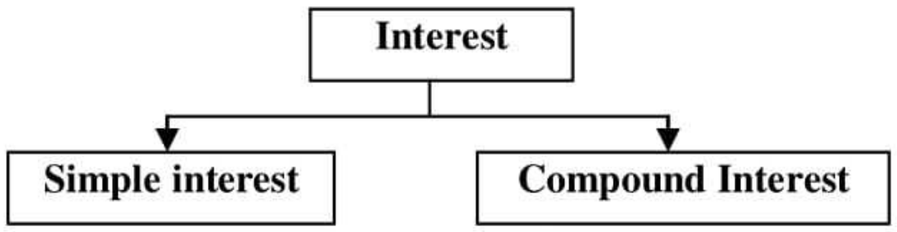
Teacher's Discussion | Interest

Interest (Simple and Compound Interest) ব্যাংক জব রিক্রুটমেন্টের জন্য ভীষণ গুরুত্বপূর্ণ একটি অধ্যায়। প্রায় সকল ব্যাংকে ৩০ মার্কসের মোট এমসিকিউ তে ৩/৪ টি এবং ২০-২৫ মার্কসের পরীক্ষায় ২/৩ টি প্রশ্ন আসে। ক্লাসে এমসিকিউ ফরম্যাটে পড়ানোর সুবিধার্থে টপিকস ক্লাসিফাইড করা হলো। টিচার চাইলে এমসিকিউ এর জন্য শর্ট-কাট নিয়ম শেখাতে পারবেন। তবে তার আগে অবশ্যই মূল নিয়ম শেখাবেন। কোন অবস্থাতেই মূল নিয়ম বাদে শর্টকাট শেখাবেন না।



Simple Interest

✍ সূত্র, $I = Pnr$

এখানে, I → Interest
p → Principal
r → rate
n → Number of Year

Compound Interest

✍ সূত্র, $C = P(1+r)^n$

এখানে, C → Compound value.
p → Principal
r → rate
n → Number of Year

NB: এগুলো ব্যতীত অন্য সকল ক্ষেত্রে simple interest -এর সূত্র প্রযোজ্য।

✍ **Situations : (চিনে নিন কখন চক্রবৃদ্ধি সুদের সূত্র ব্যবহার করবেন)**

(i) For Population
(ii) For salary
(iii) When the word compound is given

✍ Topic : Difference of Simple and Compound Interest
(A comparative Measure)

01. What will be the difference between simple and compound interest @ 10% per annum on a sum of Tk. 1000 after 4 years?
(A) Tk. 31 (B) Tk. 32.10 (C) Tk. 40.40 (D) Tk. 64.10 (E). None

Teacher's Discussion | Simple Interest

Simple Interest: The amount of money that you pay to borrow money or the amount of money that you earn on a deposit
Annual Interest Rate: The percent of interest that you pay for money borrowed, or earn for money deposited
General Information : $I = \frac{Pnr}{100}$

i) Principle: The money borrowed or lent out for a certain period is called the principal or the sum (P).
ii) Interest: The borrower pays a certain amount for the use of this money is called interest (S.I).
iii) Time: The borrowing is for a specified period called Time (T).
iv) Rate of interest: The specified term is expressed as percent of the principal is called rate of interest (R %).
v) Aggregate Amount: The sum of the principal and the interest is called the amount or Future value. Aggregate $Amount = principal + interest = P + I = P + \frac{Pnr}{100} = P\left(1 + \frac{nr}{100}\right)$

Discussed Types:

- Basic Rules
- Rate and Duration Calculation
- Multiplication Rule
- Interest Change due to rate Change

Topic - 1 : Basic Rules

02. The simple interest on a sum of money will be Tk. 600 after 10 years. If the principal is trebled after 5 years, what will be the total interest at the end of the tenth year?
(A) Tk. 600 (B) Tk. 900 (C) Tk. 1200 (D) Tk. 1500 (E) None

Topic - 2 : Rate and Duration Calculation

03. A sum of money at simple interest aggregates to BDT 2800 in 2 years and to BDT 3250 in 5 years at rate of ?
(A) 3% (B) 4% (C) 5% (D) 6% (E) None

Remember : By mentioning rate insted of duration, Number of year(s) can be asked. Not only that in the above problem **Principal** can be asked also.....

Topic - 3 : Multiplication Rules

04. Bank Asia usually offered double benefit scheme at 8 years. Calculate their rate of interest assume that they disbursed benefit at simple interest.
(A) 10.50% (B) 12.50% (C) 13.50% (D) 15% (E) None

Topic - 4 : Interest rate change due to rate change

05. Simple interest rate of a bank was reduced to 5% from 7%. As a consequence, Karim's income from bank interest was reduced by Tk. 2100 in 5 years. How much was Mr. Karim's initial deposit with the bank?
(A) BDT 12,500 (B) BDT 21,000 (C) BDT 33,500 (D) BDT 46,000 (E) None of these

Teacher's Discussion	Compound Interest

Compound interest: When interest charged over a period of time is added up in the principal, the interest so charged on this new principal is called compound interest.

If P = sum or Principal n = time in years R = rate percent per annum

Then, amount = $P\left(1+\frac{r}{100}\right)^n$

i) When interest is compounded half-yearly, Amount = $P\left(1+\frac{\frac{r}{2}}{100}\right)^{2n}$

ii) When interest is compounded quarterly, Amount = $P\left(1+\frac{\frac{r}{4}}{100}\right)^{4n}$

iii) When interest is compounded annually but time in fraction, say 2.5 years

$$\text{Amount} = P\left(1+\frac{r}{100}\right)^2\left(1+\frac{\frac{r}{2}}{100}\right)$$

iv) When rates are different for different years, say R1%, R2%,R3%, __ Rn% for 1st, 2nd,3rd, __ nth years respectively then,

$$\text{Amount} = P\left(1+\frac{R1}{100}\right)\left(1+\frac{R2}{100}\right)\left(1+\frac{R3}{100}\right)\_\_\_\_\_\_\left(1+\frac{Rn}{100}\right)$$

v) Present worth of Rs. X due n years hence is given by: Present worth = $\frac{x}{\left(1+\frac{R}{100}\right)^n}$

Very Important Formulae's :

The **difference** between the **simple interest and compound interest for 2 year** (or terms) is given by the formula,

$$\text{Difference} = P\left(\frac{R}{100}\right)^n$$

The **difference** between the **simple interest and compound interest for 3 year** (or terms) is given by the formula,

$$\text{Difference} = P\left(\frac{R^2(R+300)}{100^3}\right)$$

Concept of Equal Installments in Compound interest

$$P = \frac{x}{\left(1+\frac{r}{100}\right)^n} + \frac{x}{\left(1+\frac{r}{100}\right)^{n-1}} + \frac{x}{\left(1+\frac{r}{100}\right)^{n-2}} + \text{-------------} + \frac{x}{\left(1+\frac{r}{100}\right)}$$

P = Principal X = installment R = rate N = number of years

Discussed Types:

- Basic Rules and Duration factors
- Equal Installment

Topic -1 : Basic Rules

06. Mr. Karim deposited TK 800 in a Bank at 15% annual compound interest rate At the end of the second year, the total amount including the interest will be:

(A) 850 (B) 900 (C) 1025 (D) 1058 (E) None

07. Laboni bought a 1-year, Tk. 10,000 certificate of deposit that paid interest at an annual rate of 8 percent compounded semiannually. What was the total amount of interest paid on this certificate at maturity?

(A) Tk. 10,464 (B) Tk. 864 (C) Tk. 816 (D) Tk. 800 (E) Tk. 480

Topic -2 : Equal Installment

08. A sum of \$210 was taken as a loan. This is to be paid back in two equal installments. If the rate of the interest be 10% compounded annually, then the value of each installment is:

(A) \$121 (B) \$127 (C) \$210 (D) \$225 (E) None

09. A sum of \$2,00,00 was taken as a loan. This is to be paid back in three equal installments. If the rate of the interest be paid compounded annually, then the value of each installment is:

(A) \$1,00,000 (B) \$1,20,000 (C) \$80,000 (D) \$85,000 (E) Data inadequate

Teacher's Discussion | **Profit-Loss & Interest (লাভ-ক্ষতি ও সুদকষা)**

লাভ-ক্ষতি (Profit and Loss) ব্যাংক জব রিক্রুটমেন্টের জন্য ভীষণ গুরুত্বপূর্ণ একটি অধ্যায়। প্রায় সকল ব্যাংকে ৩০ মার্কসের মোট এমসিকিউ তে ২/৩ টি এবং ২০-২৫ মার্কসের পরীক্ষায় ১/২ টি প্রশ্ন আসে।

Discussed Types :

- Basic Rule
- Successive Rule
- P-L determination on real value
- P-L determination from sell Price
- P-L or CP determination from Mark Price
- Actual and Pseudo profit and Loss
- Break even method/No Profit and No Loss Method
- Profit and loss by quantity.

Topic - 01: Basic Rule

10. A shopkeeper sold an item at 20% profit and another at 10% loss. If the cost price of those items are equal then find overall profit or loss.
(A) 5% Loss (B) 5% Profit (C) 10% Profit (D) 10% Loss (E) None

Topic - 02: Successive Rule

11. A store usually sells certain item at 20% profit, In week that store offered 20% discount of that product. During the sell what percents profit/loss the store makes on item.
(A) 4% Profit (B) 4% Loss (C) 10% Profit (D) 10% Loss (E) None

Topic - 03: P-L determination on real value

12. The percentage profit earned by selling an article for BDT 1920 is equal to the percentage loss incurred by selling the same article for BDT 1280. At what price should the article be sold to make 25% profit?
(A) BDT 2000 (B) BDT 2200 (C) BDT 2400 (D) BDT 2500 (E) None

Topic - 04: P-L determination from sell price

Required Formula : 01. $CP=\frac{SP\times 100}{100\pm P/L}$ 02. $SP=CP\pm\frac{P/L}{100}\times CP$

13. By selling an article for Tk.72, a merchant incurs a loss of 10%. What should the selling price (Taka) be if he should gain 5%?
(A) 88 (B) 84 (C) 80 (D) 78 (E) 90

14. A chair was sold at a loss of 10% if the selling price was Tk. 240 more, then the seller would have made a profit of 20%. What was the cost of the chair?
(A) 800 (B) 1000 (C) 1200 (D) 1300 (E) None

15. **An AC salesman makes a profit of 25% on all sales. Minimum how many AC will he have to sell for $325 each to make a total profit of at least $200?**
(A) 3 (B) 4 (C) 5 (D) 6 (E) 7

16. **By selling a pen at Tk 39, the gain is as much percents as its cost, what is the cost?**
(A) Tk. 27 (B) Tk. 33 (C) Tk. 30 (D) Tk. 20 (E) Tk 40

✍ Topic - 05: Mark price & Discount Concept

17. **A trader had sold an item at 20% discount and made 25% profit? What is the profit if he sold that item at Mark Price?**
(A) 56.25% (B) 25.56% (C) 50.25% (D) 54.25% (E) None

18. **A shopkeeper makes a loss of 10% by selling an item at 72% of its marked price What will be the percent profit/Loss made by the shopkeeper if he sells the item at 12% discount?**
(A) 5% profit (B) 10% profit (C) 5% loss (D) 10% loss (E) None

✍ Topic - 06: Actual and Pseudo Profit and Loss

19. **A merchant compute 25% profit on sales. What is his actual profit?**
(A) 33.33% (B) 50% (C) 25% (D) 20% (E) None

✍ Topic - 07: Break even or no profit and no loss method

20. **A trader buys two Television for Tk 80,000/- He sells one of them at a profit of 20% and the other at a loss of 12% and makes no profit or loss at the end. What is the cost price the article that he sold at loss?**
(A) 30000 (B) 50000 (C) 12500 (D) 20000 (E) None

✍ Topic - 08: Profit and loss by quantity

Case -1 : Equal pricing $P/L = \frac{Cost\ Quantity - Sell\ Quantity}{Sell\ Quantity} \times 100$

21. **If the purchasing price of 15 apples and selling price of 12 apples are the same, then how much is the gain in percentage form?**
(A) 33.33% (B) 15% (C) 20% (D) 25% (E) None

Case -2 : Unequal pricing

22. **Some articles were bought at 6 articles for Tk 5 and sold at 5 articles for Tk 6. Gain percent is:**
(A) 30% (B) 33.33% (C) 35% (D) 44% (E) None

Students' Work — Simple & Compound Interest

1. **A certain sum of money at simple interest amount to Rs. 1040 in 3 years and to Rs. 1360 in 7 years. Then that sum is –**
   a. Rs. 800 b. Rs. 850 c. Rs. 820 d. Rs. 780 e. None of these
2. **x, y and z are three sums of money such that y is the simple interest on x and z is the simple interest on y for the same time and same rate of interest. Then, we have**
   a. $y^2 = z$ b. $x^2 = yz$ c. $z^2 = xy$ d. $y^2 = xz$ e. None of these
3. **A sum of Rs. 2668 amounts to Rs. 4669 in 5 yr at the rate of simple interest. Find the rate percent**
   a. 10% b. 35% c. 20% d. 12% e. None of these
4. **What will be simple interest for 1 yr and 4 months on a sum of Rs. 25800 at the rate of 14% per annum?**
   a. Rs. 4816 b. Rs. 4810 c. Rs. 4916 d. Rs. 4618 e. None of these
5. **At what rate of annual simple interest, a certain sum will amount to four times in 15 yr?**
   a. 10% b. 15% c. 20% d. 12% e. None of these
6. **A sum becomes its double in 10yr. Find the annual rate of simple interest**
   a. 10% b. 15% c. 20% d. 12% e. None of these
7. **At simple interest, a sum becomes 3 times in 20 yr. Find the time in which the sum will be double at the same rate of interest?**
   a. 10 yr b. 15 yr c. 20 yr d. 12 yr e. None of these
8. **A certain sum becomes 3 fold at 4% annual rate of interest. At what rate, it will become 6 fold?**
   a. 10% b. 15% c. 20% d. 12% e. None of these
9. **At a simple interest a sum amounts to Rs. 1012 in 2.5 yr and becomes Rs. 1057.54 in 4 yr. What is the rate of interest?**
   a. 2% b. 3% c. 5% d. 4% e. None of these
10. **Find the difference in amount and principal for Rs. 4000 at the rate of 5% annual interest in 4 yr.**
    a. Rs. 800 b. Rs. 850 c. Rs. 820 d. Rs. 780 e. None of these
11. **A sum was invested for 4 yr at a certain rate of simple interest, if it had been invested at 2% more annual rate of interest, when Rs. 56 more would have been obtained. What is the sum?**
    a. Rs. 800 b. Rs. 720 c. Rs. 750 d. Rs. 700 e. None of these
12. **Harsha makes a fixed deposit of Rs. 20000 in Bank of India for a period of 3 yr. If the rate of interest be 13% sl per annum charged half-yearly, what amount will he get after 42 months?**
    a. Rs. 29000 b. Rs. 29200 c. Rs. 29100 d. Rs. 28100 e. None of these
13. **The difference of simple interest from two banks for Rs. 1000 in 2 yr is Rs. 20. Find the difference in rates of interest –**
    a. 2% b. 3% c. 5% d. 4% e. None of these
14. **Raju lent Rs. 400 to Ajay for 2 yr and Rs. 100 to Manoj for 4 yr and received from both Rs 60 as collective interest. Find the rate of interest, simple interest being calculated**
    a. 2% b. 3% c. 5% d. 4% e. None of these
15. **On what sum of money will the S.I for 4 years at 8% p.a. is half of the s.I on Rs. 400 for 2 years at 10% p.a.?**
    a. Rs. 100 b. Rs. 120 c. Rs. 125 d. Rs. 144 e. None of these
16. **A sum of Rs. 500 amounts to Rs. 650 in 3 yr at simple interest. If the interest rate is increased by 3%, it would amount to how much?**
    a. Rs. 690 b. Rs. 680 c. Rs. 685 d. Rs. 695 e. None of these
17. **What will be the ratio of simple interest earned by certain amount at the same rate of interest for 12 yr and for 18 yr?**
    a. 3:2 b. 2:3 c. 4:5 d. 5:4 e. None of these
18. **A sum of Rs. 1550 was lent partly at 5% and partly at 8% per annum simple interest. The total interest received after 4 yr was Rs. 400. The ration of the money lent at 5% to that lent at 8%?**
    a. 16:15 b. 15:16 c. 17:9 d. 9:17 e. None of these

19. The annual payment of Rs. 160 in 5 yr at 5% per annum simple interest will discharge a debt of –
a. Rs. 800 b. Rs. 600 c. Rs. 400 d. Rs. 880 e. None of these

20. The simple interest on a sum of money at 9% per annum for 5 yr is half the sum, is –
a. Rs. 80 b. Rs. 60 c. Rs. 40 d. data inadequate e. None of these

21. The simple interest on a sum of money at 8% per annum for 6 yr is half the sum. What is the sum?
a. Rs. 800 b. Rs. 600 c. Rs/ 400 d. data inadequate e. None of these

22. A sum becomes 6 fold at 5% per annum. At what rate, the sum becomes 12 fold?
a. 10.5% b. 10.25% c. 10.75% d. 11% e. None of these

23. A sum of money becomes 9 times in 20 yr. Find the 10 times of rate of interest
a. 200% b. 300% c. 500% d. 400% e. None of these

24. The simple interest on a sum of money will be Rs. 200 after 5 yr. In the next 5 yr, principle is-tripled. What will be the total interest at the end of the 10th yr?
a. Rs. 800 b. Rs. 600 c. Rs. 400 d. 900 e. None of these

25. What must be the principal that amounts to Rs. 720 in 2 years 6 months as 5% per annum simple interest?
a. Rs. 800 b. Rs. 640 c. Rs. 700 d. 840 e. None of these

26. A certain sum given on simple interest became double in 20 yrs. In how many years will it be four times?
a. 20 yr b. 30 yr c. 50 yr d. 60 yr e. None of these

27. Find out the capital required to earn a monthly interest of Rs. 600 per month as 6% simple interest
a. Rs. 1,80,000 b. Rs. 1,60,000 c. Rs. 1,40,000 d. Rs. 1,20,000 e. None of these

28. A main derives his income from an investment of Rs. 2,000 at a certain rate of interest and Rs. 1,600 at 2% higher. The whole interest in 3 yrs in Rs. 960. Find the rate of interest
a. 8% b. 6% c. 5% d. 4% e. None of these

29. If the C. I on a certain sum for 3 years at 20% p.a. is Rs. 728, what is the sum invested?
a. 1500 b. 800 c. 1200 d. 1000 e. None of these

30. Find the simple interest on Rs. 600 from 3rd March to 15th May of a year at 6% p.a.
a. Rs. 7.2 b. Rs. 7 c. Rs. 6.5 d. 6 e. None of these

31. A sum doubles in 20 years at simple interest. How much is the rate?
a. 8% b. 6% c. 5% d. 4% e. None of these

32. The simple interest on a certain principal @4% p.a for 5 years is Rs. 800. How much is the principal amount?
a. Rs. 8000 b. Rs. 6000 c. Rs. 4000 d. Rs. 2000 e. None of these

33. The simple interest earned on a certain sum of money for 10 years at the rate of 5% p.a. was half the sum. How much is the sum?
a. Rs. 3000 b. Rs. 5000 c. Rs. 4000 d. data inadequate e. None of these

34. Rs. 800 becomes Rs. 956 in 3 years at certain simple rate of interest. If the rate of interest is increased by 4%, what amount will Rs. 800 become in 3 years?
a. 1050 b. Rs. 1052 c. Rs. 1060 d. Rs. 1048 e. None of these

35. A person invests Rs. 5000 at 5% p.a. simple interests for a certain period and earns Rs. 750. If he earns Rs. 720 on RS. 6000 in the same time period what is the rate of interest?
a. 8% b. 6% c. 5% d. 4% e. None of these

36. The rate of interest at which an amount of Rs. 1800 on compound interest becomes Rs. 1984.50 in 2 year is
a. 8% b. 6% c. 5% d. 4% e. None of these

37. Which is the principal amount which earns Rs. 132 as compound interest for the second year at 10% per annum?
a. Rs. 1000 b. Rs. 1200 c. Rs. 1400 d. Rs. 800 e. None of these

38. The amount of Rs. 7500 at compound interest at 4% per annum for 2 years, is
a. Rs. 8112 b. 8110 c. Rs. 8100 d. Rs. 8200 e. None of these

39. A sum of money invested at compound interest amounts to Rs. 800 in 3 years and Rs. 840 in 4 years. What is the rate of interest for per annum?
a. 8% b. 6% c. 5% d. 4% e. None of these

40. A man borrowed Rs. 800 at 10% per annum simple interest and immediately lent the whole sum at 10% per annum compound interest. What does he gain at the end of 2 years?
a. Rs. 8 b. Rs. 6 c. Rs. 5 d. Rs. 4 e. None of these

41. What is the difference between the CI and SI on a sum of Rs. 1600 at 5% p.a. for period of 2 years?
a. Rs. 8 b. Rs. 6 c. Rs. 5 d. Rs. 4 e. None of these

42. What is the difference between the compound interest and the simple interest on a capital of Rs. 16,000 at the rate of 15% per annum for a period of 2 years?
a. Rs. 480 b. Rs. 360 c. Rs. 350 d. Rs. 450 e. None of these

43. At what rate of interest per annum would the difference between the compound interest and the simple interest at the end of two years on the capital of Rs. 60000 be Rs. 1944?
a. 18% b. 16% c. 15% d. 14% e. None of these

44. The difference between the simple interest on a certain sum at the rate of 10% per annum for 2 years an compound interest which is compounded every 6 months is Rs. 124.05. What is the principal sum?
a. Rs. 7000 b. Rs. 8000 c. Rs. 9000 d. Rs. 10000 e. None of these

45. The different between the compound interest and simple interest on a certain sum of money for 2 years at 10% per annum is Rs. 15. Find the sum of money
a. Rs. 1300 b. Rs. 1500 c. Rs. 1400 d. Rs. 1600 e. None of these

46. Exchange rate of dollar vs rupee increases at the rate of 10% per month. If the current rate is Rs. 40 per dollar, what will be the rate at the end of a month?
a. Rs. 45 b. Rs. 44 c. Rs. 40 d. Rs. 41 e. None of these

47. Balan borrowed Rs. 1,000 at 10 percent per annum simple interest. He immediately lent the whole sum at 10 percent per annum compound interest. At the end of 2 years, he would gain
a. Rs. 30 b. Rs. 50 c. Rs. 10 d. Rs. 20 e. None of these

48. What is the difference between compound interest and simple interest for the sum of Rs. 2000 over a 2 year period, if the compound interest is calculated at 20% and simple interest is calculated at 23%?
a. Rs. 45 b. Rs. 44 c. Rs. 40 d. Rs. 41 e. None of these

49. At what percentage per annum, will Rs. 10,000 amount to Rs. 17280 in three years? (Compound interest being reckoned)
a. 20% b. 30% c. 50% d. 40% e. None of these

50. A sum of money doubles itself in 5 years. In how many years will it become fourfold (if interest is compounded)?
a. 8yr b. 9 yr c. 6 yr d. 10 yr e. None of these

51. If the compound interest on a certain sum at 10% per annum for 2 years is Rs. 21. What could be the simple interest?
a. Rs. 20 b. Rs. 30 c. Rs. 40 d. Rs. 10 e. None of these

52. If compound interest on a certain sum of money for 2 years at 10% is Rs. 25200, find the simple interest at the same rate for the same time
a. Rs. 25000 b. Rs. 24600 c. Rs. 24000 d. 23000 e. None of these

53. A sum of money doubles itself at compound interest in 15 years. In how many years it will become eight times?
a. 40 b. 35 c. 45 d. 50 e. None of these

54. A sum of Rs. 400 amounts to Rs. 441 in 2 years. What will it amount to if the rate of interest is increased by 5%?
a. Rs. 480 b. Rs. 484 c. Rs. 450 d. Rs. 425 e. None of these

Try yourself

1. $P + 7I = 1360$ ------(i) $P + 3I = 1040$ ----------(ii) Solving $4I = 320 \therefore I = 80$

$\therefore$ Sum $= 1040 - 3 \times 80 = 800$ **[Ans. a]**

2. Let, the time is 't' years & the rate of Interest is r%

At 1st condition, $y = \frac{x \times r \times t}{100}$ ---------- (i) At 2nd condition, $z = \frac{y \times r \times t}{100}$ ---------- (ii)

Performing (i) ÷ (ii), $\frac{y}{z} = \frac{x \times r \times t}{y \times r \times t} \therefore y^2 = xz$ **[Ans. d]**

3. Here, Interest (I) = (4669–2668) = 2001 tk. $n = 5$ & $P = 2668 \therefore r = \frac{2001}{5 \times 2668} \times 100 = 15\%$ **[Ans. e]**

4. We know, $I = Pnr = (25800 \times \frac{4}{3} \times \frac{14}{100})$ tk. $= 4816$ **[Ans. a]**

5. Let, Principal = P Then, SI = 3P; no. of times, $n = 15 \therefore$ Rate $= \left(\frac{100 \times 3p}{p \times 15}\right) = 20\%$

Alternative: Rate $= \frac{(m-1)}{\text{years}} \times 100 = \frac{4-1}{15} \times 100 = 20\%$ **[Ans. c]**

6. $\frac{(m-1)}{\text{years}} \times 100 = \frac{(2-1)}{10} \times 100 = 10\%$ [Ans. c]

(Here, m = times, such as double, triple, etc)

7. Interest Rate $= \frac{(m-1)}{\text{years}} \times 100 = \frac{3-1}{20} \times 100 = 10\%$

$\therefore$ Required time $= \frac{(m-1)}{\text{rate}} \times 100 = \frac{2-1}{10} \times 100 = 10$ years **(Ans. a)**

8. Required no of time $= \frac{3-1}{4} \times 100 = 50$ years $\therefore$ Required rate of interest $= \frac{6-1}{50} \times 100 = 10\%$ **(Ans. a)**

9. $P + 4I = 1057.54$ ----------(i) $P + 2.5I = 1012$----------(ii) Solving $\therefore I = 30.36$

$\therefore$ Sum $= 1012 - 30.36 \times 2.5 = 936.1$ $\therefore$ Rate of Interest $= \frac{38.36}{936.1} \times 100 = 3.24\% \approx 3\%$ **(Ans. b)**

10. Here, Principal, P = 4000 tk, r = 5%, n = 4 years $\therefore SI = 4000 \times 4 \times \frac{5}{100} = 800$

$\therefore$ Total Amount = (4000 + 800) = 4800 tk.

