**Vedanta's**

# SEE CAPSULE-2082

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## (Compulsory Mathematics)

# DAY–2

**SEE Q. No. 3**

1. **In the beginning of 2080 B.S., the population of a village was 25,000. The population of the municipality increases by 2% every year.**
   (a) Write the formula for calculating the population of a place after T years if its present population is P and annual growth rate is R% p.a. [1K]
   (b) What was the population of the municipality in the beginning of 2082 B.S.? [1U]
   (c) If 90 people increased in the beginning of 2082 B.S. due to migration in the village, what will be the population of the municipality in the beginning of 2083 B.S. at the same rate of growth? Calculate it. [2A]
   **Ans:** (b) 26,010          (c) 26622

2. **The population of a sub-metropolitan city before 2 years was 1,00,000. The population growth of the sub-metropolitan city is 5% per annum.**
   (a) State whether the population growth of the city is simple or compound. [1K]
   (b) Find the present population of sub-metropolitan city. [2A]
   (c) If 10000 migrated there from other places and 250 died in the beginning of this year, in how many years, will the population of the city become 1,38,915? [2HA]
   **Ans:** (a) compound          (b) 1,10,250          (c) 3 years

3. **The population of a metropolitan city increases from 1,10,000 to 1,16,699 in 2 years at a certain rate.**
   (a) The present population of a city is P and annual growth rate is R% p.a., write the formula for calculating the population of the city after T years [1K]
   (b) Find the population growth rate in the population of the city. [1U]
   (c) If the population of the city was increased by 2% in the first year and 4% in the second year, what would be change in the population after 2 years? Find it. [2HA]
   **Ans:** (b) 3% p.a.          (c) 11 less

4. **In 2026 AD, the monthly fee of grade X of a school is Rs. 8,000 and it increases every year by 10% according to the rules and regulation of the school.**
   (a) What does $P\left(1 + \dfrac{R}{100}\right)^{T} - P$ stand for? [1K]
   (b) By how much will the monthly fee be increased by 2028 AD? Find it. [2U]
   (c) Compare the monthly fees of 2028 AD and 2029 AD. [2A]
   **Ans:** (a) Increased amount of fees          (b) Rs 1680     (c) 10: 11

5. **In 2082 B.S., the number of SEE appeared students from a district are 50,000 and the number increased by 5%, 6% and 4% respectively in upcoming 3 years.**
   (a) Write the formula for calculating the population of a place after 3 years if its present population is P and annual growth rates in the 1st, 2nd and 3rd years are $R_1$%, $R_2$% and $R_3$% respectively. [1K]

(b) How many students will appear SEE in 2085 B.S.? [1U]

(c) If the number of students increases by 10% every year, how many more or less students will appear SEE in 2085 B.S.? Find it. [2A]

***Ans:*** (b) 57,876                     (c) More by 8674

6. **The population of a village is increasing by 10% every year. At the end of 2 years, the population reached to 8,000 where 1680 people migrated from the village to other places.**

(a) Write the formula to find the population of a place having initial population P after T years at the rate of R% p.a. [1K]

(b) Find the initial population of the village. [1U]

(c) What would be the population of the rural municipality at the end of 2 years if 1000 people migrated to other places from the place at the end of the first year? [2HA]

***Ans:*** (b) 8,000                     (c) 8,580

7. **The population of a rural municipality is increasing by 10% every year. At the end of 2 years, the population reached to 30,000 where 5,800 people migrated to the place finally.**

(a) Find the initial population. [2A]

(b) What would be the population of the rural municipality at the end of 2 years if 1000 people migrated to other places from the place at the end of the first year? [2HA]

***Ans:*** (a) 20,000                     (b) 23,100

8. **The price of a plot of land is Rs. 15,00,000 per Aana and the rate of the land increases every year by 5%.**

(a) What will be the price 1 Ropani of land after 3 years? [1 Ropani = 16 Aana] [2U]

(b) In how many years, will the price of 1 Ropani be Rs 2,64,60,000 at the same rate? [2A]

(c) If the price of the land was decreased by 5% p.a., what would be the price of 1 Ropani of land after 3 years? [1HA]

***Ans:*** (a) Rs 2,77,83,000             (b) 2 years     (c) Rs 2,05,77,000

9. **The population of a municipality in 2080 B.S. was 1,00,000. In 2081 B.S., 8000 migrated there from other places and 500 died due to several circumstances. The population increase rate is 2% p.a. every year.**

(a) What was the final population in 2081 B.S.? [2U]

(b) Find the population of the municipality in 2083 B.S. [1A]

(c) Analyze the population of 2080 B.S. and 2083 B.S. [1HA]

***Ans:*** (a) 1,09,500                   (b) 1,13,924                 (c) increased by 13,924

10. **Rima admitted BBS. She purchased a laptop for Rs. 80,000 for her study. After using it for 2 years, she sold the laptop at the rate of 20% compound depreciation.**

(a) What does R stand for in the formula, $V_T = V_o\left(1 - \dfrac{R}{100}\right)^T$ ? [1K]

(b) Find the cost of the laptop after 2 years? Find it. [1U]

