

SEE CAPSULE-2082

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(Compulsory Mathematics)**DAY-1****SEE Q. No. 1**

1. In a survey among the 1000 students of a school, 300 like Mathematics only and 400 like Science only but 50 like neither of the subjects.
- (a) If M and S are the sets of students who like Mathematics and Science respectively, write the cardinality notation of set of students who like neither of these subjects. [1K]
 (b) Represent the above information in the Venn-diagram. [1U]
 (c) Find the number of people who like Mathematics. [3A]
 (d) What percent of students like at most one of these subjects? Find it. [1HA]

Ans: (a) $n(\overline{M \cup S}) = 50$ (c) 550 (d) 75%

2. A and B are the subsets of a universal set U such that $n(U) = 100$, $n(A) = n(B)$, $n(A - B) = 32 + x$, $n(B - A) = 5x$, $n(A \cap B) = x$ and $n(\overline{A \cup B}) = y$.
- (a) Write the relationship among $n(U)$, $n(A - B)$, $n(B - A)$, $n(A \cap B)$ and $n(\overline{A \cup B})$. [1K]
 (b) Show the above information in the Venn-diagram. [1U]
 (c) Find the value of $n(\overline{A \cup B})$. [3A]
 (d) By what percent $n(\overline{A \cup B})$ is more or less than $n(A \cap B)$? Find it. [1HA]

Ans: (a) $n(U) = n(A - B)$, $n(B - A)$, $n(A \cap B) + n(\overline{A \cup B})$ (c) 12 (d) 50% more

3. According to a survey among certain number of players, 200 liked to play volleyball, 180 liked to play football, 100 liked to play both the games but 20 liked to play neither of these games.
- (a) If V and F are the sets of players who liked to play volleyball and football respectively, what does $n(V \cap F)$ represent? [1K]
 (b) Show the above information in the Venn-diagram. [1U]
 (c) How many players were participated in the survey? Find it. [3A]
 (d) Compare the number of players who liked to play only one of these games and none of these games by finding the ratio. [1HA]

Ans: (a) The no. of players who liked to play both the games (c) 300
 (d) 9: 1

4. According to a survey of 90 youths in a community, 50 youths have jobs in Nepal and 26 have jobs in foreign countries. Some youths have jobs both in Nepal and in foreign countries, while 16 youths have no job anywhere.

- (a) If N and F are the sets of youths who have jobs in Nepal and foreign countries respectively, what is the value of $n(\overline{N \cup F})$? [1K]
- (b) Present the above information in the Venn-diagram. [1U]
- (c) How many youths have jobs in Nepal only? Find it. [3A]
- (d) By how many times the number of youths who have jobs in Nepal only is more than the number of youths who have jobs in foreign countries only? Calculate it. [1HA]

Ans: (a) 16 (c) 48 (d) 2 times

5. **Of the tourists who came to visit Nepal were asked whether they visited Pokhara or Lumbini or both or none and they responded that 85% visited Pokhara and 75% visited Lumbini. However, 10% visited the places other than Pokhara and Lumbini, and 350 tourists visited both of these places.**

- (a) If P and L denote the sets of tourists who visited Pokhara and Lumbini respectively, write the cardinality of $n(P \cap L)$. [1K]
- (b) Show the above information in the Venn-diagram. [1U]
- (c) Find the total number of tourist to whom the survey was done? [3A]
- (d) If the tourist who visited Lumbini also visited Pokhara, what change would be there in the total number of tourist who visited both the places? [1HA]

Ans: (a) $n(P \cap L) = 350$ (c) 500 (d) 25 more

6. **In survey conducted regarding the preference of two types of fruits mango and papaya among a group of people it was found 50% responded for preferring mango, 60% responded for preferring papaya, 30% responded for preferring both the fruits and 48 people responded for none of these fruits.**

