

Set Theory গণিতের একটি গুরুত্বপূর্ণ অধ্যায় হলেও ব্যাংকার্স রিক্রুটমেন্টে এই অধ্যায় হতে ২০১৮ সালের পূর্বে তেমন কোন প্রশ্ন হতনা। তবে ইদানিং সেট থিওরি থেকে সংজ্ঞা ও সাধারণ নিয়মের বেশ কিছু প্রশ্ন আর্টস ফ্যাকাল্টির প্রশ্নপত্রে পাওয়া যায়। শুধু আর্টস ফ্যাকাল্টি নয়, AUST তাদের কয়েকটি পরীক্ষায় এ অধ্যায় থেকে প্রশ্ন করায়, গুরুত্বের সাথে অধ্যায়টি পড়া ও পড়ানোর জন্য শিক্ষার্থী ও শিক্ষক উভয়কেই অনুরোধ করা হলো।

Discussed Types :

- ✎ Various Definitions related to Set theory
- ✎ Set Operations
 - ✎ Set Theorems
 - ✎ Ordered Pair
 - ✎ Cartesian Multiplications of set
 - ✎ Power Set

✎ Topic – 01 : Various definitions related to set theory....

Important Definitions:

Set : Well defined assembling or collection of objects of real or imaginative world is called sets.

Set are described by two forms

- i) Tabular form eg, $A = \{1,2,3\}$
- ii) Set Builder Method eg, $A = \{x: x \text{ is a natural number}\}$

Finite Set : The set whose numbers of elements can be determined by counting is called finite set.

Infinite Set : The set whose numbers of elements can not be determined by counting is called infinite

Empty Set : The set which has no element is called empty set.

Subset : If the number of sets which can be formed from any set is called subset of that set.

Proper Subset : If the number of elements of any subset formed from a set is less than the given set, it is called the proper subset.

Equivalent Set : If the elements of two or more sets are the same, they are called equivalent sets.

Different Set/ Difference of Set : If a set is discarded from any set, the set thus formed is called different set.

Universal Set : if all the sets under discussion are subsets of a particular set, that particular set is called the universal set with respect to its subsets.

Complement of Set : The set formed by all the elements excluding the elements of set

Union of Set : The set formed by taking all the elements of two or more sets is called union of sets.

Intersection of Set : The set formed by the common elements of two or more sets is called intersection of sets.

Disjoint of Set : If there is no common element in between two sets, the sets are disjointed sets.

Power Set : If the set formed with all the subsets of any set is called the power set of that set.

01. If $A = \{x, y, z\}$ find the number of the elements of proper subset of A.
 (a) 6 (b) 7 (c) 8 (d) 0 (e) None
02. If the elements of two or more sets are the same, they are called
 (a) Empty Set (b) Equivalent Set (c) Proper Subset (d) Subset (e) None

Topic – 02 : Set Operations...

03. If $U = \{1, 2, 3, 4, 5, 6\}$ & $A = \{1, 3, 5, 6\}$; $B = \{2, 4, 5, 6\}$ and $C = \{1, 4, 6\}$ then find the followings
 i) $A \cup B$ ii) $A \cap B$ iii) A' iv) $A - B$
 v) $(A \cup B)'$ vi) $A' \cap B'$

Instruction: সেট বিল্ডার্স মেথড সম্পর্কে ক্রিয়ার ধারণা নেবার চেষ্টা করুন। এক্ষেত্রে মূলতঃ সেট বিল্ডার্স মেথড গুরুত্বপূর্ণ। কিন্তু টেবুলার মেথড না জানলে সেট বিল্ডার্স মেথড এর সমাধান সম্ভব নয়।

04. If $A = \{x : x \text{ is set of all odd integers}\}$ & $B = \{x : x \text{ is set of all even integers}\}$ find $A \cap B$
 (a) N (b) Z (c) A (d) 0 (e) \emptyset
05. If $A = \{x : x \text{ is positive number divisible by 6}\}$ and $B = \{x : x \text{ is positive number divisible by 3}\}$ then $A \cup B$
 (a) U (b) A (c) B (d) \emptyset (e) $A - B$
06. If $A = \{x : x^2 - 5x + 6 = 0\}$, $B = \{x : x^2 - 11x + 24 = 0\}$ then $A \cap B = ?$
 (a) {3} (b) {4} (c) {3, 4} (d) \emptyset (e) None

Topic – 03 : Set Theorem...

Distribution Laws :

- i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
 iii) $A - (B \cup C) = (A - B) \cap (A - C)$ iv) $A - (B \cap C) = (A - B) \cup (A - C)$
 iv) $A \times (B \cup C) = (A \times B) \cup (A \times C)$ v) $A \times (B \cap C) = (A \times B) \cap (A \times C)$

De-Morgan Laws :

- i) $(A \cup B)' = A' \cap B'$ ii) $(A \cap B)' = A' \cup B'$

07. If $U = \{1, 2, 3, 4, 5, 6\}$ & $A = \{1, 3, 5, 6\}$; $B = \{2, 4, 5, 6\}$ and $C = \{1, 4, 6\}$ then find $A - (B \cup C) = ?$
 (a) $(A - B) \cup (A - C)$ (b) $(A - B) \cap (A - C)$ (c) $(A \cup B) - (A \cup C)$ (d) $(B \cup C)$ (e) \emptyset
08. If $U = \{1, 2, 3, 4, 5, 6\}$ & $A = \{1, 3, 5, 6\}$ and $B = \{2, 4, 5, 6\}$ then find $(A \cup B)'$ = ?
 (a) $(A' \cup B')$ (b) $(A' - B')$ (c) $(A' \cap B')$ (d) A (e) \emptyset

Topic – 04 : Ordered Pair...

09. If $(2x + y, -1) = (4, 3x - 2y)$ then $(x, y) = ?$
 (a) (2, 1) (b) (1, 2) (c) (-1, 1) (d) (0, 1) (e) (1, 1)

Topic – 05 : Cartesian Multiplication...

10. If $U = \{1, 2, 3, 4, 5, 6\}$ & $A = \{1, 3, 5, 6\}$; $B = \{2, 4, 5, 6\}$ and $C = \{1, 4, 6\}$ then find $A \times (B \cup C) = ?$
 (a) $(A \times B) \cup (A \times C)$ (b) $(A \times B) \cap (A \times C)$ (c) $(A \cup B) \times (A \cup C)$ (d) $(B \cup C)$ (e) \emptyset
11. If $A = \{x : x^2 - 5x + 6 = 0\}$, $B = \{x : x^2 - 11x + 24 = 0\}$ then $n(A \times B) = ?$
 (a) 1 (b) 2 (c) 3 (d) 4 (e) None

Topic – 06 : Power Set...

12. If $A = \{x : x^2 - 5x + 6 = 0\}$, $B = \{x : x^2 - 11x + 24 = 0\}$ then $n\{P(A \times B)\} = ?$
 (a) 4 (b) 8 (c) 15 (d) 16 (e) None

Counting Method কে গণিতবিদগণ Set Theory এর আলাদা পাঠ হিসেবে স্বীকার করেননা, বিশেষতঃ ভেন-চিত্রকে মোটেই আলাদা করেননা। কিন্তু GRE, GMAT এবং SAT এর বইগুলি গণিতের মূল নিয়ম থেকে বেড়িয়ে আসায় Counting Method একটি আলাদা অধ্যায় হিসেবে পরিচিত।

Discussed Types :

- ✎ Venn-Diagram
- ✎ Contingency Rule

✎ Topic – 01 : Venn-Diagram...

Venn-Diagram সমাধানের জন্য জন-ভেনের চিত্রকৌশলই সবচেয়ে প্রাচীন এবং সর্বাপেক্ষা গ্রহণযোগ্য পদ্ধতি। যদিও সেট থিওরির ফর্মুলাতেও এগুলো সমাধান করা যায়, তবুও চিত্র কৌশলের উপরই সবাইকে গুরুত্বারোপ করার জন্য অনুরোধ করা যাচ্ছে। কেননা লিখিত পরীক্ষাতেও Venn-Diagram খুবই গুরুত্বপূর্ণ একটি অধ্যায়, এক্ষেত্রে সহজে সমাধানের জন্য চিত্র কৌশল খুব কার্যকর একটি পদ্ধতি।

তবে Manhattan's GRE এবং R.S. Agarwal sir এর Quantitative aptitude বই হতে প্রাপ্ত Total = Sum of all singles – Both + None কিংবা Total = Sum of all singles - Sum of all doubles + Triple + None সূত্রদ্বয় MCQ'র জন্য উপযোগী হলেও লিখিত পরীক্ষায় এগুলো ব্যবহার করা হলে সাধারণত কোন নম্বর দেওয়া হয়না। আবার GRE পরিভাষায় হার্ড ও ভেরি হার্ড লেভেলের প্রশ্নে এই সূত্রগুলো অচল। তাই চিত্র কৌশলের উপর সবাইকে গুরুত্বারোপ করার জন্য অনুরোধ করা যাচ্ছে।

Case-1: For two items

13. In a sports club with 36 members, 23 play cricket and 25 play football and 2 play neither games. How many members play both cricket and football?
 (A) 10 (B) 12 (C) 25 (D) 28 (E) None
14. In a School with 50 students, 12 have passed in Bangla but not English and 10 have passed in English but not Bangla and 23 have passed in both Bangla and English. How many students failed in both subjects.
 (A) 2 (B) 5 (C) 8 (D) 10 (E) None
15. In an exam, 90% passed in History and 85% passed in English. If none of the students failed in both subjects and 225 passed in both subjects, calculate the number of students who have attended the exam.
 (A) 250 (B) 275 (C) 300 (D) 325 (E) None of these
16. In a survey of the town of Sherpur it was found that 70% of the people surveyed watched the news on television, 35% read a newspaper, and 25% read a newspaper and watched the news on television. What percent of the people surveyed neither watched the news on television nor read a newspaper?
 (A) 30% (B) 0% (C) 20% (D) 15% (E) 5%

Case-2: For three items

17. In a class of 150 students 90 students have taken Finance (F), 75 students have taken Banking (B), and 55 students have taken Economics (E), 10 students have taken F and E but not B, 15 students have taken F and B but not E, and 25 students have taken B and E but not F. Find the number of students who have taken all the three courses.
- (A) 10 (B) 15 (C) 18 (D) 20 (E) None
18. 20% of the families in Dhaka city have a car, 30% have a refrigerator and 40% have a TV set, Again 10% have a car and a refrigerator, 15% have a refrigerator and a TV and 8% have a car and TV, 5% of the families have all the three items. What percent of families have none of the three items?
- (A) 10 (B) 38 (C) 0 (D) 42 (E) None of these

Topic – 02 : Contingency Rule ...