(c) Find the depreciated amount. [1A]

(d) If she sold the laptop at the rate of 10% compound depreciation, how much more amount would she receive? Find it. [2HA]

***Ans:*** (a) Rate of depreciation     (b) Rs 51,200     (c) Rs 28,800     (d) Rs 13,600 more

11. **Two years later, the valuation of a house will be Rs 1,44,50,000. Its price depreciates by 15% p.a.**

(a) Define compound depreciation. [1K]

(b) Find the present valuation of the house. [2U]

(c) In how many years will the valuation of the house be Rs 1,22,82,500? Find it. [2A]

***Ans:*** (b) Rs 2,00,00,000             (b) Rs 51,200                 (c) 3 years

12. **A photocopy machine costs Rs. 40,000 now. If the machine depreciates by 5% in the first year, 10% in the second year and 15% in the third year.**
   (a) What is the cost of a machine costing Rs 'P' after 3 years if its price depreciates by $R_1$%, $R_2$% and $R_3$% in the first, second and the third years respectively? [1K]
   (b) What will be the price of machine after 3 years? [1U]
   (c) If the price of the machine depreciates by a constant rate 10% every year, how much more or less would its price after 3 years? [2HA]
   **Ans:** (b) Rs 29,070          (c) Rs 90 more

13. **Harka Bahadur purchased a microbus for Rs. 25,00,000. After using the microbus for three years, he earned Rs. 15,00,000. The value of the microbus depreciated by the rate of 10% per annum and the he sold it after three years.**
   (a) If the purchasing price of the microbus is Rs. $V_o$, the rate of compound depreciation is R% per annum and price of the microbus after T years is Rs.$V_T$, then express $V_T$ in terms of $V_o$, R% and T. [1K]
   (b) Find the selling price of the bus after three years. [1U]
   (c) Find the profit or loss percent in this transaction. [2A]
   **Ans:** (b) Rs. 18,22,500          (c) 32.9% profit

14. **Smith purchased a bike for Rs. 6,00,000. After using it for 2 years, the price of the bike depreciated by Rs. 1,14,000 and sold it.**
   (a) At what price did he sell the bike? [1U]
   (b) Find the annual rate of depreciation. [2A]
   (c) If he sold the bike after using for 3 years at the same rate, what change would be there in depreciated amount? [2HA]
   **Ans:** (a) Rs. 4,86,000          (b) 10% p.a.          (c) Differed by Rs 48,600

15. **A photocopy machine costs Rs. 40,000 now. If the machine depreciates by 5% in the first year, 10% in the second year and 15% in the third year.**
   (a) What is the cost of a machine costing Rs 'P' after 3 years if its price depreciates by $R_1$%, $R_2$% and $R_3$% in the first, second and the third years respectively? [1K]
   (b) What will be the price of machine after 3 years? [1U]
   (c) If the price of the machine depreciates by a constant rate 10% every year, how much more or less would its price after 3 years? [2HA]
   **Ans:** (b) Rs 29,070          (c) Rs 90 more

16. **The compound depreciation of shares of a hydropower company for 2 years is at the rate of 2% p.a. Mithai Lal bought a certain number of shares of the company and sold it for Rs 24,010 after 2 years.**
   (a) Find the value of shares before 2 years. [2A]
   (b) How many shares at Rs 100 per share did he sell? [1U]
   (c) If he borrowed the sum required to buy the shares from a bank at compound interest rate of 10% p.a., how much would be insufficient to clear the debt after two years.[2HA]
   **Ans:** (a) Rs 25,000          (b) 250 kitta          (c) Insufficient by Rs 6240

17. **Dolma has Rs. 90,00,000 with her. She has purchased an electric car for Rs. 40,00,000 and a plot of land for Rs. 50,00,000. For 2 years, the price of the electric car has been decreasing at a compound rate of 5% per annum, while the price of land has been increasing at a certain compound growth rate.**
   (a) What does R indicate in the formula, $V_T = V\left(1 - \dfrac{R}{100}\right)^T$ ? [1K]
   (b) What will be the price of the electric car after two years? [1U]
   (c) After 2 years the total price of the electric car with the land becomes Rs. 92,28,000, find the the rate of compound growth in the price of land? [2HA]
   **Ans:** (a) Rate of depreciation          (b) Rs. 36,10,000          (c) 6% p.a.

18. Salina bought a land at Rs. 40,00,000 on 10th Baisakh of 2078 BS and started construction of a house on the same day. The construction of the house completed with an investment of Rs. 1,35,00,000. The price of land increased at the rate of 20% per year and the price of house decreased at the rate of 20% per year.
    (a) What will be the price of the land after 2 years? [2U]
    (b) What will be the price of the house after 2 years? [2A]
    (c) Will the prices of the land and house be the same after 2 years? If not, in how many years will the prices of the land and house be equal? [2HA]
    *Ans:* (a) Rs. 57,60,000        (b) Rs. 86,40,000        (c) 3 years