- (a) If M and P represent the sets of people who preferred mango and papaya respectively, and x represents the total number of people who participated in the survey, write the number of people who preferred mango in cardinality notation. [1K]
- (b) Draw a Venn-diagram to illustrate the above information. [1U]
- (c) How many people liked exactly one type of the fruits? Find it. [3A]
- (d) Pasang Sherpa calculated that the number of people who liked both types of fruits was 50% more than the number of people who liked none of the fruits. Evaluate her calculation. [1HA]

Ans: (a) $n(M) = 0.5x$ (c) 120 (d) Her calculation is correct

7. **Among 200 people of a community, it was surveyed that the ratio of the number of people who drink tea to the number people who drink coffee is 2:3 where 55 people drink both the drinks and 30 drink neither tea nor coffee.**

- (a) Write the cardinality of $n(\overline{T \cup C})$ by letting T and C as the sets of people who drink tea and coffee respectively. [1K]
- (b) Illustrate the above information in a Venn-diagram. [1U]
- (c) Find the the number of people who drink tea. [3A]
- (d) Compare the number of people who drink tea only and coffee only. [1HA]

Ans: (a) 30 (c) 90 (d) 7: 16

8. **In a survey conducted among 400 people of a community, it was found that the ratio of the number of people who use laptop only and mobile only is 3:5 where 100 use both types of gadgets and 60 do not use both the gadgets.**

- (a) Write the cardinality of $n(L \cap M)$ by letting L and M as the sets of people who use laptop and mobile respectively. [1K]
- (b) Draw a Venn-diagram to illustrate the above information. [1U]
- (c) Find the number of people who use laptop. [3A]
- (d) In the second survey if those people who do not use both the gadgets are found to use laptop, compare the number of people who use laptop and mobile. [1HA]

Ans: (a) 140 (c) 190 (d) Equal

9. In a marriage party of 320 participants, it was found that 60 participants were involved in singing only and 100 participants were involved in dancing only. The number of people who only attended the party but were not involved in either activity was three times the number of people involved in both activities.

- (a) If S and D denote the sets of people who involved in singing and dancing respectively, write the cardinality notation for those people who involved in singing but not in dancing. [1K]
 (b) Represent the above information in a Venn-diagram. [1U]
 (c) How many people were involved in dancing? Find it. [3A]
 (d) Find the ratio of number of people who were involved in singing and dancing. [1HA]

Ans: (a) $n_o(S) = 60$ (c) 140 (d) 5: 7

10. Among the 100 students who participated in SEE in 2081 from Mahendra Secondary School, 70 passed in Science, 75 passed Mathematics and 76 passed in Nepali, 60 passed in Science and Mathematics, 65 passed in Mathematics and Nepali, 55 passed in Science and Nepali and 50 passed in all the subjects.

- (a) If S, M and N denote the sets of students who passed in Science, Mathematics and Nepali respectively, write the cardinality of $(S \cap M \cap N)$. [1K]
 (b) Represent the above information in a Venn-diagram. [1U]
 (c) How many students failed in all three subjects? Find it. [3A]
 (d) Compare the number of students who passed in only one subject to those who passed in only two subjects. [1HA]

Ans: (a) $n(S \cap M \cap N) = 50$ (c) 9 (d) 19 more students passed in only two subjects

SEE Q. No. 2

1. Janak decided to invest Rs. 2,00,000 at the rate of 10% per annum for 2 years. For this, he has two safe alternatives: yearly compound interest system and half yearly compound interest system.

- (a) How many times is the half-yearly compound interest calculated in 2 years? [1K]
 (b) How much yearly compound interest will Janak get at the end of 2 years? [2A]
 (c) Which alternative would you suggest him to choose for the deposit? Give reason with calculation. [2HA]

Ans: (a) 4 times (b) Rs. 42,000 (c) Half-yearly

2. Dipshika is a student studying in class 10. Her mother deposited Rs. 75,000 for 2 years in fixed deposit of a bank at compound interest compounded annually for his study expenses and she received Rs 81,000 as the compound amount at the end of one year.

