

## **Tutorial-1**

### **MONEY-TIME RELATIONSHIP AND ECONOMIC EQUIVALENCE**

1. When Hari was just of 6 yrs old, his father had deposited Rs 50,000 for education purpose. Hari is now 22 years old and his father wants to withdraw from bank where he had deposited with an interest rate of 8.5% pa. How much money can he withdraw right now? Suggest the amount of interest on interest on deposited period. [**Rs 1,84,436.05, Rs 66,436.05**]
2. How much amount should be deposited at this time if you wish to withdraw an accumulated fund Rs. 1,87,819.83 after 8 years with 11% annual interest rate. [**Rs 81,500.00**]
3. When a student wants to get admission in Bachelor in Engineering program in 2005 AD, it costs around Rs 2,40,000. The prevailing trend shows, the cost of same course in 2020 AD would cost Rs 13,00,000. Based on increased course fee, with the same annual percentage rate, what would be the cost of course in 2030AD. Use compound interest concept. [**Rs. 40,08,855.18 with annual increment rate of 11.92%**]
4. How long will it take to double your currently deposited amount with an annual interest of 7% pa? [**10.245 yrs**]
5. In order to obtain Rs. 40,000 per year for 6 years, how much money need to be deposited right now on an interest rate of 12% pa. [**Rs 1,64,456.29**]
6. How long an equivalent annual amount of Rs 14,982.33 to be deposited to have future accumulated sum of money Rs 3,00,000 at an interest rate of 4% pa? [**15 yrs**]
7. A company pays a salary of Rs 12,00,000 per year to Mr. Raju for the current year. Company planned to let him work for 5 years work tenure by increasing his salary by Rs 1,25,000 per year throughout his tenure. If he wanted to calculate total salary amount by depositing in a bank with 6% annual interest rate, suggest what amount he can withdraw from banks deposits at the end of 5 years. [**Rs 80,91,788.55**]
8. What is an equivalent present amount of depositing Rs 1,00,000 at the end of first year and increases by Rs 20,000 per year for next 19 years with an interest rate of 12% pa? [**Rs 16,46,295.75**]
9. A person deposited Rs 30,000 right now in a bank and planned to continue the deposit each year (payment in the beginning of year) by decreasing Rs 5,000 in each next deposit till it becomes zero. What would be an equivalent annual deposit amount throughout the zero-depositing ending period if an interest rate is 15% pa. [**Rs 22,441.16**]
10. A bilateral company JICA offers a salary package to its personnel with first year (year-end payment) payment of Rs. 8,00,000 and promises for increasing by 20% per year for total 8 years of work tenure. On the other hand, KOICA offered the same job position with Rs. 8,50,000 at the end of first year and would increase by 18% per year for the same time period. Which company you wish to join with reference to remuneration package and why? Take MARR = 18%. [JICA (FV) **Rs 2,16,38,310.29** and KOICA (FV) **Rs 2,16,61,222.52**, *Choose KOICA which gives more Rs 22,912.23 at the end of 8 years*]
11. When you have planned to deposit Rs. 5,000 at the end of first year and for succeeding years it would be decreased by 8% per year for total 5 years periods to have accumulated fund at the end of 5<sup>th</sup> year, how much money will be an equivalent one time present deposit that your friend shall deposit right now in same bank (10% interest rate) for same amount as you can withdraw? [**Rs 16,410.06**]

12. What will be an equivalent amount in problem number 11, if bank pays only 8% interest? [**Rs 17,232.50**]
13. A bank is stating its nominal interest rate of 9% p.a. and compounding quarterly. Calculate the effective interest rate for (i) a year (ii) a quarter (iii) a month (iv) half year. [**9.308%, 2.250%, 0.7444%, 4.5506%**]
14. What would be effective interests per month at a nominal interest rate of 12% if compounding in: (i) a year (ii) a half year (iii) a quarter year (iv) a month (v) a week (vi) a day (vii) a continuous basis. [**0.94887%, 0.97587%, 0.99016%, 1%, 1.00385%, 1.00485%, 1.005016%**]
15. Compute the equivalent linear growth amount (G) to make economic equivalence for present deposit of Rs. 38,281.23 against one-year withdrawals at the end of two months each (6 number of linearly increased withdrawals in total) with base amount Rs. 5000 at first (at the end of 2<sup>nd</sup> months) with 12% interest rate compounding quarterly. [**Rs. 750**]
16. While you are planning to deposit Rs 5000 in 3-months interval for 4 years in increasing geometric gradient with 2.5% growth rate per deposit, a bank enticing you with an interest rate of 9.5% pa compounded monthly. What will be your accumulated fund at the end of year four? [**Rs 1,14,968.26**]
17. What will be the deficit future accumulated fund at the end of year four in example-16 when the geometric growth rate is only 2.39385% per deposit. [**Rs. 891.26**]
18. If you wish to withdraw Rs 2000 at the end of 1<sup>st</sup> year and expecting to be increased by 25% pa then after till the end of 8 years, what amount need to be deposited in a bank right now which has an interest rate of 13.5% pa. [**Rs 20,248.32**]
19. If you planned to borrow an amount from a friend right now by promising that you will repay to him at the end of this year by Rs 10,000 and will be increased for succeeding years by Rs 1500 every year then after for another next 4 years. If MARR is to be around 12% compounded semi-annually, what amount will be ready to lend you by him? [**Rs 45,205.32**]
20. Prepare a loan amortization schedule with Rs 2,50,000 principal loan for 2-years loan tenure from a bank with EMI (effective monthly installment) at an interest of 8.99% from NIC Asia bank for your personal scooter purchase. [**EMI Rs 11,419.81**]