

Q2 (A) Time

(i) RAM and ROM:-

RAM stands for random access memory. It is infinite size memory. It can be read and write infinite time. However, ROM (Read only memory) is written only once not like RAM.

(ii) Network and Internet:-

Network are the routes of signals. However, Internet is access to the online world. The networks are interpaths between a user and internet world.

(iii) Natural and Artificial Satellites:-

Natural Satellites:- The planets are said to be natural satellites of sun. As they revolve naturally around their center, sun.

Artificial Satellites:- The satellites which are man-made are called Artificial Satellites; for example geo-stationary Satellites.

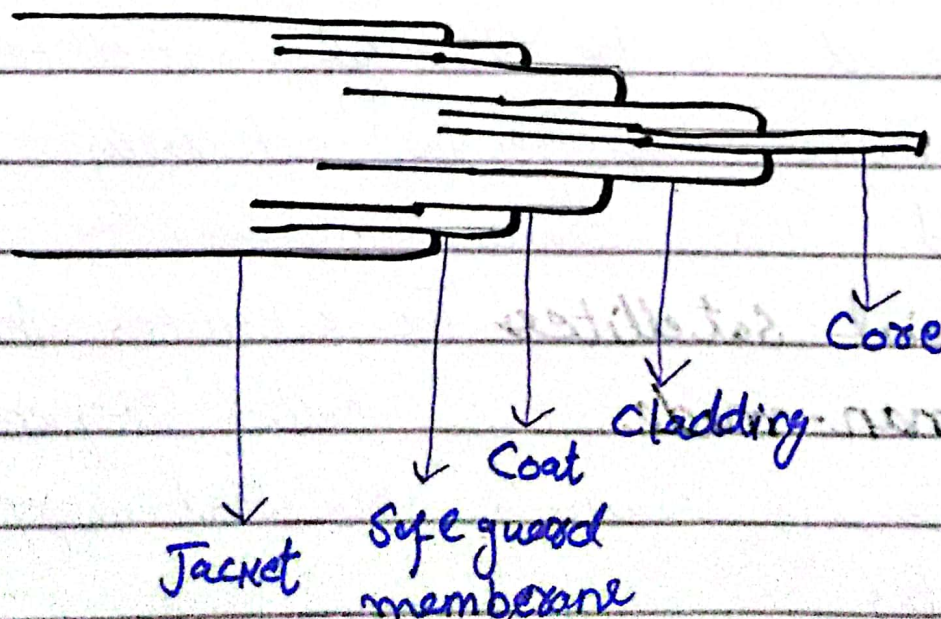
(iv) **Byte:** Byte is the unit of digital electronics. 1 Byte consists of 8 binary digits.

(v) **GPS:** GPS stands for Global Positioning System. It is used to estimate the location. This system contains 24 satellites, synchronized to the motion of earth. 3 satellites are used at a time for determination of location.

## (b) **Optical Fibres:**

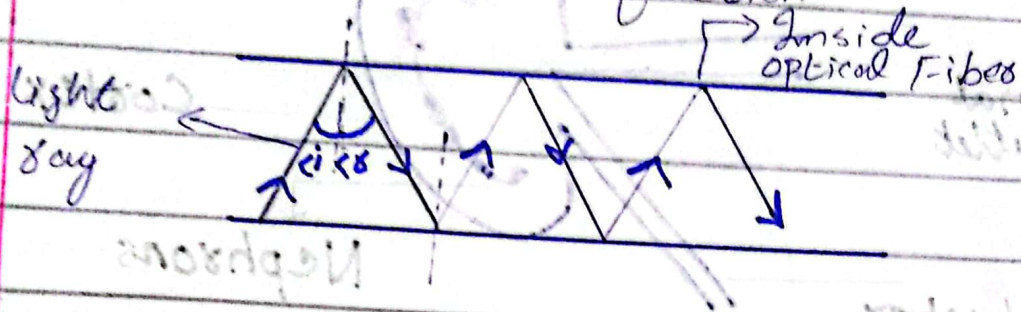
**Definition:** Optical fibres are used for carrying the information in terms of light signals.

