

DATE: 21/02/2025

CS & A

Test-1

Name:-

Q.1 (Part-A)

Percentage of Numbers

Solution:

Numbers from 1 to 70 that have 1 in the units digit:

1, 11, 21, 31, 41, 51, 61

Total 7 numbers

Numbers from 1 to 70 that have 9 in the units digit:

9, 19, 29, 39, 49, 59, 69

Total 7 numbers

Total count: $7 + 7 = 14$ numbers.

Percentage: $\frac{14}{70} \times 100\% = 20$

Answer = 20%

Hence, 20% of numbers from 1 to 70 have 1 or 9 in the units digit.

Q.2 (Part-B)

Find the ratio of A:B

Work on presentation
Add diagrams

32
Good
Vup
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Solution

Setting up the equation

$$5\% \text{ of } A + 4\% \text{ of } B = \frac{2}{3} \times (6\% \text{ of } A + 8\% \text{ of } B)$$

Converting percentages into decimals.

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

Multiplying both sides by 100

$$5A + 4B = \frac{2}{3} (6A + 8B)$$

Multiplying both sides by 3

$$15A + 12B = 2(6A + 8B)$$

$$15A + 12B = 12A + 16B$$

$$15A - 12A = 16B - 12B$$

$$3A = 4B$$

Express Ratio A:B

ANSWER

A	=	4
B	=	3

The ratio of A:B is 4:3.

Q.1 (Part C)

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Solution

Given,

$$A = 5x$$

$$B = 2x$$

$$C = 4x$$

$$D = 3x$$

And,

C gets Rs. 1000 more than D.

$$C - D = 1000 \quad \text{--- (1)}$$

putting values of C and D in eq (1)

$$4x - 3x = 1000$$

$$x = 1000$$

Now,

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

$$= 2(1000)$$

$$= \underline{2000}$$

ANSWER:

B's share is Rs. 2000.

Q. 1 (Part-D)

Finding the ratio of numbers

Solution

Let

$$\text{first number} = x$$

$$\text{second number} = y$$

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Given equation,

$$40\% \text{ of } x = \frac{2}{3} \text{ of } y$$

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

$$\frac{2}{5} x = \frac{2}{3} y$$

LCM of 5 and 3 is 15

Multiply both sides by
15.

$$15 \times \frac{2}{5} x = 15 \times \frac{2}{3} y$$

$$3 \times 2x = 5 \times 2y$$

$$6x = 10y$$

Divide both sides by 2.

$$3x = 5y$$

Write as ratio

$$\frac{x}{y} = \frac{5}{3} \Rightarrow x:y = \underline{5:3}$$

ANSWER

Ratio of first number to second number

$$= \underline{5:3}$$

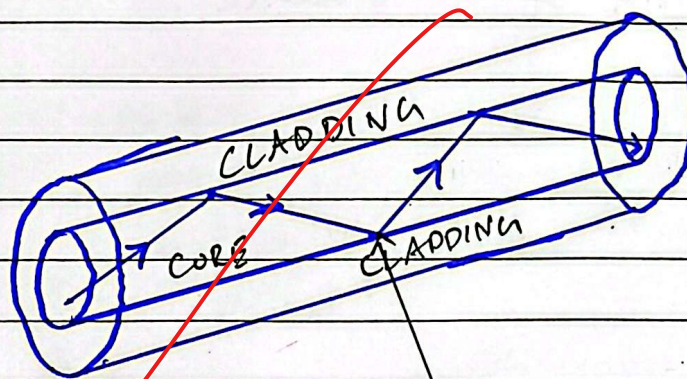
3	5, 3
5	5, 1
	1, 1

5

Q.2 (B)Optical Fiber and its working PrincipleDefinition

An optical fibre is a thin, flexible strand of glass or plastic that transmits data in the form of light signals instead of electric signals.

It is used in various fields such as telecommunicating, networking, and medical imaging because of its high speed and less signal loss.

Working Principle

Total Internal
reflection occurs
here

Optical fiber works on the principle of

Total Internal Reflection (TIR)

When light enters the fiber core at a certain angle, it reflects repeatedly from the core-cladding boundary, ~~without~~ continuing within the core.

This allows the light to travel long distances with minimal loss.

⇒ Optical fiber transmits data as light signals using total internal reflection, enabling fast, reliable, and long distance communication.

Q.2 (A)

1- Launching of a Satellite

- A satellite is launched into space with the help of ~~a~~ rocket.
- The rocket carries the satellite upward with very high speed.
- To place the satellite in orbit around the Earth, it must reach a certain speed known as escape velocity (around 40,000 km/h). At this velocity, the ~~rocket~~ overcomes the Earth's gravitational pull.

- Once in orbit, it keeps operating independently, maintained in orbit by Earth's gravitational pull balancing its centrifugal force.

Rocket $\rightarrow$ reaches escape velocity $\rightarrow$ satellite released $\rightarrow$ stays in orbit.

2- Working Principle of GPS

GPS (Global Positioning System) works using signals from satellite orbiting Earth.

- Each GPS satellite sends a signal with its location and time.
- A GPS receiver (like a phone) picks up signals from at least 3 or 4 satellites.
- By ~~measuring~~ calculating or measuring how long the signals take to reach it, the receiver calculates its exact position on earth.

This method is called trilateration.

In short,

- $\rightarrow$ satellite launch, Rocket places it in orbit using enough speed (escape velocity).
- $\rightarrow$ GPS works by measuring distances from satellites to find exact location on Earth.

Q.2 (C)Working of a cell phone

A cell phone is a wireless communication device that transmits and receives information using radio waves through a network of cell towers.

Working :-

- 1- When ^{we} ~~you~~ speak, the phone's microphone converts sound waves into electrical signals. A microchip converts these signals into a binary code.
- 2- The binary code is encoded into radio waves and transmitted by the phone's antenna to the nearest cell tower.
- 3- The cell tower, part of a network of many small 'cells', receives the signal and sends it to a base station.
- 4- The base station routes the signal through the telecommunication network, (often using fiber-optic cables) to the nearest recipient's tower.

5- The receiver's tower sends signals to their phone. The receiver's phone converts the radio waves back into electrical signals and then into sound through the speaker.

A cell phone converts voice into digital radio waves, which are transmitted through cell towers and fiber-optic networks to the receiver's phone, where they are converted back into sound, enabling wireless communication.

Q.2 (Part D)

Write Short Notes

a) RAM and ROM

RAM	ROM
• Random - Access Memory • Temporary Storage • Volatile • Can be read and written easily. • High speed memory. • Examples: DRAM, SRAM	• Read - Only Memory • Permanent Storage • Non - Volatile • Can be read only, not easily written • Slower than RAM • Examples: PROM, EPROM

b) Hardware and Software

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Software	Hardware
→ A set of instructions that instructs a computer	→ Physical components of the computer.
→ Intangible	→ Tangible
→ Cannot not operate without hardware.	→ Cannot function without software.
→ Does not "wear out", but can become corrupted or outdated.	→ Subject to physical wear and tear
→ Can be reinstalled.	→ Can be replaced.

C) Computer Bus

A computer bus is a communication system used to transfer data between components within a computer or between different computers.

Types of Buses

- **Data Bus** - Transfers data between different components.
- **Address Bus** - Sends the memory addresses where data is stored or fetched.
- **Control Bus** - Transmits control and timing signals between components.



The End