$\therefore$ Required Difference = (Amount – Principal) = 4800 – 4000 = 800 tk. **(Ans. a)**

11. Let, Sum = P Rate of Interest = r% no. of times, n = 4

ATQ, $\frac{p \times (r+2) \times 4}{100} - \frac{p \times r \times 4}{100} = 56 \Rightarrow \frac{4pr + 8p - 4pR}{100} = 56 \Rightarrow \frac{8p}{100} = 56 \therefore p = 700$ **(Ans. d)**

12. Here, P = 20,000 $r = \frac{13}{2 \times 100}$ $n = \left(\frac{42}{12 \times 2}\right) = 7$ $\therefore$ Interest $= 20{,}000 \times \frac{13}{100 \times 2} \times 7 = 9100$

$\therefore$ Required Amount after 42 months = (20,000 + 9100) tk. = 29,100 tk **(Ans. c)**

13. $\frac{1000 \times 2 \times r_1}{100} - 1000 \times 2 \times \frac{r_2}{100} = 20 = (r_1 - r_2) = \frac{20}{20} = 1\%$ **(Ans. e)**

14. Let, the simple Interest for Ajay & Manoj = r%

ATQ, $400 \times 2 \times \frac{r}{100} + 100 \times 4 \times \frac{r}{100} = 60 \Rightarrow 8r + 4r = 60 \Rightarrow 12r = 60 \therefore r = 5\%.$

15. $SI = 400 \times 2 \times \frac{10}{100} = 80$ $\therefore$ ½ of SI = (80 ÷2) = 40

Let, sum = p

ATQ, $40 = p \times 4 \times \frac{8}{100} \Rightarrow p = \frac{40 \times 100}{4 \times 8} \therefore p = 125$ **(Ans. c)**

16. Here, SI for 3 years = (650 – 500) = 150 $\therefore$ Interest Rate = $\frac{150 \times 100}{500 \times 3}$ = 10%

$\therefore$ New Interest for 3 years = 500 × 13% × 3 = 195 $\therefore$ Total Amount = (500 + 195) = 695 tk.

17. SM: 12:18 = 2:3 [As Principal & Interest rate are same]

18. Let, 1st part of lending amount @5% Interest = x tk & Rest part of lending @ 8% Internest (1550 – x) tk.

ATQ, $x \times 4 \times \frac{5}{100} + (1550 - x) \times 4 \times \frac{8}{100} = 400 \Rightarrow \frac{20x}{100} + \frac{49600 - 32x}{100} = 400 \Rightarrow -12x = -9600 \therefore x = 800$

$\therefore$ Rest part of lending amount = (1550 – 800) = 750 tk $\therefore$ Required Ratio = 800 : 750 = 16:15

19. Here, Annual payment / Installment = 160 no. of years = 5 Interest rate = 5%

Let, Debt / sum / principal = P

For Installment payment, Total Debt = (Installment payment + Installment pay x $year_1 \times$ rate) + Inst. payment (Ins. pay × $year_2 \times$ rate) + ... + Installment payment (for last year)

So, $P = \left[(160 + 160 \times \frac{5}{100} + (160 + 160 \times 2 \times \frac{5}{100}) + (160 + 160 \times 3 \times \frac{5}{100}) + (160 + 160 \times 4 \times \frac{5}{100}) + 160)\right]$

= 168 + 176 + 184 + 192 + 160 = 880 **(Ans. 880)**

20. Data Inadequate because there is no Principal given here on which we can apply. So, data is insufficient.

21. Data Inadequate

22. Required time = $\left(\frac{m-1}{rate} \times 100\right) = \left(\frac{6-1}{5} \times 100\right)$ = 100 years

$\therefore$ Required Rate = $\left(\frac{m-1}{years} \times 100\right) = \left(\frac{12-1}{100} \times 100\right) = 11\%$ **Ans. 11%**

23. Rate of Interest = $\frac{9-1}{20} \times 100 = 40\%$ $\therefore$ 10 times of rate of Interest = (40 × 10)% = 400% **Ans. 400%**

24. Each year SI. amount = (200 ÷ 5) = 40 tk.

As, Principal will be trabled then SI will be trabled. So, After 5 years Total SI amount = {(40 ×3) × 5}= 600 tk.

$\therefore$ Total Interest at the end of 10th year = (200 + 600) tk. = 800 tk. (Ans.)

25. Let, Principal = x tk. Time = 2 years 6 month = 2 ½ = $\frac{5}{2}$ years Interest rate = 5%

ATQ, $720 = x + x \times \frac{5}{2} \times \frac{5}{100} \Rightarrow 720 = x + \frac{x}{8} \Rightarrow 9x = 720 \times 8 \therefore x = 640$ **Ans. Principal = 640**

26. Rate of Interest = $\frac{m-1}{year} \times 100 = \frac{2-1}{20} \times 100 = 5\%$ $\therefore$ Required time = $\frac{m-1}{Rate} \times 100 = \frac{4-1}{5} \times 100 = 60$ years

27. Let, Capital = x ATQ, $600 = x \times \frac{1}{12} \times \frac{6}{100} \Rightarrow x = \frac{600 \times 12 \times 100}{6}$ $\therefore$ x = 120,000 **(Ans.)**

28. Let, Interest = x%

ATQ, $\frac{2000 \times x \times 3}{100} + \frac{1600 \times (x+2) \times 3}{100} = 960 \Rightarrow 60r + 48x + 96 = 960 \Rightarrow 108x = 960 - 96 \Rightarrow x = \frac{864}{108} = 8\%$

29. Here, CI = 728, Rate of Interest = 20% time = 3 years

ATQ, $P(1+i)^n - p = 728 \Rightarrow p\{(i+i)^n - 1\} = 728 \Rightarrow p = \frac{728}{\left\{\left(1 + \frac{20}{100}\right)\right\}^3 - 1} \Rightarrow p = \frac{128}{\frac{216-125}{125}} = 1000$ **(Ans)**

30. Time = (28 + 30 + 15) = 73 days = $\frac{73}{365} = \frac{1}{5}$ year $\therefore$ SI = $600 \times \frac{1}{5} \times \frac{6}{100} = \frac{36}{5} = 7.2$ **(Ans.)**

31. Rate of Interest = $\left(\frac{m-1}{time} \times 100\right) = \left(\frac{2-1}{20} \times 100\right) = 5\%$ **(Ans.)**

32. Principal = $\frac{800 \times 100}{4 \times 5}$ = 4000 tk.

33. Data Inadequate.

34. Rate of Interest = $\frac{52}{800} \times 100 = 6.5\%$ ∴New rate of Interest = (6.5 + 4)% = 10.5%

∴ Interest = $800 \times 3 \times \frac{10.5}{100} = 252$ ∴ Total amount = (800 + 252) = 1052 tk.

35. At 1st condition, $\Rightarrow \frac{750 \times 100}{5 \times 5000} = n$ ∴ n = 3 ∴ Rate of Interest = $\frac{720 \times 100}{6000 \times 3} = 4n$ **(Ans.)**

36. Let, Rate of Interest = r%

ATQ, $17280 = 1000\left(1 + \frac{R}{100}\right)^3 \Rightarrow \frac{17280}{1000} = \left(1 + \frac{R}{100}\right)^3 \Rightarrow \left(\frac{6}{5}\right)^3 = \left(1 + \frac{R}{100}\right) \Rightarrow \frac{6}{5} = \left(1 + \frac{R}{100}\right)$

$\Rightarrow 500 + 5R = 600 \Rightarrow 5R = 100$ ∴ R = 20 Ans. 20%

37. Let, Principal = @ tk ∴ 1st year compound Interest @10% = 10% of x

∴ Principal for second year = x + .10x = 1.12 ∴ 2nd year compound Interest = 1.1x × 10%

ATQ, $\frac{11x}{100} = 132 \Rightarrow x = \frac{132 \times 100}{11}$ ∴ x = 1200

38. Amount = Aggregate We know, Aggregate = $P(1 + i)^2$

Here, Principal = 7500 tk, n = 2, $i = \frac{4}{100} = \frac{1}{25}$ ∴ Aggregate = $7500 \times \left(1 + \frac{1}{25}\right)^2 = 7500 \times \frac{26 \times 26}{25 \times 25} = 8112$ **(Ans.)**

39. Let, Sum = P & Rate of Interest = ry

At 1st condition, $P\left(1 + \frac{r}{100}\right)^3 = 800$ --------- (i) At, 2nd condition, $P\left(1 + \frac{r}{100}\right)^4 = 840$ --------- (ii)

Performing (ii) ÷ (i) $\left(1 + \frac{r}{100}\right) = \frac{21}{20} \Rightarrow 20(100 + r) = 2100 \Rightarrow r = \frac{100}{20}$ ∴ r = 5 (Ans. A)

40. $SI = 800 \times 2 \times \frac{10}{100} = 160$ Compound Interest = $\left[\left\{800\left(1\frac{10}{100}\right)^2\right\} - 800\right] = 168$ ∴ Gain = 168 – 160 = 8 tk.(Ans. A)

41. $SI = 1600 \times 2 \times \frac{5}{100} = 160$ ∴ $CI = \left[\left\{1600\left(1\frac{5}{100}\right)^2\right\} - 1600\right] = 164$ ∴ Required Difference = 164 – 160 = 4 tk.

42. $SI = 16000 \times 2 \times \frac{5}{100} = 2400$ $CI = \left[\left\{1600\left(1 + \frac{15}{100}\right)^2\right\} - 1600\right] = 2760$

∴ Required Difference = 2760 – 2400 = 360 (Ans.d)

43. Let, Interest Rate = r% ∴ $SI = 60{,}000 \times 2 \times \frac{r}{100} = 1200\,r$ ∴ $CI = \left[\left\{60000\left(1 + \frac{r}{100}\right)^2\right\} - 60000\right] = 1200r + 6r^2$

ATQ, $1200r + 6r^2 - 1200\,r = 1944 \Rightarrow r^2 = 324$ ∴ r = 18 Ans. 18% (Ans. A)

44. Let, Principal = x tk ∴ $SI = x \times 2 \times \frac{10}{100} = \frac{x}{5}$ ∴ $CI = \left\{x\left(1 + \frac{10}{2 \times 100}\right)^{2 \times 2}\right\} - x = \frac{194481}{160000} - x = \frac{34481x}{160000}$

ATQ, $\frac{34481}{160000} - \frac{x}{5} = 124.05 \Rightarrow 34481x - 32000x = 124.05 \times 160000 \Rightarrow 2481x = 124.05 \times 160{,}000$

$\Rightarrow x = \frac{124.05 \times 160000}{2481 \times 100}$ ∴ x = 8000 (Ans.d)

45. Let, Sum = x tk $SI = x \times 2 \times 10$ ∴ $CI = \left[\left\{x\left(1 + \frac{10}{100}\right)^2\right\} - x\right] = \frac{121x - 100x}{100} = \frac{21x}{100}$

ATQ, $\frac{21x}{100} - \frac{x}{5} = 15$ ∴ x = 1500 Ans. 1500 tk. (ans. B)

46. Required Rate = 40 + 10% of 40 = 44 tk. (Ans.c)

47. $SI = 10000 \times 2 \times \frac{10}{100} = 200$ ∴ $CI = \left[\left\{10000 \times \left(1 + \frac{10}{100}\right)^2\right\} - 1000\right] = 210$ ∴ Gain = 210 – 200 = 10 tk. (Ans. C)

48. $SI = 2000 \times 2 \times \frac{23}{100} = 920 \therefore CI = \left[\left\{2000 \times \left(1+\frac{10}{100}\right)^2\right\} - 2000\right] = 880$

$\therefore$ Required Difference = (920 – 880) = 40 tk. (Ans. C)

49. $17280 = 1000\left(1+\frac{r}{100}\right)^3 \Rightarrow \left(1+\frac{r}{100}\right)^3 = \frac{17280}{10000} \Rightarrow 1+\frac{r}{100} = \frac{6}{5} \Rightarrow 500 + 5r = 600 \quad \therefore r = 20\%$ (Ans.a)

50. Let, Sum P & Interest rate = r% & time = n

ATQ, $P\left(1+\frac{r}{100}\right)^5 = 2p \quad \Rightarrow \left(1+\frac{r}{100}\right)^5 = 2$

Again, $P\left(1+\frac{r}{100}\right)^n = 4p \quad \Rightarrow \left(1+\frac{r}{100}\right)^n = 22 \quad \Rightarrow \left(1+\frac{r}{100}\right)^n = \left(1+\frac{r}{100}\right)^{5\times2} \therefore n = 10$ years.

(Ans. D)

51. Let, the sum = x

ATQ, $\left[\left\{x\left(1+\frac{10}{100}\right)^2\right\} - x\right] = 21 \quad \Rightarrow \frac{121x}{100} - x = 21 \quad \Rightarrow 21x = 2100 \quad \Rightarrow x = 100$

$\therefore$ simple Interest $= 100 \times 2 \times \frac{10}{100} = 20$ (Ans. A)

52. $25200 = \left\{P\left(1+\frac{10}{100}\right)^2 - P\right\} \quad \Rightarrow 25200 = \frac{121P - 100P}{100} \quad \Rightarrow P = \frac{25200 \times 100}{21} \therefore$

P = 120000

$\therefore$ SI = 120,000 × 2 × $\frac{10}{100}$ = 24000 tk. **(Ans. c)**

53. $P(1+\frac{r}{100})15 = 2P \Rightarrow \left(1+\frac{r}{100}\right)^{15} = 2$ ---------- (i)

Again, $P(1+\frac{r}{100})^n = 8P \Rightarrow \left(1+\frac{r}{100}\right)^n = 8 \quad \Rightarrow \left(1+\frac{r}{100}\right)^n = 2^3 \quad \Rightarrow \left(1+\frac{r}{100}\right)^n = \left(1+\frac{r}{100}\right)^{15\times3}$

$\therefore$ n = 45 years. **(Ans: c)**

54. $441 = 400\left(1+\frac{r}{100}\right)^2 \Rightarrow \frac{441}{400} = \left(1+\frac{r}{100}\right)^2 \Rightarrow \left(\frac{21}{20}\right)^2 = \left(1+\frac{r}{100}\right)^2 \Rightarrow r = \frac{100}{20}$

$\therefore r = 5$

$\therefore$ New Interest rate = (5 + 5)% = 10% $\therefore$ Amount $= 400 \times \left(1+\frac{10}{100}\right)^2 = 484$ **(Ans: B)**

Students' Work — Simple Interest

☑ (Try at home)

1. **Cost of a Mobile Rs.8000. Sudha bought Mobile in EMI. She paid a Down payment of Rs. 2000 and paid rest in 6 equal installments of Rs.1020 for next 6 months. Then what is the SI rate charged?**
   a) 6.5% b) 6.95% c) 10.5% d) 12.5% e) None
2. **Ajay lent Rs.8800 to be divided between his two sons aged 11 years and 13 years such that both of them would get an equal amount when lent at the** rate **of 10% SI when they attain 18 years of age. What is the share of elder in Rs.8800?**
   a) 4125 b) 4325 c) 4475 d) 4675 e) None
3. **SBI lent Rs. 10,000 to Deepak @7% SI for 10 years. Meanwhile, the government implemented a scheme due to which interest rate reduced by 2%. By this Deepak paid Rs.16,000 in total. Then after how many years after Deepak took the loan, the government introduced the scheme?**
   a) 3 Years b) 4 Years c) 5 years d) 6 years e) None

4. **What amount would Rs.2560 fetch if it is lent at 8% SI for 15 years?**
a) Rs.3072 b) Rs.4632 c) Rs.5072 d) Rs.5632 e) None

5. **Veena has to pay Rs. 2460 to Sita, 5 Months later at 6% SI per annum, and Gita has to pay Sita same amount at 7.5% SI per annum after certain months. If both took the same amount of loan from Sita then Gita paid loan after how many months?**
a) 3 Months b) 4 Months c) 6 Months d) 12 Months e) Cannot be

6. **Amit lent a part of Rs. 15900 to Raju at 6% SI. Rest to Anil at 5% SI. After 4 years he got an amount of Months Rs 19376 in total. Then what is the amount paid by Anil in total?**
a) Rs. 9176 b) Rs. 9847 c)Rs. 10200 d) Rs. 11200 e) None

7. **A man invests Rs. 124000 for 9 years at 5% SI. Income tax at the rate of 19% is deducted from interest earned at the end of every year. Find the amount at the end of the 9th year?**
a) Rs. 169198 b) RS. 169918 c) Rs. 196918 d) Rs. 199698 e) None

8. **Nitin invested an amount of Rs. 24000 at the 4% SI per annum, and another amount at 10% SI per annum. The total interest earned at the end of one year will be same as interest earned when the total amount invested at 6% SI per annum. Find the total amount invested?**
a) Rs.12000 b) Rs.24000 c) Rs.30000 d) Rs.36000 e) None

9. **A sum of money becomes Rs.1815 at 7% SI after 3 years. Same sum of money becomes Rs. 2235 at same interest after 7 years.**
a) Rs.1200 b) Rs.1500 c) Rs.1800 d) Rs.2000 e) None

10. **Pratap lent Rs.21600 to be divided between his two sons who aged 9 years and 11 years such that both of them would get an equal amount at certain age when lent at rate of 10% SI per anuum. If their investments are in the ratio of 51:57 respectively. Then at what age both received same amount?**
a) 15 Years b) 16 years c)18 years d) 21 years e) None

11. **On a certain sum, the simple interest at the end of 5(1/3) years becomes 4/9 of the sum. What is the rate percent ?**
a) 5.5% b) 9.1% c)7.6% d) 8.3% e) 10%

12. **P is going to pay Rs.700 to Q, 7 months later at 6% annual simple interest, Q is going to pay Rs.550 to P, 12 months later at 8% annual simple interest, if they decide to settle the debts, who will pay what amount to whom ?**
a) A, Rs.149 b) B,Rs.167 c) A, Rs.155 d) B, Rs.197 e) None

13. **A father left a will of Rs.5 lakhs between his two daughters aged 10 and 15 such that they may get equal amounts when each of them reach the age of 21 years. The original amount of Rs.5 lakhs has been instructed to be invested at 10% p.a. simple interest. How much did the elder daughter get at the time of the will?**
a) Rs.2,04,797 b) Rs.3,05,890 c) Rs.1,90,00 d) Rs.4,00,700 e) Rs.2,46,870

14. **Two equal some of money were invested at an annual rate of 10%, One sum at simple interest and other at compound interest, If the difference between the interest after 2 years was Rs.100, What were the sum invested ?**
a) 25,000 b) 100000 c) 20,000 d) 10,000 e) 50,000

15. **A man invests Rs.8000 for 5 years at 5% p.a. Simple Interest reckoned yearly. Income tax at the rate of 20% on the interest earned is deducted at the end of each year. Find the amount at the end of the fifth year.**
a) Rs.10,500 b) Rs.10,500 c) Rs.9,600 d) Rs.10,000 e) None

16. **Ajay bought Rs.11,000 from a bank to buy a car at 12% simple Interest. If he paid $ 6,600 as interest while clearing the loan, find the time for which the loan was given.**
a) 7 b) 3 c) 4 d) 5 e) 6

17. **Tarun invested an amount of Rs. 10000 at the simple interest rate of 8% per annum and another amount at the simple interest rate of 20% per annum. The total interest earned at the end of one year on the total amount invested became 12% per annum. Find the total amount invested.**
a) Rs.12,000 b) Rs.15000 c) Rs.5,000 d) Rs.10,000 e) None

18. **If simple interest on a certain sum of money for 6 years at 5% per annum is same as the simple interest on Rs. 650 for 9 years at the rate of 12% per annum then the sum of money is –**
a) Rs.2340 b) Rs.3240 c) Rs.2400 d) Rs.3500 e) None

19. **Kailash borrowed some money at the rate of 5% p.a. for the first three years, 8% p.a. for the next five years and 11% p.a. for the period beyond eight years. If the total interest paid by him at the end of eleven years is Rs. 8800, how much money did he borrow?**
a) Rs.7500 b) Rs.8000 c) Rs.9600 d) Rs.10,000 e) Rs.7,000

20. **If the annual rate of simple interest increases from 8% to 13%, a man's yearly income increases by Rs. 4800. His principal (in Rs.) is:**
a) Rs.90,000 b) Rs.96,000 c) Rs.88,000 d) Rs.1,00,000 e) None

21. **Out of Rs. 60,000 that Rahul has, he lends Rs. 10,000 at 11/2 % per annum simple interest and Rs. 32,000 at 6% per annum simple interest. He lends the remaining money at a certain rate of interest so that he gets total annual interest of Rs. 4000. The rate of interest per annum, at which the remaining money is lent, is?**
a) 5% b) 7.5% c) 8% d) 8.5% e) 10%

22. **Vivek invests Rs 15000 as fixed deposit at a bank at the rate of 10% per annum SI. But due to some pressing needs he has to withdraw the entire money after 5 years, for which the bank allowed him a lower rate of interest. If he gets Rs 8250 less than what he would have got at the end of 10 years, the rate of interest allowed by the bank is**
a)8% b) 8.5% c) 9% d) 9.5% e)10% An

23. **A father left a will of Rs.55 lakhs between his two sons aged 8.5 and 16 such that they may get equal amounts when each of them reach the age of 21 years. The original amount of Rs.55 lakhs has been instructed to be invested at 10% p.a. SI. How much did the elder son get at the time of the will?**
a) 25 lakh b) 26 lakh c) 28 lakh d) 33 lakh e) 36 lakh

24. **Manish borrows 8000 at simple interest from a money lender. At the end of 3 years, he again borrows 7000 and closes his account after paying 8415 as interest after 8 years from the time he made the first borrowing. Find the rate of interest.**
a) 6% b) 6.5% c) 8% d) 8.5% e) 9%

25. **A portion of Rs.8500 is invested at a8% per annum, while the remainder is invested at a 3% per annum. If the annual income from the portion earning a 8% per annum is thrice that of the other portion, what is the total income from the two investments after one year?**
a) Rs.350 b) Rs.370 c) Rs.450 d) Rs.480 e) Rs.520

26. **Raghu lends Rs 50,000 of two of his friends. He gives Rs 30,000 to the first at 6% p.a. simple interest. He wants to make a profit of 10% on the whole. The simple interest rate at which he should lend the remaining sum of money to the second friend is**
a) 8% b) 16% c) 11% d) 17% e)19%

27. **The rate of Simple Interest in SBI & BOB are in the ratio of 5:7. Gokul wants to deposit his total savings in two banks in such a way that he receive equal half-yearly interest from both banks. He should deposit in both banks SBI & BOB in the ratio of**
a) 4:5 b)7:5 c) 9:5 d) 8:5 e)5:9

28. **Vinay borrowed some money for one year at 8% per annum simple interest and after 18 months , he again borrowed the same money at a Simple Interest of 32% per annum. In both the cases, he paid Rs.5452. Which of the following could be the amount that was borrowed by Hari in each case if interest is paid half yearly?**
a) 3900 b) 4200 c) 4500 d) 4700 e). None of the Above

29. **Ravi borrows a sum of Rs.2000 at the beginning of a year. After four months Rs.2600 more is borrowed at a rate of interest double the previous one. At the end of one year, the sum of interest on both the loans is Rs.494. What is the first rate of interest per annum?**
a) 8.5% b) 9% c) 9.5% d) 12% e) None of the Above

