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भारत का नं. 1 संस्थान
कौटिल्य एकेडमी
सफलता का प्रवेश द्वार...

प्रश्न संख्या		मुख्य परीक्षा उत्तर पुस्तिका (Mains Answer Sheet)
1.	1	Force is that cause that changes the static or moving position of an object. e.g. Pull or Push.
1.	2	Anode rays are positively charged particle's beam or ray.
1.	3	Velocity is change in the displacement with given time interval. $V = \frac{\text{Displacement}}{\text{Time}}$
1.	4	Acceleration is change in rate of velocity of an moving object with time interval. $a = \frac{\text{Change in rate of velocity}}{\text{Time}}$
1.	5	Dimension is measurment of an object in specific direction on the basis of length, height etc.

1. 6	An element is simplest form of a pure substance which can neither be further broken or built. eg. Gold.
1. 7.	Nuclear fission is that reaction in which the ~~hydrogen~~ atom splits into 2 & generates energy.
1. 8	Zinc flower is an oxide of zinc which is in form of white powder. It is used in pharmaceuticals & cosmetics.
1 9	Acid is that chemical substance that gives H^+ ions & whose pH value is less than 7.
1. 10	Noble metals are those metals which do not react with other substances very easily. such as Gold, Silver.
1. 11	Oxy respiration or aerobic respiration is that ~~or~~ which happens in the presence of oxygen.

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1. 12	Infectious disease are those diseases which transmits very quickly. These are highly contegeous. e.g. viral diseases
1. 13	Cell division of proces of producing more cell. In this the cell itself divides to give birth to new cells.
1. 14	Haumones are chemical messengers. They are generally proteins, peptides, steroids etc. They are secreated by endocrine glands. e.g. Adrenal
1. 15	Fertilization is union of gametes (female egg & male sperm) to produce zygote.

2. 1

Gravitational force is the attractional force between two bodies. In other words, it is a universal force which acts between all the matters. The gravitational force that earth has is called its gravity.

According to Newton's law, the gravitational force between two bodies is directly proportional to their product of their masses & inversely proportional to the square of distance between them.

$$F = G \frac{m_1 m_2}{r^2}$$

where F = Gravitational force
G = Gravitation constant
m_1 & m_2 = mass of 2 bodies
r = distance between them.

2. 2

Audible sound is that sound wave which can be heard by the human ears. The sound wave with frequency range of 20Hz to 20,000 Hz is called audible sound wave. On the other hand, inaudible sound waves are those sound waves which cannot be heard by human ears. These sound waves have the frequency of more than 20,000 Hz. Only animals such as dogs can hear it. These are called ultrasonic sound waves.

2. 3. Thermometer is an instrument that is used to measure the temperature of human body.
There are various types of thermometers such as:
① Mercury thermometer
②
③
④

2. 4. Artificial magnet are those magnets which are made artificially by the human. These magnets are made by magnetized iron or its alloys such as steel etc. The artificial magnets are made in different shape such as bar shape, horse shoe shape etc.
These artificial magnets are used in radio, television, telephone, loud speakers etc.
Since the natural magnets are not found in abundance, these artificial magnet are proven to be very useful.

2. 5.

Physical properties of metals:

① They are lustrous or shiny in appearance. e.g. Gold, silver.

② They are malleable or mouldable.

③ They are ductile.

④ They are good conductor of electricity

⑤ They are generally found in solid state at room temperature. Mercury is exception to this.

2. 6

Moseley's periodic table is called modern periodic table. It is based on the order of atomic number of the elements. According to Moseley the elements show their physical & chemical properties according to their atomic number.

Moseley devided his periodic table in 4 blocks :-

S-block - Consists alkali metals. These are from group 2-~~12~~

P- block - This consists of halogens, inert gases etc.

d- block - It consists elements from ~~12~~ 8-13 group.

f-block - It contains rest of the elements.

Q7. Alkalis are those substances that give hydroxyl ions in a aquaous solution. Alkalis are basically bases. They turn red litmus paper into blue. Their pH value is more than 7. They give OH^- ions. The donate electron & can accept protons. e.g. CaOH, KOH etc.

Q8. Functions of the cell are as follows:

1. Cellular respiration
2. Production of energy
3. Growth of the body
4. Transportation of minerals
5. Cell division to promotes & stimulate growth

२० | ७

Nutrition in plants is done through various ways :

① Photosynthesis – They use chlorophyll, sunlight & CO_2 to make food.

② Parasitism – Plants such as cascuta or Amasbel which can't produce food through photosynthesis as they don't have chlorophyl, so they take food from their host tree.

③ Saphophitic nutrition – Saprophytes such as fungi, they take their nutrition from old bread etc.

④ Insectivores – Plants such as pitcher plants are insectivores. They eat the insects for nutrition.

⑤ Symbiosis – Fungi & algae live in symbiosis association called lichens. In this relation one provides the shelter & the other provide food to the other.

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2. 10

Acid rain is that kind of precipitation whose pH value is less than 7. It can be in form of fog, mist, vapour, rainfall etc. Pollutants such as Sulpher dioxide (SO_2) & Oxides of Nitrogen (NOx) get mixed with the precipitation & fall with them as acid rain. Longer exposer to acid rain can cause cancer. These SO_2 & NOx are mainly generated through fossil fuel emissions.

