Hajra Sarfraz (59)

Date 6-6-2024   Thursday

(Q.No.6)

(Part II)

(Section I)

Q.no 4

(a)

Renewable Energy:

Renewable energy is the energy which can be obtained from renewable resources.

Renewable Resources:

Renewable resources which can be replenished on human-time scale. For example, wind, water, etc.

Renewable Resources in Pakistan:

Pakistan has numerous sources of renewable energy which can be exploited to meet the energy demands of the following are the energy sources in Pakistan:

(a) **Wind Energy:** Wind energy is the kinetic energy of moving air which can be converted into electricity by using turbines. Pakistan has this sources especially in the coastal areas of Sindh and Balochistan.

(b) **Solar Energy:** Solar energy is the energy in the form of radiations comes from sun. Pakistan is a country which receives the solar energy throughout the year.

(c) **Hydro Power:** Water is used to produce electricity by using the potential energy of water. Electricity

generators are run by utilizing the power of water moving from higher to lower elevation. Pakistan has many water bodies from which this energy can be achieved.

(d) Geothermal Energy: Hot water or steam deep inside the earth is used to run the turbines to produce power. Geothermal energy is Pakistan's most almost untapped source of energy. It is found in the areas of tectonic activity.

(e) Biomass Energy: Pakistan is an agricultural society which is abundant with agricultural residues and waste of livestock. This waste can be changed into useful power and would be cost effective also.

Policy Recommendations to Leverage the Renewable Energy Sources:

① Shift the subsidies from fossil fuels to renewable sources of energy to promote them.

② Increase the investments from into renewable methods of energy production

③ Encourage the entrepreneurship in this field and provide the technical assistance.

④ Promote public - private partnership to improve this sector.

By following the above recommendations, Pakistan can make use of it's renewable sources to meet its energy demand. Pakistan has total 41000MW

of capacity from which only 6% is the share of ener renewable energy. By increasing its share, we can fight the energy crisis.

How Conversion to Renewables help to fight the energy crisis?

① A Reliance on fossil fuels energy will be reduced.

② There will be no need to buy expensive LNG and our foreign reserves will be saved.

③ Our energy sector will not face the energy shocks in case of geopohtical tensions as evident from Russia Ukrain war.

④ Ensure the continuous supply of energy as the renewables remain there all time. However, the storage capacity in case of wind and solar energy is required.

(b)

Sun:

Sun is the star of our solar system and it is a spherical object which is composed of hydrogen and helium.

Composition of Sun: Sun is composed of 74% Hydrogen, 24% helium and % heavy metals.

Temperature of sun: Temperature at the surface is 15℃ and at the core is 5500 °C.

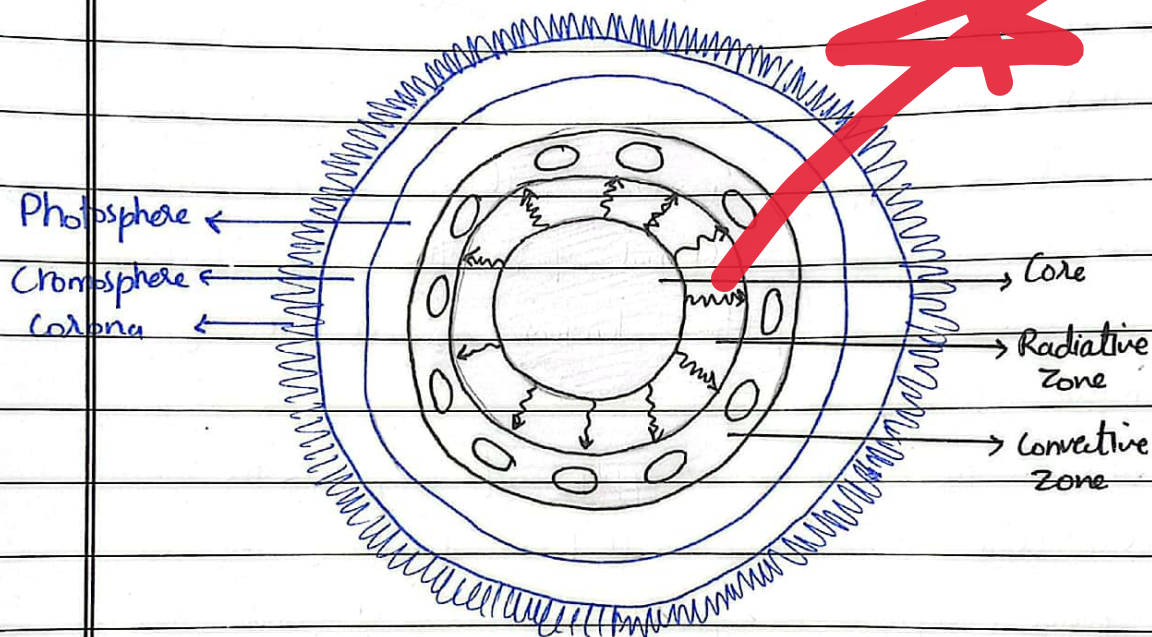Mass and Density: The mass of sun is 1.989×10^{30} kg and density is $1.4 \, g/cm^3$

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Structure of Sun.