Contingency rule অনেকটা Venn-Diagram এর মত দেখতে হলেও প্রয়োগে ভিন্নতা স্পষ্ট। যেমন কোন ক্লাসে ৫০ জন শিক্ষার্থীকে আমরা তাদের জেভারের ভিত্তিতে ছেলে-মেয়ে আকারে ভাগ করতে পারি, ঠিক তেমনি ওই শিক্ষার্থীদেরকেই আবার তাদের রেজাল্ট অনুসারে ১ম, ২য় ও ৩য় শ্রেণীতে ভাগ করতে পারি। উক্ত বিষয়টি টেবিলে বসালে আমরা লে-আউট পাই :

জেভার \ রেজাল্ট	ছেলে	মেয়ে	উপমোট
১ম শ্রেণী	x	a	x + a
২য় শ্রেণী	y	b	y + b
৩য় শ্রেণী	z	c	z + c
উপ-মোট	x + y + z	a + b + c	x + y + z + a + b + c

19. 60% of the students of a college are male. 60% of the male in the college speak French and 40% of the students of the college speak French. What percent of the female in the college do not speak French?
- (A) 40% (B) 90% (C) 10% (D) 36% (E) None of these
20. At a club. 70% of the numbers are women and 60% of the members are married. If $\frac{2}{3}$ of the men is single. What fraction of the women is married?
- (A) $\frac{5}{7}$ (B) $\frac{7}{10}$ (C) $\frac{1}{3}$ (D) $\frac{7}{30}$ (E) None of these
21. In a shop, 40% socks are white & rest are black. 60% socks are made of cotton & rest are made of wool. 25% white socks are made of cotton & 20 of the black socks are made of wool. How many black socks are made of cotton?
- (A) 100 (B) 80 (C) 60 (C) 50 (E) 25
22. In a certain club, 70% of the members are married, and of the married members, 60% are female. If 60% of the members are female, what percent of the members are unmarried male?
- (A) 8% (B) 12% (C) 18% (D) 22.5% (E) None of these

23. In a store, the ratio of red socks to green socks is 3:2. The socks are made of either cotton or wool. If 60% of the red socks are made of Cotton and 80% of the green socks are made of wool, what percentage of socks are made of cotton?

- (A) 44 (B) 48 (C) 50 (D) 52 (E) none of these

24. In the Excel Manufacturing Company, 46 percent of the employees are men. If 60 percent of the employees are unionized and 70 percent of these are men. What percent of the non-unionized workers are women?

- (A) 90% (B) 87.5% (C) 66.7% (D) 50% (E) 36%

25. In each production lot for a certain toy, 25% of the toys are red and 75% of the toys are blue. Half the toys are size A and half are size B. If 10 out of a lot of 100 toys are red and size A, how many of the toys are blue and size B?

- (A) 15 (B) 25 (C) 30 (D) 35 (E) 40

26. In a club 60% member are male and 70% members are graduates Also, 50% of the graduate members are male. What percent of the club members are female and not graduate?

- (A) 40 (B) 20 (C) 15 (D) 10 (E) 5

Teacher's Discussion

Age

বয়সের অংকগুলো মূলতঃ সমীকরণ তৈরি নির্ভর। কেবলমাত্র ব্যাংকার্স রিট্রুটমেন্ট পরীক্ষার জন্য খুবই গুরুত্বপূর্ণ একটি অধ্যায়। আর্টস ফ্যাকাল্টি ও AUST এর প্রশ্নপত্রে Age তথা বয়স অধ্যায়ের অংকগুলো গুরুত্বপূর্ণ। পরীক্ষার প্রশ্নপত্রের সাথে সংগতি রেখে ও ক্লাসে পাঠদানের সুবিধা মাথায় রেখে টপিকস/টাইপ অনুসারে নিয়ম ও সংশ্লিষ্ট সমস্যাগুলো দেওয়া হলো।

Discussed Types :

- ✎ Comparison between two
- ✎ Comparison of three or more

✎ Topic – 01 : Comparison Between Two

27. Four years ago, the father's age was three times the age of his son. The total of the ages of the father and the son after four years, will be 64 years. What is the father's age at present?
- (A) 32 years (B) 36 years (C) 40 years (D) 44 years (E) 45 years
28. Ten years ago, A was half of B in age. If the ratio of their present age is 3 : 4, what will be the total of their present ages?
- (A) 20 years (B) 30 years (C) 45 years (D) None of these

✎ Topic – 02 : Comparison of three or more

29. A is two years older than B who is twice as old as C. If the total of the ages of A, B and C be 27, then how old is B?
- (A) 7 (B) 8 (C) 44 (D) 10 (E) 13

30. Three years ago, Babu was two times as old as Ashraf. Six years ago, Babu's age was one half of that of Sharif. If S represents Sharif's current age, which of the following represents Ashraf's current age.
 (A) $S/4 + 3$ (B) $S/2 + 4/3$ (C) $S/3 - 3$ (D) $2S/3 - 1$ (E) None

Teacher's Discussion

Average and Statistics

গাণিতিক গড় সরকারী কিংবা প্রাইভেট যেকোন ব্যাংকের পরীক্ষার অন্যতম গুরুত্বপূর্ণ একটি অধ্যায়। এ অধ্যায়টি মূলতঃ এমসিকিউ জন্য ভীষণ গুরুত্বপূর্ণ। Difficulty Level Hard & Very Hard Level থেকে লিখিত পরীক্ষার কিছু সমস্যা থাকে যা ভীষণ গুরুত্বপূর্ণ। পরীক্ষার প্রশ্নপত্রের সাথে সংগতি রেখে ও ক্লাসে পাঠদানের সুবিধা মাথায় রেখে বরাবরের মত টপিকস/টাইপ অনুসারে নিয়ম ও সংশ্লিষ্ট সমস্যাগুলো দেওয়া হলো।

Discussed Types for MCQ :

- ✎ Arithmetic Mean (Average)
- ✎ Weighted Mean
- ✎ Maximum and Minimum Mean
- ✎ Replacement Rule

✎ Topic – 01 : Arithmetic Mean**Definition :**

The sum of all observations due to total number of observations is called Average or Arithmetic mean.

$$\text{Arithmetic Mean} = \frac{\sum x_i}{n}$$

Here, $\sum x_i$ = Sum of all observations
 n = Total number of observations

✎ Case – 01 : Definition Category

31. In a set the average of first two number is 2, the average of last two number is 3 and the average of first and last two number is 4. What is the average of three numbers.
 A) 1 (B) 2 (C) 3 (D) 4 (E) None
32. A worker is paid x Taka for the first 5 hours he works each day. He is paid Tk. Y per hour for each hour he works in excess of 5 hours. During one week, he works 8 hours on Saturday, 11 hours on Sunday, 12 hours on Monday, 10 hours on Tuesday and 9 hours on Wednesday, what is his average daily wage in Tk. for the five days week?
 (A) $x + \frac{7}{5}y$ (B) $5x + \frac{y}{5}$ (C) $\frac{5x + 7y}{5}$ (D) $x + 5y$ (E) None

33. A garments worker is paid d Takas per hour for the first 8 hours she works in a day. For every hour after the first 8 hours, she is paid c Takas per hour. If she works 12 hours in one day. What is her average hourly wage for that day?

(A) $\frac{2d+c}{3}$ (B) $8d/4c$ (C) $\frac{8d+12c}{12}$ (D) $\frac{4d+8c}{12}$ (E) $d + \left(\frac{1}{3}\right)c$

34. Average weight of five persons is 3 pounds more than the average weight of two persons among the five. These two persons leave. Then what is the difference in pounds between the average weight of the remaining three persons with that of the leaving two persons?

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

✎ Case - 02 : Consecutive Number Dealing

35. The average of five consecutive integers, in increasing order of size, is 9. What is the average of the last three integers?

(A) 8 (B) 9.5 (C) 10 (D) 11 (E) 16

36. Set X contains 10 consecutive integers. If the sum of the 5 smallest members of set X is 265, what is the average of the 5 largest members of Set X?

(A) 58 (B) 59 (C) 60 (D) 57 (E) 55

✎ Case - 03 : Origin and Scale Comparison

37. If the arithmetic mean of seventy five numbers is calculated, it is 35. If each number is increased by 5, then mean of new numbers is:

(A) 30 (B) 40 (C) 70 (D) 90 (E) 95

✎ Case - 04 : Exclusive Problems

38. Which one of the following numbers can be removed from the set $S = \{0, 2, 4, 5, 9\}$ without changing the average of Set S?

(A) 0 (B) 2 (C) 4 (D) 5 (E) 9

✎ Case - 05 : Empirical Problems

39. The price of each mango is 65 taka and the price of each guava is 45 taka. Aslam buys total 10 mangoes and guavas at an average price of 56 taka. How many mangos must Aslam put back and replace with guavas so that the average price of the pieces of fruit that he keeps is 52 taka?

(A) 1 (B) 2 (C) 3 (D) 4 (E) None

Topic – 02 : Weighted Mean
Definition :

Let, $m_1, m_2, m_3, \dots, m_n$ has an average of $x_1, x_2, x_3, \dots, x_n$ respectively. The average of the numbers is

$$\text{Average} = \frac{m_1x_1 + m_2x_2 + m_3x_3 + \dots + m_nx_n}{m_1 + m_2 + m_3 + \dots + m_n}$$

40. The average age of husband, wife and their child 3 years ago was 27 years and that of wife and the child 5 years ago was 20 years. The present age of the husband is:
 (A) 35 years (B) 40 years (C) 45 years (D) 50 years (E) 66 years
41. The average (arithmetic mean) of 6 numbers is 6.5. When four more numbers are added to these six numbers, the new average of all 10 numbers is 7.9. What is the average of the four numbers added.
 (A) 10 (B) 11 (C) 12.5 (D) 12.4 (E) 14
42. The average (arithmetic mean) of 9 numbers is 80. The average of first and last 4 numbers are 82 and 76 respectively. What is the average of the fifth number.
 (A) 72 (B) 88 (C) 82 (D) 85 (E) None

Topic – 03 : Maximum and Minimum Mean

43. The average daily wage of 10 employees is Tk. 400. If the lowest wage is Tk. 300, what is the possible maximum wage in Tk.
 (A) 800 (B) 900 (C) 1000 (D) 1300 (E) None

Topic – 05 : Replacement Rule

44. The average age of 6 students is 20 years. An elder one replaced by a younger one and average become 20.5 years. The age of elder one is.
 (A) 17 yr (B) 20 yr (C) 23 yr (D) 32 yr (E) None

Student's work
Try Yourself

1. The arithmetic mean of $(3a + 4)$ and another number is $2a$. What is the average of the other number and a ?
 (A) $2a$ (B) $a - 4$ (C) $a - 2$ (D) $a + 4$ (E) None of these
2. The average of five consecutive odd numbers is 61. What is the difference between the highest and lowest number?
 (A) 2 (B) 5 (C) 8 (D) 9 (E) None of these
3. The average of 7 consecutive number is 20. The largest of these numbers is:
 (A) 20 (B) 22 (C) 23 (D) 24 (E) 26
4. What is the value of 'x' if the average of 3, 4, 8 and 'x' is exactly 5?
 (A) 5 (B) 6 (C) 8 (D) 10 (E) 15
5. The average of three integer p, q and r is 8. If $pq = 24$, What is the following can't be a value of r?
 (A) 10 (B) 12 (C) 13 (D) 14 (E) None

