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Q No. 1

Good: Refine

(a)

Numbers from 1 to 70 that have 1 or 9 in their Unit's digit

HTU = 1, 9, 11, 19, 21, 29, 31, 39, 41, 49
51, 59, 61, 69

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

= 20%

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Twenty percent numbers have 1 or 9 in their Units digit

(b)

Given data.

5% of A = $\frac{2}{3rd}$ of sum of [6% of A, 8% of B]
4% of B

Solution

$A = \frac{5}{100} \times A$

$= \frac{1}{20} \times A$

$= 0.05A$

20 | 1.00 (0.05
0
10
0
10

20 × 2
2 0 × 0
6
2 0 × 4
80

$B = \frac{4}{100} \times B$

$= \frac{1}{25}$

$= 0.04B$

0.04
$25 \overline{)1}$
0
10
0
100

$A = \frac{6}{100} \times A$

$= 0.06A$

0.06
$50 \overline{)3}$
0
30
0
300

$B = \frac{8}{100} \times B$

$= 0.08$

0.08
$25 \overline{)2}$
0
20
0
200

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

$0.05A + 0.04B = \frac{2}{3}(0.06A + 0.08B)$

$0.05A + 0.04B = \frac{0.12A + 0.16B}{3}$

$0.05A + 0.04B = \frac{0.12A}{3} + \frac{0.16B}{3}$

0.15
-0.12
0.03

$0.05A - \frac{0.12A}{3} = \frac{0.16B}{3} - 0.04B$

$\frac{0.15A - 0.12A}{3} = \frac{0.16B - 0.12B}{3}$

0.06
$\times 2$
0.12

0.16
-0.12
0.04

$\frac{0.03A}{3} = \frac{0.04B}{3}$

0.03
$\times 2$
0.16

$3x \frac{3}{3x100} A = \frac{3x4}{3x100} B$

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

5

A : B = 4 : 3

(C)

Given Data

A, B, C, D

5 : 2 : 4 : 3

Solution

Total share parts = 5+2+4+3

= 14

A's share

A's share = $\frac{5}{14}$ of total

= $\frac{5}{14}$ x .

B's share $= \frac{2}{14}x$

C's share $= \frac{4}{14}x$

D's share $= \frac{3}{14}x$

$D + 1000 = C$

$\frac{4}{14}x + 1000 = \frac{3}{14}x$

$\frac{4x}{14} - \frac{3x}{14} = -1000$

$\frac{x}{14} = -1000$

$C = 1000 + D$

$\frac{4}{14}x = 1000 + \frac{3}{14}x$

$\frac{4x - 3x}{14} = 1000$

$\frac{x}{14} = 1000$

$x = 14000$

$B = \frac{2}{14} \times 14000$

$B = 2000$

Total amount = 14000 Rs

C's share = $\frac{4}{14} \times 14000^{1000}$

= 4000 Rupees

D's share = $\frac{3}{14} \times 14000^{1000}$

= 3000 Rs

Hence proved that C gets 1000 Rs more than D.

B' shares = ?

(d)

Given data

Let one number = a

Let another number = b

40% of a = $\frac{2}{3} \times b$

$\frac{40}{100} a = \frac{2}{3} b$

$40a \times 3 = 2b \times 100$

$12a = 200b$

$12a = 200b$

$a = \frac{200}{12} b$

$\frac{a}{b} = \frac{200}{12}$

$\frac{a}{b} = \frac{50}{3}$

$a:b = 50:3$

Q No. 2

(A)

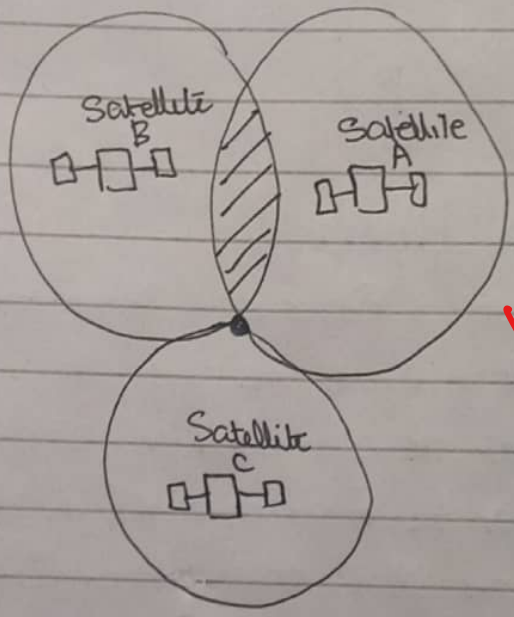
(i) Launching of a satellite.