30. **Kumar fixes the rate of interest 5% per annum for first 3 years and for the next 4 years 6 percent per annum and for the period beyond 7 years, 7.5 percent per annum. If Mr. Kumar lent out Rs.1800 for 11 years, find the total interest earned by him?**
a) Rs.1422 b) Rs.1242 c) Rs.1244 d) Rs.1342 e) None of the Above

31. **Arun took a loan of Rs. 1400 with simple interest for as many years as the rate of interest. If he paid Rs.686 as interest at the end of the loan period, what was the rate of interest?**
a) 8% b) 6% c) 4% d) 7%

32. **A person borrows Rs.5000 for 2 years at 4% p.a. simple interest. He immediately lends it to another person at 61/4% p.a for 2 years. Find his gain in the transaction per year.**
a) Rs. 167.50 b) Rs. 150 c) Rs.225 d) Rs. 112.50

33. **A sum of money amounts to Rs.9800 after 5 years and Rs.12005 after 8 years at the same rate of simple interest. The rate of interest per annum is**
a) 15% b) 12% c) 8% d) 5%

34. **A man took loan from a bank at the rate of 8% p.a. simple interest. After 4 years he had to pay Rs. 6200 interest only for the period. The principal amount borrowed by him was:**
a) Rs.17322 b) Rs.20245 c) Rs.18230 d) Rs.19375

35. **A sum of Rs. 725 is lent in the beginning of a year at a certain rate of interest. After 8 months, a sum of Rs. 362.50 more is lent but at the rate twice the former. At the end of the year, Rs. 33.50 is earned as interest from both the loans. What was the original rate of interest?**
a) 3.46% b) None of these c) 4.5% d) 5%

36. **An automobile financier claims to be lending money at simple interest, but he includes the interest every six months for calculating the principal. If he is charging an interest of 10%, the effective rate of interest after one year becomes:**
a) None of these b) 10.25% c) 10.5% d) 10%

37. **What annual payment will discharge a debt of Rs. 6450 due in 4 years at 5% per annum?**
a) Rs.1500 b) Rs.1400 c) Rs.1800 d) Rs.1600

38. **A lends Rs. 1500 to B and a certain sum to C at the same time at 8% per annum simple interest. If after 4 years, A altogether receives Rs. 1400 as interest from B and C, then the sum lent to C is**
a) Rs.2875 b) Rs.1885 c) Rs.2245 d) Rs.2615

39. **A sum of Rs. 10 is given as a loan to be returned in 6 monthly installments at Rs.3. What is the rate of interest?**
a) 820% b) 620% c) 780% d) 640%

40. **If the simple interest on a certain sum of money after 3 1/8 years is 1/4 of the principal, what is the rate of interest per annum?**
a) 6% b) 4% c) 8% d) 12%

41. **If a sum of Rs. 9 is lent to be paid back in 10 equal monthly installments of re. 1 each, then the rate of interest is**
a) 11.33% B. 11% c) 266.67% d) 26.67% **Divide Rs. 2379 into 3 parts so that their amount after 2,3 and 4 years respectively may be equal, the rate of interest being 5% per annum at simple interest. The first part is**
a) Rs. 828 b) Rs. 746 c) Rs. 248 d) Rs. 1024

42. **A person invested in all Rs. 2600 at 4%, 6% and 8% per annum simple interest. At the end of the year, he got the same interest in all three cases. The money invested at 4% is:**
a) Rs.2200 b) Rs.800 c) Rs.1600 d) Rs.1200

43. **David invested certain amount in three different schemes A, B and C with the rate of interest 10% p.a., 12% p.a. and 15% p.a. respectively. If the total interest accrued in one year was Rs. 3200 and the amount invested in Scheme C was 150% of the amount invested in Scheme A and 240% of the amount invested in Scheme B, what was the amount invested in Scheme B?**
a) Rs.5000 b) Rs.2000 c) Rs.6000 d) Rs.3000

44. **A sum of Rs. 1550 was lent partly at 5% and partly at 8% p.a. simple interest. The total interest received after 3 years was Rs. 300. The ratio of the money lent at 5% to that lent at 8% is:**
a) 16 : 15 b) 15 : 16 c) 15 : 8 d) 8 : 15

45. **A sum of money doubles in 12 years. In how many years, it will treble at S.I.**
a) 12 years b) 8 years c) 6 years d) 24 years

46. **A man invests a certain sum of money at 6% per annum simple interest and another sum at 7% per annum simple interest. His income from interest after 2 years was Rs. 354. One-forth of the first sum is equal to one-fifth of the second sum. The total sum invested was :**
a) Rs.3100 b) Rs.2700 c) Rs.2200 d) Rs.1800

47. **A sum was put a simple interest at a certain rate for 2 years. Had it been put at 4% higher rate, it would have fetched Rs. 60 more. The sum is:**
a) Rs.750 b) Rs.700 c) Rs.820 d) Rs.940

48. **A sum of Rs. 7700 is to be divided among three brothers Vikas, Vijay and Viraj in such a way that simple interest on each part at 5% per annum after 1, 2 and 3 years respectively remains equal. The Share of Vikas is more than that of Viraj by**
a) Rs.1200 b) Rs.1400 c) Rs.2200 d) Rs.2800

49. **The simple interest on Rs.500 at 6% per annum from May 3rd to July 15th in the same year is –**
a) Rs. 8 b) Rs. 6 C. Rs. 4 d) Rs. 9

50. **The simple interest on Rs. 1820 from March 9, 2003 to May 21, 2003 at 7 ½ % rate is –**
a) Rs. 27.30 b) Rs. 22.50 c) Rs. 28.80 d) Rs. 29

Solution — Simple Interest

1. Balance to be paid in installments = 8000-2000 = 6000
(6000 + 6000 × r × 3/12 × 100) = 1020 × 6 + 1020r/12 × 100(1 + 2 + 3 + 4 + 5)r = 6.95%

2. x + x × 7 × 10/100 = (8800 – x) + (8800 – x) × 5 ×10/100 x = 4125 elder = 8800 –4125 = 4675

3. 6000 = 10000(7 × x + 5 × (10 – x))/100 x = 5

4. SI = 2560 × 8 × 15/100 = 3072 Amount = 2560 + 3072 = 5632

5. 2460 = p + p × 6 × 5/12 ×100; p = 2400
Now, Gita 2460 = 2400 + 2400 × 7.5 × x/12 × 100; x = 4.

6. 3476 = x × 6 ×4/100 + (15900 – x) × 5 × 4/100 => x =7400 Anil = 8500 + 8500 × 4 × 5/100 = 10200

7. For one year = 124000 × 5/100 = 6200 income tax = 6200 × 81/100 = 5022
for 9 years = 45198 Amount = 124000 + 45198 = 169198

8. 24000 × 4/100 = 960 x × 10/100 = 0.1x
960 + 0.1x = (24000 + x) × 6/100 x = 12000 Total = 24,000 + 12,000 = 36,000

9. 2235 – 1815 = p/100(7 × 7 – 7 × 3) p = 1500

10. x + y = 21600 x/y = 51/57 x = 10200 y = 11400
10200 + 10200 × 10 × (x – 9)/100 = 11400 + 11400 × 10 × (x – 11)/100 x = 18

11. R = 100 × (4x/9)/(x × 16/3) R = 100 × 4 × 3/9 × 16 = 100/12 = 8.3%

12. For, P: P + (p × 6 × 7/12 × 100) = 700 => 1200p + 42P = 700 × 1200 => P = 676.33
For, Q: P + (p × 8 × 12/12 × 100) = 550 => 1200P + 96P = 550 × 1200 => P = 509.26 and Q = 676 – 509 = 167

13. Let Rs. x be the amount that the elder daughter got at the time of the will. Therefore, the younger daughter got (5,00,000 – x).
The elder daughter's money earns interest for (21 – 15) = 6 years @ 10% p. a simple interest
The younger daughter's money earns interest for (21 – 10) = 11 years @ 10% p. a simple interest.
As the sum of money that each of the daughters get when they are 21 is the same,
x + (6 × 10 × x/100) = (5,00,000 – x) + (11 × 10 × [5,00,000 – x]/100)
=> 100x + 60x = (5,00,000 – x) + (55,000,000-110x)
=> 160x = 55,500,000 – 111x => 271x = 55,500,000 => x = 2,04,797

14. Assume x = 100 SI = 120 CI = 121
100 mean difference 1 200 mean difference 2 Hence 10000 mean difference 100

15. 5% is the rate of interest. 20% deducted mean rate of Interest 4%
SI = 8000 × 4 × 5/100 =1600. The amount at the end of 5 years = 8000 + 1600 = 9600

16. T = 6600/11000 × 0.12 => T = 5

17. I_1= 10000 × 8 × 1/100 = 800 I_2 = x × 20 × 1/100 = x/5
Now, 800 + (x/5) = (10000 + x) × 12 × 1/100 => 80000 + 20x = 1,20,000 + 12x => 8x = 40,000 => x = 5000
Total = 10000 + 5000 = 15000

18. x × 6 × 5/100 = 650 × 12 × 9/100 => 30x/100 = 70,200/100 => 30x = 70200 => x = 2340

19. (x × 5 × 3/100) + (x × 8 × 5/100) + (x × 11 × 3/100) = 8800 => 15x/100 + 40x/100 + 33x/100 = 8800
=> 88x = 880000 => x = 10000

20. X × 13 × 1/100 – x × 8 × 1/100 = 4800 => 13x/100 – 8x/100 = 4800 => 5x/100 = 4800
=> 5x = 480000 => x = 96000

21. Total Amount = 60000 Amount divided into three parts – x, y, z x = 10000, T = 1 yr
$SI_{(x)}$ = (10000 × 11/2)/100 = 550 y = 32000 R = 6% $SI_{(y)}$ = (32000 × 6)/100 = 1920
Total Interest = 4000, Interest on the remaining amount = 4000 – 550 – 1920 = 1530
z = 60000 – 32000 – 10000 = 18000 and R = (1530 × 100) /18000 = 8.5%

22. P = 15000, T_1 = 10 years, T_2 = 5 years, R_1 = 10%, R_2 = ?
[(15000 × 10 × 10)/100 – (15000 × R_2 × 5)/100] = 8250 => 15000 – 750R_2 = 8250 => R_2 = **9%**

23. Let x be the amount of elder son at the time of will & Younger son's amount at the time of will (550000 – x)
For elder son, T = 21 – 16 = 5 For younger son, T = 21 – 8.5 = 12.5
Amount Should be equal so, Now, $x + [(x \times 10 \times 5)/100] = (5500000 - x) + [((5500000 - x) \times 10 \times 12.5)/100]$ $3x/2 = 12375000 - 2.25x \Rightarrow x = 3300000$

24. Let x be the rate of interest
Now, $8000 \times 3x/100 + 15000 \times 5x/100 = 8415 \Rightarrow 240x + 750x = 8415 \Rightarrow x = 8.5$

25. $8x + 3y = z$ (Total Income) $x + y = 8500$ -----(1) and $8x = 3(3y) \Rightarrow 8x - 9y = 0$ ------(2)
By solving (1) and (2) we get, $x = 4500$ so $y = 4000$ So, $(4500 \times 8 \times 1)/100 + (4000 \times 3 \times 1)/100 = 360 + 120 = 480$

26. S.I. on Rs 30000 = $(30000 \times 6 \times 1)/100$ = Rs. 1800
Profit to made on Rs 50000 = $50000 \times 10/100$ = Rs 5000
S.I.on Rs.20000 = 5000 – 1800 = Rs.3200 Rate = $(S.I. \times 100)/(P \times T) = (3200 \times 100)/20000$ = 16% per annum

27. $R_1 = 5x$; $R_2 = 7x$; $T_1 = T_2 = 1/2$ yr $[P_1 \times 5x \times (1/2)]/100 = [P_2 \times 7x \times (1/2)]/100 \Rightarrow P_1 : P_2 = 7:5$

28. 16% for 6 months x = Borrowed money
Take x =100% So, 116% of x = 5452 $\Rightarrow x = 4700$

29. P = 2000 Rate of Interest = x SI = $2000x/100 = 20x$ P = 2600
Rate of Interest = 2x SI = $5200x/100 = 52x \Rightarrow 52x = 494 \Rightarrow x = 9.5\%$

30. 5% for 3 years = 15% 6% for 4 years = 24%
7.5% for 4 years = 30% 69% of 1800 = 1242

31. Let rate = R%. Then, Time, T = R years P = Rs. 1400 SI = Rs. 686

$SI = \frac{PRT}{100} \Rightarrow 686 = \frac{1400 \times R \times R}{100} \Rightarrow 686 = 14\,R^2 \Rightarrow R = 7$. i.e., Rate of Interest was 7%

32. The person borrows Rs. 5000 for 2 years at 4% p.a. simple interest

Simple interest that he needs to pay = $\frac{PRT}{100} = \frac{5000 \times 4 \times 2}{100} = 400$

He also lends it at 6 ¼% p.a for 2 years Simple interest that he gets = $\frac{PRT}{100} = \frac{5000 \times \frac{25}{4} \times 2}{100} = 625$

His overall gain in 2 years = Rs. 625 – Rs. 625 = Rs. 225 His overall gain in 1 year = $\frac{225}{2}$ = Rs. 112.5

33. Simple Interest for 3 years = (Rs. 12005 – Rs. 9800) = Rs. 2205

Simple Interest for 5 years = $\frac{2205}{3} \times 5$ = Rs. 3675. Principal(P) = (Rs. 9800 – Rs. 3675) = Rs. 6125

$R = \frac{100 \times SI}{PT} = \frac{100 \times 3675}{6125 \times 5} = 12\%$

34. Principal (P) = ? Time (T) = 4 years

Simple Interest (SI) = Rs. 6200 R = 8% $P = \frac{100 \times SI}{RT} = \frac{100 \times 6200}{8 \times 4}$ = Rs. 19375

35. Let the sum of Rs. 725 is lent out at rate R% for 1 year
Then, at the end of 8 months, ad additional sum of 362.50 more is lent out at rate 2% for remaining 4 months (1/3 year)
Total simple interest = 33.50

$$\Rightarrow \frac{725 \times R \times 1}{100} + \frac{362.50 \times 2R \times \frac{1}{3}}{100} = 33.50 \Rightarrow \frac{725 \times R \times 1}{100} + \frac{362.50 \times 2R \times \frac{1}{3}}{300} = 33.50$$

$$\Rightarrow \frac{725R}{100} + \frac{725R}{300} = 33.50 \Rightarrow 725R\left(\frac{1}{1000} + \frac{1}{3000}\right) = 33.50 \Rightarrow 725R\left(\frac{4}{300}\right) = 33.50$$

$$\Rightarrow 725R \times 4 = 10050 \Rightarrow 725R = 2512.5 \Rightarrow 145R = 502.5 \Rightarrow R = \frac{502.5}{145} = 3.40\%$$

36. Let the automobile financier lends Rs. 100

Simple Interest for first 6 months = $\frac{PRT}{100} = \frac{100 \times 10 \times \frac{1}{2}}{100}$ = Rs. 5

After 6 months, he adds the simple interest to principal i.e.,
after 6 months, principal becomes Rs. 100 + Rs. 5 = Rs. 105

Simple Interest for next 6 months = $\frac{PRT}{100} = \frac{105 \times 10 \times \frac{1}{2}}{100}$ = Rs. 5.25

Amount at the end of 1 year = Rs. 105 + Rs. 5.25 = Rs. 110.25
i.e., Effective Simple Interest he gets for Rs. 100 for 1 year = 110.25 – 100 = 10.25

i.e, the Effective Rate of Interest = 10.25% $\left(\because R = \frac{100 \times SI}{PT} = \frac{100 \times 10.25}{100 \times 1} = 10.25\%\right)$

37. The annual installment which will discharge a debt of D due in T years at R% simple interest per annum = $\frac{100D}{100T + \frac{RT(T-1)}{2}}$

As per the above formula, the annual payment = $\frac{100D}{100T + \frac{RT(T-1)}{2}} = \frac{100 \times 6450}{100 \times 4 + \frac{5 \times 4 \times (4-1)}{2}} = \frac{645000}{400+30} = \frac{645000}{4030} = 1500$

38. Let the sum lent to C be Rs. X
Simple Interest for Rs. 1500 at 8% per annum for 4 years + Simple Interest for Rs. × at 8% per annum for 4 years = Rs. 1400

$\Rightarrow \frac{1500 \times 8 \times 4}{100} + \frac{x \times 8 \times 4}{100} = 1400 \Rightarrow 480 + \frac{32x}{100} = 1400 \Rightarrow \frac{32x}{100} = 920 \Rightarrow x = \frac{920 \times 100}{32} = 2875$

39. Amount borrowed = Rs. 10

Let, rate of interest = R% Simple Interest for Rs.10 for 6 months at R% = $\frac{10 \times R \times \frac{1}{2}}{100} = \frac{R}{2}$

i.e, $10 + \frac{R}{20}$ is due in 6 months payment after 1st month = Rs.3

Interest for this Rs.3 for the remaining 5 months = $\frac{3 \times R \times \frac{5}{12}}{100}$ Payment after 2nd month = Rs.3

Interest for this Rs.3 for the remaining 4 months = $\frac{3 \times R \times \frac{4}{12}}{100}$ Payment after 5th month = Rs.3

Interest for that Rs. 3 for the remaining 1 month = $\frac{3 \times R \times \frac{1}{12}}{100}$ Payment after 6th month = Rs. 3 and this closes the loan

$\Rightarrow (3 + 3 + 3 + 3 + 3 + 3) = \left(\frac{3 \times R \times \frac{5}{12}}{100} + \frac{3 \times R \times \frac{4}{12}}{100} + \ldots\ldots\ldots + \frac{3 \times R \times \frac{1}{12}}{100}\right) = 10 + \frac{R}{20}$

$\Rightarrow 18 + \frac{\frac{3R}{12}(5 + 4 + \ldots\ldots + 1)}{100} = 10 + \frac{R}{20} \Rightarrow 18 + \frac{15R}{400} = 10 + \frac{R}{20} \Rightarrow 8 = \frac{R}{20} - \frac{15}{400} = \frac{5R}{400} = \frac{R}{80} \Rightarrow R = 640\%$

40. Let the sum of money (p) be Rs. X Time (T) = $3\frac{1}{8}$ years = $\frac{25}{8}$ years Simple interest (SI) = $\frac{x}{4}$

Rate of interest per annum (R) = $\frac{100 \times SI}{PT} = \frac{100 \times \frac{x}{4}}{x \times \frac{25}{8}} = \frac{100 \times x \times 8}{4 \times x \times 25} = 8\%$

41. Amount borrowed = Rs.9 Let, rate of interest = R%

Simple Interest for Rs.9 for 10 months at R% = $\frac{9\times R\times\frac{10}{12}}{100}=\frac{90R}{1200}$ i.e., $9+\frac{90R}{1200}$ is due in 10 months

Payment after 1st month = Rs.1 Interest for this Rs. 1 for the remaining 9 months = $\frac{1\times R\times\frac{9}{12}}{100}$

Payment after 2nd month = Rs. 1 Interest for this Rs. 1 for the remaining 8 months = $\frac{1\times R\times\frac{8}{12}}{100}$

Payment after 9th month = Rs. 1 Interest for this Rs. 1 for the remaining 1 months = $\frac{1\times R\times\frac{1}{12}}{100}$

Payment after 10th month = Rs. 1 and this closers the loan

$9+\frac{90R}{1200}=10\times1+\left(\frac{1\times R\times\frac{9}{12}}{100}+\frac{1\times R\times\frac{8}{12}}{100}+\ldots+\frac{1\times R\times\frac{1}{12}}{100}\right)\Rightarrow 9+\frac{90R}{1200}=10+\frac{R}{1200}(9+8+\ldots+1)$

$\Rightarrow 9+\frac{90R}{1200}=10+\frac{R}{1200}+\left(\frac{9\times10}{2}\right)\Rightarrow 9+\frac{90R}{1200}=10+\frac{45R}{1200}\Rightarrow\frac{45R}{1200}=1\Rightarrow R=\frac{1200}{45}=26.67\%$

42. Let the parts be x, y and z R = 5%

x + interest on x for 2 years = y + interest on y for 3 years = z + interest on z for 4 years

$\left(x+\frac{x\times5\times2}{100}\right)=\left(y+\frac{y\times5\times2}{100}\right)=\left(z+\frac{z\times5\times2}{100}\right)\Rightarrow\left(x+\frac{x}{10}\right)=\left(y+\frac{3y}{20}\right)=\left(z+\frac{z}{5}\right)$

$\Rightarrow\frac{11x}{10}=\frac{23y}{20}=\frac{6z}{5}$ Let, $\frac{11x}{10}=\frac{23y}{20}=\frac{6z}{5}=k$ (where k is a constant). Then, $x=\frac{10k}{11}, y=\frac{20k}{23}, z=\frac{5k}{6}$

we know that x + y + z = 2379 So, $\frac{10k}{11}+\frac{20k}{23}+\frac{5k}{6}=2379$

$\Rightarrow 10k\times23\times6+20k\times11\times23+5k\times11\times23=2379\times11\times23\times6\Rightarrow 1380k+1320k+1265k=2379\times11\times23\times6$

$\Rightarrow 3965k=2379\times11\times23\times6\Rightarrow k=\frac{2379\times11\times23\times6}{3965}$

First part, $x=\frac{10k}{11}=\frac{10}{11}\times\frac{2379\times11\times23\times6}{3965}=\frac{10\times2379\times23\times6}{3965}=\frac{2\times2379\times23\times6}{793}=2\times3\times23\times6=828$

43. Let x , y and x be his investments at 4%, 6% and 8% respectively

Simple Interest on x at 4% for 1 year = Simple Interest on y at 6% for 1 year = Simple Interest on z at 8% for 1 year

$\frac{x\times4\times1}{100}=\frac{y\times6\times1}{100}=\frac{z\times8\times1}{100}\Rightarrow 4x=6y=8z\Rightarrow 2x=3y=4z$

Hence, we have, $y=\frac{2x}{3}$ and $z=\frac{2x}{4}=\frac{x}{2}$

we know that $x+y+z=2600\Rightarrow x+\frac{2x}{3}+\frac{x}{2}=2600\Rightarrow 6x+4x+3x=2600\times6\Rightarrow 13x=2600\times6\Rightarrow x=\frac{2600\times6}{13}=200\times6=1200$

i.e., Money invested at 4% = Rs.1200

44. Let x , y and x be his investments in A, B and C respectively. Then

Then, Interest on x at 10% for 1 year+ Interest on y at 12% for 1 year + Interest on z at 15% for 1 year = 3200

ATQ, $\frac{x\times10\times1}{100}+\frac{y\times12\times1}{100}+\frac{z\times15\times1}{100}=3200\Rightarrow 10x+12y+15z=320000$ --------- (1)

Amount invested in Scheme C was 240% of the amount invested in Scheme B $\Rightarrow z=\frac{240y}{100}=\frac{60y}{25}=\frac{12y}{5}$ --------- (2)

Amount invested in Scheme C was 150% of the amount invested in Scheme A $\Rightarrow z=\frac{150x}{100}=\frac{3x}{2}\Rightarrow x=\frac{2z}{3}=\frac{2}{3}\times\frac{12y}{5}=\frac{8y}{5}$ ----- (3)

From (1), (2), and (3), $10x+12y+15z=320000\Rightarrow 10\left(\frac{8y}{5}\right)+12y+15\left(\frac{12y}{5}\right)=320000$

$\Rightarrow 16y+12y+36y=320000\Rightarrow 64y=320000\Rightarrow y=\frac{320000}{64}=\frac{10000}{2}=50000$

i.e., Amount invested in scheme 8 = Rs. 5000

45. Let the partial amount at 5% be x and the partial amount at 8% be (1550-x)
Interest on x at 5% for 3 years + interest on (1550-x) at 8% for 3 years = 300

Now, $\frac{x \times 5 \times 3}{100} + \frac{(1550-x) \times 8 \times 3}{100} = 300 \Rightarrow \frac{x \times 5}{100} + \frac{(1550-x) \times 8}{100} = 100 \Rightarrow 5x + 8(1550-x) = 10000$

$\Rightarrow 5x + 12400 - 8x = 10000 \Rightarrow 3x = 2400 \Rightarrow x = 800$

Required Ratio = x : (1550 – x) = 800 : (1550 – 800) = 800 : 750 = 16 : 15

46. Simple Interest, SI = PRT100Simple Interest, SI = $\frac{PRT}{100}$

i.e, SI ∝ T when rate(R) and principal (P) are constants
Let x be the sum of money and which will treble in n years
(Please note that when the money doubles, simple interest is 2x – x = x
and when the money trebles, simple interest is 3x – x = 2x)

(2x – x) ∝ 12 => x ∝ 12 ----------(1)

(3x – x) ∝ n => 2x ∝ n ----------(2) From (1) and (2), $\frac{x}{2x} = \frac{12}{n} \Rightarrow \frac{1}{2} = \frac{12}{n} \Rightarrow n = 24$ years

47. Let the man invests Rs. x at 6% and Rs. y at 7%
Simple Interest on Rs. x at 6% for 2 years + Simple Interest on Rs. y at 7% for 2 years = Rs.354

Now, $\frac{x \times 6 \times 2}{100} + \frac{y \times 7 \times 2}{100} = 354 \Rightarrow x \times 6 \times + y \times 7 \times 2 = 354 \times 100 \Rightarrow x \times 6 + y \times 7 = 177 \times 100 \Rightarrow 6x + 7y = 17700$ ..... (1)

One-forth of the first sum is equal to one-fifth of the second sum $\frac{x}{4} = \frac{y}{5} \Rightarrow x = \frac{4y}{5}$ ..... (2)

Solving (1) and (2), $6x + 7y = 17700 \Rightarrow 6\left(\frac{4y}{5}\right) + 7y = 17700 \Rightarrow 24y + 35y = 177700 \times 5 \Rightarrow y = 300 \times 5 = 1500$

$x = \frac{4y}{5} = \frac{4 \times 1500}{5} = 4 \times 300 = 1200$ So, Total sum invested = x + y = 1500 + 1200 = 2700

48. Let the sub be Rs. x and the initial rate be R%. Then

Now, $\frac{x \times (R+4) \times 2}{100} - \frac{x \times R \times 2}{100} = 60 \Rightarrow \frac{x \times 4 \times 2}{100} = 60 \Rightarrow \frac{x \times 2}{100} = 15 \Rightarrow 2x = 1500 \quad \therefore x = 750$ Ans.