6. In a set the average of first two number is 2, the average of last two number is 3 and the average of first and last two number is 4. What is the average of three numbers.
 (A) 1 (B) 2 (C) 3 (D) 4 (E) None of these
7. The average weight of 5 employee is 60kg. If The Highest weight is 65kg, find the lowest Weight.
 (A) 12 kg (B) 15 kg (C) 40 kg (D) 20 kg (E) None of these
8. In a cricket championship tournament, Team Dhaka has won 40 games out of 50 played. It has 45 more games to play. In order to maintain an average of 80% victory rate, them Dhaka has to win many more games.
 (A) 24 (B) 32 (C) 36 (D) 42 (E) 47
9. The average of five numbers is 27. If one number is excluded, the average becomes 25. The excluded number is:
 (A) 25 (B) 27 (C) 30 (D) 35 (E) 38
10. The average of eight numbers is 14 and the average of six of these numbers is 16. What is the average of the remaining two numbers?
 (A) 4 (B) 8 (C) 16 (D) 6 (E) 12
11. The average of 20 numbers is zero. Of them, at the most, how many may be greater than zero?
 A) 0 (B) - 1 (C) 1 (D) none of these
12. After replacing an old member by a new member, it was found that the average age of five members of a club is the same as it was 3 years ago. What is the difference between the ages of the replaced and the new member?
 A) 12 (B) 13 (C) 14 (D) 15
13. The average of five consecutive odd numbers is 61. What is the difference between the highest and lowest numbers :
 A) 4 (B) 8 (C) 12 (D) 16
14. A pupil's marks were wrongly entered as 83 instead of 63. Due to that the average marks for the class got increased by half. The number of pupils in the class is :
 A) 45 (B) 40 (C) 39 (D) 37
15. The average weight of 8 persons increases by 2.5 kg when a new person comes in place of one of them weighing 65 kg. What might be the weight of the new person?
 A) 70 kg (B) 75 kg (C) 80 kg (D) 85 kg
16. The average of runs of a cricket player of 10 innings was 32. How many runs must he make in his next innings so as to increase his average of runs by 4?
 A) 76 (B) 79 (C) 85 (D) 87
17. The captain of a cricket team of 11 members is 26 years old and the wicket keeper is 3 years older. If the ages of these two are excluded, the average age of the remaining players is one year less than the average age of the whole team. What is the average age of the team?
 A) 20 years (B) 21 years (C) 23 years (D) 25 years
18. The average weight of a class of 24 students is 35 kg. If the weight of the teacher be included, the average rises by 400 g. The weight of the teacher is :
 A) 45 kg (B) 46 kg (C) 47 kg (D) 48 kg
19. Out of 9 persons, 8 persons spent Rs. 30 each for their meals. The ninth one spent Rs. 20 more than the average expenditure of all the nine. The total money spent by all of them was :
 A) Rs. 292.50 (B) Rs. 297.50 (C) Rs. 298 (D) Rs. 298.50
20. In an examination, a pupil's average marks were 63 per paper. If he had obtained 20 more marks for his Geography paper and 2 more marks for his History paper, his average per paper would have been 65. How many papers were there in the examination?
 A) 8 (B) 9 (C) 10 (D) 11
21. 10 years ago, the average age of a family of 4 members was 24 years. Two children having been born (with age difference of 2 years), the present average age of the family is the same. The present age of the youngest child is :
 A) 1 (B) 2 (C) 3 (D) 4

22. The average age of a husband and his wife was 23 years at the time of their marriage. After five years they have a one-year old child. The average age of the family now is :
 A) 25 B) 23 C) 19 D) 18
23. The average of 7 consecutive numbers is 20. The largest of these numbers is :
 A) 21 B) 22 C) 23 D) 24
24. If the arithmetic mean of seventy-five numbers is calculated, it is 35. If each number is increased by 5, then mean of new numbers is :
 A) 30 B) 40 C) 50 D) 60
25. The average temperature of the town in the first four days of a month was 58 degrees. The average for the second, third, fourth and fifth days was 60 degrees. If the temperatures of the first and fifth days were in the ratio 7 : 8, then what is the temperature on the fifth day ?
 A) 62 degrees B) 64 degrees C) 65 degrees D) 66 degrees
26. Of the four numbers, whose average is 60, the first is one-fourth of the sum of the last three. The first number is :
 A) 17 B) 29 C) 36 D) 48
27. The average salary of all the workers in a workshop is Rs. 8000. The average salary of 7 technicians is Rs. 12000 and the average salary of the rest is Rs. 6000. The total number of workers in the workshop is :
 A) 20 B) 21 C) 23 D) 24
28. The mean temperature of Monday to Wednesday was 37°C and of Tuesday to Thursday was 34°C. If the temperature on Thursday was $\left(\frac{4}{5}\right)$ th that of Monday, the temperature on Thursday was?
 A) 36° B) 21° C) 23° D) 24°
29. The average of 11 numbers is 10.9. If the average of the first six numbers is 10.5 and that of the last six numbers is 11.4, then the middle number is :
 A) 10.5 B) 11.5 C) 12.5 D) 13.5
30. A certain factory employed 600 men and 400 women and the average wage was Rs. 25.50 per day. If a woman got Rs. 5 less than a man, then what are their daily wages?
 A) m : 25.50 w : 27.50 B) m : 27.50 w : 22.50 C) m : 26.50 w : 27.50 D) m : 24.50 w : 26.50
31. The average age of 36 students in a group is 14 years. When teacher's age is included to it, the average increases by one. What is the teacher's age in years?
 A) 35 years B) 45 years C) 51 years D) 54 years
32. The average age of 15 students of a class is 15 years. Out of these, the average age of 5 students is 14 years and that of the other 9 students is 16 years, The age of the 15th student is :
 A) 11 B) 12 C) 13 D) 14
33. If the mean of a, b, c is M and $ab + bc + ca = 0$, then the mean of a^2, b^2, c^2 is :
 A) M B) $3M^2$ C) $2(M/3)$ D) M^2
34. The mean of 50 observations was 36. It was found later that an observation 48 was wrongly taken as 23. The corrected new mean is :
 A) 35 B) 36.5 C) 40 D) 42
35. The average age of 15 students of a class is 15 years. Out of these, the average age of 5 students is 14 years and that of the other 9 students is 16 years, The age of the 15th student is :
 A) 11 B) 12 C) 13 D) 14
36. The mean of 50 observations was 36. It was found later that an observation 48 was wrongly taken as 23. The corrected new mean is :
 A) 35 B) 36.5 C) 40 D) 42
37. The average age of husband, wife and their child 3 years ago was 27 years and that of wife and the child 5 years ago was 20 years. The present age of the husband is
 A) 30 B) 40 C) 50 D) 60
38. The average monthly salary of 20 employees in an organization is Rs. 1500. If the manager's salary is added, then the average salary increases by Rs. 100. What is the manager's monthly salary?
 A) 3600 B) 3700 C) 3800 D) 3900
39. The sum of Rahim's age and his son's age is 55 years. 5 years ago Rahim's son was 29 years younger than Rahim. What is the son's present age?
 (A) 5 (B) 8 (C) 13 (D) 15 (E) 26

40. The total age of A and B is 12 years more than the total age of B and C. C is how many years younger than A?
 (A) 12 (B) 24 (C) 26 (D) 27 (E) 32
41. Tanya's grandfather was 8 times older to her 16 years ago. He would be 3 times of her age 8 years from now. Eight years ago, what was the ratio of Tanya's age to that of her grandfather?
 (A) 1 : 2 (B) 1 : 5 (C) 3 : 8 (D) None of these (E) None of these
42. In a library, of the books standing in a row on a shelf, an atlas is the 30th book from the left and the 33rd book from the right. If 2 books to the left of the atlas and 4 books to the right of the atlas are removed from the shelf, how many books will be left on the shelf?
 (A) 56 (B) 5 (C) 58 (D) 61 (E) None of these
43. In a school, 80% students passed in Bangla and 65% passed in Science. If 50% of the students have passed both the subjects, what percent of the students have failed in both Bangla and Science?
 (A) 5% (B) 10% (C) 15% (D) 20% (E) None of these
44. There are 100 students in a room. Among the students 60 Students are male and 40 Students are right Handed. How Many female student's are left Handed if $\frac{1}{3}$ rd male are right handed?
 (A) 10 (B) 20 (C) 30 (D) 36 (E) None of these
45. In an examination, 34% of the students failed in Mathematics and 42% failed in English. If 20% of the students failed in both the subjects, then the percentage of students who passed in both the subjects was:
 (A) 44 (B) 50 (C) 54 (D) 56 (E) None of these
46. A school's honor society has 100 members: 40 boys and 60 girls, of whom 30 are juniors and 70 are seniors. What is the smallest possible number of senior boys in the society?
 (A) 0 (B) 5 (C) 10 (D) 15 (E) None of these
47. In a class, 50% of the male students and $\frac{2}{3}$ of the female students speak French. If there are $\frac{3}{4}$ as many girls as boys, what fraction of the entire class speaks French?
 (A) $\frac{4}{7}$ (B) $\frac{3}{4}$ (C) $\frac{1}{4}$ (D) $\frac{2}{3}$ (E) None of these
48. In a class of 50 students, 18 take music, 26 take art, and 2 take both art and music. How many students in the class are not enrolled in either music or art?
 (A) 6 (B) 8 (C) 16 (D) 24 (E) None of these
49. Two third of the faculty members of a department are female. Twelve of the male teacher's are unmarried, while 60% of them are married. The total number of faculty members in the department is:
 (A) 72 (B) 60 (C) 30 (D) 90 (E) None of these
50. In a sports club with 36 members, 23 play cricket and 25 play football and 2 play neither games. How many members play both cricket and football?
 (A) 10 (B) 12 (C) 14 (D) 17 (E) 25

Students' Task
সমাধান (দয়া করে নিজে চেষ্টার পূর্বে সাহায্য নেবেননা)

1. Let, Another number = x.

$$\text{Now, } \frac{(3a + 4) + x}{2} = 2a; \therefore x = a - 4.$$

$$\text{Now, average} = \frac{x - 4 + a}{2} = a - 2.$$

Ans : C

2. বিজোড় সংখ্যক, consecutive number- এর mean থাকে মধ্যমাতে ।

সুতরাং, 61 মধ্যমা হলে, সংখ্যাগুলো- 57, 59, 61, 63, 65

$$\therefore \text{পার্থক্য} = 65 - 57 = 8.$$

Ans : C

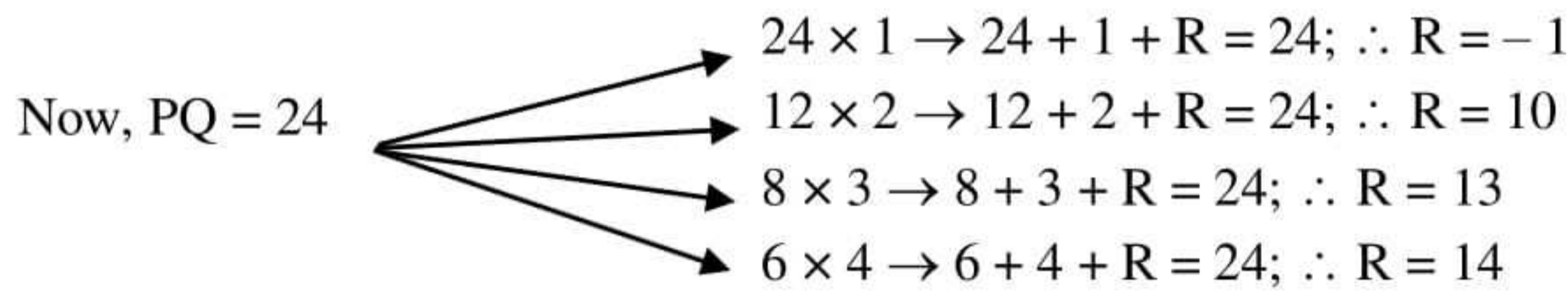
3. Like problem 2 & 5.
 Numbers are 17, 18, 19, 20, 21, 22, 23.
 ∴ Largest number = 23.

Ans : A

4. $\frac{3 + 4 + 8 + x}{4} = 5; \Rightarrow 15 + x = 20; \therefore x = 5.$

Ans : A

5. $\frac{P + Q + R}{3} = 8; \therefore P + Q + R = 24. \dots\dots\dots (i)$



From above diagram, if R = 13, the equation (i) is not satisfied.