## SEE Q. No. 4

1. The buying and selling rates of Australian dollar (AUD) $ 1 in a bank are NPR 96.58 and NPR 96.50 respectively.
   (a) Which rate is used when a person goes to a bank to exchange AUD with him? [1K]
   (b) How many rupees can be exchanged with AUD $ 4,000 on the day? [1U]
   (c) Shashwat needs AUD 5,000 for the higher study in Australia and the bank charges 1% as commission, how much Nepali rupees does he require? [2A]
   *Ans:* (a) Buying rate        (b) Rs. 3,86,320        (c) Rs 4,87,325

2. Anil goes to a bank to exchange US dollars to visit abroad. According to the money exchange rate, the buying rate of US $ is Rs. 147.80 and selling rate is Rs. 148.92.
   (a) How many dollars does he receive with Rs. 5,95,680? Find it. [2U]
   (b) How much Nepali rupees does his friend receive while exchanging US $3500 in the same day? Find it. [1A]
   (c) Before 2 weeks, the selling rate of US dollar was Rs. 146, by what percent the Nepali currency was devaluated? Find it. [1HA]
   *Ans:* (a) $4000        (b) Rs. 5,17,300        (c) 2%

3. A business man exchanged some Canadian dollars with NRs. 5,39,000 at the exchange rate of Canadian dollar 1= NRs. 98. After 5 days, Nepali currency was devaluated by 2% in comparison to Canadian dollar and on that day he exchanged the dollars into Nepali currency again.
   (a) How many Canadian dollars did he exchange with NRS 5,39,000? Find it. [1K]
   (b) Find the exchange rate of CAD $ 1 after devaluation in Nepali currency. [1U]
   (c) Calculate his gain or loss amount. [2HA]
   *Ans:* (a) CAD $5500        (b) Rs. 99.96        (c) Rs. 10,780

4. Mr. and Mrs. Sharma ought some Euro (€) for NPR 5,50,000 at the exchange rate of Euro (€) 1 = NPR 125 to visit a few European countries. Unfortunately, because of Visa problem, they cancelled the trip. Within a week Nepali rupee is revaluated by 3%. They again exchanged their Euro to Nepali rupee after a week.
   (a) How many Euro was bought? [1K]
   (b) What is the new exchange rate after revaluation of Nepali rupee? [1U]
   (c) How much did they gain or lose? [2A]
   (d) How much profit or loss would be there for them, if the Nepali rupees had devalued by 3% instead of revaluation of 3%? [2HA]
   *Ans:* (a) € 4400        (b) Rs. 121.25        (c) Rs. 16,500 loss        (d) Rs 16,500 profit

5. Sujan is a Nepali businessman in Australia. He purchased 500 Pasmina shawls at the rate of Rs. 3,500 each in Nepal and exported in Australia by paying 5% export tax. He paid Australian Dollar 30 for transportation from the airport and sold the shawls at the rate of Australian Dollar 70 for each.    [1 AUD = Rs 98.50]
   (a) Find the cost price of shawls including the export tax and transportation cost. [2U]
   (b) Find the profit or loss percent. [1HA]
   *Ans:* (a) Rs. 18,40,455        (b) 87.32% profit

6.  Ram Bahadur, a retired security person, decided to go in UAE for the employment as a security guard. He borrowed Rs. 2,50,000 for 2 years at the rate of 10% semi-annual compound interest from a bank. But, after 1 year, he remitted 5,000 UAE Dirham to his home to reduce the loan.                                   **(1 AED = Rs. 36)**
    (a) Write the formula to find the semi-annual compound amount.                    [1K]
    (b) What is the total amount to be paid after 1 year?                              [1U]
    (c) Was 3250 Dirhams sufficient to clear his remaining loan at the end of 2 years if the Nepali currency was revaluated by 5% in comparison to AED?                       [2HA]
    **Ans:** (b) Rs. 2,75,625                    (c) Yes

7.  It is given that 120 dollars=96 pounds and NRs.168=1 pound.
    (a) Hari bought some US dollars for Rs.2,68,800. How much US dollars did he get?   [2U]
    (b) Determine the exchange rate between NRs. and US dollars.                        [1A]
    (c) After few days, the Nepalese currency was devaluated in the comparison of US dollar by 10%. Find the exchange rates between NRs. and US dollar after devaluation.    [1A]
    (d) According to the new exchange rate, how much profit or loss does Hari make when he exchanges his American dollars with Nepalese rupees?                       [1HA]
    **Ans:** (a) $2000          (b) $1 = Rs. 134.40      (c) Rs. 147.84    (d) Rs. 26,880 profit

8.  Dawa Lama exchanged some Nepali rupees with American dollars at the exchange rate $1= Rs. 130. After 5 days, Nepali currency devaluated against American dollars by 10% and he made a profit of Rs. 39,000 by exchanging the same dollars into Nepali currency again.
    (a) How many Nepalese rupees is equal to one US dollar after devaluation on the Nepali currency?                                                                     [1K]
    (b) How much Nepali rupees did he exchange to get US dollars initially? Find it.    [2A]
    (c) How much profit or loss would be there for him if the Nepali currency was revaluated by 10% instead of devaluation of 10%?                                [1HA]
    **Ans:** (a) $1 = Rs. 143               (b) Rs. 3,90,000            (c) Rs. 39,000 loss