Bank Job Lecture Sheet

Lecture 3

Lecture Contents

☑ Interest

Interest

Basic Concept:

Interest (সুদ): টাকা বিনিয়োগ করার কারণে বিনিয়োগকারী একটি নির্দিষ্ট পরিমাণ টাকা লভ্যাংশ হিসেবে পায় তাই Interest (সুদ)।

Rate of Interest (সুদের হার): সাধারণত 100 টাকার 1 বছরের সুদকে সুদের হার বলে। একে শতকরা বার্ষিক সুদের হার বলে উল্লেখ করা হয়। কাজেই শতকরা সুদের হার বার্ষিক বা মাসিক উল্লেখ না থাকলে শতকরা বার্ষিক ধরেই সুদ হিসাব করতে হয়। শতকরা বার্ষিক সুদের হার 5 টাকাকে 5% সুদেও লেখা হয়।

Total amount (সুদ-আসল): সুদ ও আসলের টাকাকে একত্রে সুদাসল বা সবৃদ্ধি মূল বলে।

সুদ সাধারণত দুই প্রকার। যথা–

(i) সরল সুদ (simple Interest)

(ii) চক্রবৃদ্ধি সুদ (Compound Interest)

সরল সুদ (Simple Interest): শুধু মূলধনের উপর সুদ কিন্তু সুদের সুদ না। তাই এখানে আসল কখনো বাড়ে না।

চক্রবৃদ্ধি সুদের মূলধনের উপর সুদের পাশাপাশি সুদের টাকার উপর পুনরায় সুদ।

পরিচয়:

I = Interest/সুদের টাকা/মুনাফা/সুদ

r = rate of interest/সুদেরহার (%) [লক্ষণীয়, r-এর মান সর্বদা % এ থাকবে]

n = বছর/সময়/যতবার সুদ দেওয়া হয়।

P = Principal/capital/interest/deposit/main value/ মূলধন/ জমা/বিনিয়োগ/আসল।

T = Total amount/Future value/সুদ-আসল/সবৃদ্ধি মূল।

সরল সুদ (Simple Interest):

$I = pnr$

T = আসল + সুদ

$= p + I$

$= p + pnr$

$T = p(I + nr)$

যৌগিক সুদ/চক্রবৃদ্ধি সুদ (Compound Interest):

$T = P(1 + r)^n$

$I = T - P$

$= p(1 + r)^n - P$

Lecture 3

Tips for Compound Interest:

(i) If interest is compounded every 6-month অর্থাৎ আসলের উপর অর্ধবার্ষিকী চক্রবৃদ্ধি প্রদান করা হলে, r কে 2 দিয়ে ভাগ করতে হবে এবং সময়কে 2 দিয়ে গুণ করতে হবে। r হবে $\frac{r}{2}$ এবং n হবে 2n।

eq→ $T = p\left(1 + \frac{r}{2}\right)^{2n}$

(ii) If Interest is compound quarterly অর্থাৎ আসলের উপর quarterly চক্রবৃদ্ধি সুদ প্রদান করা হলে, r কে 4 দিয়ে ভাগ হবে এবং সময়কে 4 দিয়ে গুণ হবে। r হবে $\frac{r}{4}$ এবং n হবে 4n।

eg→ $T = p\left(1 + \frac{r}{4}\right)^{4n}$

(iii) If interest is compound monthly অর্থাৎ আসলের উপর মাসিক চক্রবৃদ্ধি সুদ প্রদান করা হলে,

r কে 12 দিয়ে ভাগ এবং সময়কে 12 দিয়ে গুণ হবে।

r হবে $\frac{r}{12}$ এবং n হবে 12n

eg→ $T = p\left(1 + \frac{r}{12}\right)^{12n}$

Simple Interest

Teacher's Discussion

1. A sum of money at simple interest amounts to Tk. 5600 in 2 years and Tk. 6500 in 5 years at the rate of- [Combined 7 Banks Senior Officer- 2021**]**

A. 4% B. 3% C. 5% D. 6% **Ans:** D

1. A man borrowed some money for 120 days. He asked the banker for the money and the banker charged Tk. 360 as interest @6% per annum. What was the amount he borrowed? [Combined 7 Bank Officer (Cash)-2023]

A. Tk. 18,000 B. Tk. 16,000 C. Tk. 15,000 D. None of these **Ans:** A

2. A sum of money amounts to Tk. 9800 after 5 years and Tk. 12005 after 8 years at the same rate of simple interest. The rate of interest per annum is: [Probashi Kallayan Bank Senior Officer- 2021]