Ans : B

6. Let, the number are x, y & z.

Now, $\frac{x + y}{2} = 2; \therefore x + y = 4 \dots\dots\dots (i)$

$\frac{y + z}{2} = 3; \therefore x + y = 6 \dots\dots\dots (ii)$

$\frac{z + x}{2} = 4; \therefore z + x = 8 \dots\dots\dots (iii)$

Shortcut : Just find the mean of the given averages.
Super shortcut : From 2, 3 & 4 the middle most observation is the answer because, they are consecutive numbers.

Now, (i) + (ii) + (iii)

$2x + 2y + 2z = 18; \Rightarrow x + y + z = 9; \therefore \text{Avg} = \frac{9}{3} = 3.$

Ans : C

7. Young Age = Initial Average – (Avg. Difference × Number) = 20 – (0.5 × 6) = 17.

Ans: A

8. Lowest weight = (60 × 5) – (65 × 4) = 40

Ans: C

9. Total match = 50 + 45 = 95

Match won = 80% of 95 = $\frac{80}{100} \times 95 = 76$

∴ Match have to win = 76 – 40 = 36.

Ans : C

10. Average of remaining two number = $\frac{(8 \times 14) - (16 \times 6)}{2} = \frac{16}{2} = 8$

Ans: B

11. Average of 20 numbers = 0.

∴ Sum of 20 numbers = (0 × 20) = 0.

It is quite possible that 19 of these numbers may be positive and if their sum is a, then 20th number is (– a).

Ans: A

12. i) Let the ages of the five members at present be a, b, c, d & e years.

And the age of the new member be f years.

ii) So the new average of five members' age = $\frac{(a + b + c + d + f)}{5}$ ----- (1)

iii) Their corresponding ages 3 years ago = $(a - 3), (b - 3), (c - 3), (d - 3)$ & $(e - 3)$ years

So their average age 3 years ago = $\frac{(a + b + c + d + e - 15)}{5} = x$ ----- (2)

$$\Rightarrow a + b + c + d + e = 5x + 15$$

$$\Rightarrow a + b + c + d = 5x + 15 - e$$
 ----- (3)

iv) Substituting this value of $a + b + c + d = 5x + 15 - e$ in (1) above,

The new average is: $\frac{(5x + 15 - e + f)}{5}$

Equating this to the average age of x years, 3 yrs, ago as in (2) above, $\frac{(5x + 15 - e + f)}{5} = x$

$$\Rightarrow (5x + 15 - e + f) = 5x$$

Solving, $e - f = 15$ years.

Thus the difference of ages between replaced and new member = 15 years.

Ans: D

13. Let the numbers be $x, x + 2, x + 4, x + 6$ and $x + 8$.

Then $[x + (x + 2) + (x + 4) + (x + 6) + (x + 8)] / 5 = 61$.

or $5x + 20 = 305$ or $x = 57$.

So, required difference = $(57 + 8) - 57 = 8$

Ans: B

14. Let there be x pupils in the class.

Total increase in marks = $(x \times \frac{1}{2}) = \frac{x}{2}$.

$\frac{x}{2} = (83 - 63) \Rightarrow \frac{x}{2} = 20 \Rightarrow x = 40$.

Ans: B

15. Total weight increased = (8×2.5) kg = 20 kg.

Weight of new person = $(65 + 20)$ kg = 85 kg.

Ans: D

16. Average = total runs / no. of innings = 32

So, total = Average \times no. of innings = $32 \times 10 = 320$.

Now increase in avg = 4runs. So, new avg = $32 + 4 = 36$ runs

Total runs = new avg \times new no. of innings = $36 \times 11 = 396$

Runs made in the 11th inning = $396 - 320 = 76$

Ans: A

17. Let the average age of the whole team be x years.

$11x - (26 + 29) = 9(x - 1)$

$\Rightarrow 11x - 9x = 46 \Rightarrow 2x = 46 \Rightarrow x = 23$.

So, average age of the team is 23 years.

Ans: C

18. Weight of the teacher = $(35.4 \times 25 - 35 \times 24)$ kg = 45 kg.

Ans: A

19. Let the average expenditure be Rs. x Then,
 $9x = [8 \times 30 + (x + 20)] \Leftrightarrow 9x = x + 260 \Leftrightarrow x = 32.50$
 Total money spent = $9x = \text{Rs. } (9 \times 32.50) = \text{Rs } 292.50$ **Ans: A**
20. Let the number of papers be x . Then, $63x + 20 + 2 = 65x$ or, $2x = 22$ or $x = 11$. **Ans: D**
21. Total age of 4 members, 10 years ago = (24×4) years = 96 years.
 Total age of 4 members now = $[96 + (10 \times 4)]$ years = 136 years.
 Total age of 6 members now = (24×6) years = 144 years.
 Sum of the ages of 2 children = $(144 - 136)$ years = 8 years.
 Let the age of the younger child be x years.
 Then, age of the elder child = $(x + 2)$ years.
 So, $x + (x + 2) = 8 \Leftrightarrow x = 3$
 Age of younger child = 3 years. **Ans: C**
22. Of the present ages of husband, wife and child = $(23 \times 2 + 5 \times 2) + 1 = 57$ years.
 Required average = $(\frac{57}{3}) = 19$ years. **Ans: C**
23. Let the numbers be $x, x + 1, x + 2, x + 3, x + 4, x + 5$ and $x + 6$,
 Then, $(x + (x + 1) + (x + 2) + (x + 3) + (x + 4) + (x + 5) + (x + 6)) / 7 = 20$.
 or, $7x + 21 = 140$ or $7x = 119$ or $x = 17$.
 Latest number = $x + 6 = 23$. **Ans: C**
24. Let the numbers are x_1, x_2, \dots, x_{75}
 By Hypothesis, $\frac{x_1 + x_2 + \dots + x_{75}}{75} = 35 \dots\dots(i)$
 Mean of new numbers = $\frac{(x_1 + 5) + (x_2 + 5) + \dots + (x_{75} + 5)}{75} = \frac{x_1 + x_2 + \dots + x_{75} + 5 \times 75}{75}$
 $= \frac{x_1 + x_2 + \dots + x_{75}}{75} + \frac{375}{75} = 35 + 5 = 40$ by (i) **Ans: B**
25. Sum of temperatures on 1st, 2nd, 3rd and 4th days = $(58 \times 4) = 232$ degrees ... (1)
 Sum of temperatures on 2nd, 3rd, 4th and 5th days = $(60 \times 4) = 240$ degrees (2)
 Subtracting (1) From (2), we get :
 Temp, on 5th day – Temp on 1st day = 8 degrees.
 Let the temperatures on 1st and 5th days be $7x$ and $8x$ degrees respectively.
 Then, $8x - 7x = 8$ or $x = 8$.
 Temperature on the 5th day = $8x = 64$ degrees. **Ans: B**
26. Let the first number be x ,
 Then, sum of the four numbers = $x + 4x = 5x$.
 so, $\frac{5x}{4} = 60$ or $x = \frac{(60 \times 4)}{5} = 48$. **Ans: D**

27. Let the total number of workers be v . Then,
 $8000v = (12000 \times 7) + 6000(v - 7) \Leftrightarrow 2000v = 42000 \Leftrightarrow v = 21.$ **Ans: B**
28. $M + T + W = (37 \times 3)^0 = 111^0\text{C}$ ----- (1)
 $T + W + \text{Th} = (34 \times 3)^0 + 102^0\text{C}$
 $\Rightarrow T + W + \frac{4}{5}M = 102^0\text{C}$ ----- (2)
 (1) - (2) gives
 $\frac{1}{5}$ th of temperature on Monday = $111^0 - 102^0 = 9^0\text{C}$
 \Rightarrow Temperature on Monday = 45^0C
 \therefore Temperature on Thursday = $\frac{4}{5} \times 45^0 = 36^0$ **Ans: A**
29. Middle numbers = $[(10.5 \times 6 + 11.4 \times 6) - 10.9 \times 11] = (131.4 - 119 - 9) = 11.5.$ **Ans: B**
30. Let the daily wage of a man be Rs. x .
 Then, daily wage of a woman = Rs. $(x - 5)$.
 Now, $600x + 400(x - 5) = 25.50 \times (600 + 400) \Leftrightarrow 1000x = 27500 \Leftrightarrow x = 27.50.$
 Man's daily wages = Rs. 27.50; Woman's daily wages = $(x - 5) =$ Rs. 22.50. **Ans: B**
31. Age of the teacher = $(37 \times 15 - 36 \times 14)$ years = 51 years. **Ans: C**
32. Age of the 15th student = $[15 \times 15 - (14 \times 5 + 16 \times 9)] = (225 - 214) = 11$ years. **Ans: A**
33. We have : $(a + b + c) / 3 = M$ or $(a + b + c) = 3M$.
 Now, $(a + b + c)^2 = (3M)^2$
 $\Leftrightarrow a^2 + b^2 + c^2 + 2(ab + bc + ca) = 9M^2$
 $a^2 + b^2 + c^2 = 9M^2$ [$\because ab + bc + ca = 0$]
 Required mean = $\frac{(a^2 + b^2 + c^2)}{3} = \frac{9M^2}{3} = 3M^2$ **Ans: B**
34. Correct Sum = $(36 \times 50 + 48 - 23) = 1825.$
 Correct mean = $1825/50 = 36.5$ **Ans: B**
35. Age of the 15th student = $[15 \times 15 - (14 \times 5 + 16 \times 9)] = (225 - 214) = 11$ years. **Ans: A**
36. Correct Sum = $(36 \times 50 + 48 - 23) = 1825.$
 Correct mean = $\frac{1825}{5} = 36.5$ **Ans: B**
37. Sum of the present ages of husband, wife and child = $(27 \times 3 + 3 \times 3)$ years = 90 years.
 Sum of the present ages of wife and child $(20 \times 2 + 5 \times 2)$ years = 50 years.
 Husband's present age = $(90 - 50)$ years = 40 years. **Ans: B**

38. Manager's monthly salary Rs. $(1600 \times 21 - 1500 \times 20) = \text{Rs. } 3600$. **Ans: A**

39. Let, Son = x \therefore Rahim = $55 - x$
 So, $55 - x = 29$ $\therefore x = 55 - 29 = 26$. **Ans: E**

40. Here, $(A + B) - (B + C) = 12$
 $\therefore A - C = 12$. **Ans: A**

41. Solve yourself.

42. বাম দিক থেকে Atlas এর অবস্থান 30^{th} হলে তার বামে 29 টি বই আছে। এবং ডান দিকে অবস্থান 33^{rd} হলে তার ডানে 32 টি বই আছে।
 \therefore মোট বই = $29 + 1 + 32 = 62$ \therefore সরিয়ে ফেলার পর মোট বই = $62 - (2 + 4) = 56$ **Ans: A**

43. Here, $100\% = 80\% + 65\% - 50\% + \text{None}$ $\therefore \text{None} = 5\%$ **Ans: A**

44. Here, Total student = 100. Male = 60; Female = 40
 Right Handed = 40; Left handed = 60 \therefore Male Right handed = $\frac{1}{3} \times 60 = 20$
 Female Right handed = $40 - 20 = 20$ \therefore Female Left handed = $40 - 20 = 20$ **Ans: A**

