

Akash AB
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GSA.

QNO. 6. (a)

Pipe A fill tank in 10 hours

Pipe B fill tank in 15 hours

Pipe C empties tank in 30 hours

Pipe A rate :-

$$A's \text{ per hour work} = \frac{1}{10}$$

Pipe B rate :-

$$B's \text{ per hour work} = \frac{1}{15}$$

Pipe C rate :-

$$C's \text{ per hour work} = -\frac{1}{30}$$

$$\text{Net per hour work} = \frac{1}{10} + \frac{1}{15} + -\frac{1}{30}$$

$$= \frac{3 + 2 - 1}{30}$$

$$= \frac{4}{30} = \frac{2}{15} = 7.5 \text{ hr}$$

So The tank Full in 7 hours 30 min.

B).

Salaries ratio $x:y:z = 4:5:7$

So let

$$x = 4k, y = 5k, z = 7k$$

So,

→ y increased by 10%

$$y_{\text{new}} = 5k \times 1.10 = 5.5k = \frac{11}{2}$$

→ z decreased by 25%

$$z_{\text{new}} = 7k \times 0.75 = 5.25k = \frac{21}{4}$$

So new combined salary

$$\frac{4k}{2} + \frac{11k}{2} + \frac{21k}{4}$$

$$\frac{16k + 22k + 21k}{4} = \frac{59k}{4}$$

As we now total is 169500

So,

$$\frac{59k}{4} = 169500$$

$$k = \frac{169500 \times 4}{59}$$

$$k = 45966.10$$

So original salary of x employee is 45966.10

c).

Let the number of original workers = x

Let worker's 1 day work = $\frac{1}{5}$.

Total work = w .

So he completed $\frac{3}{5}$ of work in 60 days

$$60x = \frac{3}{5} w$$

Divide by 60.

$$x = \frac{\frac{3}{5} w}{100}$$

$$t = \frac{w}{100x}$$

$$\text{remaining work} = \frac{2}{5} w.$$

So adding 10 workers = $x + 10$.

They finish remaining work in 20 days.

$$20(x+10) = \frac{2}{5} w$$

$$20(x+10) \left(\frac{1}{100x} \right) = \frac{2}{5} \times \frac{1}{5}$$

$$2(x+10) \cdot \frac{1}{5x} = \frac{2}{5}$$

$$\frac{x+10}{5x} = \frac{2}{5}$$

$$x+10 = 2x$$

$$x = 10$$

The contractor originally had 10 workers.

2).

Avg score = 78

Let number of students = n .

So Total marks = $78n$

Top 5 scores are

$$98 + 95 + 92 + 90 + 85 = 460$$

Avg of remaining = 75

Remaining students = $n - 5$

Marks of remaining = $75(n - 5)$

So,

Total marks - top 5 marks = remaining marks

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

$$78n - 460 = 75n - 375$$

$$78n - 75n = -375 + 460$$

$$3n = 85$$

$$n = \frac{85}{3} = 28.33$$

So Total number of students = 28.

Qno: 7 (a)

Total people = 100

People who watched Cricket (c) = 65

People who watched Hockey (h) = 40

People who watched neither = 20

So,

People who watch at least one = $100 - 20 = 80$

So,

$$(C \cup H) = |C| + |H| - |C \cap H|$$

$$80 = 65 + 40 - |C \cap H|$$

$$80 = 105 - |C \cap H|$$

$$105 - 80 = |C \cap H|$$

$$|C \cap H| = 25$$

So 25 people watch both cricket and Hockey.

b).

Let w be width

As $\text{length}(l) = w + 4 \text{ meter} \rightarrow (i)$

$$2(l + w) = 72. \quad \therefore \text{Perimeter of rectangle}$$

$$l + w = 36$$

So Put in (i)

$$w + 4 + w = 36$$

$$2w + 4 = 36 \Rightarrow 2w = 32 \Rightarrow w = 16.$$

Thus $l = w + 4 = 20 \text{m.}$

$$\text{Area} = L \times W = 20 \times 16 = 320 \text{ m}^2$$

Volume to fill to depth 2.5m

$$V = \text{Area} \times \text{Depth} \\ = 320 \times 2.5$$

$$V = 800 \text{ m}^3$$

So volume of water is 800 m^3 .

c).

Train from City A = 60 km/hr

Train from City B = 40 km/hr

Distance between A and B = 400 km

Start time 8:00 AM

$$\text{Relative Speed} = 60 + 40 = 100 \text{ km/hr}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Relative Speed}} = \frac{400}{100} = 4 \text{ hr}$$

So meeting time

$$8:00 \text{ AM} + 4 \text{ hours} = 12:00 \text{ PM}$$

Two trains will meet at 12:00 PM.

d).

Let father age = F

Let son age = S

$$\text{Sum of ages} = F + S = 75 \rightarrow \textcircled{1}$$

$$\text{Father age} = F - 10$$

$$\text{Son age} = S - 10$$

$$F - 10 = 4(S - 10)$$

$$F - 10 = 4S - 40$$

$$F = 4S - 30$$

Put in (1)

$$4S - 30 + S = 75$$

$$5S - 30 = 75$$

$$5S = 105$$

$$S = 21$$

So find F

$$F = 75 - 21 = 54$$

So father age = 54 years.