49. If a certain sum of money is lent out in n parts in such a manner that equal sum of money is obtained at simple interest on each part where interest rates are R1, R2, ... , Rn respectively and time periods are T1, T2, ... , Tn respectively, then the ratio in which the sum will be divided in n parts can be given by

$\frac{1}{R_1T_1} : \frac{1}{R_2T_2} : \cdots \frac{1}{R_nT_n}$ $T_1 = 1, T_2 = 2, T_3 = 3$ $R_1 = 5, R_2 = 5, R_3 = 5$

Share of Vikas : Share of Vijay : Share of Viraj $= \frac{1}{5 \times 1} : \frac{1}{5 \times 2} : \frac{1}{5 \times 3} = \frac{1}{1} : \frac{1}{2} : \frac{1}{3} = 6 : 3 : 2$

Total amount is Rs. 7700 So, Share of Vikas = $7700 \times \frac{6}{11} = 700 \times 6 = 4200$ Share of Viraj = $7700 \times \frac{2}{11} = 700 \times 2 = 1400$

Share of Vikas is greater than Share of Viraj by (4200 – 1400) = Rs. 2800

50. Time from May 3rd to July 15th = 28 days of May + 30 days of June and 15 days of July

= 73 days = $\frac{73}{365}$ years = $\frac{1}{5}$ years Simple interest = $\frac{PRT}{100} = \frac{500 \times 6 \times \frac{1}{5}}{100} = 6$

51. Time, T = (22 + 30 + 21) days = 73 days = $\frac{73}{365}$ year = $\frac{1}{5}$ year Rate, R = $7\frac{1}{2}\% = \frac{15}{2}\%$

SI = $\frac{PRT}{100} = \frac{1820 \times \frac{15}{2} \times \frac{1}{5}}{100} = \frac{1820 \times \frac{3}{2}}{100} = \frac{910 \times 3}{100} = \frac{2730}{100} = 27.30$

Students' Work | Compound Interest

☑ (Try at home)

1. **The compound interest on a certain sum of money at a certain rate per annum for two years is Rs. 4,100 and the simple interest on the same amount of money at the same rate for 3 years is Rs. 6000. Then the sum of money is :**
   A) Rs. 40,000 B) Rs. 36,000 C) Rs. 42,000 D) Rs. 50,000 E) None
2. **sum of money was went at 10% per annum, compounded annually for 2 years. If the interest was compounded half yearly, he would have received Rs. 440.5 more. Find the sum.**
   A) Rs. 84000 B) Rs. 96000 C) Rs. 100000 D) Rs. 104000 E) Rs. 80000
3. **Ragnal, Rollo and Vik start a business by investing Rs 70,000 that earns them a profit of Rs 42,000 at the end of the year. Ragnar invests his share in the profit in a scheme that gives him 10% interest compounded annually and Rollo invests his share in a scheme that gives him 20% interest compounded annually. Ragnar gets Rs 2,520 as interest at the end of 2 years and Rollo gets an interest of Rs 4,200 at the end of one year. Find Vik's investment in the business.**
   A) Rs 1,60,000 B) Rs 15,000 C) Rs 17,520 D) Cannot be determined E) None
4. **Rs. 12200 was partly invested in Scheme A at 10% p.a. compound interest (compounded annually) for 2 years and partly in Scheme B at 10% p.a. simple interest for 4 years. Both the schemes give equal interests. How much was invested in Scheme A ?**
   A) Rs. 7500 B) Rs. 9000 C) Rs. 8000 D) Rs. 6050 E) Rs. 10000
5. **A man borrows Rs. 8000 at 20% compound rate of interest. At the end of each year he pays back Rs. 3000. How much amount should he pay at the end of the third year to clear all his dues?**
   A) Rs. 5492 B) Rs. 5552 C) Rs. 5904 D) Rs. 6933 E) None
6. **A money-lender borrows money at 4% per annum and lends it at 6% per annum compound interest compounded half yearly and thus gains Rs. 209 in a year. The amount of money he borrows, is:**
   A) Rs. 12,000 B) Rs. 11,500 C) Rs. 10,000 D) Rs. 9,500 E) None
7. **What sum will give Rs. 488 as the difference between simple interest and compound interest at 10% in 1 1/2 years compounded half yearly ?**
   A) Rs. 80,000 B) Rs. 72,000 C) Rs. 64,000 D) Rs. 68,000 E) None
8. **A certain sum is interested at compound. The interest accrued in the first two years is Rs. 544 and that in the first three years is Rs. 868. Find the rate per cent.**
   A) 12 1/2% B) 7 1/2% C) 17 1/2% D) 25% E) None
9. **A man gave 50% of his savings of Rs. 168200 to his wife and divided the remaining sum among his sons Abid and Bisth of 15 and 13 years of age respectively. He divided it in such away that each of his sons when they attain the age of 18 years, would receive the same amount of 5% compound interest per annum. The share of Bisth was:**
   A) Rs. 42050 B) Rs. 40000 C) Rs. 45000 D) Rs. 45500 E) None
10. **What sum of money at compound interest will amount to Rs. 2249.52 in 3 years, if the rate of interest is 3% for the first year, 4% for the second year and 5% for the third year ?**
   A) Rs. 20140 B) Rs. 1980 C) Rs. 2000 D) Rs. 2180 E) None
11. **The compound interest on a certain sum for 2 years is Rs. 786 and S.I. is Rs. 750. If the sum is invested such that the S.I. is Rs. 1296 and the number of years is equal to the rate per cent per annum, Find the rate of interest?**
   A) 4% B) 5% C) 6% D) 8% E) 2%
12. **Hari took an educational loan from a nationalized bank for his 2 years course of MBA) He took the loan of Rs.5 lakh such that he would be charged at 7% p.a. at CI during his course and at 9% CI after the completion of the course. He returned half of the amount which he had to be paid on the completion of his studies and remaining after 2 years. What is the total amount returned by Hari?**
   A) Rs. 626255 B) Rs. 626277 C) Rs. 616266 D) Rs. 626288 E) None
13. **Rs.20,000 was invested by Mahesh in a FD @ 10% pa at CI. However every year he has to pay 20% tax on the CI. How much money does Mahesh have after 3 years?**
   A) 25694 B) 25594 C) 25394 D) 25194 E) None

14. Leela takes a loan of Rs. 8400 at 10% p.a. compounded annually which is to be repaid in two equal annual installments. One at the end of one year and the other at the end of the second year. The value of each installment is?

A) 4200 B) 4140 C) 4840 D) 5640 E) None

15. A sum of money lent at compound interest for 2 years at 20% per annum would fetch Rs.723 more, if the interest was payable half yearly than if it was payable annually. The sum is ____

A) Rs. 20000 B) Rs. 15000 C) Rs. 30000 D) Rs. 45000 E) None

16. A sum of Rs.7140 is to be divided between Anita and Bala who are respectively 18 and 19 yr old, in such a way that if their shares will be invested at 4% per annum at compound interest, they will receive equal amounts on attaining the age of 21 year. The present share of Anita is –

A) 4225 B) 4352 C) 3500 D) 4000 E) None

17. Suresh borrows Rs.6375 to be paid back with compound interest at the rate of 4 % pa by the end of 2 year in two equal yearly installments. How much will each installment will be?

A) 3840 B) 3380 C) 4800 D) Data inadequate E) None

18. A sum of Rs. 8400 was taken as loan. This is to be paid in two equal annual installments. If the rate of interest be 20% compounded annually, then the value of each installment is –

A) 5400 B) 5700 C) 5100 D) 5200 E) None

19. During the first year the population of a village is increased by 5% and the second year it is diminished by 5%. At the end of the second year its population was 31500. What was the population at the beginning of the first year?

A) 35500 B) 31578 C) 33500 D) 33000 E) None

20. If Rs. 7200 amounts to Rs.10368 at compound interest in a certain time , then Rs. 7200 amounts to what in half of the time?

A) 8640 B) 8600 C) 8800 D) 8520 E) None

21. A part of 70000 is lent out at 10% annum. The rest of the amount is lent out at 5% per annum after one year. The ratio of interest after 3 years from the time when first amount was lent out is 1:2. Find the second part that was lent out at 5%.

A) 40000 B) 50000 C) 60000 D) 48000 E) 55000

22. There is 50% increase in an amount in 5 years at simple interest. What will be the compound interest of Rs. 12,000 after 3 years at the same rate?

A) Rs. 2255 B) Rs. 2792 C) Rs. 3580 D) Rs. 3972 E) None

23. Karthik lends a certain amount to Vignesh on simple interest for two years at 20%. Vignesh gives this entire amount to Kamal on compound interest for two years at the same rate annually. Find the percentage earning of Vignesh at the end of two years on the entire amount.

A) 3% B) 3(1/7)% C) 4% D) 5(6/7)% E) None

24. A man borrows 3000 rupees at 10% compound interest. At the end every year he pays rupees 1000 back. How much amount should he pay at the end of the fourth Year to clear all his debt?

A) Rs. 680.5 B) Rs. 651.3 C) Rs. 751.3 D) Rs. 790.3 E) None

25. Rahul saves an amount of 800 every year and then lent that amount at an interest of 10 percent compounded annually. Find the amount after 3 years.

A) Rs. 1822.8 B) Rs. 2252 C) Rs. 2550.50 D) Rs. 2912.8 E) None

26. Find the compound interest at the rate of 8% for 3 years on that principal which in 3 years at the rate of 10% per annum gives 300 as simple interest.

A) 180.515 B) 220.25 C) 259.712 D) 289.624 E) 312.51

27. The difference between the total simple interest and the total compound interest compounded annually at the same rate of interest on a sum of money at the end of two years is Rs. 450. What is definitely the rate of interest per cent per annum?

A) 8400 B) 4800 C) 7800 D) Data inadequate E) None

28. The CI on Rs.6000 for 3 years at 8% for first year, 7% for second year, 6% for the third year will be

A) Rs.1430 B) Rs.1530 C) Rs.1250 D) Rs.1350 E) None

29. Venkat and Vidhya have to clear their respective loans by paying 2 equal annual installments of Rs.30000 each. Venkat pays at 10% pa of SI and Vidhyapays at 10% CI pa. What is the difference in their payments ?

A) 200 B) 300 C) 400 D) 500 E) None

30. **The difference between interest received by Vivek and Vimal is Rs.405 on Rs.4500 for 3 years. What is the difference in rate of interest ?**
A) 1.5% B) 2% C) 3% D) 2.7% E) None

31. **What is the difference between the compound interests on Rs. 5000 for 1½ years at 4% per annum compounded yearly and half-yearly?**
A) Rs. 2.04 B) Rs. 4.80 C) Rs. 3.06 D) Rs. 8.30

32. **A bank offers 5% compound interest calculated on half-yearly basis. A customer deposits Rs. 1600 each on 1st January and 1st July of a year. At the end of the year, the amount he would have gained by way of interest is:**
A) Rs. 120 B) Rs. 121 C) Rs. 123 D) Rs. 122

33. **There is 80% increase in an amount in 8 years at simple interest. What will be the compound interest of Rs. 14,000 after 3 years at the same rate?**
A) Rs.3794 B) Rs.3714 C) Rs.4612 D) Rs.4634

34. **The difference between simple and compound interests compounded annually on a certain sum of money for 2 years at 4% per annum is RE. 1. The sum is:**
A) Rs.600 B) Rs.645 C) Rs.525 D) Rs.625

35. **The difference between compound interest and simple interest on an amount of Rs. 15,000 for 2 years is Rs. 96. What is the rate of interest per annum?**
A) 9% B) 12% C) 8% D) 6%

36. **The least number of complete years in which a sum of money put out at 20% compound interest will be more than doubled is**
A) 5 B) 4 C) 4 D) 2

37. **The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half-yearly is:**
A) 6.07% B) 6.08% C) 6.06% D) 6.09%

38. **Simple interest on a certain sum of money for 4 years at 5% per annum is half the compound interest on Rs. 3000 for 2 years at 10% per annum. The sum placed on simple interest is:**
A) Rs.1575 B) Rs. 2200 C) Rs. 1200 D) Rs. 1625

39. **The compound interest on a certain sum for 2 years at 10% per annum is Rs. 525. The simple interest on the same sum for double the time at half the rate percent per annum is:**
A) Rs. 500 B) Rs. 400 C) Rs. 450 D) Rs. 600

40. **A sum put out at 4% compound interest payable half-yearly amounts to Rs. 13265.10 in 1 ½ years. The sum is –**
A) Rs. 12500 B) Rs. 11200 C) Rs. 8840 D) Rs. 12600

41. **A sum of money is borrowed and paid back in two annual installments of Rs. 882 each allowing 5% compound interest. The sum borrowed was:**
A) Rs.1820 B) Rs.1640 C) Rs.1260 D) Rs.1440

42. **If the difference between the simple interest and compound interests on some principal amount at 20% for 3 years is Rs. 48, then the principal amount is**
A) Rs. 365 B) Rs. 325 C) Rs. 395 D) Rs. 375

43. **A tree increases annually by 1/5 th of its height. If its height today is 50 cm, what will be the height after 2 years?**
A) 64 cm B) 72 cm C) 66 cm D) 84 cm

44. **What annual payment will discharge a debt of Rs. 1025 due in 2 years at the rate of 5% compound interest?**
A) Rs. 560 B) Rs. 560.75 C) Rs. 551.25 D) Rs. 550

45. **Arun borrowed a certain sum from Manish at a certain rate of simple interest for 2 years. He lent this sum to Sunil at the same rate of interest compounded annually for the same period. At the end of two years, he received Rs. 2400 as compound interest but paid Rs. 2000 only as simple interest. Find the rate of interest.**
A) 40% B) 30% C) 20% D) 10%

46. **If a sum on compound interest becomes three times in 4 years, then with the same interest rate, the sum will become 81 times in:**
A) 12 years B) 18 years C) 16 years D) 14 years

47. **Divide Rs. 3364 between A and B, so that A's Share at the end of 5 years may equal to B's share at the end of 7 years, compound interest being at 5 percent.**
A) Rs. 1764 and Rs.1600 B) Rs. 1756 and Rs.1608
C) Rs. 1722 and Rs.1642 D) None

Solution — Compound Interest

1. SI of 2 years = Rs. 4000
Difference between SI and CI at the end of 2 years = 4100–4000 = Rs. 100
Rate of interest = $\frac{100}{2000} \times 100 = 5\%$ $\Rightarrow \frac{P \times 5 \times 3}{100} = 6000$ $\Rightarrow$ P = Rs. 40000

2. Let the sum = 100 Interest if compounded annually = $100\left[\left(1+\frac{10}{100}\right)^{2}-1\right]$ = Rs. 21

Interest if compounded half yearly = $100\left[\left(1+\frac{5}{100}\right)^{4}-1\right]$ = Rs. 21.550625

Difference = 0.550625 Actual sum $\frac{440.5}{0.550625} \times 100$ = Rs. 80000

3. Let Ragnar's share of profit = Rs 100
Interest in 2 years at 10% = 21 Rs21 → 2520 100 → 12000 rs
Let Rollo's share of profit = Rs 100 Interest in 1 year = 20 rs
20 → 4200 100 → 21000 Rs

Share of Vik in profit = 42000 – (21000 + 12000) = 9000 Share in investment = $\frac{9000}{42000} \times 70000$ = 15000 Rs.

4. Let Amount invested in Scheme A = x Rs.
Amount invested in Scheme B = (12200 – x)

$\therefore x\left[\left(1+\frac{10}{100}\right)^{2}-1\right] = \frac{(12200-x)\times 10\times 4}{100} \Rightarrow 21x = 48000 - 40x \Rightarrow 61x = 488000 \Rightarrow x = 8000$ Rs.

5. At end of 1st year 8000 + 16000 = 9600 Amount = 9600 – 3000 = 6600
At the end of 2nd Year 6600 + 1320 = 7920 Amount = 7920 – 3000 = 4920
Amount to be paid at the end of third year = 4920 + 984 = 5904

6. Let the amount borrowed = Rs. 100 Interest to be paid = $\frac{4}{100} \times 100$ = Rs. 4

Interest he gets= 6.09 His gain = 6.09 – 4 = Rs. 2.09 But actual gain = Rs. 209

Actual amount borrowed = $\frac{209}{2.09} \times 100$ = Rs. 10000

7. Let sum = 100 Rs. S.I. = 15 Rs. C.I. = 15.6725 Rs.

Difference = 0.7625 → 488 Rs. $100 \rightarrow \frac{488}{0.7625} \times 100$ = Rs. 64,000

8. $544 = P\left[\left(1+\frac{R}{100}\right)^{2}-1\right]$ ---------- (1) and $868 = P\left[\left(1+\frac{R}{100}\right)^{3}-1\right]$ ---------- (2)

Solving, (2) and (1) $P = \frac{9}{8}$ and R = 12.5%

9. Total share of Abid and Bisth = 84100 Rs Let share of Abid = X
Share of Bisth = 84100 – x

Now, $x \times \left(1+\frac{5}{100}\right)^{3} = (84100-x)\left(1+\frac{5}{100}\right)^{5}$ $x \times \left(1+\frac{5}{100}\right)^{3} = (84100-x)\left(1+\frac{5}{100}\right)^{5} \Rightarrow x = 44100$

Share of Bisth = 84100 – 44100 = Rs. 40000

10. Required amount = $2249.52 \times \frac{100}{103} \times \frac{100}{104} \times \frac{100}{105}$ = Rs. 2000

11. CI for 2 years = Rs. 786 SI for 2 years = Rs. 750 36/360 × 100 = 10%
P for first year = 3600 P × x × x/100 = 1296 x = 6%

12. 5,00,000 × $(1.07)^2$ = 572450 Returned amount = 286225
After two years = 286225 × $(1.09)^2$ = 340063 Total amount = 286225 + 340063 = 626288

13. (20000 × $(1.08)^3$) = 25194

14. 8400 = x × (210/121) => 4840

15. Sum – Rs.x
C.I. compounded annually = (11/25)x
C.I. compounded half yearly = (4641/10000)x
(4641/10000)x – (11/25)x = 723 $\Rightarrow$ x = 30000

16. Amount got by Anita after 3 yr = Amount got by Bala after 2 yr
$x \times (26/25)^3 = (7140 - x) \times (26/25) \Rightarrow 26/25 = 7140 - x / x \Rightarrow x = 3500$

17. $25x/26 + 625/676x = 6375 \Rightarrow x = (6375 \times 676)/1275 = 3380$

18. Let value of each installment be x.
$x/(1 + 20/100) + X/(1 + 20/100)^2 = 8400 \Rightarrow x(5/6 + 25/36) = 8400$
$\Rightarrow x(56/36) = 8400 \Rightarrow x= 5400$

19. $x \times 105/100 \times 95/100 = 31500$ $x = 31500 \times 100/105 \times 100/95$ D = 31578

20. Let rate = R% and time = n year
Then, $10368 = 7200(1 + R/100)n$ $\Rightarrow (1 + R/100)n = 10368/7200 = 1.44$
$\therefore (1 + R/100)n/2 = \sqrt{1.44} = 1.2$ $\therefore$ Required amount for n/2 yr
$= 7200(1+ R/100)n/2 = 7200 \times 1.2 =$ Rs. 8640

21. $10 \times 3 \times x/5 \times 2 \times y = ½ \Rightarrow x/y = 1/6 \Rightarrow 6/7 \times 70000 = 60000$

22. In S.I,
Let P =100, I = 50, T = 5 yrs; $R = 50 \times 100/100 \times 5 = 10\%$
In C.I, P = 12000, T = 3 yrs, R = 10% C.I = [12000 × (1 + 10/100)^3 – 1] C.I = 3972.

