

1

QNo=1

(A) 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  $\rightarrow$  Total number = 70

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

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

Answer = 20% of the numbers have 1 or 9 in the unit digit.

(B) 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% A and 8% of B. Find the ratio A : B.

## Solution

Let  $a$  &  $b$  are the numbers

$$5 \cdot 1 \cdot (A) + 4 \cdot 1 \cdot (B) = \frac{2}{3} \left( \frac{6}{100} a + \frac{8}{100} b \right)$$

$$\frac{15}{100} a + \frac{24}{100} b = \frac{2}{3} \left( \frac{6}{100} a + \frac{8}{100} b \right)$$

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

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

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

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

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

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

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

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

$$A : B = 4 : 3 \quad \text{Answer}$$

(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 =  $u$

$$A = 5u$$

$$B = 2u$$

$$C = 4u$$

$$D = 3u$$

C get 1000 more than

$$4u + 1000 = 3u$$

$$4u - 3u = 1000$$

$$u = 1000$$

B's share =  $2u$

$$= 2(1000)$$

B's share = 2000 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 number

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

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

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

$$\frac{x}{y} = \frac{2 \cancel{0} \cancel{4}}{3 \cancel{0} \cancel{0}}$$

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

$$x:y = 5:3$$

Answer.

②

Q NO=2

(A)

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 ~~over~~ the earth's surface and gives enough speed to it to stay in a <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 ~~-dependent~~ department of defense.

### How it works

It works on principle of "trilateration" which which uses the ~~time~~ 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 strand 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 <sup>optical</sup> 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 fiber.

### 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 reflects 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 song signals until it reaches the receiver.

②

(C)

## 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.

## RAM & ROM

- RAM → Random Access Memory
- It ~~stays~~ is temporary memory of a computer
- It stores 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 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