

Date 6-6-2024

GSA (Mock)

Thursday

(Part II)

(Section I)

Q not

(a)

Renewable Energy:

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

Renewable Resources:

Renewable resources are those sources of energy which can be replenished on human-time scale. For example, wind, solar, hydropower

Renewable Resources in Pakistan:

Pakistan has numerous sources of renewable energy which can be exploited to meet the energy demands of it. Following are 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 source 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 its renewable sources to meet its energy demand. Pakistan has total 41000Mw

Date.....

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

How conversion to Renewables help to fight ^{the} energy crisis?

- ① 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 geopolitical tensions as evident from Russia-Ukraine 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 2% heavy metals.

Temperature of sun: Temperature at the surface is 15K 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

Date

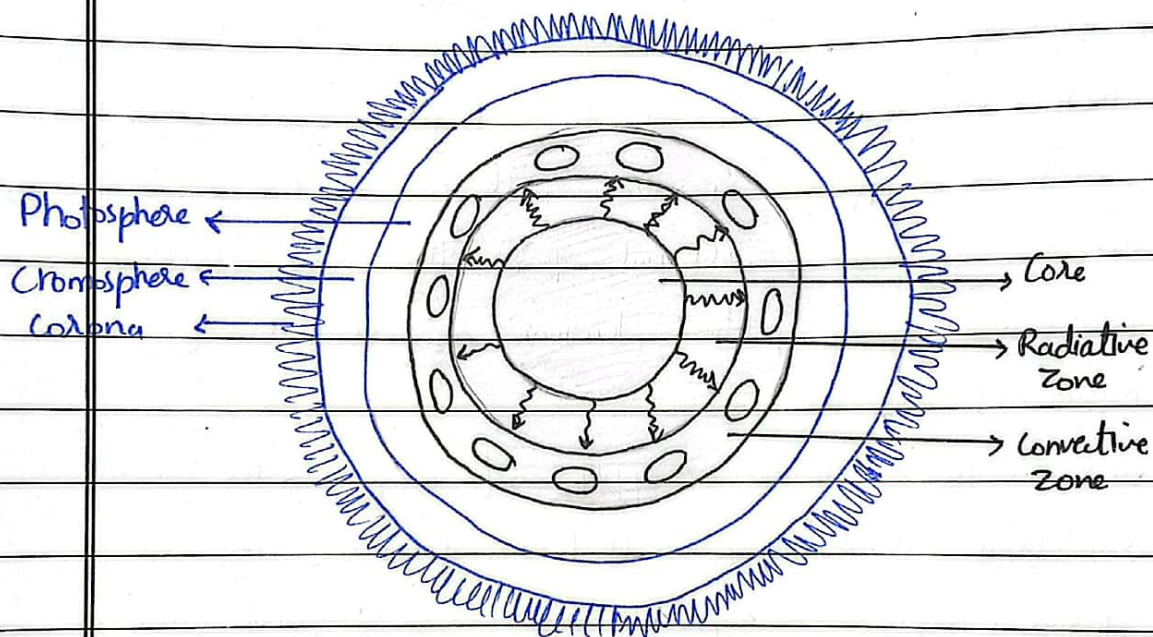
Structure of Sun Sun is formed by inner layers and outer layers.

Inner layer

- ① The core
- ② Radiative zone
- ③ Convective zone

External layers

- ① The Photosphere
- ② The Chromosphere
- ③ Corona



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.

Date

(c) Convective Zone: Convective zone starts from outer edge 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 convection. 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 4000K and 8000K 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 $500,000\text{K}$.

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

(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 insulators so they are used in electronic devices and as disc blockers.

Medicine: Ceramics have biocompatibility due to which they are used in dental implants and rods for bones to join.

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

Ceramics are not recyclable:

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

Date.....

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

(d)

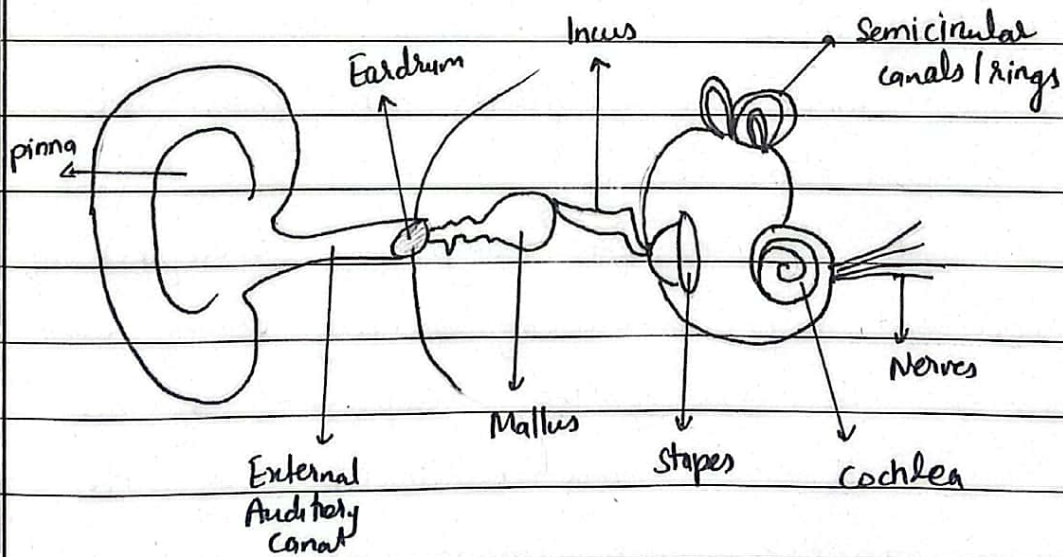
Human Ear:

