

LMS ID: 39207

Q8

Q8(c)

Find the next number in each of the following sequences and explain the pattern.

i) 4, 12, 6, 18, 9, 27, —

$$4 \times 3 = 12$$

$$12 \div 2 = 6$$

$$6 \times 3 = 18$$

$$18 \div 2 = 9$$

$$9 \times 3 = 27$$

$$27 \div 2 = 13.5$$

According to given series, repeated multiplications and divisions have been utilized. The pattern is found to be multiplication by 3 followed by division with 2. Using this pattern, the next number in series would be 13.5.

ii) 1, 2, 6, 24, 120, —

$$1 \times 2 = 2$$

$$2 \times 3 = 6$$

$$6 \times 4 = 24$$

$$24 \times 5 = 120$$

$$120 \times 6 = \underline{720}$$

In this series, it is evident that every successive number is actually the product of preceding number and an ascending order number. Therefore, 120 is multiplied by 6 and resulting answer should be 720.

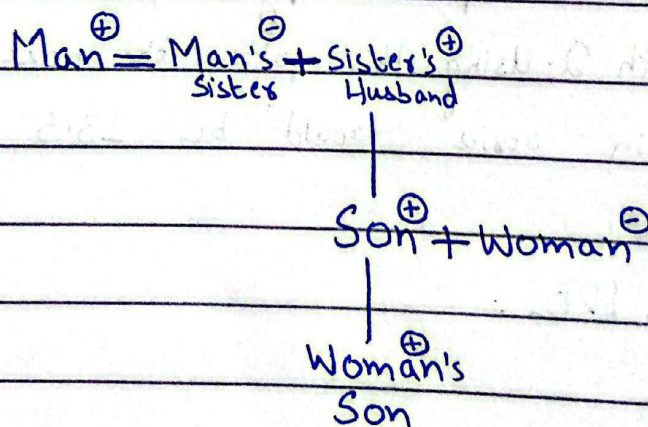
Q8(b)

A man tells a woman, "The son of my sister's husband is the father of your son." How is the woman related to the man?

⊕ indicate male, ⊖ indicate female.

+ represents couple while = represents siblings

| represents different generations.



Woman is daughter-in-law of Man's sister.

Q8(d)

Five friends (P, Q, R, S, T) have different heights.

- P is shorter than Q but taller than R.
- S is shorter than T but taller than Q.
- The shortest person is 150cm tall and the tallest is 180cm tall. Who among the friends is the third tallest, and what is the maximum possible range of their heights?

According to given information:

Height:

1) $Q > P > R$

2) $T > S > Q$

by above two conditions,
the descending order of heights
of five friends would be.

$$T > S > Q > P > R.$$

So, we could conclude that T is tallest
with 180cm height while R is shortest
with 150cm height.

Q is the third tallest in height.

$$\begin{aligned} \text{Maximum Possible} &= \text{Maximum} - \text{Minimum} \\ \text{range of their heights} &= \text{height} - \text{height} \end{aligned}$$

$$= 180 - 150 = 30 \text{ cm.}$$

Q8(a)

In a certain code language, if 'ROAD' is coded as "UQDG", how would LAKE be coded in the same language?

Explain the rule of coding?

$$R(18) + 3 = U(21)$$

$$O(15) + 2 = Q(17)$$

$$A(1) + 3 = D(4)$$

$$D(4) + 3 = G(7)$$

In this code, +3 is added to all alphabets except the 2nd one.

$$L(12) + 3 = 15(O)$$

$$A(1) + 2 = 3(C)$$

$$K(11) + 3 = 14(N)$$

$$E(5) + 3 = 8(H)$$

LAKE could be coded as OCNH

Q6

Q6c

Data:

Work completed in 60 days = $\frac{3}{5}$ of work.

After hiring additional workers, work completed in = 20 days

Solution:

Work : Days : workers.

$$\begin{array}{ccccc} \frac{3}{5} & | & : & 60 & \uparrow & : & x & & | \\ \frac{3}{5} & \downarrow & : & 20 & | & : & x+10 & & \downarrow \end{array}$$

$$\frac{x}{x+10} = \frac{\frac{3}{5} \times 20}{\frac{3}{5} \times 60}$$

$$\frac{x}{x+10} = \frac{3 \times 5 \times 20}{5 \times 2 \times 60}$$

$$\frac{x}{x+10} = \frac{1}{2}$$

$$2x = x+10$$

$$2x - x = 10$$

$$x = 10$$

Initially, there were 10 workers.

