(1 + \frac{5}{100}\right)^2 - P$$

$$512.50 = P\left(\frac{105}{100}\right)^2 - P$$

$$512.50 = P\left[(1.05)^2\right] - P$$

1/0

.105
105 2/5
.025 ⌐

$$512.50 = P(1.1025 - 1)$$

$$512.50 = P(0.1025)$$

$$\boxed{R = 5000}$$

③ +0+0

① +0+0

19Ans:— Given, Total Investment
$= ₹16,000$

$R = 10\%$

I on one part $= 3yrs$

II on other part $= 5yrs$

Total Interest $= 6400$

① Let Amount invested for 3 years $= 3x$

Let Amount invested for 5yrs $= (16000 - x)$

② Interest from 3 yrs investment

$$I_1 = \frac{x \times 10 \times 3}{100} = 0.3x$$

Interest from 5yrs invest.

$$I_2 = \frac{(16000 - x) \times 10 \times 5}{100}$$

$$= 0.5(16000 - x)$$

Total Interest

$$0.3x + 0.5(16000 - x) = 6400$$

$$0.3x + 8000 - 0.5x = 6400$$

$$-0.2x + 8000 = 6400$$
$$-0.2x = 6400 - 2000$$
$$-0.2x = ₹1600$$
$$x = \frac{1600}{0.2} = 8000$$

∴ amount invested for 5 years
$$= 16000 - 8000 = 8000$$

Profit & loss

Section (c)

2) Ans:- Shopkeeper problem

Given, loss = 10%

profit (if sold 100 more)

$= 5\%$

Differ in S.p = 100

Let e.p = x

① Formula:- Diff in S.P
$$= \frac{\text{Cost price} \times (\text{profit /or loss})}{100}$$

∴ ↳ before deriving,

$$\text{S.P (for 10\% loss)} = \frac{90 \times \text{C.p}}{100} \quad (100-10)$$

$$\text{S.p (for 5\% Profit)} = \frac{105 \times \text{Cp}}{100} \quad (100+5)$$

in order to derive, add profit & loss in this formula,

$$\text{Diff in S.p} = \frac{\text{C.p} \times (10+5)}{100}$$

$$100 = \frac{\text{C.p} \times 15}{100}$$

$$\Rightarrow \text{C.p} = \frac{10000}{15} = 666.66$$
$$= ₹667\text{//}$$

②Ans:- Given, Let us assume cost price be ₹100,

& Marked price = 30% of C.p ~~× ₹~~
Successive discount = 10 each
$$10+10 = 20$$
$$a = 10 \qquad a \qquad b$$
$$b = 10$$

So,

Marked price = C.p + 30°/₀ of

= 100 + 30 = 130

So, Net Discot
(successive discot)

$$= a + b - \frac{a \times b}{100}$$

$a = 10$
$b = 10$

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

$$= 20 - 1 = 19\%$$

$\frac{10 + 20}{+ 10 \times 20}{100}$

So, S.p = M.p - Net discot

$$= 130 - 19\% \text{ of } 130$$

$$= 130 - \frac{19}{100} \times 130 = 130 - 24.7$$

$\frac{30 + 1}{3^{2}/\!/}$

$$= ₹105.3$$

∴ Since C.p = ₹100   SP = ₹105.3,

$\frac{120 -}{32}$

Gain = 105 - 100 = ₹5.3

$\frac{8d}{}$

Gain % = $\frac{5.3}{100} \times 100 = 5.3\%$,

120   100

23Ans:- Given, Cost price of 10 article

$$= ₹8$$

$$C.P \text{ of article} = \frac{8}{10}$$

$$= 0.8$$

S.p of article $= ₹1.20$

∴ profit $= S.p - C.p = 1.20 - 0.8$

$$= 0.4$$

∴ profit % $= \dfrac{0.4 \times 100^{50}}{0.8^{1}} = 50\%$

24Ans:- Given, Discount $= 20\%$

profit $= 25\%$

Mark up % $= \left(\dfrac{100 + profit\%}{100 - Discount\%} \times 100\right) - 100$

$$= \left(\left(\dfrac{100 + 25}{100 - 25}\right) \times 100\right) - 100$$

$$= (156.25) - 100 = 56.25$$

$$10 + 20 + \frac{10 \times 20}{100}$$

$$30 + \frac{200}{100} = 32$$

25Ans: Given,

A makes profit of 10%

B makes prot of 20%

Final S.p of C

= ₹132

S.p of A = ?