Q. 1

Sound or sound waves are longitudinal mechanical waves.

Sound waves can travel through all the 3 mediums i.e. solid, gaseous & liquid. The speed of sound is highest through solids.

On the basis of the frequency range of the sound waves they can be divided as follows:

① Audible soundwaves – The frequency range of 20 Hz to 20,000 Hz of sound wave is audible to human ears & hence called audible sound-waves. Any vibrating particle between this range can be heard by human ears.

② Infrasonic soundwaves – The frequency of less than 20 Hz comes under this category. Big events such as earthquakes produce these soundwaves. Sound of elephants & whales are also infrasonic soundwaves.

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(2) Ultrasonic Soundwaves — The frequency of more than 20,000 Hz of comes under this category. The ultrasonic soundwaves are not heard by the human ears but can be heard by certain animals such dogs, bats etc

Featenes of soundwaves :-

(1) Intensity — Intensity of a soundwave can be defined as the area through a soundwave passes in a unit time.

(2) Frequency — The frequency of sound wave is that the number of times the soundwave passes through a particular point.

(3) Quality — The quality of sound depends upon the intensity & the frequency of the soundwave.

(4) Pitch — The sharpness and dullness of the sound is called pitch.

Q. 2

Chemicals are used in day to day human life. It is an important part of modern lifestyle.

There are different chemical substances which are used in daily life in one form or in another.
Some of them can be described as follows:

① Sodium chloride (NaCl) – It is used as normal salt in food.

② Sodium Benzoate – It is used as preservative.

③ $CaCO_3$ as calcium carbonate – It is used in cement manufacturing.

④ Sodium carbonate – It is used as baking soda in food items.

⑤ Sodium bi carbonate – It is used as detergent.

⑥ Alum – It is used to purify water.

(7) Hydrochloric acid (HCl) → It is used as preservative in pickels. Also used to remove tanning of utensils.

(8) Sulphuric Acid (H_2SO_4) → It is used as cleaning agent in bathroom cleaning.

(9) Phasphoric Acid – Used in fertilizer manufaturing.

(10) Ammonium Nitrate – Used in making explosives.

(11) Potash – used as fertilizer.

(12) Ammonia – used as fertilizer.

(13) Citric acid – In food products as flavoring agent.

(14) Bleaching powder – used as bleaching agent

Hence, chemicals has a significant role to play in daily life of humans.

Q. 3

Atomic structure of an atom consists of a nucleus, which consists proton & neutron. This nucleus is surrounded by the electrons which are revolving around it.

The model of atomic structure has evolved over the period of time. There have been different scientists who have propounded different models of the atomic structure.
Let's have a look at it:

① Dalton's model of atom – Dalton in early 19th century propounded this model. In his model every atom has a nucleus in its centre. All the atoms of an elements are similar in all aspects & different from the atoms of other elements.

He could not explain the existence of isotopes & isobars through his model. This was the major drawback of his model.

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② J.J. Thomson's model – J.J. Thomson propounded his water-melon model or Plum-pudding model of atom. According to which positively charged Protons are uniformally distributed in the atoms & negatively charged electrons are embedded in between.

He failed to specify about the stability of the atom.

③ Rutherford's model – Through his Gold foil with α particle scattering experiment, he proved that nucleus is positively charged & consists Protons in it. & electrons move around it.

④ Bohr's model – In 1913 Bohr finally propounded the model which was widely accepted. According to this nucleus is positively charged with Presence of neutral Neutron & Positively charged Proton. Electrons revolves around it in this orbit. This model is still used to understand the atomic structure.

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pandemic the ~~ex~~ medical oxygen crisis wrecked havoc. situation were even worse in the metro cities.

③ Lack of awareness — Due to lack of awareness among people the virus spread more quickly.

However, the governments at central & state levels were very quick to respond & several measures were taken to curb the spread. These can be described as follows:

① ~~A~~ Nation wide lockdown in early stages.

② Awareness campaigns to bring awareness among people.

③ Arrangement of medical equipments & other medical facilities.

④ Rapid vaccination drive

⑤ Protection of employment through various schemes such as Atma Nirbhar Bharat.

Covid-19 shook the whole nation but with government response & stimulus it was handled very well manner.

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Q. 5

Nutrients are those substances that are essential for human body to function well. These constitute the very fundamental part of human body.

There are some basic or most essential nutrients, such as:

① Carbohydrates – provide instant energy.
② Proteins – Building blocks of human body.
③ Fats – Provide energy & maintain the temperature of body.
④ Minerals
⑤ Water
⑥ Vitamins
⑦ Fibers.

These nutrients play a key role for a healthy development of the human body & brain.

Their usage, can be explained as follows:

PTO

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① They provide energy.
② Stimulate growth.
③ Regulate body temperature.
④ Provide strength & stamina.
⑤ Make all the body parts function properly.
⑥ Help is digestive system work properly.
⑦ Increases or strengthens the cognitive abilities also.