Sun is formed by inner layers and outer layers.

Inner layer	External layers
⊙ The core	⊙ The Photosphere
⊙ Radiative zone	⊙ The Chromosphere
⊙ Convective zone	⊙ Corona

Photosphere ←
Chromosphere ←
Corona ←

→ Core
→ Radiative Zone
→ Convective Zone

Inner layers:

(a) **The Core:** Core is the energy producing region of the sun. In the core, the temperature is high and density is also high due to high pressure. This results in the possibility of fusion reaction. It is almost 25% of the solar radius from the center.

(b) **Radiative zone:** This zone starts from the outer surface of the core and moves outward till base of the convective zone. It is named on the basis of way of flow of energy which flows outward in the form of thermal radiation.

(c) Convective Zone: Convective zone is starts from outer endge of the radiative zone. It is characterized by the dominant flow of energy. This region is not dense enough, so energy moves in the form of convectives. The material moving from inner side to the surface and releases heat. After being cooled the material plunges backward to refill the heat.

External layers:

The external area of the sun is called as solar atmosphere.

(a) Photosphere: Photosphere is the boundary between the sun's inner structure and atmosphere. This is the visible part of the sun. Although it does not have the solid texture, it is called as surface of the sun.

(b) Chromosphere: Chromosphere comes after the photosphere. The temperature at its base is 4100 6000 k and 8000 500,000 k at the outer edge. It is the hotter region of solar atmosphere.

Transition region: It is a narrow region composed of 60 miles. In this region temperature increases abruptly to 500,000 k.

(c) Corona: Corona is the non-visible part of the solar atmosphere and is visible during total solar eclipse.

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(c)

Ceramic Material:

A ceramic material is an inorganic and non-metalloid material which is heated and then shaped by hardening it through cooling. The word ceramic is derived from Greek language which means "made of clay"

Characteristics:

① Ceramic is harder and strong material
② It is oxidation and wear resistant.
③ It acts as an insulator.
④ It does not conduct electricity
⑤ It is brittle and can be broken
⑥ It has high melting point

Usages

Construction: Ceramics like bricks, tiles etc are used in construction work

Electronics: Ceramics are insulator so they are used in electronic devices and as disc brakers

Medium: Ceramics have biocompatability due to which they are used in dental implants and rods for bones to join

Industry: Ceramics are extensively used in industries for various purpose such as abrasives etc.

Ceramics are not recyclable: Ceramics cannot be recycled. For recycling, the conversion of material into its raw form is

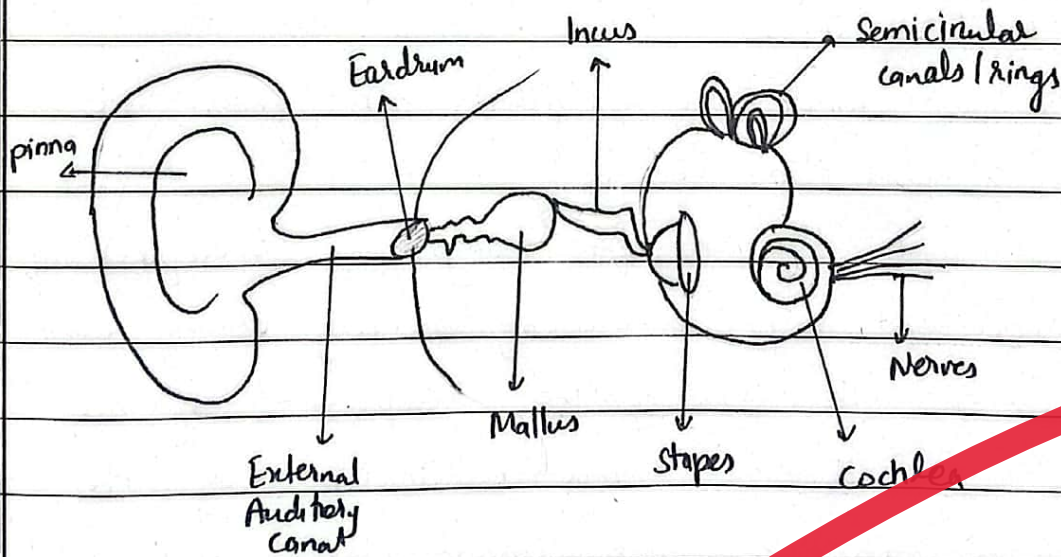necessary which cannot be obtained by heating it or melting it.