A satellite is launched into the air by the help of a rocket. The rocket is launched from a launching pad. It enters into the space and detaches the satellite 1500 kms away from the Earth. The satellite then takes its position and opens its charging units to obtain energy

for operation via the sun.

(ii) Working principle of the ~~Satellite~~ GPS.

The GPS works on the principle of trilateration.



Trilateration

Trilateration means that three satellites work together inorder to specify a position of a phone at a specific time. Two satellites covering a specific area will identify whether the device is present in its area or

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not. While the third satellites pin points the exact location of the device if the device is present in the area of its first two pair of satellites. This is called trilateration. Through this process we get the time of a device at a particular position.

(B)

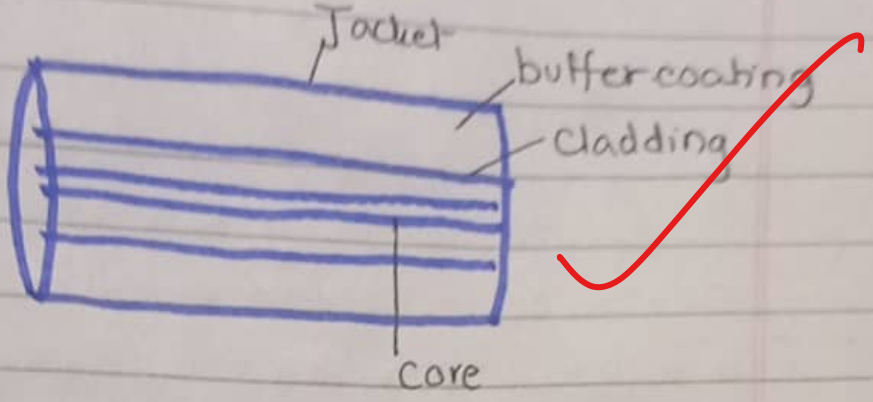
(i) Optical Fiber.

Optical Fiber is a ~~transmission~~ cable that is made up of thousands of glass fibers commulated together to transmit information from one place to another efficiently. These glass fibers are ~~even~~ thin like a strand of hair.

(ii) Working principle of Optic Fiber.

Optical Fiber works on the prinaple of total internal reflection.

Construction of optical Fiber



Core:

The inner most part of the optical fiber which is made up of a material that is less dense than the cladding

Cladding:

The part surrounding the core which is made up of a material that has more density than the core.

$n_{core} > n_{cladding}$

Buffer coating:

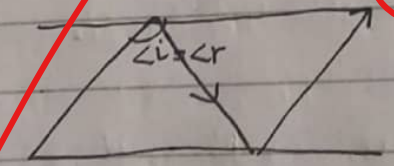
It is present outside the cladding to prevent the loss of signals transmitting through the fiber.

Jacket:

The outermost protective layers which provides insulation to the wire

Total internal reflection

The optic fiber works on the principle of total internal reflection. When light passes from a lighter medium to a denser medium then it bends. When the ray of incidence is form an incident angle such that the ray of refraction bends back within the same medium. This phenomenon is called total internal reflection.



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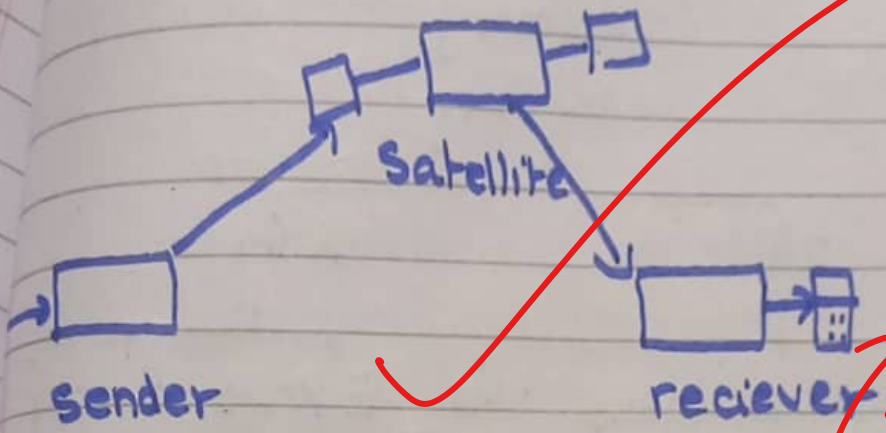
∴ ∠i=∠r.