45. শুধু Mathematics-এ ফেল 34%; শুধু English-এ ফেল 42%
 \therefore উভয় বিষয়ে ফেল $\{(34\% + 42\%) - 20\% \} = 56\%$ \therefore শতকরা পাশ করে $(100 - 56) = 44\%$ **Ans: A**

46. বলা হয়েছে school-এর honor society-তে মোট সদস্য রয়েছে 100 জন যার মধ্যে boys 40 জন এবং girls 60 জন। আবার এই 100 জনের মধ্যে senior রয়েছেন 70 জন এবং junior রয়েছেন 30 জন। সর্বনিম্ন কতজন সদস্য এই society-র senior boys এটা বের করার পূর্বে আমরা দেখবো সর্বোচ্চ কতজন সদস্য এই society-র senior girls। 70 জন senior সদস্যের মধ্যে যদি আমরা ধরে নেই যে, 60 জন girls-এর সবাই senior সদস্য তবে বাকী $(70 - 60) = 10$ জন হবে এই society-র সর্বনিম্ন সংখ্যক senior boys। **Ans: C**

47. From problem, the following lay out be drawn.

Sex	Male	Female	
Language			
Know French	$50\% \text{ of } 4 = 2$	$\frac{2}{3} \times 3 = 2$	4
Did not know French	2	1	3
	4	3	7

\therefore Fraction of know French = $\frac{4}{7}$ **Ans: A**

48. আমরা জানি যে, কমপক্ষে একটি বিষয়ে ভর্তিকৃত student
 সংখ্যা = sum of single – both = (18 + 26) – 2 = 42;
 সুতরাং music বা art কোনটিতেই ভর্তি হয়নি এমন student সংখ্যা = 50 – 42 = 8 Ans: B
49. Married male teacher = 60%
 ∴ Unmarried male teacher = 40% অর্থাৎ 12 জন; 40% = 12 জন
 ∴ 20% = 6 জন [12 ÷ 2 = 6]
 এবং [40 ÷ 2 = 20] 60% = 18 জন [যোগ করে]
 মোট Male teacher = (12 + 18) বা, 30 জন
 তিন ভাগের দুই ভাগ female অর্থাৎ 1 ভাগ male $\frac{1}{3}$ অংশ = 30 জন
 ∴ 1 বা সম্পূর্ণ অংশ = 30 × 3 জন = 90 জন। ∴ উত্তর: 90 জন। Ans: D
50. আমরা জানি, Total = All Singles – Both + None
 ⇒ 36 = (23 + 25) – Both + 2
 ⇒ 36 = 48 – Both + 2 ⇒ Both = 14. Ans: C

বিগত বছরের প্রশ্নপত্র সমাধান

২০১৯ সালের প্রশ্নপত্র সমাধান

[Sonali Bank Ltd. (Officer (cash), 22-02-2019)]

1. In an office, 44% of the workers prefer coffee and 72% prefer tea. If each of them prefers coffee or tea and 40 like both, the total number of workers in the office is-
 a. 200 b. 250 c. 240 d. 210 Ans. b

Solution:

$$\text{both} = 72\% + 44\% - 100\% = 16\%; 16\% = 40$$

$$\therefore 100\% = \frac{40}{16} \times 100 = 250$$

2. After distributing the chocolates equally among 25 kids, 8 chocolates remain. Had the number of children been 28, 22 chocolates would have been left after equally distributing. Find the total number of chocolates?
 a. 315 b. 358 c. 368 d. 322 Ans. b

Solution:

Total children 'x'

1st conditionঅর্থাৎ $\frac{x-8}{25}$ ভাগফল (কোনো অবশেষ থাকবে না)

Option (ক) 315 – 8 = 307; 5 দ্বারা বিভাজ্য নয় Option (খ) 358 – 8 = 350 ÷ 25 = 14; 25 দ্বারা বিভাজ্য

বাকীগুলোও বিভাজ্য নয়। তাই 2nd condition দরকার নেই।**Ans. 358**

3. In your bookshelf, you have five favorite books. If you decide to arrange these five books in every possible combination and moved just one book in every half a minute. How much time it will take you to arrange?
 a. 3 hours b. 1 hour c. 2 hours d. 30 minutes **Ans. b**

Solution:

$$\text{Can be arrange} = \frac{5!}{2} = 60 \text{ Min}$$

[IFIC Bank Ltd. (TSO, 25/01/2019)]

4. The present ages of Simba and Bambi are in the ratio is 6:4. Five years ago there ages where in the ratio of 5:3. How old is Simba?
 a. 30 b. 36 c. 42 d. 48 **Ans. A**

Solution:

বর্তমান Bambi বয়স = $6x$ এবং Simba বয়স = $4x$

$$\text{প্রশ্নমতে, } \frac{6x - 5}{4x - 5} = \frac{5}{3} \Rightarrow 20x - 25 = 18x - 15 \Rightarrow 20x - 18x = 25 - 15 \Rightarrow 2x = 10, \therefore x = 5$$

[Pubali Bank Ltd. TAJO (Cash),- 25/01/2019]

5. The average of 2, 7, 6 and x is 5 and the average of 18, 1, 6, x and y is 10. What is the value of y?
 a. 5 b. 10 c. 20 d. 30 **Ans. C**

Solution:

প্রশ্নে বলা হচ্ছে যদি 2, 7, 6, x এর গড় 5 এবং 18, 1, 6, x, y এর গড় 10 হয় তাহলে y এর মান কত?

$$\text{সূত্র: গড়} = \frac{\text{সংখ্যাগুলোর যোগফল}}{\text{মোট সংখ্যা}}$$

$$\text{প্রশ্নমতে, 2, 7, 6 এবং x চারটি সংখ্যার গড় দেয়া আছে} = 5 \Rightarrow \frac{2 + 7 + 6 + x}{4} = 5 \therefore x = 5$$

$$\text{আবার, 18, 1, 6, x এবং y এর গড় দেয়া আছে} = 10. \Rightarrow \frac{18 + 1 + 6 + x + y}{5} = 10 \therefore y = 20.$$

6. The ages of A and B are in the ratio 6:5 and the sum of their ages is 44 years. What will be the ratio of their ages after 8 years?
 a. 8:7 b. 7:6 c. 9:8 d. 3:4 **Ans. A**

Solution:

প্রশ্নে বলা হচ্ছে, A এবং B এর বয়সের অনুপাত 6:5 এবং তাদের বয়সের সমষ্টি 44 বছর। 8 বছর পর তাদের বয়সের অনুপাত কত হবে?

ধরি, A এর বয়স $6x$ বছর এবং B এর বয়স $5x$ বছর।

$$\text{প্রশ্নমতে, } 6x + 5x = 44 \Rightarrow 11x = 44$$

$$\therefore x = \frac{44}{11} = 4$$

অতএব, A এর বর্তমান বয়স $6x = 6 \times 4 = 24$ বছর এবং B এর বর্তমান বয়স $5x = 5 \times 4 = 20$ বছর

8 বছর পর A এর বয়স হবে = $24 + 8 = 32$ বছর

\therefore 8 বছর পর B এর বয়স হবে = $20 + 8 = 28$ বছর

অতএব, 8 বছর পর A এবং B এর বয়সের অনুপাত হবে = $32:28 = 8:7$.

[Islami Bank Ltd. PO- 04/03/2019]

7. The average age of 12 children is 15 years. If another child comes the average age comes to 13. What is the age of the new child?

- a. 5 years b. 7 years c. 9 years d. 11 years

Ans. Note

Solution:

প্রশ্নে বলা হচ্ছে যে, 12 জন বালকের গড় বয়স 15 বছর। নতুন একজন বালক আসলে তাদের গড় বয়স হয় 13 বছর। নতুন বালকের বয়স কত?

12 জন বালকের বয়সের সমষ্টি = $12 \times 15 = 180$ বছর

আবার, নতুন একজন বালক আসায় 13 জন বালক হবে ঐ দলে।

∴ ঐ 13 জনের বয়সের সমষ্টি = $13 \times 13 = 169$

যেহেতু, 13 জনের বয়সের সমষ্টি, 12 জনের বয়সের সমষ্টি হতে কম, তাই নতুন বালকের বয়স বের করা সম্ভব না।

Note: অনেকেই নতুন বালকের বয়স = $180 - 169 = 11$ বছর এভাবে করেছে। কিন্তু এটি সঠিক নয়।

∴ ৫০টি আমের দাম = $\frac{2.4 \times 50}{2} = 60$ টাকা

8. In a row of trees, a tree is 7th from the left and 14th from the right end. How many trees are there in the row?

- a. 18 b. 19 c. 20 d. 21

Ans. C

Solution:

প্রশ্নে বলা হচ্ছে যে, গাছের সারিতে একটি গাছকে বাম থেকে হিসেব করলে 7th হয় আর ডান থেকে হিসেব করলে 14th হয়। ঐ সারিতে মোট গাছের সংখ্যা কত?

Intelligent Solution:

মোট গাছের সংখ্যা = $7 + 14 - 1 = 20$ টি।

9. A husband and wife have six married sons. Each of them has four children. The total number in the family is:

- a. 32 b. 34 c. 36 d. 38

Ans. D

Solution:

প্রশ্নে বলা হচ্ছে যে, একটি দম্পতির 6 জন বিবাহিত পুত্রসন্তান রয়েছে। প্রত্যেক সন্তানের 4 জন করে সন্তান রয়েছে। ঐ পরিবারে সদস্য সংখ্যা কত?

প্রথমে একজন দম্পতি অর্থাৎ দুইজন সদস্য থাকবে। এরপর তাদের 6 সন্তানের প্রত্যেকের 1 জন করে স্ত্রী রয়েছে।

অর্থাৎ এ পর্যন্ত মোট সদস্য হবে = $2 + 6 + 6 = 14$ জন।

6 সন্তানের প্রত্যেকের 4 জন করে সন্তান থাকায় মোট সন্তান হবে = $4 \times 6 = 24$ জন।

অতএব, ঐ পরিবারের মোট সদস্য সংখ্যা হবে = $14 + 24 = 38$ জন।

10. In a sport club with 30 members, 17 play badminton and 19 play tennis and 2 do not play either. How many member play both badminton and tennis?

- a. 8 b. 9 c. 10 d. 11

Ans. A

Solution:

এক্ষেত্রে প্রয়োজনীয় সূত্রটি হলো, $None = Total - [F + S - (F \cap S)] = ?$

এই মানগুলো এখন নিচের সমীকরণে বসিয়ে পাই, $None = Total - [F + S - (F \cap S)]$

$\Rightarrow 2 = 30 - [17 + 19 - (F \cap S)] \Rightarrow 36 - (F \cap S) = 30 - 2 \Rightarrow 36 - (F \cap S) = 28 \Rightarrow (F \cap S) = 36 - 28 = 8$

∴ $(F \cap S) = 8$

অর্থাৎ Badminton ও Tennis উভয়-ই খেলে 8 জন সদস্য।

AUST 6 Banks & 2 Financial Institutions (Senior Officer) Date:10/05/2019

11. The sum of the present ages of a father and his son is 60 years. Six years ago, father's age was five times the age of the son. After 6 years, son's age will be:
 a. 12 years b. 14 years c. 18 years d. 20 years **Ans. D**

Solution:

Let, 6 years ago, son's age = x ; father's age = $5x$

ATQ: $(x + 6) + (5x + 6) = 60 \Rightarrow 6x = 60 - 12 \Rightarrow 6x = 48 \therefore x = 8$

\therefore son's age after 6 years = $(x + 6) + 6 = 8 + 12 = 20$

[AUST - 4 Banks (Officer)-24/05/19]

12. The average attendance of a college for the first three days of a week is 325 and first four days is 320. How many were present on the fourth day?
 (A) 300 (B) 315 (C) 350 (D) 305 **Ans. D**

Solution:

4th day = $(320 \times 4) - (325 \times 3) = 305$.