23. $SI = 20 \times 2 = 40\%$; $CI = 20 + 20 + (400/100) = 44\%$; Diff = 44 – 40 = 4%

24. After one year amount = 3000 ×110/100 = 3300
He pays 1000 back, so remaining = 3300 – 1000 = 2300
After two year amount = 2300 ×110/100 = 2530
He pays 1000 back, so remaining = 2530 –1000 = 1530
After three year amount = 1530 × 110/100 = 1683
He pays 1000 back, so remaining = 1683 –1000 = 683
After fourth year = 683 × 110/100 = 751.3

25. $800 \times (11/10)^3 = 1064.8$
$800 \times (11/10)^2 = 968$; $800 \times (11/10) = 880$ $\therefore$ Total amount = 2912.8

26. SI = 300
Per yr = 100; Rate = 10%; $C.I = 1000 \times (108/100)^3 - 1000$; C.I = 259.712

27. Difference = $Pr^2/(100)^2 = (450 \times 100 \times 100)/(P \times r^2)$; P is not given

28. $A = 6000 \times 108/100 \times 107/100 \times 106/100 = 6000 \times 1.08 \times 1.07 \times 1.06 = 7349.616 = 7350$; CI = 7350 – 6000 = 1350

29. D = [(30,000 × 110/100 × 110/100) – 30,000] – 30,000 × 10 × 2/100 = [36300 – 30000] – 6000 = 6300 – 6000; D = 300

30. $4500 \times 3/100(R1 - R2) = 405$; $R1 - R2 = 405 \times 100/13500 = 3\%$

31. Amount after $1\frac{1}{2}$ years when interest is compounded yearly $= 5000 \times \left(1 + \frac{4}{100}\right)^1 \times \left(1 + \frac{\frac{1}{2} \times 4}{100}\right)$

$= 5000 \times \frac{104}{100} \times \left(1 + \frac{2}{100}\right) = 5000 \times \frac{104}{100} \times \frac{102}{100} = 50 \times 104 \times \frac{51}{50} = 104 \times 51 =$ Rs. 5304

Compound Interest for $1\frac{1}{2}$ years when interest is compounded yearly = Rs. (5304 – 5000)

Amount after $1\frac{1}{2}$ years when interest is compounded half-yearly $= P\left(1 + \frac{(R/2)}{100}\right)^{2t} = 5000\left(1 + \frac{(4/2)}{100}\right)^{2 \times \frac{3}{2}}$

$= 5000\left(1 + \frac{2}{100}\right)^3 = 5000\left(\frac{102}{100}\right)^3 = 5000\left(\frac{102}{100}\right)\left(\frac{102}{100}\right)\left(\frac{102}{100}\right) = 50 \times 102 \times \frac{51}{50} \times \frac{51}{50} = 102 \times 51 \times \frac{51}{50} = 51 \times 51 \times \frac{51}{25}$

= Rs. 5306.04

compound interest for $1\frac{1}{2}$ years when interest is compounded half-yearly = Rs. (5306.04 – 5000)

Difference in the compound interests = (5306.04 – 5000) – (5304 – 5000) = 5306.04 – 5304 = Rs. 2.04

32. Amount after 1 year on Rs. 1600 (deposited on 1st Jan) at 5% when interest calculated half-yearly

$= P\left(1+\frac{(R/2)}{100}\right)^{2t} = 1600\left(1+\frac{(5/2)}{100}\right)^{2\times 1} = 1600\left(1+\frac{1}{40}\right)^2$

Amount after 1/2 year on Rs. 1600 (deposited on 1st July) at 5% when interest calculated half-yearly

$= P\left(1+\frac{(R/2)}{100}\right)^{2t} = 1600\left(1+\frac{(5/2)}{100}\right)^{2\times\frac{1}{2}} = 1600\left(1+\frac{1}{40}\right)$

Total Amount after 1 year $= 1600\left(1+\frac{1}{40}\right)^2 + 1600\left(1+\frac{1}{40}\right) = 1600\left(\frac{41}{40}\right)^2 + 1600\left(\frac{41}{40}\right) = 1600\left(\frac{41}{40}\right)\left[1+\frac{41}{40}\right]$

$= 1600\left(\frac{41}{40}\right)\left(\frac{81}{40}\right) = 41\times 81 = \text{Rs. } 3321$ $\quad\therefore$ Compound Interest = Rs.3321 – Rs.3200 = Rs.121

33. Let P = Rs. 100

Simple Interest = Rs. 80 ($\because$ 80% increase is due to the simple interest)

Rate of interest $= \frac{100\times SI}{PT} = \frac{100\times 80}{100\times 8} = 10\%$ per annum

Now let's find out the compound interest of Rs. 14,000 after 3 years at 10%

P = Rs.14000 ; T = 3 years; R = 10%

Amount after 3 years $= P\left(1+\frac{R}{100}\right)^T = 14000\left(1+\frac{10}{100}\right)^3 = 14000\left(\frac{110}{100}\right)^3 = 14000\left(\frac{11}{10}\right)^3 = 14\times 11^3 = 18634$

$\therefore$ Compound Interest = Rs.18634 – Rs.14000 = Rs.4634

34. **Solution-1**

Let the sum be Rs. x

Amount after 2 years on Rs. x at 4% per annum when interest is compounded annually $= x\left(1+\frac{4}{100}\right)^2 = x\left(\frac{104}{100}\right)^2$

Compound Interest $= x\left(\frac{104}{100}\right)^2 - x = x\left[\left(\frac{104}{100}\right)^2 - 1\right] = x\left[\left(\frac{26}{25}\right)^2 - 1\right] = x\left[\left(\frac{676}{625}\right) - 1\right] = x\left[\frac{51}{625}\right] = \frac{51x}{625}$

Simple Interest $= \frac{PRT}{100} = \frac{x\times 4\times 2}{100} = \frac{2x}{25}$

Given that difference between compound interest and simple interest is Rs.1 $\Rightarrow \frac{51x}{625} - \frac{2x}{25} = 1 \Rightarrow \frac{51x-50x}{625} = 1 \therefore x = 625$

Solution-2

The difference between compound interest and simple interest on Rs. P for 2 years at R% per annum

$= P\left(\frac{R}{100}\right)^2 \Rightarrow P\left(\frac{4}{100}\right)^2 = 1 \Rightarrow P\left(\frac{1}{25}\right)^2 = 1 \Rightarrow P\left(\frac{1}{625}\right) = 1 \therefore P = 625$ i.e., required sum is Rs.625

35. Let the rate of interest per annum be R%

Amount after 2 years on Rs.15000 when interest is compounded annually $= P\left(1+\frac{R}{100}\right)^T = 15000\left(1+\frac{R}{100}\right)^2$

Compound Interest $= 15000\left(1+\frac{R}{100}\right)^2 - 15000 = 15000\left[\left(1+\frac{R}{100}\right)^2 - 1\right]$

Simple Interest $= \frac{PRT}{100} = \frac{15000\times R\times 2}{100} = 300R$

Difference between compound interest and simple interest = Rs.96

$15000\left[\left(1+\frac{R}{100}\right)^2 - 1\right] - 300R = 96 \Rightarrow 15000\left[1+\frac{2R}{100}+\left(\frac{R}{100}\right)^2 - 1\right] - 300R = 96$

$\Rightarrow 15000\left[\frac{2R}{100}+\left(\frac{R}{100}\right)^2\right] - 300R = 96 \Rightarrow 30R + 15000\left(\frac{R}{100}\right)^2 - 300R = 96 \Rightarrow 15000\left(\frac{R}{100}\right)^2 = 96$

$\Rightarrow 15000\left(\frac{R^2}{10000}\right) = 96 \Rightarrow 3\left(\frac{R^2}{2}\right) = 96 \Rightarrow R^2 = 64 \quad \therefore R = 8 \quad \therefore$ Rate of interest per annum = 8%

36. Let principal be P

$P\left(1+\frac{R}{100}\right)^T > 2P \quad \Rightarrow P\left(1+\frac{20}{100}\right)^T > 2P \quad \Rightarrow \left(1+\frac{20}{100}\right)^T > 2 \Rightarrow \left(\frac{120}{100}\right)^T > 2 \therefore 1.2^T > 2$

Now let's find out the minimum value of T for which the above equation becomes true

If $T = 1, 1.2^T = 1.2^1 = 1.2$; If $T = 2, 1.2^T = 1.2^2 \approx 1.$;If $T = 3, 1.2^T = 1.2^3 \approx 1.7$

If $T = 4, 1.2^T = 1.2^4 \approx 2.07$ which is greater than 2

Hence T = 4 i.e., required number of years = 4

37. Let principal, P be Rs.100

Amount after 1 year on Rs.100 at 6% per annum when interest is compounded half-yearly= $P\left(1+\frac{(R/2)}{100}\right)^{2T}$

$= 100\left(1+\frac{(6/2)}{100}\right)^{2\times1} = 100\left(1+\frac{3}{100}\right)^2 = 100\left(\frac{103}{100}\right)^2 = \frac{100\times103\times103}{100\times100} = \frac{103\times103}{100} = 106.09$

This means, if interest is compounded half-yearly at 6%, Rs.100 becomes Rs.106.09 after 1 year

Now, we need to find out the rate of interest on which Rs.100 becomes Rs.106.09 after 1 year

when the interest is compounded annually, $P\left(1+\frac{R}{100}\right)^T = 106.09 \Rightarrow 100\left(1+\frac{R}{100}\right)^1 = 106.09$

$\Rightarrow 100\left(1+\frac{R}{100}\right) = 106.09 \Rightarrow 100 + R = 106.09 \Rightarrow R = 106.09 - 100 = 6.09\%$ i.e, effective annual rate of interest is 6.09%

38. Amount after 2 year on Rs.3000 at 10% per annum when interest is compounded annually

$P\left(1+\frac{R}{100}\right)^T = 3000\left(1+\frac{10}{100}\right)^2 = 3000\left(\frac{110}{100}\right)^2 \Rightarrow \frac{3000\times110\times110}{100\times100} = 3\times11\times110 = 3630$

Compound Interest = 3630 - 3000 = Rs.630

Given that simple interest on a certain sum of money for 4 years at 5% per annum is half of the compound interest.

i.e., simple interest $= \frac{630}{2} =$ Rs. 315

$P = \frac{100\times SI}{RT} = \frac{100\times315}{5\times4} = \frac{20\times315}{4} = 5\times315 =$ Rs. 1575 (Ans.)

39. Let the sum be Rs. P.

Amount after 2 years at 10% per annum when interest is compounded annually

$= \left(1+\frac{R}{100}\right)^T = P\left(1+\frac{10}{100}\right)^2 = P\left(\frac{110}{100}\right)^2 = P\left(\frac{11}{10}\right)^2$

Compound Interest $= P\left(\frac{11}{10}\right)^2 - P = P\left[\left(\frac{11}{10}\right)^2 - 1\right]$

Given that compound interest = 525

$\Rightarrow P\left[\left(\frac{11}{10}\right)^2 - 1\right] = 525 \Rightarrow P\left[\frac{121}{100} - 1\right] = 525 \Rightarrow P\times\frac{21}{100} = 525 \Rightarrow P = 525\times\frac{100}{21} = 25\times100 = 2500$

Simple interest on the same sum(Rs.2500) for 4 years at 5%

$= \frac{2500\times5\times4}{100} = 25\times5\times4 = 25\times20 =$ Rs. 500

40. Let the sum be P

Time, $T = 1\frac{1}{2}$ year $= \frac{3}{2}$ year

Amount after $1\frac{1}{2}$ year s $= P\left(1+\frac{(R/2)}{100}\right)^{2T} = P\left(1+\frac{(4/2)}{100}\right)^{2\times\frac{3}{2}} = P\left(1+\frac{2}{100}\right)^3 = P\left(\frac{102}{100}\right)^3 = P\left(\frac{51}{50}\right)^3$

Given that amount after 1 ½ years = 13265.10

$\Rightarrow P\left(\frac{51}{50}\right)^3 = 13265.10 \Rightarrow P = 13265.10\left(\frac{51}{50}\right)^3 = \frac{13265.10\times50\times50}{51\times51\times51} = \frac{260.1\times50\times50\times50}{51\times51} = \frac{51\times50\times50\times50}{51\times51}$

$= 0.1\times50\times50\times50 =$ Rs. 12500

41.

Present worth of Rs. x due T years hence is given by

$$\text{Present Worth (PW)} = \frac{x}{\left(1+\frac{R}{100}\right)^T}$$

The sum borrowed = Present Worth of Rs.882 due 1 year hence + Present Worth of Rs.882 due 2 year hence

$$= \frac{882}{\left(1+\frac{5}{100}\right)^1} + \frac{882}{\left(1+\frac{5}{100}\right)^2} = \frac{882}{\left(\frac{105}{100}\right)} + \frac{882}{\left(\frac{105}{100}\right)^2} = \frac{882}{\left(\frac{21}{20}\right)} + \frac{882}{\left(\frac{21}{20}\right)^2} = \frac{882\times 20}{21} + \frac{882\times 20\times 20}{21\times 21}$$

$$= 42\times 20 + \frac{42\times 20\times 20}{21} = 840 + 2\times 20\times 20 = 840 + 800 = 1640 \text{ i.e., The sum borrowed = Rs.1640}$$

42. Let the sum be Rs. x

Amount after 3 years on Rs. x at 20% per annum when interest is compounded annually

$$= P\left(1+\frac{R}{100}\right)^T = x\left(1+\frac{20}{100}\right)^3 = x\left(\frac{120}{100}\right)^3 = x\left(\frac{6}{5}\right)^3$$

$$= \text{Compound Interest} = x\left(\frac{6}{5}\right)^3 - x = x\left[\left(\frac{6}{5}\right)^3 - 1\right] = x\left[\frac{216}{125} - 1\right] = \frac{91x}{125}$$

$$\text{Simple Interest} = \frac{PRT}{100} = \frac{x\times 20\times 3}{100} = \frac{3x}{5}$$

Given that difference between compound interest and simple interest is Rs.48

$$\frac{91x}{125} - \frac{3x}{5} = 48 \Rightarrow \frac{91x - 75x}{125} = 48 \Rightarrow \frac{16x}{125} = 48 \Rightarrow x = \frac{48\times 125}{16} = 3\times 125 = \text{Rs. 375 i.e, the sum is Rs. 375}$$

43. $\text{Rate of increase} = \frac{1}{5}\times 100 = 20\%$

$$\text{Height after 2 years} = P\left(1+\frac{R}{100}\right)^T = 50\left(1+\frac{20}{100}\right)^2 = 50\left(1+\frac{1}{5}\right)^2 = 50\left(\frac{6}{5}\right)^2 = \frac{50\times 6\times 6}{5\times 5} = 2\times 6\times 6 = 72 \text{ cm}$$

44. Let x be the annual payment

Then, present worth of x due 1 year hence + present worth of x due 2 year hence = 1025

$$\frac{x}{\left(1+\frac{5}{100}\right)^1} + \frac{x}{\left(1+\frac{5}{100}\right)^2} = 1025 \Rightarrow \frac{x}{\left(\frac{21}{20}\right)} + \frac{x}{\left(\frac{21}{20}\right)^2} = 1025 \Rightarrow \frac{20x}{21} + \frac{400x}{441} = 1025 \Rightarrow \frac{820x}{441} = 1025$$

$$x = \frac{1025\times 441}{820} = \frac{205\times 441}{164} = \text{Rs. 551.25}$$

45. Let the sum be x

Simple interest on x for 2 years = Rs.2000

$$\text{Simple interest} = \frac{PRT}{100} \Rightarrow 200 = \frac{x\times R\times 2}{100} \Rightarrow xR = 100000 \text{--- (1)}$$

Simple interest = PRT1002000 = x × R × 2100⇒ xR = 100000--- (1)

Compound Interest on x for 2 years = 2400

$$P\left(1+\frac{R}{100}\right)^T - P = 2400 \Rightarrow x\left(1+\frac{R}{100}\right)^2 - x = 2400 \Rightarrow x\left(1+\frac{2R}{100}+\frac{R^2}{10000}\right) - x = 2400 \Rightarrow x\left(\frac{2R}{100}+\frac{R^2}{10000}\right) = 2400$$

$$\frac{2xR}{100} + \frac{xR^2}{10000} = 2400 \text{ ------ (2)}$$

Substituting the value of x R from (1) in (2) ,we get

$$\frac{2\times 100000}{100} + \frac{100000\times R}{10000} = 2400 \Rightarrow 2000 + 10R = 2400 \Rightarrow 10R = 400 \Rightarrow R = 40\%$$

46. Let the sum be P

The sum P becomes 3P in 4 years on compound interest

$$3P = P\left(1+\frac{R}{100}\right)^4 \Rightarrow 3 = \left(1+\frac{R}{100}\right)^4$$

Let the sum P becomes 81P in n years

$$81P = P\left(1+\frac{R}{100}\right)^n \Rightarrow 81 = \left(1+\frac{R}{100}\right)^n \Rightarrow (3)^4 = \left(1+\frac{R}{100}\right)^n \Rightarrow \left(\left(1+\frac{R}{100}\right)^4\right)^4 = \left(1+\frac{R}{100}\right)^n \Rightarrow \left(1+\frac{R}{100}\right)^{16} = \left(1+\frac{R}{100}\right)^n$$

n = 16 i.e, the sum will become 81 times in 16 years.

47. A's share after 5 years = B's share after 7 years

$$\text{(A's present share)}\left(1+\frac{5}{100}\right)^5 = \text{(B's present share)}\left(1+\frac{5}{100}\right)^7$$

$$\Rightarrow \frac{\text{(A's present share)}}{\text{(B's present share)}} = \frac{\left(1+\frac{5}{100}\right)^7}{\left(1+\frac{5}{100}\right)^5} = \left(1+\frac{5}{100}\right)^{(7-5)} = \left(1+\frac{5}{100}\right)^2 = \left(\frac{5}{100}\right)^2 = \frac{441}{400}$$

i.e, A's present share : B's present share = 441 : 400

Since the total present amount is Rs.3364, A's share = $3364 \times \frac{441}{(441+400)} = 3364 \times \frac{441}{841} = 4 \times 441 = \text{Rs. } 1764$

B's present share = 3364 – 1764 = Rs.1600

Students' Work — Profit & Loss

1. A milkman buys two cows for Rs. 3000. He sells first cow at a profit of 22% and the second cow at a loss of 8%. What is the SP of second cow if in the whole transaction there is no profit no loss?

A) Rs. 2312 B) Rs. 2024 C) Rs. 2484 D) Rs. 2532 E) None

2. Sum of CP's of two cows is Rs. 39, 000. Both the cows are sold at a profit of 20% and 40% respectively with their SP's being the same. What is the difference of CP's of both the cows?

A) Rs. 3,000 B) Rs. 2, 000 C) Rs. 1, 500 D) Rs. 2, 500 E) None

3. A shopkeeper sells his gods at its CP only. But he uses 650 g weight at the place of 1000 g weight for a kg. What is his net profit percentage?

A) 55% B) 20 1/3% C) 49 2/3% D) 53 11/13% E) None

4. A seller calculated his intended selling price at 6% profit on the cost of a product. However, owing to some mistake while selling, the units and tens digits of the selling price got interchangeD) This reduced the profit by Rs. 180 and profit percentage to 2.4%. What is the cost price of the product?

A) Rs. 4500 B) Rs. 5000 C) Rs. 4750 D) Rs. 6000 E) None

5. Jim sells a book to Carrey at a profit of 20% and Carrey sells this book to Sid at a profit of 25%. Now Sid sells this book at a loss of 10% to Simba. At what percentage loss should Simba sells this book now so that his SP becomes equal to Jim's CP?

A) 26.68% B) 25.92% C) 58.66 D) Cannot be determined E) None

6. A fruit vendor professes to sell fruits at the cost price, but uses false weights. He gains 40% in this manner. What weight does he substitute for one kilogram?

A) 745 1/3 g B) 750 g C) 714 2/7 g D) 800 g E) None

7. A shopkeeper marks up his goods by 20% and then gives a discount of 20%. Besides he cheats both his supplier and customer by 100 g, i.e., he takes 1100 g from his supplier and sells only 900 g to his customer. What is his net profit percentage? (Rounded off to two decimal points)

A) 24.5% B) 17.33% C) 25% D) 32.5% E) None

8. Some mangoes are purchased at the rate of 8 mangoes/Rs and some more mangoes at the rate of 6 mangoes/Rs, investment being equal in both the cases. Now, the whole quantity is sold at the rate of 3.5 mangoes/Rs What is the net percentage profit/loss?

A) 100% profit B) 60% loss C) 80% loss D) no profit /no loss E) None

9. **A man would gain 25% by selling a chair for Rs. 47.5 and would gain 15% by selling a table for Rs. 57.E) He sells the chair for Rs. 45; what is the least price for which he must sell the table to avoid any loss on the two together?**
A) Rs. 41.2 B) Rs. 48.5 C) Rs. 42.5 D) Rs. 43 E) Cannot be determined

10. **A bookseller marks his books at an advance of 69% on the actual cost of production He allows a discount of 15% and also given a copy free for every dozen sold a time. What rate per cent profit does the book seller make, if books are sold in lots of 24? (find the approximate value)**
A) 38% B) 47% C) 24% D) None of these E) Cannot be determined

11. **Rahim went shopping to buy a Mobile, the shopkeeper asked him to pay 18% Tax if he wants a bill. If not you can get 7% discount on the actual price of the mobile. Then Rahim decided not to take the bill and paid Rs. 4650. By this how much money could Rahim saved on purchasing mobile?**
A) Rs.250 B) Rs.350 C) Rs.650 D) Rs.850 E) Rs.1250

12. **A seller bought 2750 Mangoes and 1210 Apples at the same price. He sells in such a way that he can buy 406 Mangoes with the sale of 322 Mangoes and he can buy only 289 Apples with the sale of 391 Apples. Then what is the overall profit percentage made by him?**
A) 0% B) 2% C) 5% D) 6% E) 10%

13. **Aryan sold a repair mobile to Bhaskar at a profit of 30% and Bhaskar sold it to Chandu at a profit of 20%. Chandu sold it to Dinesh at a loss of 23.07%. Dinesh repaired the mobile by spending 5% of his purchasing price and then sold it again to Aryan at a profit of 3.17%.Then what is the loss of Aryan?**
A) 5% B) 10% C) 15% D) 20% E) No Loss No Profit

14. **The ratio selling prices three articles A, B, and C is 29:27:32., the ratio of percentage profit is 4:2:5, respectively. If the cost price of article A is equal to B and the cost price of article C is Rs. 480. Then what is the overall gain?**
A) 10% B) 12% C) 15% D) 18% E) 19%

15. **Swati went shopping to buy a watch with some money. She selected a watch, which is marked Rs.400 higher price than the money she had. But shopkeeper gave two successive discounts of 10% and 15% respectively on the marked price of the watch. Then she could buy that watch and also another watch worth Rs.540 with all the money she had. Then what is the marked price on the first watch?**
A) Rs.3060 B) Rs.3600 C) Rs.4000 D) Rs.4200 E) Cannot be determined

16. **A trader sells Rice to a customer at a profit of x% over the cost price, besides if he cheats his customer by giving 950 g instead of 1Kg. Thus his overall percentage is 20%. Then what is the value of x?**
A) 10 B) 12 C) 14 D) 15 E) 20

17. **A trader sells two varieties of Rice A and B. He Mixes 12 Kg of A with 16 kg of B, and by selling this mixture at price of B Rice he gets 20% profit. If the price of A variety Rice is Rs.66/Kg, then what is the price of B variety /Kg.**
A) Rs.72 B) Rs.84 C) Rs.96 D) Rs.108 E) None

18. **Akash bought a Sopha for Rs. 50,000. After one year he sold it to Bhuvan at 10% less of his cost price. Bhuvan spends extra Rs.600 for its repair. And offered Sopha to Charan for Rs.X. Charan requested to get a discount of 15% on that price. But Bhuvan gave him two successive discounts of 10% and 5% instead of 15%.By this Bhuvan got Rs.300 more from Charan. What is the profit % of Bhuvan?**
A) 10% B) 12.5% C) 15% D) 20% E) None

19. **A mobile of Rs.8000 was offered 20% discount on Diwali by Flipkart. Shriya availed the offer and she got additional 10% by paying through Debit carD) After that, she spent 10% of the purchased price for buying Screen guard and Back Cover. At what price she should sell to Sravani the Mobile (with screen guard and Back Cover)to incur a loss of 25%?**
A) 4752 B) 5140 C) 5422 D) 5760 E) None

20. **The ratio selling prices three articles A, B, and C is 19:25:27., the ratio of percentage profit is 7:10:4, respectively. If the cost price of article A and B is 400 and 500 respectively. Then what is the total Selling price of all three articles?**
A) Rs.1644 B) Rs.1674 C) Rs.1694 D) Rs.1704 E) None

21. **A retailer sold 12 notes at a profit of 20% and 8 notes at a profit of 10%. If he had sold all the 20 notes at a profit of 15%, then his profit would have been reduced by Rs.36. What is the cost price of each note?**
A)Rs.160 B)Rs.190 C)Rs.120 D)Rs.180 E) None

22. **The profit Percentage on 3 bikes are 15%, 35% and 10% and the ratio of CP is 5:3:1. Also the ratio of the Bike sold of P, Q and R is 2:3:5. Then the overall approximate Profit Percentage is?**
A) 19% B) 20% C) 16% D) 21% E) None

23. When a shopkeeper reduces the selling price of an article from 1180 to 1126 his loss increases by 5% . What is the cost price of article?
A) 1050 B) 1060 C) 1070 D) 1080 E) None

24. A and B, there are two companies, selling the packs of cold-drinks. For the same selling price A gives two successive discounts of 10% and 25%. While B sells it by giving two successive discounts of 15% and 20%. What is the ratio of their marked price?
A) 143 : 144 B) 19 : 11 C) 136 : 135 D) 73 : 77 E) None

25. A reputed company sells a wrist watch to a wholesaler making a profit of 10%. The wholesaler, in turn, sells it to the retailer making a profit of 10%. A customer purchases it by paying Rs. 990. Thus the profit of retailer is 2(3/11)% What is the cost incurred by the company to produce it?
A) 700 B) 600 C) 800 D) 900 E) None

26. A and B both are dealers of Honda Motorcycles. The price of an used Honda Motorcycle is Rs.28,000. A gives a discount of 10% on whole, while B gives a discount of 12% on the first Rs. 20,000 and 8% on the rest Rs. 8000. What is the difference between their selling prices?
A) Rs.240 B) Rs.420 C) Rs.640 D) Rs.740 E) None

27. The profit percentage of P and Q is same on selling the articles at Rs. 1800 each but A calculates his profit on the selling price while Q calculates it correctly on the cost price which is equal to 20%. What is the difference in their profits?
A) 40 B) 50 C) 60 D) 70 E) None

28. A person sold a pen at Rs. 96 in such a way that his percentage profit is same as the cost price of the watch. If he sells it at twice the percentage profit of its previous percentage profit then new selling price will be?
A) Rs.132 B) Rs.150 C) Rs.192 D) Rs.180 E) None

29. A trader mixes 25% of solution A to his Solution B and then he sells the whole mixture at the price of Solution B) If the cost price of Solution A be 50% of the cost price of Solution B, what is the net profit percentage?
A) 100/3% B) 200/7% C) 100/9% D) 200/3% E) None

30. A scientist mixes 10% water in his solution but he is not content with it so he again mixes 10% more water in the previous mixture. What is the profit percentage of the scientist if he sells it at cost price:
A) 15% B) 21% C) 18% D) 16% E) None

31. The profit earned after selling an article for Rs. 1680 is the same as the loss incurred after selling the article for Rs. 1512. What is the cost price of the article?
A)Rs.1602 B)Rs.1912 C)Rs.1200 D)Rs.1596 E) None

32. Arun sells an article at 20% profit to Bala, Bala sells it to Catherine at 10% profit. Catherine sells it to Dinesh at Rs. 16 profit. The difference between the cost price of Dinesh and cost price of Arun was Rs. 500. How much did Bala pay to Arun for the article?
A) Rs.1350 B) Rs.1815 C) Rs.1650 D) Rs.1750 E) None

33. Rahul purchased an article for Rs. 8400 and sold it for a loss of 5%. From that money he purchased another article and sold it for a gain of 5%. What is the overall gain or loss?
A) Profit of Rs.21 B) Profit of Rs.24 C) Loss of Rs.21 D) Loss of Rs.24 E) None

34. A Shop Keeper sells two bags for Rs. 500 each. On one, he gets 14% profit and on the other he gets 14% loss. His profit or loss in the entire transaction was?
A) 64/25 % Gain B) 49/25 % Gain C) 64/25 % Loss D) 49/25 % Loss E) None