A. 5% B. 8% C. 12% D. 15% **Ans:** C

3. What is the annual interest rate on an account that earns Tk. 948 in simple interest over 36 months with an initial deposit of Tk. 7900? [Bangladesh Bank AD- 2021**]**

A. 40% B. 4% C. 3% D. 5% **Ans:** B

4. Kona deposited Tk. 505 into her savings account. If the interest rate of the account is 5% per year, how much interest will she have made after 4 years? [Bangladesh Bank AD- 2021]

A. Tk. 252.20 B. Tk. 606 C. Tk. 10100 D. Tk. 101 **Ans:** D

5. The interest on a certain deposit at 4.5% p.a. is Tk. 202.50 in one year. How much will the additional interest in one year be on the same deposit at 5% p.a.? [Bangladesh Bank Officer- 2016**]**

A. Tk. 22.50 B. Tk. 25 C. Tk. 20.25 D. Tk. 42.75 **Ans:** A

6. Anmie invested a certain sum of money in a bank that paid simple interest. The amount grew to Tk. 240 at the end of 2 years. She waited for another 3 years and got a final amount of Tk. 300. What was the principal amount that she invested at the begining? [UCB MTO- 2017**]**

A. 200 B. 150 C. 210 D. 175 **Ans:** A

7. Tk. 600 becomes 720 in 4 years when the interest is simple, if the rate of interest is increased 2%, then what will be the total amount? [Islami Bank PO- 2019**]**

A. 642 B. 724 C. 725 D. 768 **Ans:** D

8. **A man needs money for 120 days. He asked the banker for a loan and the banker charged Tk 360 @ 6% per annum. What is the amount of loan?** [Combined 9 Bank Senior Officer (General)-2023]
A. Tk. 15000 B. Tk. 16000 C. Tk. 18000 D. None of these **Ans: C**

9. **A sum of Tk. 24500 amounts to Tk. 34300 in 5 years at a simple interest rate. What is the rate of interest? [**Shadharon Bima Corporation Junior Officer- 2019**]**
A. 4% B. 5% C. 6% D. 8% **Ans:** D

10. **A total of Tk. 1200 was deposited in two savings accounts for one year, one portion at 5% simple interest, and the rest at 7% simple interest. If Tk. 72 was earned in interest, how much was deposited at 5%? [**Dutch Bangla Bank PO- 2019**]**
A. Tk. 410 B. Tk. 520 C. Tk. 600 D. Tk. 650 **Ans:** C

11. **If a certain sum of money can become 5 times of its principal in 10 years, then the rate of interest is:** [NRBC Bank, TO- 2022]
A. 20% B. 30% C. 40% D. 50% **Ans:** C

12. **A man borrows $360. If he pays it back in 12 monthly payments of $31.50, what is his interest rate?**
A. 1.5% B. 4.5% C. 10% D. 5% E. 7.5% **Ans:** D

13. **A moneylender charged Tk. 25 as a simple interest on a loan of Tk. 150 for $\frac{1}{6}$ years. What was the rate % p.a?**
A. 125 B. 50 C. 75 D. 25 E. 100 **Ans:** E

14. **A man has Tk. 10,000 to invest. He invests Tk. 4000 at 5% and Tk. 3500 at 4%. In order to have a yearly income of Tk. 500, he must invest the remainder at-**
A. 6% B. 6.3% C. 6.1% D. 6.4% **Ans:** D

15. **At simple interest Tk. 800 becomes Tk. 920 in 3 years. If rate of interest is increased by 3% then total amount becomes:**
A. Tk. 988 B. Tk. 990 C. Tk. 192 D. Tk. 992 **Ans:** D

16. **At what annual rate of interest, one year's interest will be equal to $\frac{1}{5}^{th}$ of the sum of principal and interest?**
A. 20% B. 15% C. 25% D. 18% **Ans:** C

Student's Drill

1. **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.**
A. Tk. 1020.80 B. Tk. 1025 C. Tk. 1052 D. None of these **Ans:** B

2. **If the sum of interests on Tk. 500 in 4 years and Tk. 600 in 5 years is Tk. 500 then what will be the interest on Tk. 1000 in 3 years?**
A. Tk. 300 B. Tk. 350 C. Tk. 400 D. Tk. 380 **Ans:** A