### **Composition of Optical Fibres:**



## Working Principle of Optical Fibres.

The working principle of optical fibre is total internal reflection.



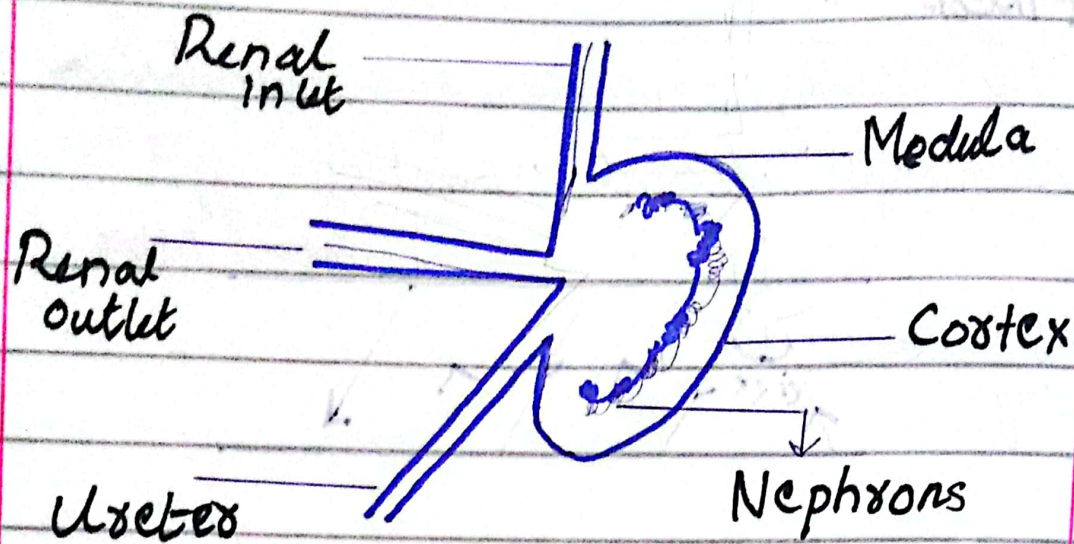
**Total Internal Reflection:** It is the phenomenon, where the light ray cannot come out from the system. When the light ray incident with the angle more than  $90^\circ$  degree, it reflects with same angle in the system.

In such way light ray: signal progresses in the optical fibres and carry the information. It is rapid transportation system of information.

(c) Explain working of kidney.

**Definition:** The kidney in human is a bag like structure. It is responsible for the filtration of blood.

# Structure of Kidney



i) **Medulla**: It is the inner wall of kidney that protects the inner structure of kidney.

ii) **Cortex**: It is the outer side wall of kidney.