35. A Shopkeeper bought 30 kg of rice at the rate of Rs. 40 per kg. He sold 40% of the total quantity at the rate of Rs. 50 per kg. At what price per kg should he sell the remaining quantity to make 25% overall profit?
A) Rs.54 B) Rs.50 C) Rs.40 D) Rs.30 E) None

36. If the Cost Price of 25 articles is equal to the Selling Price of 20 articles, then what is the gain %?
A) 25% B) 29% C) 50% D) 40% E) None

37. A TV was purchased for Rs. 54000. Its price was marked up by 40%.It was sold at a discount of 20% on the marked price. What was the profit percent of the cost price?
A) 10% B) 11% C) 15% D) 12% E) None

38. A shopkeeper sold a smartphone for Rs.15000. Had he offered discount of 10% on the Selling Price, he would have earned a profit of 8%. What is the Cost Price of that Smartphone?
A) 11300 B) 11500 C) 12500 D) 12300 E) None

39. **Pinkey sold a machine to Shalini at a profit of 30%. Shalini sold this machine to Arun at a loss of 20%. If Pinkey paid Rs.5000 for this machine, then find the cost price of machine for Arun?**
A) 6200 B) 5200 C) 4800 D) 4750 E) None

40. **A merchant earns a profit of 20% by selling a basket containing 80 Oranges whose cost is Rs.240 but he gives one-fourth of it to his friend at cost price and sells the remaining oranges. In order to earn the same profit, at what price must he sell each orange?**
A) Rs. 4.80 B) Rs. 4.90 C) Rs. 3.80 D) Rs. 4.50 E) None

41. **Arun went to buy an Android mobile, the shopkeeper told him to pay 20% tax if he asked the bill. Arun manages to get the discount of 5% on the actual sale price of the mobile and he paid the shopkeeper Rs. 8550 without tax. Besides he manages to avoid to pay 20% tax on the already discounted price, what is the amount of discount?**
A)2685 B)2636 C)2250 D)2675 E)2690

42. **Cost Price of two mobiles is same. One is sold at a profit of 20% and the other for Rs. 5200 more than the first. If the net profit is 40%. Find the cost price of each mobile?**
A) Rs. 13000 B) Rs. 12000 C) Rs. 16000 D) Rs. 12500 E) None

43. **Rahul sells his laptop to Ravi at a loss of 20% who subsequently sells it to Suresh at a profit of 25%. Suresh after finding some defect in the laptop, returns it to Ravi but could recover only Rs.4.50 for every Rs. 5 he had paid. Find the amount of Suresh's loss if Rahul had paid Rs.50,000 for the laptop?**
A) Rs.6000 B) Rs.7000 C) Rs.2000 D) Rs.5000 E) None

44. **A reduction of 20% in the price of sugar enables a housewife to purchase 6 kg more for Rs. 240. What is original price per kg of sugar?**
A) Rs.10 per Kg B) Rs.8 per Kg C) Rs.6 per Kg D) Rs.5 per Kg E) None

45. **A Bike is available at 40% discount at show room "A" and the same is available at only 25% discount at show room "B". Mr. Arun has just sufficient amount of Rs. 60,000 to purchase it at show room "A". What is the amount that Mr. Arun has less than the required amount to purchase it at that show room "B"?**
A) Rs. 70000 B) Rs. 50000 C) Rs. 10000 D) Rs. 15000 E) None

46. **Person A sold his car to Person B at a profit of 20% and B sold it to C at a profit of 10%. Person C sold it to mechanic at a loss of 9.09%. Mechanic spent 10% of his purchasing price and then sold it at a profit of 8.33% to Person "A" once again. What is the loss of person "A"?**
A) 23% B) 29% C) 50% D) 40% E) None

47. **A and B are two partners and they have invested Rs. 54,000 and Rs. 90,000 in business. After one year A received Rs 1200 as his share of profit out of total profit of Rs. 4200 including his certain commission on total profit since he is a working partner and rest profit is received by B) What is the commission of A as a percentage of the total profit?**
A) 1200 B) 1100 C) 1500 D) 1250 E) None

48. **A shopkeeper bought 150 pen drives at the rate of Rs. 500 per pen drive. He spent Rs. 500 on transportation and packing. If the marked price of pen drive is Rs. 520 per pen drive and the shopkeeper gives a discount of 5% on the marked price then what will be the percentage profit gained by the shopkeeper?**
A) 4.5% B) 5.5% C) 3.8% D) 1.2% E) None

49. **A vendor has two types of grapes. One is the fresh grapes containing 80% water and dry grapes containing 25% water. He sells 20 kg dry grapes, by adding water to the dry grapes, at cost price. What is the total profit percentage when after adding water the weight of 20 kg dry grapes increase in the proportion of water in fresh grapes?**
A) 265% B) 200% C) 280% D) 275% E) None

50. **Pinkey and Shalini invested some amount of money in the ratio of 3:5 for the same period in the business. They decided that at the end of the year 20% profit was to be given to an organization as a donation. Out of the remaining, 75% was to be reinvested and the rest of the profit was to be divided as interest on their capitals. If the difference in their share is Rs. 2400. What is the total profit?**
A) 49800 B) 49400 C) 48000 D) 49500 E) None

51. **A tradesman marks the price of his goods such that after allowing a discount of 25%, he earns a profit of 40%. What is the marked price of an article whose cost price is Rs.180?**
A)285 B)336 C)358 D)375 E)390

52. **Sriram purchased 40 dozen notebooks at Rs. 50 per dozen. He sold 10 dozens of it at 15% profit and the remaining 30 dozens at 25% profit. What is his percentage profit in the whole transaction?**
A)18.8% B)20% C)22.5% D)25% E)28.5%

53. **A dealer marked the price of an item 20% above cost price. He allowed two successive discounts of 20% and 25% to a customer. As a result he incurred a loss of Rs.812. At what price did he sell the item to the customer?**
A) 1875 B) 2088 C) 2155 D) 2258 E) None

54. **An item was bought at Rs. X and sold at Rs. Y, thereby earning a profit of 20%. Had the value of X been 15% less and the value of Y been Rs.60 less, a profit of 20% would have been earned, What was the value of Y ?**
A) 350 B) 400 C) 450 D) 500 E) None

55. **A vendor sold two magazines namely A and B) He sold magazine 'A' at a loss of 30% and magazine 'B' at a profit of 35% but finally there is no loss or no gain. If the total Selling price of both magazines is Rs.572. Find the difference between the Cost Price of Magazine 'A' and 'B'?**
A) Rs. 32 B) Rs. 44 C) Rs. 56 D) Rs. 62 E) None

56. **A man buys some quantity of rice for Rs 5100. He sells one third of it at a profit of 10%. At what percent gain should he sell the remaining two-third so as to make an overall profit of 20% on the whole transaction?**
A) 10% B) 15% C) 20% D) 25% E) None

57. **Ravi found that he had made a loss of 10% while selling his smartphone. He also found that had he sold it for Rs.100 more, he would have made a profit of 10%. The initial loss was what percentage of the profit earned, had he sold the smartphone for a 10% profit ?**
A) 100% B) 118% C) 75% D) 85% E) None

58. **A, B and C invests rupees 8000, 12000 and 10000 respectively in a business. At the end of the year the balance sheet shows a loss of 40% of the initial investment. Find the share of loss of B.**
A)4000 B)4500 C)4800 D)5000 E) None

59. **Deepika buys two bangle set for a total cost of Rs. 600. By selling one bangle set for 4/5 of its cost and the other for 5/4 of its cost, She makes a profit of Rs. 96 on the whole transaction. The cost of the lower priced bangle set is?**
A)Rs. 360 B)Rs. 320 C)Rs. 150 D)Rs. 120 E) None

60. **A milkman buys some milk. If he sells it at rupees 10 a litre, he losses 400 rupees but when he sells it at 12 a litre, he gains 800 rupees. How much milk did he purchase?**
A)400 litre B)550 litre C)600 litre D)800 litre E) None

61. **A vendor bought bananas at 66 for a rupeE) How many for a rupee must he sell to gain 20%?**
A) 33 B) 44 C) 55 D) 6

62. **The percentage profit earned by selling an item for Rs. 1920Rs. 1920 is equal to the percentage loss incurred by selling the same item for Rs. 1280.Rs. 1280. At what price should the item be sold to make 25%25% profit?**
A) Insufficient Data B) Rs. 3000 C) Rs. 2000 D) Rs. 2200

63. **On selling 1717 balls at Rs. 720Rs. 720, there is a loss equal to the cost price of 55 balls. What is the cost price of a ball?**
A) Rs. 43 B) Rs. 60 C) Rs. 55 D) Rs. 34

64. **A shopkeeper sells one radio for Rs. 840Rs. 840 at a gain of 20%20% and another for Rs. 960Rs. 960 at a loss of 4%.4%. What is his total gain or loss percentage?**
A) 5% B) 6% C) $6\frac{12}{17}\%$ D) $5\frac{15}{17}\%$

65. **A trader mixes 2626 kg of rice at Rs. 20Rs. 20 per kg with 3030 kg of rice of other variety at Rs. 36Rs. 36 per kg and sells the mixture at Rs. 30Rs. 30 per kg. What is his profit percentage?**
A) 6% B) 5% C) 4% D) 7%

66. **A trader gives 12% additional discount on the discounted price, after giving an initial discount of 20% on the labelled price of an item. The final sale price of the item is Rs. 704. Find out the labelled price?**
A) Rs. 1000 B) Rs. 2000 C) Rs. 1200 D) Rs. 920

67. **By selling an item for $\text{Rs. }15,$ a trader loses one sixteenth of what it costs him. The cost price of the item is**
A) $\text{Rs. }14$ B) $\text{Rs. }15$ C) $\text{Rs. }16$ D) $\text{Rs.}17$

68. **A shopkeeper sells his goods at cost price but uses a weight of 800 gm instead of kilogram weight. What is his profit percentage?**
A) 18% B) 40% C) 25% D) 20%

69. **If a seller reduces the selling price of an item from $\text{Rs. }400$ to $\text{Rs. }380,$ his loss increases by $2\%.$ What is the cost price of the item?**
A) Rs. 1000 B) Rs. 800 C) Rs. 1200 D) Rs. 1100

70. **A trader keeps the marked price of an item 35% above its cost price. The percentage of discount allowed to gain 8% is**
A) None B) 30% C) 25% D) 20% Answer: D

71. **Arun bought a computer with 15% discount on the labelled price. He sold the computer for Rs. 2880Rs. with 20% profit on the labelled price. At what price did he buy the computer?**
A) Rs. 3000Rs. B) Rs. 2080Rs. C) Rs. 2040Rs. D) Rs. 2000

72. **A material is purchased for Rs. 600.Rs. If one fourth of the material is sold at a loss of 20% and the remaining at a gain of 10%,find out the overall gain or loss percentage?**
A) $3\frac{1}{2}\%$ B) $2\frac{1}{2}\%$ C) 3% D) 2%

73. **A reduction of 10%in the price of a pen enabled a trader to purchase 99 more for Rs. 540. What is the reduced price of the pen?**
A) Rs. 88 B) Rs. 66 C) Rs. 55 D) Rs. 4

74. **If a man sells 5 toffees for 1` tk. he got 20% loss, when he sells 3 toffees for 1 tk, then what is the percent profit he got from it?**
A) 25% B) 33.33% C) 66.67% D) 42.8%

75. **During a sale, a trader reduced t he price of his goods 25% below the marked price which had originally been fixed at 25% profit o cost price after deducting 10% discount for cash. What percent does he gain or loss?**
A) $4\frac{1}{6}\%$ B) $5\frac{3}{4}\%$ C) $6\frac{5}{7}\%$ D) $2\frac{2}{3}\%$

76. **The difference between the two selling prices of a silk saree at a discount of 30% and at two successive discounts of 20% & 10% is R.S. 72. Find the list price of Silk.**
A) 2400 B) 3600 C) 4800 D) 6000

Solution — Profit & Loss

1. **Explanation:** First Cow Second cow
CP of First Cow = x & Second cow = (3000–x)

$SP = \frac{122x}{100} + \frac{92}{100}(3000 - x) \Rightarrow 3000 = \frac{122x}{100} + \frac{92}{100}(3000 - x) \quad \therefore 3000 = \frac{122x}{100} + \frac{92}{100}\left(3000 - \frac{92}{100}x\right) \Rightarrow x = 800$

$\therefore$ CP of second Cow = 3000 – 800 = 2200 Rs. $\therefore$ SP of second cow = 2200– (2200×8%) = 2024. **Answer – B**

2. **Explanation:** First cow: Second cow
Let cp $\rightarrow$ 10 × 7 : 10 × 6
SP $\rightarrow$ 12×7 : 14× 6
Ratio of their cost price = 7:6 $\therefore$ 130 $\rightarrow$ 39000
1 $\rightarrow$ 300 $\Rightarrow$ 10 $\rightarrow$ 3000 Rs. **Answer – A**

3. **Explanation:** His profit % $= \frac{350}{650} \times 100 = 53\frac{11}{13}\%$ **Answer – D**

4. **Explanation:** Profit % reduced = 6 – 2. 4 = 3.6%
$\therefore$ Required CP $= \frac{180}{3.6} \times 100$ = 5000 Rs. **Answer – D**

5. **Explanation:** Jim 100 $\rightarrow$ Carrey 120 $\rightarrow$ Sid 150 Simba 1325
Required% $= \frac{135-100}{135} \times 100 = \frac{35}{135} \times 100 = 25.92\%$ **Answer – B**

6. **Explanation:** Let the weight substituted for 1 kg = x g
So, $\frac{100-x}{x} \times 1000 = 40$ $\therefore$ Solving $X = 714\frac{2}{7}$ g **Answer – C**

7. **Explanation:** Let initial CP = 100 Rs.
When the shopkeeper cheats from manufacturer then he will get 110 units in the price of 100 units
$\therefore$ Profit % $= \frac{10}{100} \times 100 = 10\%$ $\therefore$ New price = Rs. 110 Rs.
Now MP = 132
SP = 132 – 26.4 = 105.60

Now the shopkeeper cheats from the customer
If he sells 100 units then he will get a profit of 10 units

$\therefore$ profit% $= \frac{10}{90} \times 100 = \frac{100}{90}$ $\therefore$ New SP $= \left(100 + \frac{100}{90}\right) \times \frac{1}{100} \times 105.60$

$= \frac{10}{9} \times 105.60 = \frac{1056}{9}$ = 117.33 Rs. $\therefore$ his net profit % = 17.33% **Answer – B**

8. **Explanation:** Let 1 Rs. invested in both the cases $\rightarrow$
$\therefore$ in 2 Rs. no. of mangoes purchased = 8 + 6 = 14
SP of 14 mangoes = $14 \times \frac{1}{3.5} = 4$ Rs.
$\therefore$ 100% profit. **Answer – A**

9. **Explanation:** CP of chair = $\frac{100}{125} \times 47.5 = 38$ Rs.

CP of table = $\frac{100}{115} \times 57.5 = 50$ Rs.

$\therefore$ Required SP of table = (50 + 38) – 45) = 43 Rs. **Answer – D**

10. **Explanation:**

CP	MP	SP
100	169	143.65

CP of 25 books = 2500 Rs.
SP of 24 books = 143.65 × 24 = 3447.6
Required % profit = $\frac{947.6}{2500} \times 100 = 38\%$ **Answer – A**

11. **Explanation:** SP × 93/100 = 4650
SP = 5000
Including tax= 5000 + 900 = 5900 $\therefore$ Saving = 5900 – 4650 = 1250 **Answer – E**

12. **Explanation**: Cost of 2750 Mangoes = 1210 Apples
Total cost = 2420 Apples
Given: 406 = 322(100 + x/100)
x = 6/23%; Given: 289 = 391(100 + y/100)
y = 6/23% loss
Overall profit: 2750 Mangoes × (100 + 6/23/100) +1210 Apples × (100 – 6/23/100) = 2420 × Apples (100 + P/100)
1210 Apples × (100 + 6/23/100) + 1210 Apples × (100 – 6/23/100) = 2420 × Apples (100 + P/100)
P = 0% **Answer – A**

13. **Explanation:** Aryan
Let CP = 100 $\therefore$ SP = 130
Bhaskar = 156; Chandu = 120; Dinesh = 126+3.17% = 130 $\therefore$ Aryan = 130 – 130 = 0 **Answer – E.**

14. **Explanation :** 29y/27y = (100 + 4x/100 + 2x) $\Rightarrow$ x = 4
% are 16%,8%,20%
32y = 480(120/100) $\Rightarrow$ y =18
SP's are 522, 486, 576
CP of A
29 × 18 = CP (116/100)
CP = 450
CP's are 450,450 and 480
Overall gain = 1584 =1380(100 + g/100) $\therefore$ g =15% **Answer – C.**

15. **Explanation :** (x + 400) × 90/100 × 85/100 + 540 = x
x = 3600 $\therefore$ MP = 3600 + 400 = 4000 **Answer – C.**

16. **Explanation :** 1000 × (100 + x/100) = 950 × 120/100
x = 14% **Answer – C.**

17. **Explanation :** 120/100 × (12 × 66 + 16B) = 28 × B
B = 108 **Answer –D.**

18. **Explanation :** $x \times (90/100 \times 95/100 - 85/100) = 300 \quad \therefore x = 60{,}000$
Now Charan purchased for $60{,}000 \times 90/100 \times 95/100 = 51300$
Bhuvan CP $= 45000 + 600 = 45600$
$51300 = 45600 \times (100 + p/100) \quad \therefore p = 12.5\%$ **Answer – B.**

19. **Explanation :** $8000 \times 80/100 \times 90/100 = 5760$
Back cover + screen guard $= 576 \quad \therefore$ Total $= 6336$
Sravani $= 6336 \times 75/100 = 4752$ **Answer – A.**

20. **Explanation :** $400 \times (1 + 7x/100) / 500 \times (1 + 10x/100) = 19/25 \quad \therefore x = 2$
Profit percentages = 14%, 20% and 8%
$19 \times y = 400 \times 114/100 \quad \therefore y = 24$
Total SP $= (19 + 25 + 27) \times 24 = 1704$ **Answer – D.**

21. **Explanation :** Cost Price = x
Total Profit $= 12x \times 20/100 + 8x \times 10/100 = 32x/100 = 3.2x$ —(i)
Total Profit $= 20x \times 15/100$ — (ii)
$3.2x - 3x = 36 \quad \therefore 0.2x = 36 \quad \therefore x = 180$ **Answer – D.**

22. **Explanation:** $5x \times 2y + 3x \times 3y + x \times 5y = 24xy$
Total Profit $= (5x \times 2y \times 15/100) + (3x \times 3y \times 35/100) + (x \times 5y \times 10/100) = 515xy/100 = 5.15xy$
Overall Profit Percentage $= 5.15xy \times 100/24xy = 21.46\%$ **Answer – D.**

23. **Explanation :** 5% of CP $= 1180 - 1126 \quad \therefore$ CP $= 54 \times 100 / 5 = 1080$ **Answer – D.**

24. **Explanation :** $A = 90/100 \times 75/100 = .675$
$B = 85/100 \times 80/100 = .68$
$\therefore A:B = 680:675 = 136:135$ **Answer – C.**

25. **Explanation :** $x \times 110/100 \times 110/100 \times (100 + 25/11)/100 = 990 \quad x = 800$ **Answer – C.**

26. **Explanation :** Discount offer by A = 10 % of 28000 = 2800
Total Discount offer by B = 12% of 20,000 + 8% of 8000 = 3040
Required difference = 3040 – 2800 = 240 **Answer – A.**

27. **Explanation :** Explanation:
Profit(Calculated on SP) = 20% of 1800 = 360
Profit(calculated on CP)
$x + x/5 = 1800 \quad \therefore x = 1500$
Profit = 300 $\quad \therefore$ Difference $= 360 - 300 = 60$ **Answer – C.**

28. **Explanation :** CP = x
Profit Percentage = x%
$SP = x(100 + x)/100$
$x(100 + x)/100 = 96 \quad \therefore x = 60$; Profit Percentage = 60%
New SP $= 60 \times 220 / 100 = 132$ **Answer – A.**

29. **Explanation :** Quantity of Solution B = 100 litre & Quantity of Solution A = 25 litre
CP of 1 litre Solution B = Rs.10 & CP of 1 litre Solution A = Rs.5
$\therefore$ CP $= 100 \times 10 + 25 \times 5 = 1125$ & SP $= (100 + 25) \times 10 = 1250$
Profit $= 1250 - 1125 = 125\% = 125 \times 100 / 1125 = 100/9\%$ **Answer – C.**

30. **Explanation :** Let Initial Quantity of Solution = 100 litre
After mixing 10% water, Quantity of the mixture $= 110 \times 110 / 100 = 121$ litre
CP of One litre of Solution = Rs.1
Total CP = Rs.100 & Total SP = Rs.121
Profit $= 121 - 100 = 21 \quad \therefore$ Profit % $= 21 \times 100/100 = 21\%$ **Answer – B.**

31. **Explanation :** CP = x
$\therefore 1680 - x = x - 1512 \Rightarrow 2x = 3192 \Rightarrow x = 1596$ **Answer – D.**

32. **Explanation:** Cost Price of Arun = 100x
Cost Price of Bala = 120x & Cost Price of Catherine = 132x
Cost Price of Dinesh $= 132x + 16 \Rightarrow 132x + 16 - 100x = 500$
$32x + 16 = 500 \Rightarrow 32x = 484 \quad \therefore x = 484/32 = 15.125$
$\therefore$ Cost Price of Bala $= 120x = 120 \times 15.125 = 1815$ **Answer – B.**

33. **Explanation :** CP = 8400 & SP = 8400 × 95/100 = 7980
CP = 7980
SP = 7980 × 105/100 = 8379 ∴ Difference = 8400 – 8379 = 21 **Answer – C.**

34. **Explanation :** % = x
Loss % = $x^2/100 = 196/100 = 49/25\%$ **Answer – D.**

35. **Explanation :** Total CP of Rice = 30 × 40 = 1200 & 40% of Total Quantity = 40% of 30 = 12
SP = 12 × 50 = 600 ⇒ SP = 1200 × 125/100 = 1500 SP of Remaining Quantity = 1500 – 600 = 900
Remaining Quantity = 18kg Rice per Kg = 900/18 = Rs. 50 **Answer – B.**

36. **Explanation :** Gain % = (5 / 20) x 100 = 25% **Answer – A.**

37. 40 – 20 + [40 × (-20)/100] = 20 – 8 = 12% **Answer – D.**

38. **Explanation :** S.P of Smart Phone = Rs.15000
Discount = 10%
New SP = 15000 – 1500 = Rs. 13500
Profit = 8%
CP = 13500 × 100/108 = 12500 **Answer – C.**

39. **Explanation :** R1 = 30% R2 = 20%
5000 × 130/100 × 80/100 = Rs. 5200 **Answer – B.**

40. **Explanation :** CP of 80 Oranges = Rs.240
CP of 1 Orange = Rs.3
CP of 20 Oranges = Rs.60
120% of 240 = 288
SP of remaining 60 Oranges = 288 – 60 = 228
SP of 1 Orange = 228/60 = Rs.3.80 **Answer – C.**

41. **Explanation :** CP = 100, SP (with tax) =120
New SP = 100 – 5 = 95 Discount = 120 – 95 = 25
Discount = 25/95 × 8550 = 2250 **Answer – C.**

42. Explanation: CP of each mobile be Rs.x then
(2 x 1.20 x x) + 5200 = 2 x 1.4 x N
⇒ 0.4 x = 5200
∴ N = 13000 **Answer – A.**

43. **Explanation :** 0.50/5 × 50,000 = 5000 **Answer – D.**

44. **Explanation :** Reduction in price = 1/5 = 20%
Increase in Quantity = 25%
25% = 6 Kg.
original amount of Sugar = 6 × 4 = 24Kg. ∴ Original price of the sugar = 240/24 = Rs. 10 per kg. **Answer – A.**

45. **Explanation :** Let the marked price be x.
Cost price (CP) = 40 % discount on MP = 0.6y = 60000
⇒ y= Rs.100000 MP
SP at Show Room "A" = Rs. 60000
SP at Show Room "B" = 100000 X 0.75 = 75000; Difference = 15000 **Answer – D.**

46. **Explanation : for** A, CP = 100 & SP = 120
for B, CP = 120 & SP = 132 for C, CP = 132 SP = 120
Mechanic: CP = 120 + 12 = 132 & SP = 143
Loss of A = 143 – 120 = 23 ∴ % loss of A = (23 / 100) x 100 = 23% **Answer – A.**

47. **Explanation :**
Ratio of profit of A : B (excluding commission of A) = 54000 : 90000 =>3 : 5
Now the share of profit of B = 4200 – 1200 = Rs. 3000
So the share of profit A (excluding commission) = Rs. 1800
So the commission of A = 3000 – 1800 = 1200 **Answer – A.**