(C)

working principle of the phone.



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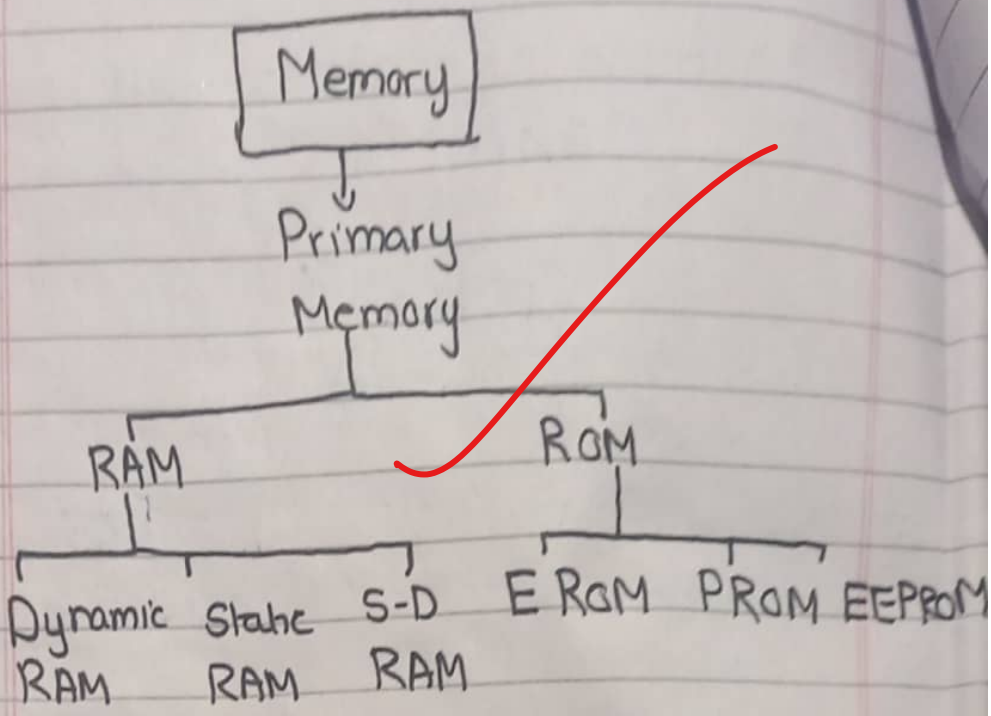
When a phone sends a message to another phone then first it sends the ~~rees~~ signal to the satellite through a sending ~~or input~~ device. When the information reaches the satellite, it transmits the signal to the phone through a reciever.

(D)

Write short notes on the following

(i) RAM and ROM



RAM:

RAM stands for Random Access memory. It is a volatile memory. It is less expensive than ROM. Also, it is smaller in size than ROM. It is three types:

- Dynamic RAM
- Static RAM
- SD RAM

ROM:

ROM stands for Read Only Memory. It is not volatile. It is more expensive and greater in size than RAM. It is three types as well.

EROM
PROM
EEPROM

(ii) Software and Hardware

Hardware is useless without software

Hardware:

Hardware is a physical part of the computer. It is tangible. Hardware can perform any task without a software. It processes the data and is repairable if damaged.

Software:

It is the program which is executed by the CPU. It is non-tangible. It cannot executed without a ~~softw~~ hardware. It is a set of instruction that tells the computer what to do. When a problem arises it is debugged.

(c)

Computer Bus:

A communication pathway for transferring data addresses and control signals between components like the CPU, memory and input/output devices. It consists of a set of parallel electrical ~~sign~~ conductors and its size and width determines how many bits it can transfer at once.

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