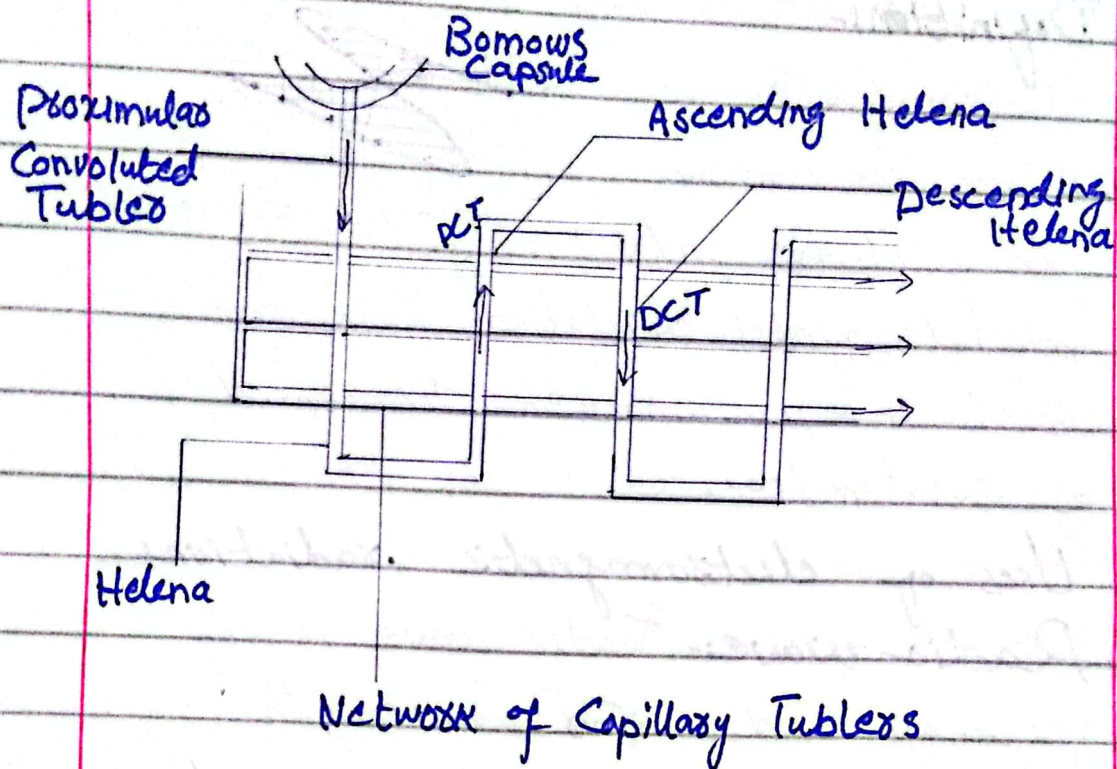
iii) **Renal**: The renal vein carries the excretion from intestine for the filtration.

iv) **Renal Out**: It sends back the filtered blood to the body.

v) **Nephrons**: These are the basic functional unit of kidney and responsible for filtration of blood. There are millions in number.

vi) **Ureter**: It is the path for the waste outside the kidney.

# The Filtration System of Kidneys

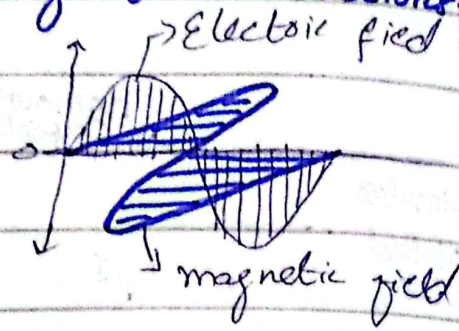


The above depicted figure is system of Nephrons and it demonstrates the filtration of blood. The aimed blood enters in by Bowman's capsule then from the Henle it filters many times which are part of proximal convoluted tubules. Further, the Network of Capillary Tubules are responsible to absorb the minerals, vitamins, fatty acids etc from there for the use of body. This excretion sent to Renal out vein and filtered blood enters in body.

## Q5- Uses of electromagnetic radiations.

### Definition:-

Electromagnetic waves are combine form of electric and magnetic field oscillation. These can travel in vacuum with the speed of  $3 \times 10^8$  m/sec.



### Uses of electromagnetic radiations

1- **Radio-wave:-** Radio wave is low frequency and higher wavelength electromagnetic wave, it is used for communication network as signals also used for mobile networks.

2- **Microwave:-** The microwave is used in satellite communication because these waves can penetrate inside the clouds. Also, these are used in microwave ~~ovens~~ ovens in domestic sectors.

3- **Infrared waves:-** Infrared waves are waves which carry the heat waves. These are used in TV remotes.