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132
 20
152
 10
162
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Since Profit% of A increases till B increases, apply Successive change for resultat profit pera

result perct = $+x + y + \frac{xy}{100}$

$$= 10 + 20 + \frac{10 \times 20}{100}$$

$$= 30 + \frac{200}{100} = 32\%$$

∴ S.p of A = Final S.p of C -
                     net perct

= 132 - 32 = ₹100//

26Ans:- Given, Markup Price is Increased by 20%

Discout is increased from 10 to 20%

net effect on (S.P) = ?

① Initial S.P:

Assum initial M.P = ₹100

∴ Intial S.P = 100 - 10 = ₹90

② New S.P:

New marked price after 20%

= 100 + 20% = 120

∴ New S.P = $120 - \dfrac{\overset{24}{\cancel{20}}}{\underset{\underset{8}{\cancel{100}}}{}} \times \overset{24}{\cancel{120}}$

= 96

③ Diff in = 96 - 90 = ₹6 increase

④ Percetage change = $\dfrac{6}{90} \times 100 = 6.67$ %

increase

$$\frac{900}{}$$

$$\left(\frac{10}{100}\right)^2 = \frac{1}{100}$$

27Ans! overall weight (loss %)

$$= \left(\frac{x}{100}\right)^2$$

$$\frac{90}{100-90}$$

$$= \left(\frac{10}{100}\right)^2 = \frac{1}{100}$$

$$= 1\%$$

28Ans. Given, False weight

$$\frac{900}{.084} \qquad = 900g$$

$$= \frac{900}{1000} = 0.9$$

$$900x \qquad C.P \text{ of } 900g \text{ false} = \frac{900 \times 100}{1000}$$

$$= ₹90\%$$

$$\frac{900 \times 10}{1000} \qquad S.P = ₹100 \qquad \frac{90 \times 100}{100}$$

$$0.9 \qquad \text{Gain} = 100 - 90 = 10,$$

$$\frac{0.9}{1-0.9} \times 100 \qquad \text{Gain}\% = \frac{10 \times 100}{90} = 11.11\%$$

$$\text{(cor)}$$

$$\frac{0.9 \times 100}{0.1}$$

$$\frac{1.9}{99.9}$$

$$\frac{0.9+1}{100} \times 100$$

$$\frac{-0.9}{6.0}$$

$$\text{Error} = 900g$$

$$\frac{900}{1000} = 0.9 \, kg$$

$$= 0.9 \times 100 = 20$$

$$\frac{x}{9.9}$$

True weight = 1000 − 900 = 10%

So, Gain° 10 = $\frac{10}{90} \times 100 = 11.1\%$

Gain° 10 = $\frac{Error}{True\,weight} \times 100$

Error = 900g
actual Error = 1000 − 900 = 100g

True weight = 900g

Gain° 10 = $\frac{100}{900} \times 100 = 11.1\%$

29Ans:- Given, Discount = 5%
      Gain% = 20%
      C.P (CP) = ₹100

∴ Gain% = S.P − C.P

⇒ S.P ⇒ Gain + C.P
    = 100 + 20 = ₹120

S.P = M.P − Discount ⇒ 120 = M.P
           $\frac{-5}{100}$

Here Discout $= 100 - Dis \%$
$$= 100 - 5 = 95\%$$

$\therefore 120 = M \cdot P \times \left(5 \quad \dfrac{\overset{MP}{-100}}{}\right) \times 100\%$

$120 = M \cdot P \times 0.95$

$M \cdot P = \dfrac{120}{0.95} = ₹126.32$

So

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$M \cdot P = \dfrac{100 + Gain\%}{100 - Discout\%} \times c \cdot p$

$= \dfrac{120}{95} \times 100 = ₹126.33$