Alternative way, 4th day = $320 + \{(-5) \times 3\} = 30 - 15 = 305$

13. In a college Rahim scored 80 marks out of 150 in History and 95 marks out of 120 in English. If he wants to score 70% marks in 3 subjects, find the minimum marks she should score in Geography out of 100.
 (A) 70 (B) 55 (C) 76 (D) None of these **Ans. D**

Solution:

Total marks = $(150 + 120 + 100) = 370$. \therefore Target marks = $\frac{70}{100} \times 370 = 259$

\therefore Need to score = $259 - (80 + 95) = 84$

14. The average weight of 17 students is 90 kg. If the weight of teacher is also included, then the average weight is increased by 200 grams. Find the weight of the teacher?
 (A) 93.6 kg (B) 94 kg (C) 93.4 kg (D) 94.6 kg **Ans. C**

Solution:

Teacher's weight = $90 + 0.2 \times 17 = 93.4$ kg.

\therefore 1st number = $9 \times 2 = 18$.

15. The average age of A, B and C is 30 years. If the difference between B's age and A's age is same as the difference between C's age and B's age. If D is 40 years older than B then what is the sum of the age of B and D?
 (A) 100 years (B) 60 years (C) 75 years (D) 120 years **Ans. B**

Solution:

Here, $B - A = C - B \therefore 2B = A + C$

So, $A + B + C = 30 \Rightarrow B = \frac{30}{3} = 10$. $\therefore B + D = 10 + 50 = 60$.

BSC {Officer (Cash)- 2018}

16. The average age of a group of 15 employees is 24 years. If 5 more employee join the group, the average age increases by 2 years. Find the average age of the new employees.
 a. 35 b. 30 c. 24 d. 32

Solution:

15 জনের মোট বয়স = (15×26) বছর = 360 বছর

5 জন যোগ দেয়ায় 20 জনের মোট বয়স = (20×26) বছর = 520 বছর

$$\therefore 5 \text{ জনের গড় বয়স} = \left(\frac{520-360}{5}\right) \text{ বছর} = 32 \text{ বছর।}$$

17. The average of nine numbers is 50. The average of the first five numbers is 54 and that of the last three numbers is 52. Then the sixth number is-
- a. 30 b. 34 c. 44 d. 24

Solution:

9টি সংখ্যার সমষ্টি = $(9 \times 50) = 450$
 প্রথম 5টি সংখ্যার সমষ্টি = $5 \times 54 = 270$
 শেষ 3টি সংখ্যার সমষ্টি = $3 \times 52 = 156$
 \therefore ষষ্ঠ সংখ্যাটি হলো = $[450 - (270 + 156)] = 24$

18. A batsman has a certain average of runs for 12 innings. In the 13th inning, he scores 96 runs thereby increasing his average by 5 runs. What is his average after the 13 innings?
- a. 36 b. 48 c. 24 d. 31

Solution:

ধরি,
 প্রথম 12টি ম্যাচের গড় রান x
 \therefore “ 12টি ” মোট ” = $12x$
 এখন, 13টি ম্যাচে মোট রান = $12x + 96$
 প্রশ্নমতে, $13(x + 5) = 12x + 96 \Rightarrow 13x + 65 = 12x + 96 \Rightarrow x = 96 - 65 \therefore x = 31$
 \therefore 13 তম ম্যাচের পর তার গড় রান = $31 + 5 = 36$

19. The average of the first and the second of three numbers is 15 more than the average of the second and the third of these numbers. What is the difference between the first and the third of these three numbers?
- a. 15 b. 45 c. 60 d. none of these

Solution:

ধরি, তিনটি সংখ্যা যথাক্রমে x , y এবং z ।
 $\therefore \frac{x+y}{2} = \frac{y+z}{2} + 15 \Rightarrow \frac{x+y}{2} = \frac{y+z+30}{2} \Rightarrow x+y = y+z+30 \therefore x-z = 30$

20. 30 pens and 75 pencils altogether were purchased for Tk 510. If the average price of a pencil was Tk 2, what was the average price of a pen?
- a. Tk 9 b. Tk 10 c. Tk 11 d. Tk 12

Solution:

75টি পেন্সিলের মোট মূল্য (75×2) বা 150 টাকা
 \therefore 30 টি কলমের মোট মূল্য $(510 - 150) = 360$ টাকা
 \therefore প্রতিটি কলমের গড় মূল্য = $\frac{360}{30} = 12$ টাকা

21. Sum of 4 consecutive even numbers is greater than three consecutive odd numbers by 81. If the sum of the least odd and even numbers is 59 then find the sum of largest odd and even numbers.
- a. 69 b. 53 c. 65 d. 72

Solution:

ধরি,

চারটি ক্রমিক জোড় সংখ্যা যথাক্রমে, $x, x + 2, x + 4, x + 6$
 এবং " " " " " $y, y + 2, y + 4$

$$\therefore x + x + 2 + x + 4 + x + 6 = y + y + 2 + y + 4 + 81 \Rightarrow 4x + 12 = 3y + 87 \Rightarrow 4x - 3y = 75 \dots\dots\dots (i)$$

আবার, $x + y = 59 \dots\dots\dots (ii)$

$$(i) + (ii) \times 3 \Rightarrow 4x - 3y + 3x + 3y = 75 + 177 \Rightarrow 7x = 252$$

$$\therefore x = 36$$

$$\therefore y = (59 - 36) \text{ বা } 23$$

$$\text{সুতরাং বৃহত্তম জোড় ও বিজোড় সংখ্যার সমষ্টি} = (x + 6) + (y + 4) = (36 + 6) + (23 + 4) = 69$$

22. The average age of a group of 15 employees is 24 year. If 5 more employees join the group, the average age increases by 2 years. Find the average age of the new employees.
 a. 35 b. 30 c. 24 d. 32

Solution:

15 জন কর্মীর মোট বয়স (15×24) বছর বা 360 বছর

20 " " " " (20×26) " বা 520 "

\therefore নতুন 5 কর্মীর মোট বয়স $(520 - 360) = 160$ বছর

\therefore নতুন 5 " গড় " $(160 \div 5) = 32$ বছর

BSC {(3 Govt. Banks & Financial Institutes [Senior Officer 2018]}

23. A box contains 12 poles and 7 pieces of net. Each piece of net weighs 0.2 gm. Each pole weighs 1.1 gm. The box and its contents together weigh 16.25 gm. How much does the empty box weigh?
 a. 1.2 gm b. 1.65 gm c. 2.75 gm d. 6.15 gm

Solution:

1 টি pole এর ওজন 1.1 gm

$$\therefore 12 \text{ টি " " " } (12 \times 1.1) = 13.2 \text{ gm}$$

1 টি নেটের ওজন 0.2 gm

$$\therefore 7 \text{ টি " " } (7 \times 0.2) = 1.4 \text{ gm}$$

$$\therefore \text{খালি box এর ওজন } (16.25 - 13.2 - 1.4) \text{ gm} = (16.25 - 14.6) = 1.65 \text{ gm}$$

24. The average of 6 numbers is 25. If 3 more numbers, with an average of 22 are added to these numbers, what will be the average of the combined 9 numbers?
 a. 20 b. 24 c. 26 d. 32

Solution:

$$\text{Sum of 6 numbers} = 6 \times 25 = 150$$

$$\text{" " 3 numbers} = 3 \times 22 = 66$$

$$\therefore \text{Total} = 150 + 66 = 216$$

$$\text{Now, the average of combined 9 numbers} = \frac{216}{9} = 24$$

25. In June a baseball team that played 60 games had won 30% of its games played. After a phenomenal winning streak this team raised its average to 50%. How many games must the team have won in a row to attain this average?
 a. 30 b. 45 c. 20 d. 24

Solution: 60 এর 30% = $\frac{60 \times 30}{100} = 18$

ধরি, তারা একটানা x সংখ্যক গেম জিতেছিল যাতে তাদের এভারেজ বা গড় জয় 50% এ পৌঁছেছিল।

$$\text{তাহলে, } 18 + x = (60 + x) \times \frac{50}{100} \Rightarrow 18 + x = \frac{60 + x}{2} \Rightarrow 36 + 2x = 60 + x \Rightarrow 2x - x = 60 - 36 \Rightarrow x = 24$$

∴ তাদের একটানা 24 টি ম্যাচ জিততে হয়েছিল।

26. 5 বছর পূর্বে পিতা পুত্রের বয়সের অনুপাত ছিল ৩:১ আর ১৫ বছর পরে পিতা পুত্রের বয়সের অনুপাত হবে ২:১। পিতা ও পুত্রের বর্তমান বয়স কত?
 ক. ৭৫, ২৫ খ. ৬০, ২০ গ. ৬৫, ২৫ ঘ. ৩০, ৭০

Solution:

$$\text{পিতার বর্তমান বয়স} = 3x + 5$$

$$\text{পুত্রের " " } = x + 5$$

$$15 \text{ বছর পর পিতা ও পুত্রের বয়সের অনুপাত} = (3x + 5 + 15) : (x + 5 + 15) = 3x + 20 : x + 20$$

$$\therefore (3x + 20) : (x + 20) = 2 : 1 \Rightarrow \frac{3x+20}{x+20} = \frac{2}{1} \Rightarrow 3x + 20 = 2x + 40 \Rightarrow x = 20$$

$$\text{পিতার বর্তমান বয়স} = (3 \times 20) + 5 = 65 \text{ বছর}$$

$$\text{পুত্রের " " } = 20 + 5 = 25 \text{ বছর}$$

27. একটি বর্গের বাহুর দৈর্ঘ্য দ্বিগুণ বৃদ্ধি হলে তার ক্ষেত্রফল কতগুণ বৃদ্ধি পাবে?
 ক. ২ গুণ খ. ৪ গুণ গ. ৬ গুণ ঘ. ৮ গুণ

Solution:

ধরি, বাহুর দৈর্ঘ্য a একক

$$\text{বর্গক্ষেত্রের একবাহুর দৈর্ঘ্য দ্বিগুণ করলে ক্ষেত্রফল} = (2a)^2 = 4a^2 = 4 \times a^2$$

28. দুই অঙ্কবিশিষ্ট একটি সংখ্যার অঙ্কদ্বয়ের সমষ্টি ৭; অঙ্কদ্বয় স্থান বিনিময় করলে যে সংখ্যা পাওয়া যায় তা প্রদত্ত সংখ্যা থেকে ৯ বেশী। সংখ্যাটি কত?
 ক. ৬১ খ. ২৫ গ. ৩৪ ঘ. ৪৩

Solution:

এখানে, option গুলো দেখলে সহজে উত্তর পাওয়া যায়

$$\text{যেমন: } 61 \text{ এর ক্ষেত্রে স্থানবিনিময় করলে } 16 \text{ যেখানে, } 61 - 16 = 45 \neq 9$$

$$25 \text{ " " " " } 52 \text{ " } 52 - 25 = 27 \neq 9$$

$$34 \text{ " " " " } 43 \text{ " } 43 - 34 = 9$$

∴ সংখ্যাটি ৩৪

29. A person buys a TV worth BDT 3,90,000 with a down payment of 40,000, including Tk. 5000 as first month's installment. How many more installments does he have to pay if his installments had to double after each successive payment?
 a. 6 b. 7 c. 8 d. 10
 BSC, Sonali Bank Ltd. & Janata Bank Ltd., (SO, It/ICT-18)

Solution:

$$\text{বাকি টাকার পরিমাণ} = (39000 - 40,000) = 350000 \text{ টাকা}$$

$$\text{এখানে, } 10000 + 20000 + 40000 + 80000 + 160000 = 3,10,000$$

এখানে, 5টি কিস্তিতে সম্পূর্ণ টাকা পরিশোধ করা যায় না আবার নিয়ম অনুসারে ৬ষ্ঠ কিস্তি দিলে টাকার পরিমাণ অকে বেড়ে যায়।

কিন্তু যেহেতু 5th কিস্তিতে মোট টাকা পরিশোধ হয় না তাই আরও 6টি কিস্তি লাগবে।

30. A man walks 10m east but runs 5m west everyday. How many days will it take him to cross a building 380m east?
 a. 75 days b. 76 days c. 78 days d. 80 days
 BSC, Sonali Bank Ltd. & Janata Bank Ltd., (SO, It/ICT-18)

Solution:

1 দিনে অতিক্রম করে (10 - 5) বা 5 মি.