Given Data:

Q6(d)

Average score of students = 78

Top 5 scores = 98, 95, 92, 90, 85

Average score of remaining students = 75

To Find:

Total number of students in class = ?

Solution:

$$\text{Average score of students} = \frac{\text{Total scores}}{\text{Total students.}}$$

Let x be total number of students.

$$78 = \frac{\text{Total scores}}{x}$$

$$\text{Total scores} = 78x$$

After removing top 5 scores;

$$\text{Average score} = \frac{\text{Total scores}}{\text{Total students}}$$

$$75 = \frac{78x - (98 + 95 + 92 + 90 + 85)}{x - 5}$$

$$75(x - 5) = 78x - (460)$$

$$75x - 375 = 78x - 460$$

$$\Rightarrow 78x - 75x = 460 - 375$$

$$3x = 85$$

$$x = \frac{85}{3} = 28.3$$

Total number of students in class = 28

Q6(b)

Given:

The salaries of $X:Y:Z = 4:5:7$

Increase in Y's salary = 10%

Decrease in Z's salary = 25%

New total of their combined salaries = 1,69,500.

To find:

Original salary of employee X = ?

Solution:

Changes in salary

$X:Y:Z$

$4:5:7$

$4:5 + 5 \times \frac{10}{100} : 7 - 7 \times \frac{25}{100}$

$4:5.5:5.3$

Let x be the common factor, so

$$4x + 5.5x + 5.3x = 1,69,500$$

$$14.8x = 1,69,500$$

$$x = \frac{1,69,500}{14.8}$$

$$14 \overline{) 169500}$$

$$\begin{array}{r} 14 \overline{) 169500} \\ 74 \\ \underline{37} \end{array}$$

$$x = 423750$$

$$37$$

$$x = 114527$$

$$\begin{array}{r} 114527 \\ 37 \overline{) 423750} \\ \underline{- 57} \\ 53 \\ \underline{- 37} \\ 167 \\ \underline{- 142} \\ 195 \\ \underline{- 185} \\ 100 \\ \underline{- 74} \\ 260 \\ \underline{- 259} \\ 1 \end{array}$$

$$\text{Original salary of } x = 4x = 4 \times 11452.7 \\ = 45,810.8$$

Original salary of x is 45,811 Rs.

Q6(a)

Given:

Time taken by Pipe A to fill tank = 10 hrs

Time taken by Pipe B to fill tank = 15 hrs

Time taken by Pipe C to empty tank = 30 hrs.

Let the total work be = 1 x

Solution:

$$\frac{1}{10} + \frac{1}{15} - \frac{1}{30} = \frac{1}{x}$$

$$\frac{15 + 10}{150} - \frac{1}{30} = \frac{1}{x}$$

$$\frac{25}{150} - \frac{1}{30} = \frac{1}{x}$$

$$\frac{25 - 5}{150} = \frac{1}{x}$$

$$\frac{20}{150} = \frac{1}{x}$$

$$\boxed{x = 7.5 \text{ hrs.}}$$

(Q5)

(a)

Balanced Diet:

Balanced diet refers to the combination of food which is needed by human body to fulfill its structural and functional needs.

Balanced Diet : A Healthy lifestyle

In food sciences, Diet is not merely a source to satisfy hunger but it is the ultimate source of energy, structural buildup. Balanced Diet is very important to maintain healthy lifestyle. Its importance lies in a fact that it helps prevent multiple diseases and also help to manage lifestyle conditions namely diabetes, obesity, hypertension, high cholesterol levels. Even the modern day problems including depression, anxiety also connects to food habits.

So, by improving diet can lead to a happy and healthy life.

Concept of Balanced Diet:

Balanced diet refers to balanced intake of carbohydrates, proteins, lipids, fruits, vegetables, nuts. Everything needs to be taken in a recommended amount.

A normal healthy person have different balanced diet while a person with any specific kind of disease may have to refrain from having a particular class of food. The concept of balanced diet could vary from one person to another depending upon their physique, and health.