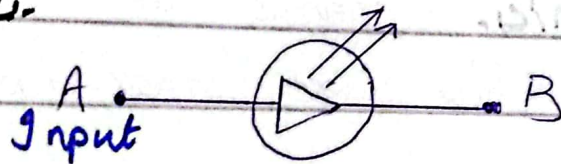
4- Ultraviolet waves. - These are used in beauty tanning baths and to sterilization of medical equipments as well as to purify the food from microorganisms.

5- X-rays. - The X-ray electromagnetic wave used for taking the image of bones, the higher frequency X-ray ~~are~~ is also used in the treatment of brain tumor to destroy the cells.

(b) Explain LED

Definition: - LEDs are light emitting diodes.

Symbol:



Explanation:

The light emitting diodes are widely used in applications like LED bulbs of LEDs in mobiles. These are made up of material which is highly responding to electricity. When current pass through such material, the transition of electrons produce an energy

in visible range. Thus this diode, which is a kind of semiconductor emits the light. The emitting light ray colour depends on the doping of semiconductors. LEDs can be of red, blue and yellow colours. However, the combination of these make up a white LED. As these are highly responsive and sensitive to electricity, these are cost-efficient products that save the electrical energy.

(c) Describe in short Ceramics and Semiconductors.

**Ceramics.** Ceramic are inorganic solids. These are made up of either metal or non-metals compounds. But one main property of ceramic are that these are highly flame resistors. So used in switch board, electric networks, construction sectors, microchips because of extremely high melting points.



Semiconductors, Semiconductors are materials which behave as insulators at room-temperature but extend to this act as conductors. The forbidden gap between valance and conduction band in semiconductors is more than conductors and lesser than insulators.

### Band in Semiconductors

Valance band

Forbidden gap

Conduction band

Forbidden gap in semiconductors  $\left\{ \begin{array}{l} \text{Insulators} \\ \text{Conductors} \end{array} \right.$

Forbidden gap in semiconductors  $\left\{ \begin{array}{l} \text{Insulators} \end{array} \right.$

### Types of semiconductors:

There are two types of semiconductors

(i) Intrinsic Semiconductors:- Intrinsic semiconductors are pure natural conductors which are free of impurities

(ii) Extrinsic Semiconductors: These ~~intrinsic~~ semiconductors are made artificially by adding the impurities called doping. It can be doped from III or IV group of periodic table. The III group doping made P-type semiconductor (majority of positive charges) or IV group are N-type semiconductor in which negative charge carriers dominates.

### Importance of Semiconductors

Semiconductors are called as brains of modern electronics. Because of the speciality that its properties can be modified as per requirement.

Data

(b) Daughter's age =  $x$

Father's age  $\Rightarrow y = 4x$  — (i)

After 5-years

$y + 5 = 3(x + 5)$  — (ii)

putting eq (i) & (ii)

$4x + 5 = 3(x + 5)$

$4x + 5 = 3x + 15$

$4x - 3x = 15 - 5$

$x = 10$  yrs Daughter's age now

put in (i),

Father's age now =  $y = 4x$

$= 4 \times 10$

$= 40$  years

Father's age after 5-years =  $40 + 5$

$= 45$  years

Father's age after further 5-years =  $45 + 5$   
 $= 50$  years

Answer

(c) Volume of football = ?

Diameter of football =  $12\text{cm} = D$

Radius of football =  $\frac{D}{2} = \frac{12}{2} = 6\text{cm}$

$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \pi (6\text{cm})^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times (6\text{cm})^3$$

$$= \frac{88}{21} \times (6\text{cm})^3$$

$$= \frac{176}{7} \times 216 \text{ cm}^3$$

$$= \frac{88}{21} \times 216 \text{ cm}^3$$

$$= 4.19 \times 216 \text{ cm}^3$$

$$\text{Volume of football} = 90.504 \text{ cm}^3$$

Answer

$$\begin{array}{r} \overline{) 25.1} \\ \underline{176} \\ 36 \quad 21 \\ \underline{35} \quad 21 \\ 10 \quad 21 \\ \underline{7} \quad 21 \\ 30 \quad 21 \\ \underline{21} \quad 21 \\ 9 \quad 21 \\ \underline{189} \\ 189 \end{array}$$