5 মি. অতিক্রম করে 1 দিনে।

$$\therefore 1 \text{ " " " } \frac{1}{5} \text{ "}$$

$$\therefore 370 \text{ " " " } \frac{370}{5} \text{ " } = 74 \text{ দিনে।}$$

সুতরাং তিনি 75 তম দিনে 10 মি. হেঁটে 380 মি. পথ অতিক্রম করবে।

- 31. Bangladeshi supporters in a stadium double every match. In the eighth match, there were 48000 supporters which was the full capacity of the stadium. In which match did the Bangladeshi supporter fill up half the capacity of the stadium?**

BSC, Sonali Bank Ltd. & Janata Bank Ltd., (SO, It/ICT-18)

- a. 2nd match b. 4th match c. 6th match d. 7th match

Solution:

8th খেলায় দর্শক সংখ্যা = 48000

যেহেতু প্রতিখেলায় দর্শক সংখ্যা আগের তুলনায় দ্বিগুণ হয় তাই 7th খেলায় দর্শক সংখ্যা = $48000 \div 2 = 24000$

সুতরাং 7th খেলায় ধারণক্ষমতার অর্ধেক দর্শক স্টেডিয়ামে উপস্থিত ছিলেন।

- 32. A bag and a book costs BDT 1100. If the bag costs 1000 more than the book, how much does the book cost?**

BSC, Sonali Bank Ltd. & Janata Bank Ltd., (SO, It/ICT-18)

- a. 100 b. 150 c. 50 d. 200

Solution:

ধরি, বই-এর মূল্য = x টাকা

\therefore ব্যাগ এর মূল্য = (x + 1000) টাকা

প্রশ্নমতে, $x + x + 1000 = 1100 \Rightarrow 2x = 100$

$\therefore x = 50$

\therefore বই এর মূল্য 50 টাকা।

- 33. There are total 40 dishes of rice and meat. If the ratio of number of rice dish to the number of meat dish is 3 to 2, how many meat dishes are there?**

BSC, Sonali Bank Ltd. & Janata Bank Ltd., (SO, It/ICT-18)

- a. 16 b. 24 c. 8 d. 32

Solution:

ধরি, ভাতের ডিস = 3x

\therefore মাংসের " = 2x

প্রশ্নমতে, $3x + 2x = 40 \Rightarrow 5x = 40 \therefore x = 8$

\therefore মাংসের ডিসের সংখ্যা = $2 \times 8 = 16$ টি।

- 34. You bought 11 pencils and erasers worth BDT 80. If erasers cost half that of a pencil and you bought one extra eraser, how much is the eraser worth?**

BSC, Sonali Bank Ltd. & Janata Bank Ltd., (SO, It/ICT-18)

- a. 3 b. 4 c. 5 d. 6

Solution:

ধরি,

১টি পেন্সিলের মূল্য = x টাকা

$$\therefore 1 \text{ টি মুছুর " } = \frac{x}{2} \text{ "}$$

প্রশ্নমতে, $5x + 6 \cdot \frac{x}{2} = 80$ [যেহেতু মুছুর সংখ্যা পেন্সিলের সংখ্যা অপেক্ষা 1 বেশি তাই মুছুরি 6 টি এবং পেন্সিল 5টি।]

$$\Rightarrow 5x + 3x = 80 \Rightarrow 8x = 80$$

$\therefore x = 10$

\therefore মুছুরির দাম = $\frac{10}{2} = 5$ টাকা। = 5 টি।

35. If $A = \{1, 2, 3, 4, 5\}$, then number of proper subsets of A is-

Sonali Bank Ltd. (Senior Officer [MCQ]-2018)

- a. 120 b. 30 c. 31 d. 32

Solution:

আমরা জানি, Proper subset সংখ্যা = $2^n - 1$
 এখানে, $n = 5$
 সুতরাং, Proper subset সংখ্যা = $2^5 - 1 = 32 - 1 = 31$ টি।

36. A clock strikes once at 1 o'clock, twice at 2 o'clock, thrice at 3 o'clock and so on. How many times will it strike in 24 hours?

Sonali Bank Ltd, Officer (Cash-18)

- a. 78 b. 136 c. 156 d. 196

Solution:

যেহেতু ঘড়িটি 1 টা বাজলে 1 বার বাজে
 $\therefore 2 \text{ " " } 2 \text{ " "}$
 $\therefore 3 \text{ " " } 3 \text{ " "}$
 $\therefore 12$ ঘন্টায় মোট বাজে = $\frac{12(12+1)}{2} = 78$ বার
 $\therefore 24 \text{ " " " } = (78 \times 2) = 156$ বার

37. In an examination, 34% of the students failed in mathematics and 42% failed in English. If 20% of the students failed in both the subjects, then find the percentage of students who passed in both the subjects.

Sonali Bank Ltd, Officer (Cash-18)

- a. 22% b. 32% c. 44% d. 54%

Solution:

$n(S) = n(M) + n(E) - n(M \cap E) + n(M \cup E)$ [Let, $n(M \cup E) = x$]
 $\Rightarrow 100\% = 34\% + 42\% - 20\% + x \Rightarrow x = 100\% - 56\% \therefore x = 44\%$

38. In a group of 15, 7 can speak Spanish, 8 can speak French and 3 can speak neither. What fraction of the group can speak both French and Spanish?

Sonali Bank Ltd, Officer (Cash-18)

- a. 1/5 b. 4/15 c. 1/3 d. 7/15

Solution:

$I = n(S) + n(F) - n(S \cap F) + \text{Neither} \Rightarrow 15 = 7 + 8 - n(S \cap F) + 3 \Rightarrow n(S \cap F) = 18 - 15$
 $\therefore n(S \cap F) = 3$

So, required fraction = $\frac{3}{15} = \frac{1}{5}$

39. Three measuring rods are 64 cm, 80cm and 96 cm in length. What is the least length of cloth that can be measured exact number of times using any one of these rods?

Sonali Bank Ltd, Officer (Cash-18)

- a. 9.60 m b. 8.0 m c. 9.60 cm d. 96 m

Solution:

LCM of (64, 80 and 96) = 960 cm. = 9.6 meter.

40. The ratio of income of A to that of B is 7:5 and the expenditure of A to that of B is 3:2. If, at the end of the year, each saves Tk. 500, find the income of A.

Sonali Bank Ltd, Officer (Cash-18)

- a. Tk. 2500 b. Tk. 3000 c. Tk. 3200 d. Tk. 3500

Solution:

ধরি, A এর আয় $7x$ এবং ব্যয় $3y$
 B “ “ $5x$ এবং ব্যয় $2y$
 $\therefore 7x - 3y = 500$ (i)
 $5x - 2y = 500$ (2)

$$\begin{aligned} \therefore 7x - 3y = 5x - 2y &\Rightarrow 2x = y \\ (1) \Rightarrow 7x - (3 \times 2x) &= 500 \\ \therefore x &= 500 \\ \therefore A \text{ এর আয়} &= (7 \times 500) = 3500 \end{aligned}$$

41. In distributing milk at a summer camp it is found that a quart of milk will fill either 3 large glass tumblers of 5 small glass tumblers. How many small glass tumblers can be filled with one large glass tumbler?

Sonali Bank Ltd, Officer (Cash-18)

- a. 11/5 b. 7/5 c. 5/3 d. 7/3

Solution:

বড় 3টি গ্লাস পূর্ণ হয় ছোট 5 টি গ্লাস দ্বারা
 \therefore 1টি " " " " $\frac{5}{3}$ টি " "

42. If $12a + 3b = 1$ and $7b - 2a = 9$, what is the average of a and b?

Sonali Bank Ltd. (Officer-18)

- a. 0.1 b. 0.5 c. 1 d. 2.5

Solution:

$$12a + 3b = 1 \dots\dots (i)$$

$$7b - 2a = 9 \dots\dots\dots (ii)$$

$$(i) + (ii) \Rightarrow 10a + 10b = 10 \Rightarrow a + b = \frac{10}{10} = 1 \Rightarrow \frac{a+b}{2} = 1/2 \Rightarrow \frac{a+b}{2} = 0.5 \therefore a \text{ এবং } b \text{ এর গড় হলো } 0.5 \text{।}$$

43. In a class of 78 students 41 are taking French, 22 are taking German. Of the students taking French or German, 9 are taking both courses. How many students are not enrolled in either course? S.B Ltd. (Officer-18)

- a. 6 b. 15 c. 24 d. 33

Solution:

$$\text{We know that, } n(S) = n(A) + n(B) - n(A \cap B) + n(A \cup B) \text{ [Let, } n(A \cup B) = x]$$

$$\Rightarrow x = n(T) - n(A) - n(B) + n(A \cap B) = 78 - 41 - 22 + 9 = 24$$

44. Consider that $w + x = -4$, $x + y = 25$ and $y + w = 15$. Then the average of w, x, y is- Sonali Bank Ltd. (Officer-18)

- a. 3 b. 4 c. 5 d. 6

Solution:

$$w + x = -4$$

$$x + y = 25$$

$$y + w = 15$$

$$\text{Shortcut : Average} = \frac{(-4+25+15)}{6} = 6$$

$$2(x + y + w) = 36$$

$$\Rightarrow x + y + w = \frac{36}{2} \Rightarrow x + y + w = 18 \therefore \frac{x + y + w}{3} = \frac{18}{3} = 6 \therefore \text{গড়} = 6$$

45. The present age of Habib and Shikhan are in the ratio of 6:4. Five years ago their ages were in the ratio of 5:3. How old is Habib now?