48. **Explanation :** C.P. of 150 calculators = 150 x 500 = Rs. 75000
∴ Total C.P. = 75000 + 500 = Rs. 75500
Marked price of 150 calculator = 150 x 570 = Rs. 82500
Selling price after discount = 82500 x 95 / 100 = Rs. 78375
∴ percentage profit = [(78375 – 75500) / 75500] x 100 = 3.8% Answer – **C.**

49. **Explanation :** Fresh grapes
Water: Pulp = 80% : 20% = 4 : 1
Dry grapes
Water: Pulp = 25% : 75% = 1 : 3
So out of 20 kg dry grapes, Water : Pulp = 5 kg : 15 kg
After adding of water the ratio of water : pulp is same as the fresh grapes = 4 : 1
After adding water the quantity of Water and Pulp are 60 kg and 15 kg respectively.
% = 55/20 × 100 = 275%

50. **Explanation :** Let the total profit = 100
Amount left after donation = 50
Amount left after reinvestment = 20
Now, 5x/8 – 3x/8 = 2400
⇒ 2x/8 = 2400 = 9600
⇒ 1/5 of y = 9600 => y = 48000

51. **Explanation :** S.P = (100+profit%) × cp /100 = 140 × 180/100 = 252
M.P – 25% of M.P = SP
X – 25/100 X = 252
X = 336

52. **Explanation :** C.P = 4 × 50 = 2000
S.P = 10 × 50 × 115 /100 + 30 × 50 × 125/100 = 2450
Profit = 2450- 2000 = 450
Profit% = 450/2000 × 100 = 22.5

53. **Explanation :** CP = 100
MP = 120 ⇒ 120 × 80/100 = 96; 96 × 75/100 = 72
Loss = 100 – 72 = 28% ∴ CP = 100/28 × 812 = 2900 ∴ SP = 2900 × 72/100 = 2088

54. **Explanation :** x(1.2)=y————1
x(0.85)(1.2)=y-60————————-2
Sub 1 in 2, and solve y ∴ Y=400

55. **Explanation :** 30% of x = 35% of y ; x + y = 572
x/y = 7/6 ∴ Difference = Rs.44

56. **Explanation :** 10……..X
……20……
x-20……..10
1:2
X=25

57. **Explanation :** Profit= 10%
10% of CP = Rs. 100 CP = Rs. 1000
Now, Loss% = 10% ∴ Loss =Rs. 100 ∴ Required % = (100/100) × 100 = 100%

58. **Explanation :** Total loss after one year = 30000 × 40/100 = 12000
share of B = (40/10) × 12000 = 4800

59. **Explanation :** CP of 1st bangle set = x
CP of 2nd bangle set = 600 – x
SP of 1st bangle set = 4x/5
SP of 2nd bangle set = (600 – X)5/4
Profit = SP – CP 96 = 4x/5 + (600 – X)5/4 – 600 ∴ X = 120

60. **Explanation:** Cost price of 6 bananas =1

gain = 20% ∴ selling price of 6 bananas = $1 \times \frac{120}{100} = \frac{12}{10}$

Number of bananas he should sell for Rs. 1 for a gain of 20% $= 6 \times \frac{10}{12} = 5$

61. **Explanation:** cost price $= \frac{1920 + 1280}{2} = 1600$

Required selling price $= 1600 + 1600 \times \frac{1}{4} = 2000$

62. **Explanation:** loss = (cost price of 17 balls - selling price of 17 balls)
= (cost price of 17 balls - 720) ⇒ (cost price of 17 balls - 720)
= cost price of 5 balls ⇒ cost price of 12 balls =720 ⇒ cost price of 1 ball =60

63. **Explanation:** Selling price of first radio = 840
gain = 20%

cost price of first radio = $\frac{840 \times 100}{120} = 700$ ∴ selling price of second radio = 960 ∴ loss = 4%

cost price of second radio = $\frac{960 \times 100}{96} = 100$

total cost price = 700 + 1000 = 1700 total selling price = 840 + 960 = 1800

total gain = 1800 – 1700 = 100 total gain percentage = $\frac{100 \times 100}{1700} = \frac{100}{17}\% = 5\frac{15}{17}\%$

64. **Explanation:** cost price of 26 kg rice of first variety = 26 × 20 = 520
cost price of 30 kg rice of second variety= 30 × 36 = 1080
cost price of the 56 kg rice mixture = 56 × 30 = 1680

profit = 1680 – 1600 = 80 so, profit percentage = $\frac{80 \times 100}{1600} = 5\%$

65. **Explanation:** Let labelled price = x

Initial discount = 20% ; Price after initial discount = $\frac{80x}{100}$; Additional discount = 12%

Price after additional discount = $\frac{80z}{100} \times \frac{88}{100}\frac{80z}{100} \times \frac{88}{100} = 704 \Rightarrow \frac{4x}{5} \times \frac{22}{25} = 704 \Rightarrow \frac{x}{5} \times \frac{11}{25} = 88 \Rightarrow \frac{x}{5} \times \frac{1}{25} = 8$

⇒ x = 1000

66. **Explanation:**
$\text{cost price}-\text{selling price}$ $=\dfrac{1}{16}(\text{cost price})$
$\Right arrow \text{cost price}-15=\dfrac{1}{16}(\text{cost price})\\ \Right arrow \dfrac{15}{16}(\text{cost price})=15\\
\Right arrow \text{cost price}=16$

67. **Explanation:** $\dfrac{100(1000-800)}{800}=25\%$
i.e., profit percentage $=25\%$

68. **Explanation:**
(i) $2/%$ of the cost price $ = 400 – 380 – 380 = 20$
cost price $ = 20 × 50 = 1000$

(ii)
Let cost price $ = x$
If selling price is $400,$
loss percentage $ = \dfrac {(x – 400) 100} –{x} $
If selling price is $380, $
loss percentage $ = \dfrac {(x – 380) 100} – {x} $
If selling price is $380,$
loss percentage $ = \dfract {(x -380) 100} – {x} $
$\dfract {(x – 380) 100} – {x}-\dfrac {(x-400) 100}-{x}= 2 \\\rightarrow$
(x-380)100-(x-400) 100 = 2x\\\ rightarrow 20 × 100 = 2x \\\ rightarrow x = 1000$

69. **Solution 1**
reference: formula 1.3
Let required discount percentage $=x\%$
$35-x-\dfrac{35x}{100}=8\\ \Rightarrow \dfrac{135x}{100}=27\\ \Rightarrow x=20$
Solution 2
Let cost price $=100$
Then, marked price $=135$
To gain $8\%,$ selling price $=108$
Required discount percentage
$=\dfrac{(135-108)100}{135}=20\%$

70. **Explanation:** 120% of labelled price = 2880

85% of labelled price $= \frac{2880 \times 85}{120} = 2040$

71. **Explanation:** total cost price = 600

price received by selling one fourth at 20% loss $= \frac{1}{4} \times 600 \times \frac{80}{1000} = 120$

price received by selling remaining at 10% gain $= \frac{3}{4} \times 600 \times \frac{110}{100} = 495$

total selling price = 120 + 495 = 615
overall gain = 615 – 600 = 15

overall gain percentage $= \frac{15 \times 100}{600} = \frac{5}{2}\% = 2\frac{1}{2}\%$

72. **Solution 1**

Due to the reduction of 10%, total cost required to purchase he same number of pens will be decreased y Rs. 54 and the total cost of additional 9 pen is equal to this amount.

Therefore, reduced cost of a pen$= \frac{54}{9} = 6$

73. **Explanation:** At 20% loss cost price of 1 toffee $= \left(\frac{1}{5 \times 80} \times 100\right) = \frac{1}{4}$

now, sales price of 3 toffees is 1 tk $\therefore$ sales price of 1 toffee $= \frac{1}{3}$

$\therefore$ Required % of profit $= \frac{\left(\frac{1}{3} - \frac{1}{4}\right)}{\frac{1}{4}} \times 100 = \frac{4}{12} \times 100 = 33.33\%$

74. **Solution:** Let,
cost price = 100 x
Intended selling price = 100x × 125% = 125x

Marked price $= \frac{125 \times 100}{90} = \frac{1250}{9}$ $\therefore$ Actual selling price $= \frac{1250}{9} \times \frac{75}{100} = \frac{625}{6}$ $\therefore$ Profit $= \frac{625}{6} - 100 = \frac{25}{6}$

$\therefore$ Required profit percentage $= \frac{\frac{25}{6}}{100} \times 100 = 4\frac{1}{6}\%$

75. **Solution:** Here,

successive discounts of 20% & 10% is equivalent to a single discount ie. $\left(-20 - 10 + \frac{20 \times 10}{100}\right) = -28\%$

$\therefore$ Difference = 30% – 28% = 2% i.e. 2% of the list price = 72 $\therefore$ list price $= \frac{72}{2\%} = \frac{72 \times 100}{2} = 3600$ (Ans.)

1. A trader sells his goods at a discount 20%. He still makes a profit of 25%. If he sells the goods at the marked price only, his profit will be:
6 Banks & 2 Financial Institutions (SO'019)

a. 56.25% b. 25.56% c. 50.25% d. 54.25% **Ans. A**

Solution: At 20% discount, Sales price = 100 – 20 = 80 $\therefore$ Cost price= $\frac{\text{sell price} \times 100}{100 + \text{profit}} = \frac{80 \times 100}{100 + 25} = 64.$

$\therefore$ Profit = $\frac{(100 - 64)}{64} \times 100 = 56.25\%$

2. The cost price of 19 articles is same as the selling price of 29 articles. What is loss percentage?
6 Banks & 2 Financial Institutions (SO'019)

a. 52.30% b. 35.00% c. 34.48% d. 30.00% **Ans. C**

Solution: Loss = $\frac{\text{cost quantity–sell quantity}}{\text{sell quantity}} \times 100 = \frac{19 - 29}{29} \times 100 = -34.48\%$

3. What is the rate of simple interest for the first 4 years if the sum of Tk. 360 becomes Tk. 540 in 9 years and the rat e of interest for the last 5 years is 6%?
6 Banks & 2 Financial Institutions (SO'019)

a. 4% b. 5% c. 3% d. 6% **Ans. B**

Solution: Let, Rate of first 4 years be r.

ATQ, $360 \times 4 \times \frac{r}{100} + 360 \times 5 \times \frac{6}{100} = (540 - 360) \Rightarrow 14.4r \div 108 = 180 \Rightarrow 14.4r = 72 \therefore r = 5\%$

4. What is the amount of equal installment, if a sum of Tk. 1428 due 2 years hence has to be completely repaid in 2 equal annual installments starting next year?
6 Banks & 2 Financial Institutions (SO'019)

a. Tk. 700 b. Tk. 800 c. Tk. 650 d. cannot be determined

Solution: Let, Equal installment is x.

For 1st year, Interest = $\frac{pnr}{100} = \frac{1428 \times 2 \times r}{100}$

Due to, insufficient values (rate not given) problems can't be solved.

5. A shopkeeper sold an item at 20% profit and another item at 10% loss. If the cost price of both the items is same, find the overall profit percent.
4 Banks & 2 Financial Institutions (Ofiicer'19)

(A) 7.55% (B) 6.00% (C) 5.00% (D) 6.50% **Ans. C**

Solution: Total cost = 100 + 100 = 200, Change = 20% of 100 – 10% of 100%=10

$\therefore$ profit = $\frac{10}{200} \times 100 = 5\%.$

6. By what percentage above the cost price, a fan should be sold if a shopkeeper wants to make a profit of Tk. 500 and the marked price of the article is Tk. 6000 which is 50% above the cost price?
4 Banks & 2 Financial Institutions (Ofiicer'19)

(A) 25.0% (B) 12.5% (C) 20.0% (D) None **Ans. B**

Solution: C.P = $\frac{6000}{150} \times 100 = 4000.$ $\therefore$ Profit = $\frac{500}{4000} \times 100 = 12.5\%$

7. The simple interest received on a sum of money at the end of 10 years is two times of the principal. At the same rate of interest, what would be the ratio of principal and compound interest received at the end of two years?
4 Banks & 2 Financial Institutions (Ofiicer'19)

(A) 25:11 (B) 20:11 (C) 20:9 (D) None of these **Ans. A**

Solution: Rate = $\frac{200}{100} \times 10 = 20\%$ [If principal is 100] & $I_c = 100\,(100 + \frac{20}{100})^2 - 100 = 44$

$\therefore$ Required ratio = 100:44 = 25:11

8. A milkman pays tk. 6.40 per liter of milk. He adds water and sells the mixture at tk. 8 per liter. By doing this, he makes 37.5% profit. Find the proportion of water to milk received by the customers?
Sonali Bank Ltd. (Officer-FF, 08-02-2019)

a. 1:12 b. 1:10 c. 1:15 c. 1:20 Ans. b

Solution: For buying milk he pays = 6.40 M Tk & After selling he gets = 8 (M+W)

According to the question,

$6.4\ M \times 137.5\% = 8(M + W) \Rightarrow 6.40M\frac{137.5}{100} = 8M + 8W \Rightarrow 8.8M = 8M+8W \Rightarrow 8W = 8.8M-8M = 0.8M$

$\Rightarrow \frac{W}{M} = \frac{0.8}{8} = \frac{1}{10}$ Ratio = 1:10

9. A leading library charges c cents for the first week that a book is loaned and of cents for each day over one week. What is the cost for taking out a book for d days. were d is greater than? Sonali Bank Ltd. (Officer-FF, 08-02-2019)

a. c + fd b. cd c. cf(d-7) d. cd + f Ans. c

Solution: Since d days is greater than 7 So, the cost for (d–7) days is (d–7) × f ∴ Total cost = C + (d–7) f

10. Find the compound interest at the rate of 10% per annum for four years on the principal which in four years at the rate of 4% per annum gives tk. 1600 as simple interest. Sonali Bank Ltd. (Officer-FF, 08-02-2019)

a. tk. 4641 b. tk. 4732 c. tk. 4321 d. tk. 899 Ans. a

Solution: $P = \frac{1 \times 100}{nr} = \frac{1600 \times 100}{4\times4} = 10000$

Compound interest = $p\ (1+r)^n - p = 10000\ (1 + \frac{10}{100})^4 - 1000 = 10000\ (1.1)^4 - 10000 = 14641 - 10000 = 4641$

11. An amount of Tk. 10,000 becomes Tk. 20,736 in 2 years. If the rate of interest is compounded half yearly, what is the annual rate of interest? Sonali Bank Ltd., Officer (cash'19)

a. 25% b. 20% c. 40% d. 30% Ans. c

Solution: $C = P\ (1 + r)^n$

$\Rightarrow 20736 = 10{,}000\left(1 + \frac{r}{2}\right)^4 \Rightarrow \frac{20736}{10000} = \left(1 + \frac{r}{2}\right)^4 \Rightarrow \left\{\frac{12}{10}\right\}^{41/4} = \left(1 + \frac{r}{2}\right)^{4\times\frac{1}{2}} \Rightarrow \frac{6}{5} = \left(1 + \frac{r}{2}\right) \Rightarrow \frac{r}{2} = 1.2–1 = 0.2 \therefore r = 0.4$

12. Rahim invested in all Tk. 2600 in three different schemes at 8%, 4% and 6% per annum simple interest. At the end of the year, he received the same interest in all the three schemes. What is the money invested in scheme having 4% rate of interest? Sonali Bank Ltd., Officer (cash'19)

a. Tk. 700 b. Tk. 800 c. Tk. 50 d. Tk. 1200 Ans. d

Solution: Let the three schemes be x,y and z of 8%, 4%, and 6% respectively.

i.e, $0.08x = 0.04y = 0.06z \Rightarrow 4x = 2y = 3z$

Now $4x = 2y \Rightarrow \frac{x}{y} = \frac{2}{4} = \frac{1}{2} = 1:2$

$2y = 3z \Rightarrow \frac{y}{z} = \frac{3}{2} = 3:2$

$\therefore$ x:y:z = 3:6:4 sum = 3 + 6 + 4 = 13 So, 4% of invest, $y = 2600 \times \frac{6}{13} = 1200$ Ans.

13. Tom bought 14 movies tickets of two categories, premium and regular seats and paid 6,900 Taka. Premium seats cost 600 Taka and regular seats cost 350 Taka each. How many premium seats did he buy? IFIC Bank Ltd. (TSO,19)

a. 8 b. 9 c. 10 d. 12 Ans. A

Solution ধরি, টম প্রিমিয়াম টিকিট কিনেছিলেন xটি ∴ টম নরমালের টিকিট কিনেছিলেন (14–x) টি

প্রশ্নমতে, $600x + (14 - x) \times 350 = 6{,}900 \Rightarrow 600x + 4{,}900 - 350x = 6{,}900 \Rightarrow 250x = 2{,}000 \therefore x = \frac{2000}{250} = 8$

14. One apple and one banana together cost 9 Taka. One apple and one carrot together cost 12 Taka. One banana and one carrot together cost 15 Taka. How much does as apple cost? IFIC Bank Ltd. (TSO,19)

a. 3 b. 4.5 c. 6 d. 9 Ans. A

Solution: ধরি, একটি আপেলের দাম x টাকা; একটি কলার দাম y টাকা এবং একটি গাজরের দাম টাকা।

প্রশ্নমতে, x + y = 9 ..... (i) ;x + z = 12 ..... (ii) &y + z = 15 ..... (iii)

(i), (ii) এবং (ii) নং সমীকরণ যোগ করি:

$x + y + x + z + y + z = 9 + 12 + 15 \Rightarrow 2x + 2y + 2z = 36 \Rightarrow 2(x + y + z) = 36 \Rightarrow x + y + z = \frac{36}{2} = 18 \Rightarrow x + 15 = 18$

$\therefore x = 18 - 15 = 3$

15. 'Interest rate fall continues a further 20% drop on the old rate'. If the old interest rate is 8.75% what is the new rate? IFIC Bank Ltd. (TSO,19)

a. 1.75% b. 5.75% c. 6.75% d. 7.0% Ans. D

Solution: ∴ নতুন সুদ $= 8.75 \times 80\% = \left(8.75 \times \frac{80}{100}\right)\% = 7\%$

16. Suppose IFIC bank pays 10% tax on its first 100000 taka earning and 15% on all earnings in excess of 1,00,000 taka. What will be fine amount of tax, if its earning is 2,75,000 taka? IFIC Bank Ltd. (TSO,19)

a. 36,250 b. 37,500 c. 35,000 d. 35,250 Ans. A

Solution: ∴ 1,00,000 টাকার উপর কর দিবে $= \left(100000 \times \frac{10}{100}\right) = 10{,}000$ টাকা

এবং 1,75,000 টাকার উপর কর দিবে= $\left(175000 \times \frac{15}{100}\right) = 26{,}250$ টাকা ∴ মোট কর দিবে= 10,000 + 26,250 = 36,250 টাকা।

17. A man buys oranges at the rate of 35 taka per 100 pieces and sells those at 7.20 taka per dozen. If the profit is 30 taka, how many oranges did he buy? IFIC Bank Ltd. (TSO,19)

a. 210 b. 120 c. 110 d. 90 Ans. B

Solution: দূরত = বেগ × সময় = 3 × 5 = 15 km

18. A sum of money at simple interest amounts of Tk. 815 in 3 years and to Tk. 854 in 4 years. The sum is Pubali Bank Ltd., TAJO (Cash'19)

a. Tk. 650 b. Tk. 698 c. Tk. 690 d. Tk. 700 Ans. B

(4 –3) = 1 বছরের সরল সুদ = 854 – 815 = 39 টাকা

∴ 3 বছরের সরল সুদ = 39 × 3 = 117 টাকা অতএব, আসল = 815–117= 698 টাকা।

19. The cost price of an article is Tk. 7,840. What should be the selling price of the article so that there is a profit of 7%? Pubali Bank Ltd., TAJO (Cash'19)

a. Tk. 8,388.80 b. Tk. 8,300 c. Tk. 8,000 d. Tk. 8,500.50 Ans. A

Solution: 7% লাভে দ্রব্যটির বিক্রয়মূল্য কত? 7% লাভে ক্রয়মূল্য 100 টাকা হলে বিক্রয়মূল্য হবে = 100 + 7 = 107 টাকা

7% লাভে, দ্রব্যটির ক্রয়মূল্য 100 টাকা হলে বিক্রয়মূল্য = 107 টাকা

∴ দ্রব্যটির ক্রয়মূল্য 7,840 টাকা হলে বিক্রয়মূল্য= $\frac{107 \times 7840}{100} = 8{,}388.80$ টাকা

20. P and Q started a business investing Tk. 85,000 and Tk. 15,000 respectively. In what ratio the profit earned after 2 years be divided between P and Q respectively? Pubali Bank Ltd., TAJO (Cash'19)

a. 3:4 b. 3:5 c. 17:3 d. 15:23 Ans. C

Solution: 2 বছর পর তাদের মুনাফার অনুপাত কত হবে?

P এবং Q এর টাকা যেহেতু সমান সময়ের জন্য ব্যবসায় খেটেছে, তাই মূলধন বিনিয়োগের অনুপাতে মুনাফা বণ্টিত হবে।

অতএব, মুনাফা বণ্টনের অনুপাত হবে = 85,000: 15,000 = 85:15 = 17:3.

21. As the price of mango has reduced 20%, it is now possible to buy 2 more mangoes at Tk. 12. What is the correct price of 50 mangoes? Islami Bank Ltd. (PO- 04.03.2019)

a. Tk. 50 b. Tk. 40 c. 30 d. 60 Ans. D

Solution: এখানে, 20% of 12 টাকা= 2.4 টাকা। 20% দাম কমার কারণে 2টি আমর বেশি পাওয়া যাচ্ছে।

অর্থাৎ, 2টি আমের দাম = 2.4 টাকা ∴ ৫০টি আমের দাম $= \frac{2.4 \times 50}{2} = 60$ টাকা

21(A). **A certain kind of bacteria grows twice in number every half an hour. If there is 3,00,000 bacteria, at 10.00 am in a culture, how many bacteria will you find at 11.30 am? (IFIC, TSO 2019)**

a. 48,00,000 b. 24,00,000 c. 16,00,000 d. 12,00,000 **Ans. B**

Solution:

প্রশ্নে বলা হচ্ছে যে, একটি নির্দিষ্ট প্রজাতির ব্যাকটেরিয়া প্রতি আধা ঘণ্টা অন্তর দ্বিগুণ হয়। সকাল 10 টার সময় ব্যাকটেরিয়ার সংখ্যা 3,00,000 থালে সকাল 11.30 মিনিটে ব্যাকটেরিয়ার সংখ্যা কত হবে?