(d)

Human Ear:

Human ear is an organ that is involved in hearing and balance of body.

Structure of Human Ear:

Human ear has 3 parts:

① External / Outer ~~layer~~ Ear
② Middle Ear
③ Inner Eear

External Ear: External ear has three parts in it-

(a) Pinna / Aricules: It is the outermost part of the ear. It collects as much as sound as possible and transmit in the ear.

(b) External Auditory Canal: It transfer the sound waves into the ear.

(c) Eardrum / Tympanic Membrane: Eardrum is the

the membrane that separates the the outer ear from middle ear. It is sensitive to the sound vibrations. It transmitt the sound vibrations in the middle Ear.

Middle Ear: Middle ear is composed of Ossicles and Eustavian tube.

Ossicles: Ossicles are three tiny bones. These are the tinniest bones of the body. They are named as

(a) Mallus
(b) Inus
(c) Stapes

The bones are responsible for amplification of pressure of sound vibrations.

Inner Ear. Inner ear is filled with fluid. It has 3 parts in it.

(a) Semicircular tube rings. These rings have receptors of balance and help in balancing the body during walking
(b) vestibule. It also has the receptors of balance
(c) Cochlea. It is a snail-like structure. It has specific receptors which convert the sound vibrations into the electrical signals. These signals transmit through the nerves to brain. In brain, the electrical signals are interpreted as sound.

Qno 2
(b)

Blood Vessels: Blood vessels are pathways for blood circulation. They are of three types:

(a) Artries

(b) Veins

(c) Capillaries

Artries:

Artries are blood vessels which carry the oxygenated blood except the pulmonary artries. These blood vessels carry blood from the heart to other parts of body.

The lumen of artries is round. These have high pressure inside them. These vessels provide oxygenated blood to the parts of body from the heart.

Veins:

Veins are blood vessels which carry the deoxygenated blood except the pulmonary veins. These blood vessels carry blood from the body parts to the heart.

The lumen of veins is oval shaped. These vessels have lower blood pressure relative to artries. These also have valves to prevent the backflow of blood. Veins transport deoxygenated blood from all body parts to the heart.

(c)   Capillaries:

Capillaries   are the smallest   blood   vessels. Capillaries are   compose of   one   cell   thick   lines. These are permeable   to   water and   gases.   Thus   capillaries are   responsible   ✗ for   gases   exchange   from the blood.

Capillaries
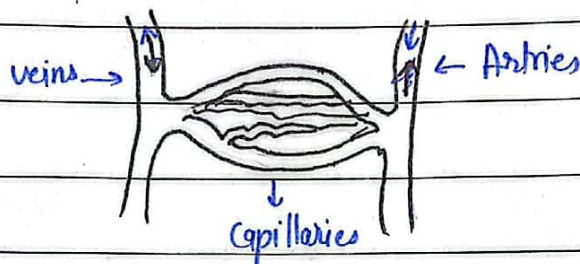
(c)

Reasons   of   Atoms making chemical   bonds: Atoms form   chemical   bonds   for   various   reasons

① Atoms   form   chemical   bonds   to   stabilize   their   valence shell   electrons.

② Formation   of   chemical   bond   stabilizes   the   atoms which   make   them

Ionic bond.   In   case   of   ionic   bond,   anionic   atom transfer   its   electron   to   get   stabilize   while other   with   positive   charge   gain   an   electron to   stablir   it.

Covalent bond.   In   the   covalent   bond,   atoms   share electrons   and   get stabilized.

③ Octate Rule.   Atoms   make   bonds   in   obeyance with   octate   Rule.   According   to   the   octate   rule atoms   strive   to   get   the   electronic   state

Structure of water molecule: Water has non-linear V shaped structure. It has an angle of 104.5°. One oxygen molecule bonds with two hydrogen atoms. Oxygen have a lone pair on it also.

the
nearest nobel gas. Noble gases are stable atoms which exist inertly in the atmosphere.

(A)

① Conductors: Conductors are the materials which can conduct electricity. Most metals are conductors.

eg. silver, iron, gold ch.