- (a) For principal Rs. 'P', time T years and rate of interest R% per year, write the formula to find yearly compound amount 'CA'. [1K]
 (b) Find the annual rate of compound interest offered by the bank. [2U]
 (c) Find the compound amount that Dipshika will get at the end of 2 years. [2A]

Ans: (a) $CA = P \left(1 + \frac{R}{100} \right)^T$ (b) 8% p.a. (c) Rs. 87,480

3. Upendra has taken a loan of Rs 5,00,000 from a bank for 2 years at the rate of interest of 6% for the first year and 9% for the second year.

- (a) Define compound interest. [1K]
 (b) How much should he pay to clear his loan after 2 years? Find it. [2U]
 (c) If he took the loan at the rate of 8% per annual with semi-annual compound interest system, how much more or less amount would he have paid to clear the loan? [2A]

Ans: (a) The interest calculated on the initial principal and the accumulated interest of previous periods. (b) Rs 5,77,700 (c) Rs. 7,2,29.28 more

4. **Kul Bahadur has deposited a certain sum in a bank. The sum will amount to Rs. 14,520 in 2 years and Rs. 15,972 in 3 years at a certain rate of annual compound interest.**
- (a) Define quarterly compound interest. [1K]
 (b) Find the rate of compound interest. [2U]
 (c) Find the interest of the the same sum at the same rate for 1 year, with the interest being compounded semi-annually. [2A]
Ans: (b) 10% p.a. (c) Rs. 1230
5. **In annual compound interest on a certain sum for 3 years at 10% p.a. is Rs 13,240.**
- (a) Write the formula to calculate the interest compounded yearly. [1K]
 (b) Find the sum of money. [2U]
 (c) In how many years, will the sum amount to Rs 48,400 at the same rate of annual compound interest? Find it. [2A]
Ans: (b) Rs 40,000 (c) 2 years
6. **Sita borrowed some money for 2 years at the rate of compound interest of 10% p.a. from a bank and immediately she lent the entire money at the same rate of half yearly compound interest for the same period of time to Rupak. In this transaction, she gained Rs. 8,810.**
- (a) Write the formula to calculate the amount compounded half-yearly. [1K]
 (b) How much money did Sita borrow from the bank? Find it. [2A]
 (c) If she lent the money at the same rate of terminal compound interest, how much more money would she earn in this transaction? Find it. [2HA]
Ans: (b) Rs. 16,00,000 (c) Rs. 4,634.64 more
7. **Ridima deposited Rs. 10,00,000 in a development bank for 2 years to get the half yearly compound interest at the rate of 8% per annum. But just after 1 year, bank has changed the policy and decided to give the interest compounded quarterly at the same rate of interest.**
- (d) Write the formula to calculate the interest compounded half-yearly. [1K]
 (e) Calculate the principal for the second year. [2A]
 (f) If the bank policy was not changed, how much more or fewer amounts would she get at the end of two years? Calculate it. [2HA]
Ans: (b) Rs. 10,81,600 (c) Rs. 900.06 less
8. **According to the yearly compound interest, the compound interest of a sum for 1 year and 2 years are respectively Rs. 2,000 and Rs. 4,200.**
- (a) Write the formula to calculate the interest compounded yearly. [1K]
 (b) Find the rate and sum of money. [2U]
 (c) At what rate per annum, the yearly compound interest of the same sum in 2 years will be Rs 3,328? [2A]
Ans: (b) 10% p.a., Rs 20,000 (c) 8% p.a.
9. **Narad divided Rs 1,05,000 into two parts for his daughter and son and deposited them in a bank at the rate of 10% per annum compound interest so that the amount received by his daughter at the end of 2 years would be equal to the amount received by his son at the end of 3 years.**
- (a) Write the formula to find yearly compound amount. [1K]
 (b) How much sum did he deposit for his daughter? Find it. [2A]
 (c) Compare the interest earned by his son and daughter. [2HA]
Ans: (b) Rs 55,000 (c) 331: 231 or Son earned Rs 5,000 more