Sonali Bank Ltd. (Officer-18)

- a. 24 b. 30 c. 36 d. 42

Solution:

$$\text{ধরি, হাবিবের বর্তমান বয়স} = 6x$$

$$\text{শিখার " " } = 4x$$

a. 7

b. 5

c. 3

d. 8

Solution:

যেহেতু 7 দিয়ে ভাগ করলে ভাগশেষ 0 হয়। সুতরাং সংখ্যাটি অবশ্যই 7 দ্বারা নিঃশেষে বিভাজ্য হবে। এখন 7 দ্বারা ভাগ করা যায় কিন্তু 14 দ্বারা ভাগ করা যায় না এমন সংখ্যাগুলো হলো 7, 21, 35, 49, ইত্যাদি। তাহলে option এ 7 উল্লেখ থাকায় 7 ই হবে সঠিক উত্তর।

57. The total age of A and B is 12 years more than the total age of B and C. C is how many years younger than A? PKB, SEO (Cash-18)

a. 12

b. 24

c. 26

d. none of these

Solution:

ধরি, B এবং C এর বয়সের সমষ্টি, $B + C = x$ বছর (i)

A এবং B “ “ “ $A + B = x + 12$ “ (ii)

(ii) - (i) \Rightarrow
 $\therefore A + B - B - C = x + 12 - x \Rightarrow A - C = 12 \Rightarrow A = C + 12$
 $\therefore A, C$ অপেক্ষা 12 বছরের বড়।

58. মনে করমন প্রতি স্টপেজে বাস থেকে অর্ধেক বাসযাত্রী নামে এবং অতিরিক্ত কোনো যাত্রী উঠে না। যদি ৪র্থ বাস স্টপেজে শেষ বাসযাত্রীর পূর্ববর্তী যাত্রী নামে, তাহলে বাসে কতজন যাত্রী ছিল? Palli Sanchay Bank (Cash Assistant 2018)

ক. ১৬

খ. ২০

গ. ৩২

ঘ. ৬৪

Solution:

ধরি, বাসে যাত্রীর সংখ্যা ছিল x জন

১ম স্টপেজে যাত্রী নামে $\frac{x}{2}$ জন \therefore অবশিষ্ট যাত্রী $\left(x - \frac{x}{2}\right)$ জন $= \frac{x}{2}$ জন

\therefore ২য় স্টপেজে যাত্রী নামে $\frac{x}{8}$ জন \therefore অবশিষ্ট যাত্রী $= \left(\frac{x}{2} - \frac{x}{8}\right)$ জন $= \frac{x}{8}$ জন

\therefore ৩য় স্টপেজে যাত্রী নামে $\frac{x}{8}$ জন \therefore অবশিষ্ট যাত্রী $= \left(\frac{x}{2} - \frac{x}{8}\right)$ জন $= \frac{x}{8}$ জন

\therefore ৪র্থ স্টপেজে যাত্রী নামে $\frac{x}{16}$ জন \therefore অবশিষ্ট যাত্রী $= \left(\frac{x}{2} - \frac{x}{16}\right)$ জন $= \frac{x}{16}$ জন

প্রশ্নমতে, $\frac{x}{16} = 1 \therefore x = 16$.

59. একটি গাড়ির চাকার ব্যাস ১.৬৭ মিটার। ৪২ কিলোমিটার পথ যেতে চাকাটি কতবার ঘুরবে? Palli Sanchay Bank (Cash Assistant 2018)

a. ১০০০ বার

b. ৩০০০ বার

c. ২৫০০০ বার

d. ৮০০০ বার

Solution:

চাকাটির ব্যাস = ১.৬৭ মিটার

\therefore ব্যাসার্ধ r হলে $2r = 1.67 \Rightarrow 2\pi r = 1.67\pi$

চাকাটি ১.৬৭ π মিটার অতিক্রম করে ১ বার ঘুরে

\therefore " ৪২০০০ " " " $\frac{82000}{1.67\pi} = 8000$ বার ঘুরে

৬০. 'ক' শহরের জনসংখ্যা ৬৮,০০০ জন এবং প্রতিবছরে এর জনসংখ্যা ১২০০ জন করে হ্রাস পাচ্ছে। 'খ' শহরের জনসংখ্যা ৪২,০০০ জন এবং প্রতিবছরে এর জনসংখ্যা ৮০০ জন করে বৃদ্ধি পাচ্ছে কত বছরে উভয় শহরের জনসংখ্যা সমান হবে? Jiban Bima Corporation (Junior Officer 2018)

ক. ৯ বছর

খ. ১০ বছর

গ. ১৩ বছর

ঘ. ১৫ বছর

Solution:

ধরি, x বছর পর উভয় শহরের জনসংখ্যা সমান হবে।

$\therefore 68000 - (1200 \times x) = 42000 + (800 \times x)$

$\Rightarrow 68000 - 1200x = 42000 + 800x \Rightarrow 1200x + 800x = 68000 - 42000 \Rightarrow 2000x = 26000 \therefore x = 13$

৬১. $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$ এর গড় কোনটি?

Jiban Bima Corporation (Junior Officer 2018)

- a. $\frac{5}{4}$ b. $\frac{2}{3}$ c. $\frac{1}{2}$ d. $\frac{3}{4}$

Solution:

এখানে, $\frac{1}{4} + \frac{1}{2} + \frac{3}{4} = \frac{1+2+3}{4} = \frac{6}{4} = \frac{3}{2}$ \therefore সংখ্যা তিনটির গড় $= \frac{\frac{3}{2}}{3} = \frac{3}{2} \times \frac{1}{3} = \frac{1}{2}$

বিগত বছরের প্রশ্নপত্র সমাধান

Bangladesh Bank

62. What decimal of an hour is a second?

BB-AD (GENERAL SIDE'16)

- a. 0.000126 b. 0.0025 c. 0.0256 d. 0.0027

Solution:

1 hour = 3600 seconds

\therefore one second = $\frac{1}{3600}$ hours = .00027

63. The ratio of two numbers is 3:4 and their HCF is 4. Their LCM is:

BB-AD (GENERAL SIDE'16)

- a. 48 b. 12 c. 16 d. 24

Solution:

Given, two number's ratio is 3:4; Let the numbers be 3x and 4x. Now their HCF is (the common number) x. So x = 4
 We know, 1st number \times 2nd number = their HCF \times their LCM

$\Rightarrow 3x \times 4x = 4 \times \text{LCM} \Rightarrow 3 \times 4 \times 4 \times 4 = 4 \text{ LCM} \therefore \text{LCM} = \frac{3 \times 4 \times 4 \times 4}{4} = 48$

64. If m and n are whole numbers such that $m^n = 121$, then the value of $(m-1)^{n+1}$ is:

BB-AD (GENERAL SIDE'16)

- a. 1000 b. 1 c. 10 d. 121

Solution:

$m^n = 121 = (11)^2$

$\therefore m = 11; n = 2$

$\therefore (m-1)^{n+1} = (11-1)^{2+1} = 10^3 = 1000$

65. The ages of A and B are in the ratio 3:1. Fifteen years hence, the ratio will be 2:1. Their present ages are:

BB-AD (GENERAL SIDE'16)

- a. 21 years, 7 years b. 30 years, 10 years c. 45 years, 15 years d. 60 years, 20 years

Solution:

Given, their present age ratio 3:1; so assume their present age is 3x and x respectively.

After 15 years the ratio becomes 2:1

$\therefore \frac{3x+15}{x+15} = \frac{2}{1} \Rightarrow 3x+15 = 2x+30 \Rightarrow x = 30-15 = 15$

\therefore Their present ages are $(3 \times 15) = 45$ and 15 years respectively.

66. A person's present age is two-fifth of the age of his mother. After 8 years, he will be one-half of the age of his mother. How old is the mother at present?

BB-AD (GENERAL SIDE'16)

- a. 48 years b. 32 years c. 36 years d. 40 years

Solution:

Lets the mother's present age be x years; then the person's present age is $\frac{2}{5} \times$ years

$$\text{Now, } \left(\frac{2}{5}x + 8\right) = \frac{(x + 8)}{2} \Rightarrow \frac{4}{5}x + 16 = x + 8 \Rightarrow 4x + 5 \times 16 = 5x + 5 \times 8$$

$$\Rightarrow 5x - 4x = 5(16 - 8) \therefore x = 5 \times 8 = 40$$

67. The total of the ages of Ali, Gazi and Masud is 93 years. Ten years ago, the ratio of their ages was 2:3:4. What is the present age of Masud? BB-AD (GENERAL SIDE'16)

a. 24 years b. 38 years c. 34 years d. 32 years

Solution:

Total age now = 93 \therefore Total age 10 years ago = $(93 - 3 \times 10) = 63$

$$\therefore \text{Masud's age 10 years ago} = 4 \times \frac{63}{2+3+4} = 28 \therefore \text{Masud's age now} = 28 + 10 = 38$$

68. What will be the least number which when doubled will be exactly divisible by 12, 18, 21 and 30? BB, OFFICER (CASH-16)

a. 630 b. 1260 c. 2520 d. 196

Solution:

LCM of (12, 18, 21 and 30) = 1260

$$\therefore \text{The number} = 1260 \div 2 = 630$$

69. A student was asked to find the arithmetic mean of the number 3, 11, 7, 9, 15, 13, 8, 19, 17, 21, 14 and x . He found the mean to be 12. That should be the number in place of x ? BB, OFFICER (CASH-16)

a. 7 b. 17 c. 31 d. 3

Solution:

$$\frac{3 + 11 + 7 + 9 + 15 + 13 + 8 + 19 + 17 + 21 + 14 + x}{12} = 12 \Rightarrow \frac{137 + x}{12} = 12 \Rightarrow x = 144 - 137 = 7$$

70. Sum of 10 integers is 462. The average of first 4 numbers is 52 and the average of last 5 numbers is 38. What is the fifth number? BB, AD (FF,QUOTA-15)

a. 64 b. 60 c. 50 d. 62

Solution:

$$\text{১ম ৪টি সংখ্যার সমষ্টি } (4 \times 52) = 208$$

$$\text{শেষ ৫টি " " } (5 \times 38) = 190$$

$$\therefore 9 \text{ টি সংখ্যার সমষ্টি} = 398$$

$$\therefore \text{পঞ্চম সংখ্যাটি} = (462 - 398) = 64$$

Q. Answer the question on the basis of the information given below.

Income (in Taka)	Tax (in Taka)
0 - 4,000	1% of income
4,000 - 6000	40 + 2% of income over 4,000
6,000 - 8,000	80 + 30% of income over 6,000
8,000 - 10,000	140 + 4% of income over 8,000
10,000 - 15000	220 + 5% of income over 10,000
15,000 - 25,000	470 + 6% of income over 15,000
25,000 - 50,000	1070 + 7% of income over 25,000

71. Your income for a year is Tk 26,000. You receive a raise so that next year's income will be Tk 29,000. How much more will you pay in taxes next year if the tax rate remains the same? BB, AD (FF,QUOTA-15)

a. Tk 75

b. Tk 80

c. Tk 125

d. Tk 210

Solution:

$$26000 \text{ হাজার টাকায় tax দেয়} = 1070 + (26000 - 25000) \times 7\% = 1070 + 1000 \times \frac{7}{100} = 1070 + 70 = 1140$$

$$29000 \text{ “ “ “ “} = 1070 + (29000 - 25000) \times 7\% = 1070 + 4000 \times \frac{7}{100} = 1350$$

Tax বেশি দিতে হবে (1350 – 1140) বা 210 টাকা।

72. Jafar paid Tk 100 tax. If X was his income then which of the following stat statements is taxes?

BB, AD (FF, QUOTA-15)

a. $6,000 < x < 8,000$ b. $4,000 < X < 6,000$ c. $0 < X < 4,000$

d. All of the above

Solution:

$$6000 \text{ টাকায় tax দিতে হয়} = 40 + (6000 - 4000) \times 2\% = 40 + 2000 \times \frac{2}{100} = 80 \text{ টাকা।}$$

$$8000 \text{ “ “ “ “} = 80 + 2000 \times \frac{3}{100} = 80 + 60 = 140 \text{ টাকা।}$$

∴ নির্ণেয় statement $6000 < x < 8000$



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