3. **Mr. X withdraw Tk 45,000 from a bank at 3.6% rate per annum after maturity. If the income and investment ratio of Mr. X is 2:5. Find the duration of maturity.**
A. 10.11 Years B. 11.11 Years C. 12.25 Years D. 13 Years **Ans:** B

4. **A sum of principal becomes Tk 550 as interest-principal after 5 years and interest is 3/8 of the principal. - How much principal and rate of interest per annum?**

A. 7 % B. 8.5% C. 7.5% D. 9.5% **Ans:** C

5. **A sum of Tk. 12,500 amounts to Tk. 15,500 is 4 years at the rate of simple interest. What is the rate of interest?**

A. 3% B. 4% C. 5% D. 6% **Ans:** D

6. **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 **Ans:** D

7. **Hasib took a loan of 1400 Tk. with simple interest for as many years as the rate of interest. If he paid 126 Tk. as interest at the end of the loan period, what was the rate of interest?**

A. 3% B. 6% C. 9% D. 12% **Ans:** A

8. **A certain sum of money becomes three times of itself in 20 years at simple interest. In how many years does it become double of itself at the same rate of simple interest?**

A. 12 years B. 10 years C. 15 years D. 20 years **Ans:** B

Solution of Student's Drill

1. We know, $I = pnr$

$\Rightarrow r = \frac{I}{pn}$

$= \frac{156}{800 \times 3} \times 100\%$

$= 6.5\%$

If $r = (6.5 + 4)\% = 10.5\%$

$\therefore T = p(1 + nr)$

$= 800\left(1 + 3 \times \frac{10.5}{100}\right)$

$= 800\left(\frac{1000 + 315}{1000}\right)$

$= 800 \times \frac{1315}{1000} = \frac{10520}{10} = 1052$ **(Ans.)**

$P = 800$
$T = 956$
$n = 3$
$\therefore I = 956 - 800$
$= 156$

2. We know, $I = pnr$

$\therefore 500 \times 4 \times r\% + 600 \times 5 \times r\% = 500$

$\Rightarrow \frac{2000r}{100} + \frac{3000r}{100} = 500$

$\Rightarrow r = \frac{500}{5000} \times 100\% = 10\%$

$I = 1000 \times 3 \times \frac{10}{100} = 300$ **(Ans.)**

3. Here, $\frac{I}{p} = \frac{2}{5}$ $\therefore I = pnr$ $\Rightarrow n = \frac{I}{pr}$

$= \frac{2}{5} \times \frac{1}{3.6\%} = \frac{2}{5} \times \frac{100 \times 10}{36}$

$= \frac{100}{9} = 11.11$ years **(Ans.)**

4. Let, $I = 3x$, $p = 8x$

$\therefore 3x + 8x = 550 \Rightarrow x = 50$

$\therefore I = 3 \times 50 = 150$

$p = 8 \times 50 = 400$

$I = pnr$

$\Rightarrow r = \frac{I}{pn} = \frac{150}{400 \times 5} \times 100\% = 7.5\%$ **(Ans.)**

5. $I = pnr$;

Here, $p = 12500$, $T = 15500$

$\therefore I = 3000$

$\Rightarrow r = \frac{I}{pn} = \frac{3000}{12500 \times 4} \times 100\%$

$= 6\%$ **(Ans.)**

6. For simple interest,
$I = pnr = 1000 \times 4 \times 10\% = 400$ Tk
For compound interest,
Interest after 1st year $= 1000 \times 10\% = 100$
" " 2nd " $= 1100 \times 10\% = 110$
" " 3rd " $= 1210 \times 10\% = 121$
" " 4th " $= 1331 \times 10\% = 133.1$
$\therefore$ Total interest = 464.1
Interest difference = 464.1 – 400
= 64.1 Tk. **(Ans.)**

7. We know, $I = pnr$
$\Rightarrow r = \frac{I}{pn} \Rightarrow r = \frac{126}{1400 \times r} \times 100\%$
$\Rightarrow r^2 = 9\% \quad \therefore r = 3\%$ **(Ans.)**

$p = 1400$
$r = n$
$I = 126$

8. Let, $p = 100 \quad \therefore T = 300 \quad I = 200 \quad n = 20$
$r = \frac{I}{pn} = \frac{200}{100 \times 20} \times 100\% = 10\%$
If $T = 200$
$n = \frac{I}{pr} = \frac{100 \times 100}{100 \times 10} = 10$ years **(Ans.)**

