

①

Q No = 1

① What Percentage of numbers from 1 to 70 have 1 or 9 in the unit digit?

Let solve (A)

Step 1 = Numbers ending in 1

1, 11, 21, 31, 41, 51, 61 = 7 numbers

Step 2 = Numbers ending in 9

9, 19, 29, 39, 49, 59, 69 = 7 numbers

Total = 7 + 7 = 14 numbers

Step = 3 → Total number = 70

$$\text{Percentage} = \frac{14}{70} \times 100$$

$$= 2 \times 10 = 20\%$$

Answer = 20% of the numbers have

1 or 9 in the unit digit.

② Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio A:B.



## Solution

Let  $a$  &  $b$  are the number

$$5\% \text{ of } (A) + 4\% \text{ of } (B) = \frac{2}{3} \left( \frac{6}{100} a + \frac{8}{100} b \right)$$

$$\frac{1}{20} a + \frac{1}{25} b = \frac{2}{3} \left( \frac{3}{50} a + \frac{2}{25} b \right)$$

Use fractions

$$\frac{1}{20} a + \frac{1}{25} b = \frac{2}{3} \left( \frac{3}{50} a + \frac{2}{25} b \right)$$

$$\frac{1}{20} a + \frac{1}{25} b = \frac{6}{150} a + \frac{4}{75} b$$

$$\frac{1}{20} a + \frac{1}{25} b = \frac{1}{25} a + \frac{4}{75} b$$

Bring like terms together

$$\frac{1}{20} a - \frac{1}{25} a = \frac{4}{75} b - \frac{1}{25} b$$

$$\left( \frac{1}{20} - \frac{1}{25} \right) a = \left( \frac{4}{75} - \frac{1}{25} \right) b$$

$$\frac{5-4}{100} a = \frac{4-3}{75} b$$

$$\frac{1}{100} a = \frac{1}{75} b$$

$$\frac{a}{100} = \frac{b}{75}$$

$$\frac{a}{b} = \frac{100}{75} \cdot \frac{4}{3}$$

$$\frac{a}{b} = \frac{4}{3}$$



$$a : b = 4 : 3$$

Answer.

(C) A sum of money is distributed among A, B, C, D in the proportion of 5 : 2 : 4 : 3. If C gets Rs 1000 more than D what is B's share?

Solution

$$A : B : C : D$$

$$5 : 2 : 4 : 3$$

Let each part =  $x$

$$A = 5x$$

$$B = 2x$$

$$C = 4x$$

$$D = 3x$$

C get 1000 more than D

$$4x + 1000 = 3x$$

$$4x - 3x = 1000$$

$$x = 1000$$

$$B's \text{ share} = 2x$$

$$= 2(1000)$$

$$B's \text{ share} = 2000 \text{ Answer}$$



① If 40% of a number is equal to two-third of another number, what is the ratio of first number to the second number?

Solution

Let  $x$  &  $y$  are two numbers

$$\frac{40}{100}(x) = \frac{2}{3}(y)$$

$$\frac{40x}{100} = \frac{2}{3}y$$

$$\frac{x}{y} = \frac{2}{3} \times \frac{100}{40}$$

$$\frac{x}{y} = \frac{5}{3}$$

$$\frac{x}{y} = \frac{5}{3}$$

$$x:y = 5:3$$

Answer.



②

Q NO=2

①

Q How a Satellite is Launched?  
Define the working principle  
of GPS?

How Satellite is Launched?

A satellite is launched into space through rocket. It is attached to rocket and rocket carries satellite high above ~~above~~ the earth's surface and gives enough speed to it to stay in <sup>desired</sup> orbit. Once in orbit it starts its work such as communication, weather observations, navigation or scientific research.

Working principle of GPS

GPS stands for global positioning system, it is a radio navigation system that allows users to determine their exact location, velocity and time 24 hours, in all weather anywhere in the world.



It is developed and maintained by US ~~development~~ department of defense.

### How it works

It works on principle of "trilateration" which uses the distance from at least four satellites to determine the exact ~~location~~ position of receiver on Earth.

#### ① Satellite transmit Signals

Each GPS satellite continuously sends signals containing its ~~location~~ and exact time the signal was sent.

#### ② Receiver detects the signals

GPS Receiver (in phone or car) picks up signal ~~from~~ from at least four satellites.

#### ③ Distance measurement

Receiver calculates ~~the~~ how far it is from each satellite by measuring the time it takes for the signal to reach it.



(4)

## Position Calculation

Using the distance from multiple satellites the receiver determine its exact latitude, longitude and altitude.

(B)

What is Optical fiber?  
Explain the working principle of optical fiber?

## Optical Fiber

Optical fiber is a long, thin strands of very pure glass with diameter of human hair. These are arranged in bundles that called fiber cables used to transmit light signal at distance.

## Working Principle

It has three main parts.

Core = thin glass center of fiber

Cladding = outer optical material surrounding the core

Buffer coating = plastic coating that protect the fiber.



It is used Optical fiber communication is a method to transmitting the information from one place to other by sending pulses of light through optical fibers.

Explanation

- ① Transmitter → it produce and encode light signals
- ② Optical fiber → Conduct light signals
- ③ Optical receivers → Receives and decode light signals.

- The light enters into core of optical fiber at a specific angle.
- The core part has more high refractive index than cladding.
- When light enters and tries to move from core to cladding then it reflect back into core this is called total internal reflection.
- The light keeps bouncing along the fiber's length carrying data in the form of light signals until it reaches the receiver.



②

## ③ Explain working of a cell phone!

⇒ A cell phone is a wireless communication device that uses radio waves to send and receive voice, texts and data.

### ① Voice to Signal

When you speak into phone, your voice is converted into electric signals then into radio waves.

### ② Transmission to cell Tower

Phone's antenna sends these radio waves to the nearest cell tower (base station).

### ③ Signal Routing

Cell tower passes signals to a mobile switching center which connects your call to correct network - either another mobile phone or landline.

### ④ Receiving End

The other person's



Phone receives the signal through its nearest tower, converts it back from radio waves into sound and you hear the voice.

### ⑤ Data transfer

For internet and messaging, the same process happens, but instead of voice, digital data is transmitted and received.

### ⑥ Cellular Network

The entire area is divided into small regions called cells each with its own tower. As you move your phone automatically switches from one cell to another - this is called handover allowing continuous communication.

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## RAM & ROM

→ RAM → Random Access Memory

→ It ~~store~~ is temporary memory of a computer

→ It store data and programs while



the computer is working

→ When power turned off all data in RAM is lost

→ It allows quick reading and writing of data making computer fast.

RAM = temporary + fast + volatile memory

## **ROM**

→ Read only memory

↳ It is permanent memory of computer

→ It contains the instructions needed to start the computer

↳ Data in ROM cannot be changed and erased easily

→ It is non-volatile, meaning data stays even when the power is off.

ROM = Permanent + Non-volatile + slower memory.

## **Software**

→ It is the set of instructions or programs that tell the hardware what to do.

→ You cannot touch it, you can only see and use it on the screen

→ Examples = MS Word, WhatsApp, games etc.



## Hardware

↳ It is refers to the physical parts of a computer.

→ Tangible can be touched and see

→ It includes all electronic and mechanical components.

→ Examples = monitor, keyboard, mouse, CPU

In short hardware is body of computer and software is brain of the computer.

## Computer Bus

A computer bus is a set of wires or channels that connect different component of computer like CPU, memory, input/output devices and help them exchange data, addresses and control signals.

### Types of Computer Buses

- ① Data Bus → carries data
- ② Address BUS → locates data
- ③ Control Bus → manages data flow