সকাল 10 টায় ব্যাকটেরিয়ার সংখ্যা = 3,00,000

∴ সকাল 10.30 টায় ব্যাকটেরিয়ার সংখ্যা = 6,00,000

∴ সকাল 11.00 টায় ব্যাকটেরিয়ার সংখ্যা = 12,00,000

∴ সকাল 11.30 টায় ব্যাকটেরিয়ার সংখ্যা = 24,00,000

22. A sum fetches a simple interest of Tk 6000 at the rate of 5% p.a. in 6 years. What would be the compound interest earned at the same rate of interest and the same principal in 2 years? BSC {Officer (Cash)- 2018}

a. Tk 2050 b. Tk 2500 c. Tk 2125 d. Tk 2245

Hints: ধরি, মূলধন x টাকা

আমরা জানি, $I = pnr \Rightarrow 6000 = x \times 6 \times \frac{5}{100} \therefore x = 20000$

এখন, যৌগিক মুনাফার ক্ষেত্রে, $C = P(1+r)^n = 20000\left(1+\frac{5}{100}\right)^2 = 20000 \times \frac{105}{100} \times \frac{105}{100} = 22\text{-}50$

∴ মুনাফা = (22050 – 20000) টাকা = 2050 টাকা।

23. Alam sold an item for Tk 6,384 and incurred a loss of 30%. At what price should he have sold the item to have gained a profit of 30%? BSC {Officer (Cash)- 2018}

a. Tk 14,656 b. Tk 11,856 c. Tk 13,544 d. None of these

Hints: 30% ক্ষতিতে,

বিক্রয়মূল্য 70 টাকা হলে ক্রয়মূল্য 100 টাকা

∴ " 1 " " $\frac{100}{70}$ "

∴ " 6384 " " $\frac{100\times6384}{70}$ " = 9120 টাকা

∴ 30% লাভে বিক্রয়মূল্য = $\left(9120 + 9120 \times \frac{30}{100}\right)$ টাকা = 11856 টাকা।

24. Kiran purchased a scooter for Tk 52000. He sold it at loss of 10%. With that money be purchased another scooter and sold it at profit of 20%. What is his overall loss/profit? BSC {Officer (Cash)- 2018}

a. Tk 2060 profit b. Tk 2560 loss c. Tk 1340 loss d. Tk 4160 profit

∴ 8% লাভ হলো।

সুতরাং মোট লাভের পরিমাণ = $\left(52000 \times \frac{8}{100}\right)$ টাকা = 4160 টাকা।

25. Alam sold two vehicles for Tk 46000 each. If he gained 10% on the first and lost 10% on another, then what is his percentage profit or loss in this transaction? BSC {Officer (General)- 2018}

a. 2% loss b. 1% profit c. 1% loss d. None of these

Hints: শতকরা লাভ/ক্ষতি = $10 - 10 - \frac{10\times10}{100} = -1$ সুতরাং 1% ক্ষতি হবে।

26. The profit earned after selling an article for Tk 3,362 is the same as the loss incurred after selling the article for Tk 2,346. At what selling price will a trader make a 20% profit on this article? BSC{Officer (General)- 2018}

a. 4639.4 b. 4769.6 c. 4830.8 d. none of these

Hints: ধরি,

ক্রয়মূল্য x টাকা

প্রশ্নমতে,

$3362 - x = x - 2346 \Rightarrow 2x = 5708 \therefore x = 2854$

এখন, 20% লাভে বিক্রয়মূল্য = $\left(2854 + 2854 \times \frac{20}{100}\right)$ টাকা= 3424.8 টাকা।

27. An article costs Tk 500 and the marked price is mentioned as Tk 800. What is the profit % for the seller if he sells and offers a discount of 10% on the marked price? BSC {Officer (General)- 2018}

a. 30% b. 44% c. 56% d. 64%

Hints: 10% মূল্যহ্রাসে সূচিত মূল্য (Marked price) $= \left(800 - 800 \times \frac{10}{100}\right)$ %= 720 টাকা

∴ লাভ (720 – 500) টাকা = 220 টাকা

∴ 500 টাকায় লাভ হয় 220 টাকা

∴ ১ " " " $\frac{220}{500}$ "

∴ 100 " " " $\frac{220\times100}{500}$ "= 44 টাকা।

28. By selling 32 guavas for Tk 30 at the rate of Tk 1,066 per guava a man loss 25%. How many guavas should be sold for Tk 18 to gain 20% of profit in the transaction? BSC {Senior Officer 2018)}

a. 24 b. 12 c. 18 d. 36

Hints: 25% ক্ষতিতে,

বিক্রয়মূল্য 75 টাকা হলে ক্রয়মূল্য 100 টাকা

∴ " ৩০ " " " $\frac{100 \times 30}{75} = 40$ "

আবার,

20% লাভে, ক্রয়মূল্য 100 টাকা হলে বিক্রয়মূল্য 120 টাকা

" " 40 " " " $\frac{120 \times 40}{100} = 48$ টাকা

48 টাকায় পেয়ারা বিক্রয় করতে হবে 32 টি

∴ 18 " " " " " $\frac{32 \times 18}{48}$ টি = 12 টি

29. A sold a watch to B at a gain of 20% and B sold it to C at a loss of 10%. If C bought the watch for Tk 216, at what price did A purchase it? BSC {Senior Officer 2018)}

a. Tk 200 b. Tk 216 c. Tk 250 d. Tk 176

Hints: C এর ক্রয়মূল্য = B এর বিক্রয়মূল্য

10% ক্ষতিতে, B এর বিক্রয়মূল্য 90 টাকা হলে ক্রয়মূল্য 100 টাকা

20% লাভে, A এর বিক্রয়মূল্য 120 টাকা হলে ক্রয়মূল্য 100 টাকা

∴ A " " 240 " " " $\frac{100\times216}{90}$ = 200 টাকা

30. The sum of principal and simple interest of a certain amount of money would be tk. 460 after 3 years from now and Tk. 500 after 5 years from now. What is the total interest rate? BSC, 3 Govt. Banks & Financial Institutes (SO'18)

a. 5% b. 12% c. 15% d. 20%

Hints: আসল + 5 বছরের সুদ = 500

আসল + 3 বছরে সুদ = 460

∴ 2 বছরের সুদ = 40

∴ 1 " " = 20 টাকা

∴ 3 " " = (3 × 20) = 60 টাকা

∴ আসল = 460 – 60 = 400 টাকা

∴ 400 টাকার 1 বছরের সুদ = 20 টাকা

∴ 1 " 1 " " $=\frac{20}{400}$ "

∴ 100 " 1 " " $=\frac{20 \times 100}{400}$ = 5 টাকা।

31. An article when sold at a gain of 5% yields Tk. 15 more than when sold at a loss of 5%. Its cost price would be-

BSC, 3 Govt. Banks & Financial Institutes (SO'18)

a. Tk. 100 b. Tk. 150 c. Tk. 200 d. Tk. 250

Hints: এখন, $10\% = 15 \Rightarrow 1\% = \frac{15}{10} \Rightarrow 100\% = \frac{15 \times 100}{10} = 150$ টাকা

32. The interest charged on a loan is p dollars per $1,000 for the first month and q dollar per $1,000 for each month after the first month. How much interest will be charged during the first three months on a loan of $10,000?

BSC, 3 Govt. Banks & Financial Institutes (SO'18)

a. 10p + 20q b. 30 q c. 30 p d. 20p + 10q

Hints: 1000 টাকার 1 মাসের মুনাফা p টাকা

$\therefore$ 10000 " 1 " " $\frac{10000 \times p}{1000} = 10p$ টাকা

আবার,

1000 টাকার 1 মাসের মুনাফা q টাকা

$\therefore$ 10000 " 2 " " $\frac{q \times 2 \times 10000}{1000} = 2q$ টাকা

$\therefore$ মোট মুনাফা = (10p + 20q) টাকা।

33. The difference in taka between simple and compound interest at 5% annually on a sum of Tk. 2000 after 2 years is-

BSC, 5 Govt. Banks & Financial Institutes (Officer'18)

a. 5 b. 50 c. 20 d. 200

Hints: সাধারণ সুদের ক্ষেত্রে, $I = pnr = 2000 \times 2 \times \frac{e}{100} = 200$ টাকা।

যৌগিক সুদের ক্ষেত্রে, $I = p(1+r)^n - 1\} = 2000 \left\{\left(1 + \frac{5}{100}\right)^2 - 1\right\} = 205$ টাকা। $\therefore$ পার্থক্য = (205 – 200) টাকা = 5 টাকা।

34. একজন ব্যবসায়ী ৮০ টাকায় একটি পণ্য বিক্রি করে ২৫% লাভ করে। ব্যয় ও বিক্রি মূল্যের অনুপাত কত?

BSC, 8 Govt. Banks & Financial Institutes (SO'18)

ক. ৩:৪ খ. ৪:৫ গ. ৫:৬ ঘ. ২:৩

Hints: ২৫% লাভে,

বিক্রয়মূল্য ১২৫ টাকা হলে ক্রয়মূল্য ১০০ টাকা

" ১ " " " $\frac{১০০}{১২৫}$ "

" ৮০ " " " $\frac{১০০ \times ৮০}{১২৫}$ "

= ৬৪ টাকা

$\therefore$ ব্যয় ও বিক্রি মূল্যের অনুপাত = ৬৪: ৮০ = ৪:৫

35. ১০০০ টাকা ১২% চক্রবৃদ্ধি মুনাফা হারে বিনিয়োগ করলে ২ বছর পরে লাভসহ কত হবে? BSC, 8 Govt. Banks & Financial Institutes (SO'18)

ক. ১২৫৪.৪০ টাকা খ. ১২৪৪.৫০ টাকা গ. ১২৬৪.৪০ টাকা ঘ. ১৩৫৫.৪০ টাকা

Hints: চক্রবৃদ্ধি মুনাফার ক্ষেত্রে, $C = P(1 + r)^n = 1000\left(1 + \frac{12}{100}\right)^2 = 1000 \times \frac{112}{100} \times \frac{112}{100} = 1254.40$ টাকা

36. কোনো আসল ৩ বছরে মুনাফাসহ ৫৫০০ টাকা হয়। মুনাফা আসলের $\frac{৩}{৮}$ অংশ হলে মুনাফার হার কত?

BSC, 8 Govt. Banks & Financial Institutes (SO'18)

ক. ১২.৪০% খ. ১২.৫০% গ. ১২% ঘ. ১৩%

Hints: ধরি, মুনাফা = x টাকা ∴ আসল = (৫৫০০ − x) টাকা

প্রশ্নমতে, $x = (৫৫০০ - x)$ এর $\frac{৩}{৮} \Rightarrow x = \frac{৩(৫৫০০-x)}{৮} \Rightarrow ১১x = ১৬৫০০ \Rightarrow x = \frac{১৬৫০০}{১১} \Rightarrow x = ১৫০০$

মুনাফা = ১৫০০ টাকা এবং আসল = (৫৫০০ − ১৫০০) = ৪০০০ এখন, মুনাফার হার $= \frac{\text{মুনাফা} \times ১০০}{\text{আসল} \times \text{সময়}} = \frac{১৫০০\times১০০}{৪০০০\times৩} = ১২.৫\%$

37. বার্ষিক ১০% লাভে ৩০০০ টাকা এবং ৮% মুনাফায় ২০০০ টাকা বিনিয়োগ করলে মোট মুলধনের উপর গড়ে শতকরা কত টাকা হারে মুনাফা পাওয়া যাবে?

BSC, 8 Govt. Banks & Financial Institutes (SO'18)

ক. ৯.৪% খ. ৯% গ. ৯.২% ঘ. ৯.৫%

Hints: $T_1 = ৩০০০ \times ১ \times \frac{10}{100} = ৩০০$ টাকা $I_2 = ২০০০ \times ১ \times \frac{8}{100} = ১৬০$ টাকা

মোট মুনাফা = ৩০০ + ১৬০ = ৪৬০ টাকা ∴ মোট আসল = (৩০০০ + ২০০০) টাকা = ৫০০০ টাকা

∴ মুনাফার হার $= \frac{৪৬০\times১০০}{৫০০০} = ৯.২\%$

38. কোনো শহরের বর্তমান জনসংখ্যা ৪ লক্ষ। শহরটির জনসংখ্যা বৃদ্ধির হার শতকরা ২৫ জন হলে, ২ বছর পরে শহরের জনসংখ্যা কত হবে?

BSC, 8 Govt. Banks & Financial Institutes (SO'18)

ক. ৬,২৫,০০০ খ. ৬,৫০,০০০ গ. ৫,৫০,০০০ ঘ. ৫,২৫,০০০

Solution: $C = P(1 + r)^n = 400000\left(1 + \frac{25}{100}\right)^2 = 400000 \times \frac{125}{125} \times \frac{112}{100} = 40 \times 125 \times 125 = 6,25,000$

∴ ২ বছর পরে শহরের জনসংখ্যা হবে ৬,২৫,০০০ জন।

39. Compound interest on a certain sum for 2 years at 10% per annum is Tk. 420. What would be the simple interest at the same rate and for the same time?

Sonali Bank Ltd. (O-Cash'18)

a. Tk. 100 b. Tk. 200 c. Tk. 300 d. Tk. 400

Hints: ধরি, sum (মূলধন) = p

$\therefore p(1 + r)^n - p = 420 \Rightarrow p\left\{\left(1 + \frac{10}{100}\right)^2 - 1\right\} = 420 \Rightarrow P\left(\frac{121}{100} - 1\right) = 420 \Rightarrow 21p = 420 \times 100 \therefore p = 2000$

∴ সরল মুনাফা $I = 2000 \times 2 \times \frac{10}{100} = 400$

40. A bank offers 5% interest compounded half yearly. A customer deposits Tk. 1600 each on 1st January and 1st July of a year. At the end of the year, the amount he would have gained by the way of interest is-

Sonali Bank Ltd. (O-Cash'18)

a. Tk. 121 b. Tk. 122 c. Tk. 123 d. 124

Hints: প্রথম 6 মাসে মুনাফা $= 1600 \times \frac{1}{2} \times \frac{5}{100}$ ∴ দ্বিতীয় 6 মাসের মোট মূলধন = 1600 + 40 + 1600 = 3240

দ্বিতীয় 6 মাসে মুনাফা $= 3240 \times \frac{1}{2} \times \frac{5}{100} = 81$ ∴ মোট মুনাফা = (40 + 81) টাকা = 121

41. The simple interest on a sum of money will be Tk. 600 after 10 years. If the principal is trebled after 5 years, what will be the total interest at the end of the tenth year?

Sonali Bank Ltd. (O-MCQ'18)

a. Tk. 600 b. Tk. 1200 c. Tk. 900 d. Tk. 1500

Hints: ধরি, মূলধন = x টাকা

∴ x টাকায় 10 বছরের সুদ = 600 টাকা

∴ x " 1 " " $= \frac{600}{10}$ "

∴ x " 5 " " $= \frac{600 \times 5}{10} = 300$ টাকা

এখন, যেহেতু 5 বছর পর মূলধন 3 গুণ হয়। সুতরাং নতুন মূলধন = 3x

এখন, x টাকার 5 বছরের মুনাফা = 300 টাকা

∴ 1 " 5 " " $= \frac{300}{x}$ "

∴ 3x " 5 " " $= \frac{300\times3x}{10} = 900$ টাকা ∴ মোট মুনাফা = (900 + 300) টাকা = 1200 টাকা

42. What is the original price of a T-shirt, if the sale price after 15%, discount is 272? Rupali Bank Ltd. (O-Cash'18)

a. 300 b. 280 c. 320 d. 314

Hints: হ্রাসকৃতমূল্য 85 টাকা হলে পূর্বমূল্য = 100 টাকা

∴ " 1 " " " $= \frac{100}{85}$ "

∴ " 272 " " " $= \frac{100\times272}{85}$ "

= 320 টাকা

43. Tk. 500 is deposited in a savings account which pays 7% annual interest compounded semi-annually. To the nearest Taka, how much is in the account at the end of the year? Rupali Bank Ltd. (O-Cash'18)

a. 542 b. 536 c. 512 d. 524

Hints: প্রথম ছয়মাসের জন্য, $I_1 = Pnr = 500 \times \frac{1}{2} \times \frac{7}{100} = \frac{3500}{200} = 17.5$

পরবর্তী ছয় মাসের জন্য, আসল = 500 + 17.5 = 517.5

∴ $I_2 = 517.5x \times \frac{1}{2} \times \frac{7}{100} = 18.113$ ∴ মোট টাকার পরিমাণ = 517.5 + 18.113 = 535.61 = 536 (প্রায়)

44. If 5% is gained by selling an article for BDT 350 than selling it for BDT 340, the cost of the article is- Rupali Bank Ltd. (O-Cash'18)

a. BDT 180 b. BDT 150 c. BDT 200 d. BDT 250

Hints: 5 টাকা লাভ হলে ক্রয়মূল্য = 100 টাকা

∴ 1 " " " " $= \frac{100}{5}$

∴ 10 " " " " $= \frac{100 \times 10}{5}$ = 200 টাকা

45. The sum of principal and simple interest of a certain amount of money would be Tk. 460 after 3 years from now and Tk. 500 after 5 years from now. What is the total interest rate? PKB (SE-O'018)

a. 5% b. 12% c. 15% d. 20%

Hints: আসল + 5 বছরের সুদ = 500

আসল + 3 বছরের সুদ = 460

∴ 2 বছরের সুদ = 40

∴ 1 " " = 20 টাকা

∴ 3 " " = (3 × 20) = 60 টাকা

∴ আসল = 460 – 60 = 400 টাকা

∴ 400 টাকায় 1 বছরের সুদ = 20 টাকা

∴ 1 " 1 " " $= \frac{20}{400}$ "

∴ 100 " 1 " " $= \frac{20\times100}{400} = 5\%$

46. A lamp is manufactured to sell for $35.00, which yields a profit of 25% of cost. If the profit is to be reduced to 15% of cost, what will be the new retail price of the lamp? PKB (SE-O'018)

a. $31.50 b. $28.00 c. $21.00 d. $$32.20

বিক্রয়মূল্য 125 টাকা হলে ক্রয়মূল্য = 100 টাকা

∴ " 1 " " " $= \frac{100}{125}$ "

∴ " 35 " " " $= \frac{100\times35}{125}$ " = 28 টাকা

15% লাভে, ক্রয়মূল্য 100 টাকা হলে বিক্রয়মূল্য = 115 টাকা

" 1 " " " $= \frac{115}{100}$ "

" 28 " " " $= \frac{115\times28}{100}$ " = 32.2 টাকা

47. How much interest will Tk. 1000 earn in one year at an annual interest rate of 20% if interest rate is compounded every 6 months? PKB (SEO-Cash'18)

a. 200 b. 205 c. 208 d. 210

Hints প্রথম ছয়মাসের ক্ষেত্রে, $I_1 = p \times n \times r = 1000 \times \frac{1}{2} \times \frac{20}{100} = 100$ টাকা। ∴ মোট টাকা = 1000 + 100 = 1100 টাকা।

পরবর্তী ছয়মাসের ক্ষেত্রে, $I_2 = 1100 \times \frac{1}{2} \times \frac{20}{100} = 110$ ∴ মোট মুনাফা = 100 + 110= 210 টাকা।

48. An article when sold at a gain of 5% yields Tk. 15 more than when sold at a loss of 5%. Its cost price would be- PKB (SEO-Cash'18)

a. Tk. 100 b. Tk. 150 c. Tk. 200 d. Tk. 250

Hints: ক্ষতি 5% + লাভ 5% = 10%

এখন, $10\% = 15 \Rightarrow 1\% = \frac{15}{10} \Rightarrow 100\% = \frac{15\times100}{10} = 150$ টাকা

49. A wholesaler sells goods to a retailer at a profit of 20%. The retailer sells to the customer, who pays 80% more than the cost of the wholesaler. What is the retailer's profit? PKB (SEO-Cash'18)

a. 30% b. 40% c. 50% d. 60%

Hints: ধরি, পাইকারী বিক্রেতার ক্রয়মূল্য = 100 টাকা। ∴ খুচরা বিক্রেতার কাছে বিক্রি করেন $= 100 + \frac{20}{100} \times 100$

$= 120$ টাকা।

∴ খুচরা বিক্রেতার ক্রয়মূল্য = 120 টাকা ∴ ভোক্তা ক্রয় করেন = 100 + 100 এর $\frac{80}{100} = 180$ টাকায়

খুচরা বিক্রেতা লাভ করেন = 180 – 120 = 60 টাকা ∴ খুচরা বিক্রেতা শতকরা লাভ করেন $= \frac{60}{120} \times 100$

$= 50\%$

50. একটি পন্য বিক্রয় করে পাইকারী বিক্রেতা ২০% এবং খুচরা বিক্রেতা ২০% লাভ করে। যদি দ্রব্যটির খুচরা বিক্রয়মূল্য ৫৭৬ টাকা হয়, তবে পাইকারী বিক্রেতার ক্রয়মূল্য কত? Jiban Bima Corporation (JO'018)

ক. ২৫০ টাকা খ. ৩০০ টাকা গ. ৪০০ টাকা ঘ. ৪৮০ টাকা

Hints: ২০% লাভে, খুচরা বিক্রেতার বিক্রয় মূল্য ১২০ টাকা হলে ক্রয়মূল্য ১০০ টাকা

∴ " " " " ৫৭৬ " " " $\frac{৫৭৬ \times ১০০}{১২০} = ৪৮০$ টাকা

খুচরা বিক্রেতার ক্রয়মূল্য = পাইকারী বিক্রেতার বিক্রয়মূল্য

আবার, ২০% লাভে, পাইকারী বিক্রেতার বিক্রয়মূল্য ১২০ টাকা হলে ক্রয়মূল্য ১০০ টাকা

∴ " " " ৪৮০ " " " $\frac{১০০\times৪৮০}{১২০} = ৪০০$ টাকা

51. সুদের হার দশমিক ৭৫ শতাংশ হ্রাস পাওয়াতে একজন আমানতকারীর আমানতের উপর ৪ বছরের প্রাপ্ত আয় ৭৫০ টাকা কমে যায়। তার আমানতের মোট পরিমাণ কত? Jiban Bima Corporation (JO'018)

ক. ২৫,০০০ টাকা খ. ১৮,৭৫০ টাকা গ. ৩০,০০০ টাকা ঘ. ১,০০,০০০ টাকা

Hints: ১০০ টাকায় ১ বছরে কমে ০.৭৫ টাকা

∴ " " ৪ " " $(০.৭৫ \times ৪) = ৩$ টাকা

৩ টাকা কমে যখন মোট আমানত ১০০ টাকা ∴ ৭৫০ " " " " $\frac{৭৫০ \times ১০০}{৩} = ২৫০০০$ টাকা

52. What will be the difference in taka between simple and compound interest at 10% on a sum of tk. 1000 after 4 years? BB {AD (General)- 2018}

a) 31.90 b) 32.10 c) 44.90 d) 64.10

Hints : সরল মুনাফা, $I_1 = Pnr = 1000 \times 4 \times \frac{10}{100} = 400$

এবং চক্রবৃদ্ধি মুনাফা $I_2 = P(1+r)^n - P = P\{(1+r)^{n-1}\} = 1000\left\{\left(1+\frac{10}{100}\right)^4 - 1\right\} = 1000\left\{\left(\frac{100+10}{100}\right)^4 - 1\right\}$

$= 1000\{(1.1)^4 - 1\} = 1000 \times 0.4641 = 464.10$ $\therefore$ পার্থক্য $= 464.10 - 400 = 64.10$

53. If selling price of an article is- $\frac{4}{3}$ of its cost price, the profit in the transaction is: BB, AD (GS'16)

a. $33\frac{1}{3}\%$ b. $16\frac{2}{3}\%$ c. $20\frac{1}{2}\%$ d. $25\frac{1}{2}\%$

Hints: Let, the cost price be x $\therefore$ selling price is $\frac{4}{3}$ of $x = \frac{4x}{3}$

$\therefore$ Profit% $= \frac{\text{selling price}-\text{cost price}}{\text{cost prie}} \times 100\% = \frac{\frac{4x}{3}-x}{x} \times 100\% = \left(\frac{4}{3}-1\right) \times 100\% = \left(\frac{4-3}{3}\right) \times 100\% = \frac{100}{3}\% = 33\frac{1}{3}\%$

54. Tk 800 becomes Tk 956 in 3 years at a certain rate of simple interest. If the rate of interest is increased by 4%, what amount will Tk 800 become in 3 years? BB, AD (GS'16)

a. Tk 1052 b. Tk 1020.80 c. Tk 1025 d. None of these

Hints: For simple interest, A = principal + interest

$\Rightarrow A = P + i$

and $i = A - P = Pnr \Rightarrow 956 - 800 = 800 \times 3 \times \frac{r}{100} \Rightarrow 156 = 800 \times 3 \times \frac{r}{100}$ $\therefore r = \frac{156\times100}{800\times3} = 6.5$

When the interest rate (r) is increscent by 4%, it becomes = 6.5 + 4 = 10.5

$\therefore$ new $i = Pnr = 800 \times 3 \times \frac{10.5}{100} = 252$ So total amount $A = P + i = 800 + 252 = 1052$

55. Peter purchased a machine for Tk 80,000 and spent Tk 5000 on repair and Tk 1000 on transport and sold it with 25% profit. At what price did he sell the machine? BB, OFFICER (CASH'16)

a. Tk 1,06,250 b. Tk 1,07,500 c. Tk 1,17,500 d. Tk 1,05,100

Hints: Total expense = (80,000 + 5,000 + 1,000) = 86,000 taka

At 25% profit,

selling price $= 86{,}000 + 86{,}000 \times \frac{25}{100} = 1{,}07{,}500$

বিসিএস প্রিলিমিনারি ও লিখিত কোর্সের সম্মানিত শিক্ষকম-লী

বাংলা বিভাগ:


এস আলম স্যার


মাসুম বিল্লাহ্ স্যার

ইংরেজি বিভাগ:


মাহবুব শাকিল স্যার


এম রুবেল রানা স্যার


ম. হাসান স্যার


তারেক শাহাদৎ স্যার


আল-আমিন স্যার

গণিত ও মানসিক দক্ষতা বিভাগ:


শেখ শাহজাহান স্যার


রবিউল ইসলাম স্যার


সোহেল স্যার


প্রবাল শরীফ স্যার


ওবায়দুর রহমান স্যার

সাধারণ বিজ্ঞান, কম্পিউটার তথ্য ও যোগাযোগ প্রযুক্তি বিভাগ:


মাহমুদুর রহমান স্যার


মিরাজুল ইসলাম স্যার


নুরে আলম সুমন স্যার


নিয়ামুল কবীর স্যার

বাংলাদেশ বিষয়াবলি, ভূগোল, নৈতিকতা ও সুশাসন বিভাগ:


আসাদ স্যার


এ্যাড. খালিদ হাসান স্যার


সুমন ইবনে হাবিব স্যার

আন্তর্জাতিক বিষয়াবলি বিভাগ:


আমিরুল ইসলাম স্যার


সুমন ইবনে হাবিব স্যার


খন্দকার পলাশ স্যার


নেছার উদ্দিন স্যার


মাহবুব হোসেন স্যার