② Semiconductors: Semiconductors are materials which have the conductivity intermediate between conductors and insulators. The are partly conductive to electricity

eg. Silicon and germanium.

(3) Metals: Metals are the materials which can easily conduct electricity and are formed by metallic bonds between anions and cations.

eg. silver, copper, gold, iron

④ Plastics: Plastics are materials composed of organic materials. Plastics have long chains organic molecules that gives them peculiar characteristics. The word is derived from Plastikus /Plasticos which means "fit for moulding".

eg. polyethylene, resins ch.

(c) ceramics: Ceramics are inorganic, non-metalloid materials which are made up of clay. The are heated and then shaped by hardening through cooling. The word is derived from latin Greek word "ceramus" which means "made of clay".

eg. bricks, abrasives, bone rods

(a)

Global warming: Threat to developing countries

Global warming is a phenomenon caused by emissions from Industries and other man-made things. These emissions are contributed from developed countries but the developing and least developed countries suffer the most from its consequences.

Measures taken in COP29 to counter Impacts of Global warming:

① **Provision of Loss and Damage Fund**

The developed countries should materialize their pledge of Loss and Damage Fund. It must be provided to the deserving countries, so that they could use it to bring resilience to climate change.

② **Targeting the Usage of Fossil Fuels**

COP29 should try to persuade the fossil fuel producing countries such as Arab countries and Industrial countries like USA and China to reduce the consumption and usage of Fossil Fuels.

③ **Incentivizing the Renewable Energy Production**

There should be taken initiatives to incentivize the renewable energy production.

④ **Promoting "Debt for Nature Swap"**

Debt for nature swap will help the developing countries in dual manner. The developing countries' invest in of environment to make it resilient and green while get rid of their debt at the same time.

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Section I I

Qno 6

(a)

Given data.

Initial population = 18000

final population = 22,500

Solution:

To find the increase in population, subtraction of of initial from final population.

∴ Increase in population = final - Initial

= 22500 - 18000

= 4500.

Apply the formula of percentage increase, to find percentage increase in 10 years.

$$\text{percentage increase} = \frac{\text{Increase}}{\text{initial / original value}} \times 100$$

$$= \frac{4500}{18000} \times 100$$

$$= 25\% \quad \text{per decade}$$

Applying the formula to find percentage per year.

percent	×	Base	=	Amount
25%	×	10	=	

$25\% = 0.25$

$$\text{percentage increase per year} = \frac{0.25}{10} = 0.025$$

$0.025 = 25\%$.

Thus population increase per year is 25%.

(b)

Solution:

By using arrow method

Machines	days	Units
↑ 20	↑ 9	↑ 600
18	12	x

$$\frac{x}{600} = \frac{12}{9_1} \times \frac{18^{\,2}}{20}$$

$$\frac{x}{600} = \frac{2 \cdot 4 \cdot 6}{20_5}$$

$$\frac{x}{600} = \frac{6}{5}$$

$$x = \frac{6}{5} \times 600^{120}$$

$$x = 720$$

So, 18 machines in 12 days will make 720 units.

(C)

Soln.

$$\frac{car}{speed} = 450\,m\,/\,60\,sec$$

$$\frac{train}{speed} = 69000\,m\,/\,2700\,sec$$

$$450 : 60 :: 69000 : 2700$$

$$\boxed{\frac{450}{69000} = \frac{60}{2700}}$$
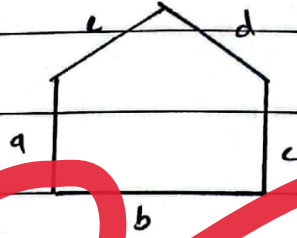
$$450 \times 2700 = 60 \times 69000$$
$$1215\,000 = 4140\,000$$

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they are not equivalent ratios.

(d)

Soln.

perimeter of pentagon

length of each side = 15cm

perimeter = a + b + c + d + e

= 15 + 15 + 15 + 15 + 15

= 75 cm.

perimeter = 75cm.

Q no 7

(b)

Circumference of radius circle with radius 4cm.

circumference = C = $2\pi r$

C = $2 \times 3.14 \times 4$

= 25.12 cm.

(c)

Age of 5 students : 20, 22, 21, 21, 23

Rearrangement in order

20, 21, 21, 22, 23.

Mode = 21 (as it comes twice and more than any other (21,21) age)

Media = 21 (central value)

Mean = $\dfrac{20 + 21 + 21 + 22 + 23}{5}$ = 21.4

Range = $\boxed{23 - \dfrac{20}{2} \quad 1_2/1\frac{3}{2}}$ 23 - 20 = 3