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 Ear



External Ear: External ear has three parts in it-

- (a) Pinna / Auricles: 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

Date

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

Middle Ear: Middle ear is composed of ossicles and Eustachian tube.

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

(a) Malleus

(b) Incus

(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.

Date

Qno 2

(b)

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

(a) Arteries

(b) Veins

(c) Capillaries

Arteries:

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

The lumen of arteries 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.

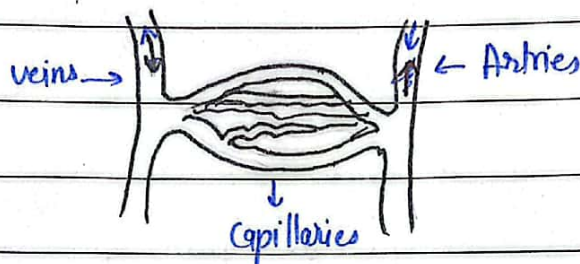
The lumen of veins is ~~xx~~ oval shaped. These vessels have lower ^{blood} pressure relative to arteries. These also have valves to prevent the backflow of blood.

Veins transport deoxygenated blood from all body parts to the ~~to~~ heart.

Date

(c) Capillaries:

Capillaries are the smallest blood vessels. Capillaries are composed of one cell thick lines. They are permeable to water and gases. Thus, capillaries are responsible for gas exchange from the blood.



(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 stabilize it.

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

③ **Octate Rule.** Atoms make bonds in obedience 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.

Date



the nearest noble 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 etc.
- ② Semiconductors: Semiconductors are materials which have the conductivity intermediate between conductors and insulators. They 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 of organic molecules that gives them peculiar characteristics. The word is derived from Plastics / Plastik which means "fit for moulding".
eg. polyethylene, resins etc.
- (C) Ceramics: Ceramics are inorganic, non-metallic materials which are made up of clay. They 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

Date.....

(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 an environment to make it resilient and green while get rid of their debt at the same time.

Date

Section II

Qno 6

(a)

Given data.

$$\text{Initial population} = 18000$$

$$\text{final population} = 22,500$$

Solution:

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

$$\text{\$ Increase in population} = \text{final} - \text{Initial}$$

$$= 22500 - 18000$$

$$= 4500.$$

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

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

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

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

Applying the formula to find percentage per year.

$$\boxed{\begin{array}{l} \text{percent} \times \text{Base} = \text{Amount} \\ 25\% \times 10 = \end{array}}$$

$$25\% = 0.25$$

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

$$0.025 = 2.5\%$$

Thus population increase per year is 2.5%.

Date

(b)

Solution:

By using arrow method

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

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

$$\frac{x}{600} = \frac{246}{205}$$

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

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

$$x = 720$$

So, 18 machines in 12 days will make 720 units

(c)

Soln.

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

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

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

$$\frac{450}{69000} = \frac{60}{2700}$$

$$\Rightarrow 450 \times 2700 = 60 \times 69000$$

$$1215000 = 4140000$$

$$\frac{3}{45}$$

$$\frac{60}{2700}$$

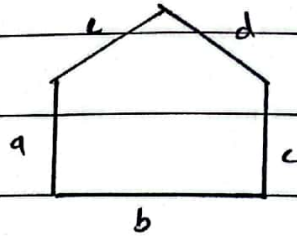
Mojahid

They are not equivalent ratios.

(d)

Soln.

perimeter of pentagon
length of each side = 15cm



$$\begin{aligned} \text{perimeter} &= a + b + c + d + e \\ &= 15 + 15 + 15 + 15 + 15 \\ &= 75 \text{ cm.} \end{aligned}$$

$$\text{perimeter} = 75 \text{ cm.}$$

Q no 7

(b)

Circumference of a circle with radius 4cm.

$$\text{circumference} = C = 2\pi r$$

$$C = 2 \times 3.14 \times 4$$

$$= 25.12 \text{ cm.}$$

(c)

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

Rearrangement in order

20, 21, 21, 22, 23.

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

Median = 21 (central value)

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

$$\text{Range} = \frac{23 - 20}{2} = 1.5$$

$$23 - 20 = 3$$