Functions of Carbohydrates:

Carbohydrates have different functions in body.

1) Carbohydrates: source of energy

Carbohydrates is a main source of energy. It is the most common type of food consumed by human in the form of rice, bread, wheat, grains.

2) Carbohydrates: Structural composition:

Carbohydrates forms the cell membrane of all cells which is basic structural unit

g life.

Functions of Proteins:

Protein is highly present in eggs, lentils, legumes, meat, safford. The functions of protein are:

i) Protein: energy source

Protein is a source of energy. 1 gram of protein also provides 4kcal of energy.

ii) Protein: structural component.

Protein is a structural component that is used to form multiple structures including

- 1) hair
- 2) Nails
- 3) Cell membrane
- 4) Skin
- 5) All organs including liver, spleen
- 6) muscular structures.

2) It is also used as an insulation material that not only protects vital organs from trauma or injury but also helps insulate body from external threats.

3) Proteins are also used for enzyme formation

that acts as catalyst to multiple biochemical reactions.

Q5(d)

RAM

RAM stands for Random Access Memory.

It is a volatile memory.

It is a temporary storage.

It allows to store data and information temporarily only when it is being utilized. This memory vanishes, once the system is shut down.

ROM

ROM stands for Read only Memory.

It is a non-volatile memory.

It is a permanent type of storage.

It is written once only in factory and stores information about startup.

CPU

CPU

Central processing unit is mainly responsible to execute the input instructions using data from input or storage devices and produce output.

Main components of CPU:

Main components of CPU are

ALU: Arithmetic-logical Unit

Arithmetic logic unit is responsible for performing all the operations related to arithmetic and logic. Busses transfer data and command to ALU where it execute its function accordingly. ALU could be called brain of CPU.

CU: Control Unit

Control Unit is responsible for controlling all the functions of CPU. It controls the operations performed by ALU.

Therefore, ALU and CU works collectively to execute the functions of CPU.

Q3
(a)

Mitochondria:

Mitochondria is a double membrane bounded organelle. It is a self-replicating organelle.

Structure of Mitochondria:

Mitochondria is double membrane bounded organelle. Inner membrane of mitochondria form invaginations called cristae. This divide mitochondria into two compartments.

i) Intermembrane space:

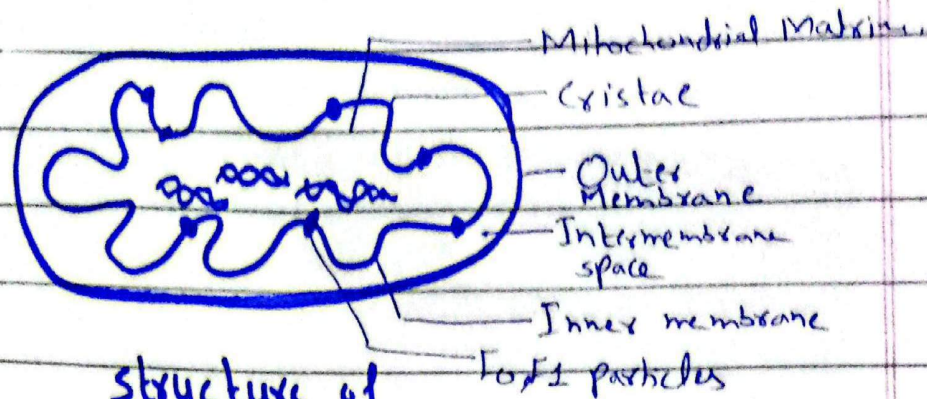
It is outer space between inner folded membrane and outer membrane.

ii) Mitochondrial Matrix:

It is the inner space enclosed by inner membrane. It contains its own DNA.

FO-F1 Particles

FO & F1 particles are also attached to inner membrane. These particles are responsible for energy synthesis.



Structure of Mitochondria

Function of Mitochondria:

i) Mitochondria : ATP Synthesis

Mitochondria is basically responsible for synthesis of ATP. ATP is energy currency of the cell. Since ATP is energy currency, Mitochondria is called energy house of the cell. It is called power house of the cell because it provides energy to other organelles.

Mitochondria is a self-replicating organelle. So it increases its number in organs where energy is needed in great amount.

Ribosome: