

Day: _____

GISA (Test 1)

Date: _____

Q1)

A) What percentage of numbers from 1 to 70 have 1 or 9 in the units' digits?

Data :

Numbers with 1 in units place :

1, 11, 21, 31, 41, 51, 61 $\Rightarrow$ 7 numbers

Numbers with 9 in units place

9, 19, 29, 39, 49, 59, 69 $\Rightarrow$ 7 numbers

Solution

7 + 7 = 14 numbers

Now calculating percentage

$$\% = \frac{\text{given numbers}}{\text{Total numbers}} \times 100$$

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

$$\% = 20\%$$

Therefore, 20% of numbers from 1 to 70 have 1 or 9 in units digits.

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

GIVEN EQUATION:

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

Solution:

Multiplying each percent by 100 gives equivalent equation:

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

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

Multiplying 3 on both sides

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

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

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

$$-4B = -3A$$

Cutting negative sign on b/s

$$\frac{4}{3} = \frac{A}{B}$$

Answer = $\boxed{A:B = 4:3}$

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- c) A sum of money is to be distributed among A, B, C, D in proportion of ~~2000~~ $5:2:4:3$.
If C gets Rs 1000 more than D, what is B's share.

DATA

- Sum of money distributed among A, B, C, D in proportion $5:2:4:3$
- C gets 1000 more than D
- B's share = ?

SOLUTION

Let suppose common multiplier be k . Then
 $A = 5k$, $B = 2k$, $C = 4k$, $D = 3k$

Given $C - D = 1000$

Putting values of C and D

$$4k - 3k = 1000$$

$$k = 1000$$

Then,

$$B = 2k$$

$$B = 2(1000)$$

$$B = 2000$$

$$\boxed{B's \text{ Share} = 2000 \text{ Rs}}$$

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D) If 40% of a number is equal to two third of another number, what is the ratio of first number to the second number

DATA

• 40% of a number is equal to two third of number

• Ratio of the first number to the second = ?

SOLUTION

Let suppose the numbers are:

First number = A

Second number = B

Given

$$40\% \text{ of } A = \frac{2}{3} \text{ of } B$$

$$\frac{2 \cancel{40}}{5 \cancel{100}} \times A = \frac{2}{3} \times B$$

$$\frac{2A}{5} = \frac{2B}{3}$$

→ Cross multiplying

$$3(2A) = 5(2B)$$

$$6A = 10B$$

$$\frac{A}{B} = \frac{10}{6}$$

$$\frac{A}{B} = \frac{5}{3}$$

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$$A : B = 5 : 3$$

Question no 2

A) How a Satellite is launched? Define the working principle of GPS

A. Satellite :-

'A satellite is an object that revolves around a planet in a fixed path called an orbit'. It basically is a machine that is launched into space to move around the earth mainly for getting information.

Moreover, a satellite contains an antenna that is used to send and receive information often to and from earth. It also contains a power source, a solar panel.

B. How Is Satellite Launched :

Step 1 : Preparation

In the first step of preparation, the satellite is attached to a rocket on Earth.

Step 2: Lift off

Then the rocket engines burn fuel to create thrust strong enough to overcome Earth's gravity and take off into the sky.

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Step 3: Ascent through Atmosphere

The rocket moves upward through the atmosphere, shedding used fuel stages to reduce weight.

Step 4 : Orbit Insertion

Once the rocket reaches the desired height and speed, it releases the satellite into its orbit around the Earth.

Step 5: Stabilization and Operation

The satellite's onboard systems (solar panels, antennas) are activated, and they start performing its functions like communication and navigation.

C. GPS :

The Global Positioning System (GPS) is a satellite based navigation system providing accurate information about a person's or objects' location, speed and time anywhere on Earth.

D. Working of GPS:

The working principle of GPS is called 'Principle of Trilateration'.

Principle of Trilateration:

A method used to determine the exact position of a point by measuring its distance from at least three known points (in GPS - satellites).

Each Satellite acts as a known point in space, and the GPS receiver measures how far it is from each Satellite by calculating how long the satellite's signal took to reach it. When the receiver knows the distance from three or more satellites ~~signal took to reach it~~, the satellite can find its exact position (latitude, longitude, altitude) on Earth.

B) What is optical fibre? Explain the working principle of optical fibre.

A. Optical Fibre

An optical fibre is a thin, flexible strand of a glass or plastic that transmits light signals over long distances for communication purposes. It contains a core, cladding, protective coating:

1. Core : central part where light travels

2. Cladding: outer layer that reflects light back into the core

3. Protective Coating: Outer cover that protects the fibre from damage

Optical fibre has the ability to carry much more information and deliver it with greater fidelity. It also supports higher data rates and is virtually immune to all kinds of interference.

B. Working Principle of Optical Fibre

The optical fiber works on the principle of Total Internal Reflection (TIR).

1. Total Internal Reflection:

Total Internal Reflection is the phenomenon in which light ray traveling from a denser medium to a rarer medium is completely reflected back into the denser medium, instead of refracting out.

When it hits the boundary at an angle greater than the critical angle.

⇒ Conditions for Total internal reflection

1. The light must travel from a denser medium to a rarer medium.

2. The angle of incidence must be greater than the critical angle.

C. Example In Daily Life :

Optical Fiber is used in internet cables, telephone network and also medical instruments like endoscopes.

C) Explain working of a cell phone

A. Cellphone:

A cellphone is a wireless communication device that allows voice calls, text messaging, and internet access using radio waves.

B. Working Principle of Cellphone

1. Voice To Signal Conversion

When someone speaks into the phone, the voice is converted into digital signals by a microphone.

2. Signal Transmission

Those signals are sent as radio waves to the nearest cell tower.

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3. Switching Centre :

The cell tower forwards the signals to a mobile Switching Center (MSC), which connects your call to the receiver's network.

4. Receiver's Tower :

The MSC routes the call to the receiver's nearest tower, that sends radio signals to the phone.

5. Signal To sound Conversion :

The receiver's phone converts the digital signals back into sound, allowing person to hear voice.

C. Example in Daily life

When a WhatsApp call is made, the voice is converted into data packets and sent through internet servers instead of traditional cell towers.

D) Write short notes on :

1. RAM and ROM

=> RAM

RAM is a type of temporary memory that stores data and instructions currently being used by the computer. The full form of RAM is "Random Access Memory". It allows the CPU to read and write data quickly, which helps the computer work faster.

Key Points

1. **Volatile Memory:** data is lost when the computer's power is turned off.
2. **Used for Processing:** RAM is used for running applications and processing data.
3. **Performance and RAM:** the higher the RAM, the faster the computer's ability to run smoothly.

=> ROM

ROM is a type of permanent (non volatile) memory that stores essential programs & instructions required to start the computer.

Its full form is "Read Only Memory"

Key Points

1. **Non Volatile memory:** data remains stored even when computer's power is off.
2. **Contains Basic Input/Output system:** ROM has a basic input or output system or firmware
3. **Not modified Easily:** Data is not edited easily.

Examples

RAM : When ms Word is opened, it loads into RAM so it can run smoothly.

ROM : When computer is switched on the boot up instructions come from ROM.

B) Software and Hardware

SOFTWARE :

Software is a set of programs and instructions that tells the hardware what to do and how to do it. There are two types of software :

1. System Software :

Runs the hardware and manages system operations

Example: Windows, macOS, Android.

2. Application Software:

Help users perform specific tasks

Example: MS Word, Excel, Photoshop, WhatsApp

Software is intangible, one can use it but not touch it. It controls working of hardware components.

HARDWARE:

Hardware refers to the physical components of a computer system. Hardware are the parts of computer that one can see and touch. There are several types of hardware:

1. **Input devices** : used to enter data into the computer like mouse and keyboard.

2. **Output Devices** : used to produce the results or display like monitor, printer

3. **Storage Devices** : used to store data like Hard drive, USB.

~~Where~~ Hardware is the body of computer while Software is its mind, both are needed to make computer work.

C) Computer Bus

COMPUTER BUS:

A computer bus is a communication pathway that transfers data, instructions, and signals between different parts of computer (CPU, memory, and input/output devices). There are three types of computer buses:

1. **Data Bus**: This transfers actual data between CPU and memory.
2. **Address Bus**: Carries the address & of where data needs to go.
3. **Control bus**: Carries control signals.

Example: When a file is opened, the CPU uses the address bus to locate it, the data bus to fetch it, and the control bus to manage the process.