Compound Interest

Teacher's Discussion

1. If the rate of interest is 10% per annum and is compounded half yearly, the principal of Tk. 4000 in $\frac{3}{2}$ years will amount to- [Combined 7 Banks Senior Officer- 2021]
A. Tk. 4630.00 B. Tk. 4630.50 C. Tk. 4631.50 D. Tk. 4632.00 **Ans:** B

2. What will be the difference in Taka between simple and compound interest at 10% on a sum of Tk. 1000 after 4 years? [Bangladesh Bank AD- 2018]
A. 31.90 B. 32.10 C. 44.90 D. 64.10 **Ans:** D

3. A man deposits Tk. 600 in a Bank at 10% interest rate compounded annually. At the end of the second year, what will be the tatal amount including interest? [Bangladesh Bank Officer- 2011]
A. 660 B. 720 C. 726 D. 626 **Ans:** C

4. Mr. Atef bought a 1 year BDT 10000 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? [One Bank, Special Cadre Officer- 2022]
A. BDT 816 B. BDT 856 C. BDT 480 D. BDT 860 **Ans:** A

5. What would be the compound interest on BDT 7700/- at $15\frac{1}{4}$ % per annum for 2 years compounded annually? [One Bank, Special Cadre Officer- 2022]
A. BDT 2725.75/- B. BDT 2527.57/- C. BDT 2227.57/- D. BDT 2520.57/- **Ans:** B

6. The rate of inflation was 1000%. Then what will be the cost of an item, which costs 6 taka now, 2 years from now?
A. 666 B. 660 C. 720 D. 726 **Ans:** D

7. Aniruddha's salary increases at the rate of 10% per month. If this initial salary is Tk. 1000, what will his salary amount to after 3 increments?
A. Tk. 1331 B. Tk. 1248 C. Tk. 1463 D. Tk. 1300 **Ans:** A

8. A man deposits tk. 600 in a bank at 10% interest rate compounded annually. At the end of the second year, the total amount including interest will become.
A. 660 B. 720 C. 726 D. 626 **Ans:** C

Student's Drill

1. Find the compound interest on Tk 8000 at 15% per annum for 2 years 4 months, compounded annually.

A. Tk. 3109 B. Tk. 3100 C. Tk. 3150 D. Tk. 3209 **Ans:** A

2. Find the compound interest on Tk. 16000 at 20% per annum for 9 months, compounded quarterly.

A. 2522 B. 2550 C. 2620 D. 2652 **Ans:** A

3. In how many years Tk. 100000 will become Tk. 133100 at compound interest rate of 10% per annum?

A. 2 years B. 3 years C. 4 years D. 5 years **Ans:** B

4. Tk 2000 is deposited in a saving account which pays 6% annual interest compounded semi-annually. To the nearest Taka, how much is in the account at the end of the year?

A. 2022 Tk B. 2082 Tk C. 2122 Tk D. 2152 Tk **Ans:** C

5. What will be the difference between simple and compound interest @ 10% per annum on a sum of Tk. 1000 after 4 years?

A. 64.1 Tk B. 65 Tk C. 65.2 Tk D. 66.1 Tk **Ans:** A

Solution of Student's Drill

1. Interest after 1st year = 8000 × 15% = 1200

" " 2nd " = 9200 × 15% = 1380

" " 4 months = $10580 \times \frac{15}{3}\% = 529$

∴ Total interest = 1200 + 1380 + 529

= 3109 **(Ans.)**

2. Since compounded quarterly

so interest rate = $\frac{20\%}{4} = 5\%$

Interest after 3rd months = 16000 × 5% = 800

" " 3rd " = 16800 × 5% = 840

" " 3rd " = 17640 × 5%

$= \frac{88200}{100} = 882$

Hence total interest = 800 + 840 + 882

= 2522 **(Ans.)**

3. $T = p(1 + r)^n$

$133100 = 100000\left(1 + \frac{10}{100}\right)^n$

$\Rightarrow \frac{1331}{1000} = \left(\frac{11}{10}\right)^n \quad \Rightarrow \left(\frac{11}{10}\right)^3 = \left(\frac{11}{10}\right)^n$