Son age = 21 years.

QNO: 8.(g).

ROAD $\rightarrow$ UQDG.

$$R \rightarrow U \quad (R+3=U)$$

$$O \rightarrow R \quad (O+3=R)$$

$$A \rightarrow D \quad (A+3=D)$$

$$D \rightarrow G \quad (D+3=G)$$

So each alphabet replaced by 3 letters.

So for ~~ROAD~~ LAKE

as we already know,

L $\rightarrow$ O

A $\rightarrow$ D

k $\rightarrow$ N

E $\rightarrow$ H

So LAKE become ODNH.

B).

- Let the man be M.
- My sister husband = The man married to m's sister
- The son of my sister's husband - normally it is Nephew
- That Nephew is father of your son, The nephew is the woman's son's father i.e. the woman's husband or father of her child
- So woman married to M's nephew
- She is M's niece by marriage, stated as niece in law.

C).

i) 4, 12, 6, 18, 9, 27, —

First number 4

2nd number = 12 i.e. 4×3

3rd number = 6 i.e. $12 \div 2$

4th number = 18 i.e. 6×3

5th number = 9 i.e. $18 \div 2$

6th number = 27 i.e. 9×3

So pattern is $\times 3, \div 2, \times 3, \div 2 \dots$

So next number is $27 \div 2 = 13.5$

So answer is 13.5.

ii) 1, 2, 6, 24, 120, —

First number 1.

2nd number $2^{\text{nd}} = 1 \times 2$

3rd number = 6 i.e. 2×3

4th number = 24 i.e. 6×4

5th number = 120 i.e. 24×5

as pattern is multiply by increasing number
(2, 3, 4, 5 ...)

So next number is $120 \times 7 = 720$.

Answer is 720.

d).

we have 5 friends P, Q, R, S, T.

- P is shorter than Q but taller than R.

$$R < P < Q$$

- S is shorter than T but taller than Q.

$$Q < S < T$$

Shortest = 150 cm, Tallest = 180 cm

So order become.

$$R < P < Q < S < T.$$

So Third tallest

Tallest = T (1st)

Second Tallest = S (2nd)

• Third Tallest = Q (3rd)

Maximum possible range of heights

Range = Tallest - shortest = $T - R$.

Maximum range = $180 - 150 = 30\text{cm}$

So,

Third tallest = Q.

Maximum possible range of heights = 30cm

QNO. 5.

Internet of Things :-

The internet of things refers to a network of physical devices such as sensors, vehicles and wearable gadgets that are connected to the internet allowing them to share and exchange data without human intervention. These devices can communicate with each other and with centralized systems, enabling automation, real time monitoring and much more.

IoT transforming daily life and Business:-

• Daily life:-

- IoT devices are making homes, health and transportation smarter and more convenient.

Example Smart thermostats that adjust temperature automatically, wearable fitness tracker that monitor health.

• Business:-

- IoT is transforming industries by improving efficiency, reducing costs and enabling data-driven decisions.

Examples:- Sensor on machines monitor performance in real-time, Predicting maintenance needs and preventing downtime.

Supply chain management: Connected devices track inventory, shipments and environmental condition, optimizing logistics.

Real-world Examples:-

- Smart home devices:-

Amazon Echo or Google Nest can

Control lights, appliances and security system via voice commands or mobile apps.

- They can also gather usage data to optimize energy consumption.

• IoT in Logistics:-

DHL and FedEx use IoT enabled tracking devices on shipments to monitor location temperature and humidity.

This ensures goods are delivered safely and allows proactive responses to delays or disruptions.

D)

RAM

- Stands for Random access memory, it is a volatile memory used for temporarily storing data during program execution
- Volatile (data lost when power is off)
- Both readable and writable
- Fast in speed

ROM

- Stands for Read only memory used to store permanent instructions needed for booting and basic function.
- Non-volatile (data retained without power).
- Mostly readable
- Slower than RAM.

Basic Architecture of a Computer.

A Computer's architecture can be broadly divided into Input $\rightarrow$ CPU $\rightarrow$ Memory $\rightarrow$ Output.

The CPU (Central Processing Unit) is the brain of the computer, responsible for executing instructions.

Components of CPU:

- ALU (Arithmetic Logic Unit).
- Performs arithmetic operations (Addition, Subtraction).
- Performs logic operations (AND, OR, NOT, Compare).
- Handles all mathematical and decision making tasks in the CPU.
- CU (Control Unit).
- Directs the flow of data between CPU, memory and I/O devices.
- Fetches instruction from memory.
- Decodes the instruction to understand the operation.
- Executes and coordinates execution by signaling ALU, registers and buses.

Other Components

Registers:

High speed storage inside CPU for temporary data.

- Cache memory:

Small, fast memory to reduce CPU-memory access time.

- Busess:

Communication pathways for data transfer among CPU, memory and I/O.

CPU operation flow:-

Fetch: CU gets instruction from RAM.

Decode: CU decodes instruction to determine operation.

Execute: ALU performs the operation; results stored in registers or memory.

———— x ————