$$\begin{array}{r} 216 \quad 4.19 \\ \underline{21} \overline{) 88} \\ 84 \\ \underline{40} \\ 21 \\ \underline{190} \\ 189 \\ \underline{1} \end{array}$$

$$\begin{array}{r} 1944 \\ \underline{1216 \times} \\ 884 \times \times \\ \hline 90504 \end{array}$$

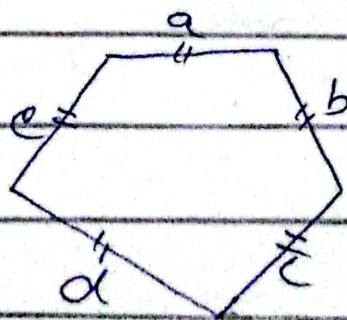
(c) Perimeter of pentagon building = ?

Length of one side = 281 m

There are five patterns in pentagon

so all sides are equal

$$a = b = c = d = e$$



Perimeter of Pentagon =  $a+b+c+d+e$

from eq (i)

$\Rightarrow$

$$= a+a+a+a+a$$

$$= 5 \times a$$

$$= 5 \times 281 \text{ m}$$

$$\text{perimeter of pentagon} = 1405 \text{ m}$$

Answer

Q7 (A)

$\Rightarrow$  Average of seven consecutive numbers = 20

$\Rightarrow$  Average = mean or mid-point

of 7-numbers

$\Rightarrow$  20 is mid-point of 7-consecutive numbers

$$\text{Series } S = 17, 18, 19, 20, 21, 22, 23 \text{ --- (i)}$$

$$\text{Now } \frac{S}{7} = 20$$

$$S = 20 \times 7$$

$$S = 140 \text{ --- (2)}$$

The sum of eq (i)

$$\text{Sum} = 17 + 18 + 19 + 20 + 21 + 22 + 23$$

$$= 140 \text{ --- (3) = (2)}$$

So it is proved that 23 is the largest number

Answer

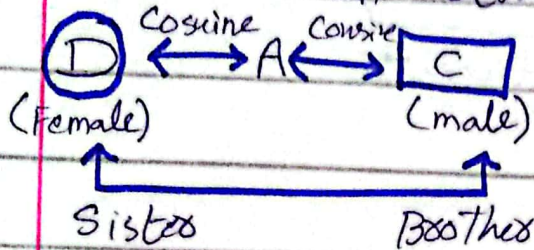
(b) According to conditions given in question

(i) C is A's father's Nephew = C is Cousin of A

(ii) D is A's Cousin

(iii) D is not brother of C

(iv) Relation between D and C = ?



Relation:- D is ~~bro~~ the Sister of C

Answer

(c) Sequence = 7, 12, 19, 28, 39, —

$$\begin{array}{ccccccccc} 7, & 12, & 19, & 28, & 39 & & & & \\ \underbrace{\quad\quad} & \underbrace{\quad\quad} & \underbrace{\quad\quad} & \underbrace{\quad\quad} & \underbrace{\quad\quad} & & & & \\ 12-7 & 19-12 & 28-19 & 39-28 & 13 & & & & \\ = 5 & = 7 & = 9 & = 13 & & & & & \end{array}$$

⇒ So, Series is ascending with the odd numbers starting from 5

⇒ So next number should be

addition by 13 with previous number

⇒ 7, 12, 19, 28, 39, —

⇒ ~~7+0, 12~~

$$\Rightarrow 7 + 0, 7 + 5, 12 + 7, 19 + 9, 28 + 11, \underline{39 + 13}$$

$$7, 12, 19, 28, 39, \underline{52}$$

Answer