∴ n = 3 **(Ans.)**

4. Since compounded semi-annually

So, interest rate = $\frac{6}{2}\% = 3\%$

Interest after 6th month = 2000 × 3% = 60

" " 6th " = 2060 × 3% = $\frac{6180}{100} = 61.8$

Hence total amount = 2060 + 61.8

= 2121.8 ≈ 2122 Tk. **(Ans.)**

5. For simple interest, I = pnr = 1000 × 4 × 10%

= 400

For compound interest,

Interest after 1st year = 1000 × 10% = 100

" " 2nd " = 1100 × 10% = 110

" " 3rd " = 1210 × 10% = 121

" " 4th " = 1331 × 10% = 133.1

∴ Total interest = 100 + 110 + 121 + 133.1

= 464.1

∴ Difference = 464.1 – 400 = 64.1 Tk. **(Ans.)**

Home Practice

1. **A man deposit Tk. 600 in a bank at 10% interest compounded annually including interest at the end of the second year?** [BUP (FBS): 2021-22]
   A. 660 B. 720 C. 726 D. 625 **Ans:** C

2. **When two equal amounts are deposited for 5 years and 3 years at a rate of 7% and 9% per annual respectively and the difference of their interest is 475. Find out the deposited amount.** [BUP (FBS): 2020-21]
   A. 5937.5 B. 6037.5 C. 5837.5 D. 5992.5 **Ans:** A

3. **What is the amount of interest on Tk. 500 invested for nine months at the rate of 12.5% per annum?** [BUP (FBS): 2020-21]
   A. Tk. 62.50 B. Tk. 46.875 C. Tk. 83.33 D. None of these **Ans:** C

4. **A person takes a loan of Tk. 200 at 5% simple interest. He returns Tk. 100 at the end of 1 year. In order to clear his dues at the end of 2 years, he would pay:** [BUP (FBS): 2020-21]
   A. Tk. 115 B. Tk. 115.50 C. Tk. 105 D. Tk. 110 **Ans:** B

5. **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?** [BUP (FBS): 2020-21]
   A. 1052 B. 110011 C. 110101 D. 100011 **Ans:** A

6. **A farmer borrowed Tk. 3600 at 15% simple interest per annum. At the end of 4 years, he cleared this amount by paying Tk. 4000 and a cow. The cost of cow is-**
   A. 1000 B. 1200 C. 1550 D. 1760 **Ans:** D

7. **At the rate of $8\frac{1}{2}$ % p.a. simple interest, a sum of Tk. 4800 will earn how much interest in 2 years 3 months?**
   A. 796 B. 816 C. 918 D. 956 **Ans:** C

8. **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 Officer (General): 2018]
   A. Tk. 600 B. Tk. 900 C. Tk. 1200 D. Tk. 1500 **Ans:** C

9. **How much time will it take for an amount of Tk. 450 to yield Tk. 81 as interest at 4.5% per annum of simple interest?** [BDBL (Senior Officer): 2017; BKB Officer (Cash): 2017]
   A. 3.5 years B. 4 years C. 4.5 years D. 5 years **Ans:** B

10. **In how many years, Tk. 150 will produce the same interest at 8% as Tk. 800 produce in 3 years at $4\frac{1}{2}$ %?**
    A. 6 B. 8 C. 9 D. 12 **Ans:** C

11. **The interest earned on Tk. 15000 in 3 years at simple interest is Tk. 5400. Find the rate of interest per annum.**
    A. 11.5% B. 12% C. 12.5% D. 15% **Ans:** B

12. **A sum of money amounts to Tk. 5200 in 5 years and to Tk. 5680 in 7 years at simple interest. The rate of interest per annum is:**

A. 3% B. 4% C. 5% D. 6% **Ans:** D

13. **A sum of money at simple interest amounts to Tk. 815 in 3 years and to Tk. 854 in 4 years. The sum is-**

A. Tk. 650 B. Tk. 690 C. Tk. 698 D. Tk. 700 **Ans:** C

14. **The simple interest at x% for x years will be Tk. x on a sum of-**

A. Tk. x B. Tk. $\left(\frac{100}{x}\right)$ C. Tk. 100x D. Tk. $\left(\frac{100}{x^2}\right)$ **Ans:** B

15. **What would be the compound interest accrued on an amount of Tk. 8000 at the rate of 15 p.c.p.a. in 3 years?**

A. Tk. 4051 B. Tk. 4167 C. Tk. 4283 D. Tk. 4325 **Ans:** B

16. **Find the compound interest on Tk. 8000 at 15% per annum for 2 years 4 months, Compounded annually-**

A. Tk. 3109 B. Tk. 3150 C. Tk. 3032 D. Tk. 3209 **Ans:** A

17. **There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Tk. 12000 after 3 years at the same rate?**

A. Tk. 2160 B. Tk. 3120 C. Tk. 3972 D. Tk. 6240 **Ans:** C