

# SCIENCE - (2019-2020)

(1) ✓

## Section-A

- When two forces  $F_1$  and  $F_2$  acts on a box there  
is no change in the state of motion of the box.  
Such a pair of forces are known as Balanced forces. A pair of equal and opposite forces.

- The two diseases caused in plants by micro-organisms are

- Pirus Canker
- Rust of wheat
- Tobacco Mosaic Virus

- The chromosomes are the thicker thread-like structures responsible for the characters (genes) inherited by one generation to the next. It is found in the nucleus (nucleoplasm) of the cell.

## Section-B

- Friction depends upon the nature of the two surfaces in contact. It is observed that-  
Sliding friction is a little less than static friction.

- All the surfaces have some amount of irregularities present in them. (ups and downs). When any two surfaces are put in contact, the irregularities of one surface get somewhat interlocked with the irregularities of the other surface. Here, static friction <sup>comes</sup> ~~int~~ play.
- Hence, we have to apply a force in order to unlock this interlocking and enable it to move.
- But, in sliding friction, the motion has already started. Hence, the irregularities now just act like obstruction in their path as the 'contact points' of one surface do not get enough time to interlock with the other 'contact points'. Hence, the value of friction gets reduced a little.  
Hence,  $\text{static friction} > \text{sliding friction}$

5. Friction can be increased by various ways-

- In vehicles, tyres having treads and grooves can be used in order to increase the grip of the tyre on the road.
- Sportmen use special types of sport shoes having spikes or cleats on it. This also increases friction and provides better grip on the ground.

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- Gymnasts use coarse particles like chalk powder in their hands to increase the friction between their hands and the uneven bars.

6. a) Two examples of fuel are:

• coal, wood, ~~soot~~ charcoal

• petrol/gasoline

• LPG, CNG, natural gas

b) The most reactive metal is potassium while the least reactive metal is platinum.

7. a) The plastic waste cause several damage to the environment and the living organism

• They are non-biodegradable and hence cause a lot of pollution. On burning, these produce harmful gases which pollute the air and can be dangerous.

• Animals while trying to eat the food from the plastic waste can sometimes eat them which can choke their digestive track and cause them to die.

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b) Melamine is a thermosetting plastic which cannot be re-moulded again due to the cross-linked arrangement of their molecules.

- It does not conduct the heat of the fire and can resist the heat of the fire better than any other plastic. (Does not catch fire easily and remains strong)  
It is for this reason used for making fire resistant fabrics.

8. There are many advantages of synthetic fibres.  
They are-

- wrinkle resistant and hence it need little or no ironing.
- They are easy to clean and dry quickly
- more durable than natural fibres and less expensive. They also have a long life.
- easily available.

9. a) Mitochondria - They are rod-shaped or spherical structures present in large number in the cells engaged in different physiological activities.

- They are responsible for cellular respiration and

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for the generation of energy for different active activities of life also known as power house of the cell.

- 6) Ribosomes - tiny granules present in cytoplasm and the rough ER.  
• they are responsible for protein synthesis.

Q. Plant cell

- They have an additional outer covering - the cell wall other than the cell membrane.
- This provides rigidity to the cell.
- They have plastids in them.
- They have large vacuoles.

Animal cell

- They only have the cell membrane as their outer covering.
- This provides flexibility to the cell.
- They have no plastids.
- They have either no small or no vacuoles.

Section-C

ii) The three effects of forces are-

- Change in the state of rest / motion of the object
- Change the direction of motion of the object.

(b)

- change the ~~shape~~ of object
- change the size of the object.

12. a) Myopia (near-sightedness) is the defect of vision Mohit is suffering from  
By the likely cause of it-

- excessive curvature of the cornea.
- elongation of the eye ball.

c) It can be corrected by using a concave lens of appropriate focal length.

13. 'Exposure to noise may cause a number of adverse effects on human health.'

These measures to limit noise pollution are -

- to install silencing devices in the home appliances and in factories (machines)
- to plant more and more trees as they help in absorbing sound and decrease noise pollution.
- set up and install factories in far-off areas from the residential areas
- Ban on using music system at large volumes in public places.

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All these measures will help to reduce and limit noise pollution.

14. Our solar system have eight planets in it. Hence, they can be classified into a categories on the basis of their basic characteristics - Terrestrial & Jovian planets.

a). Jupiter is called a Jovian planet as it is situated beyond the asteroid belt between Mars and Jupiter. It does not come in the first four nearest planets to the sun.

- They are largely made up of a number of gases unlike the terrestrial planets which have rocky surfaces.
- They are very much large in size as compared to them.

Hence - It is a Jovian planet.

b) i) the constellation Ursa Major (Big dipper) is the constellation having two stars, at the top help in locating the pole star.

ii) Orion is the constellation in which Rigel (star) is present.

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15. a) Magnitude on  
Richter scale

2.2  
2.2 4.5

Effect of earthquake

i) causes local damage  
to roads, buildings  
and houses. It can be  
felt by people very well.  
It is not that dangerous.

ii) 8.0 and above

ii) A highly destructive  
earthquake capable of  
destroying the population of  
the whole city. Major damage.

b) Focus is the point under the surface of the earth  
where the tension gets released or the earthquake  
originates. But it is very deep down.

Hence, it is located on the surface of the earth at  
a point directly above the focus, this is known  
as epicenter of the earthquake.

The intensity of the earthquake is maximum here.

9)

16. a) The strong heating of coal in the absence of air is known as destructive distillation of coal.
- b) The coal was formed from the dead remains of plant matter that got buried under the surface of the earth.
- The physical and chemical properties of these buried plant matter changed due to the various geological actions which led to the formation of this hard material (solid) known as coal. The geological actions ~~had~~ included the heat, temperature and pressure from the soil and rocks above it.
- The process of conversion of plant matter into coal is known as carbonisation.

17. a) Nitrogen dioxide - This gas is very harmful for the plants causing serious effects. This gas is responsible for the retarded photosynthetic activity of the plants.
- b) Smog - The layer of smog in the lower atmosphere level restricts the sunlight to reach the plants and

hence, they are unable to manufacture their own food by photosynthesis making the use of this sunlight.

c) carbon monoxide - also results serious harmful effects to the plants causing the leaves of the plant to drop. Another gas carbon dioxide is also responsible for drought and decrease in their number.

18. Sewage is a major source of water pollution:  
The three measures to check pollution by sewage in water are

- Sewage must be churned properly by the machine. The churned sewage is then passed on to tank with a gentle slope. The heavier particles settle down on the slope while the water (relatively pure) is separated from it and collected in a container.
- Alum can be used for purification of water from sewage. It does so by making the suspended particles heavy by ~~me~~ their accumulation around alum. Then they settle down, & water can be decanted off.
- Purification of sewage water by chlorination also helps to get the pure water by using chlorine.

fallen

19. a) The organism associated with curd formation is a bacterium called the Lactobacillus.

b) The organism associated with the fermentation process in bakery is fungi, like yeast.

c) Organism used for production of Penicillin is a fungi - Penicillium notatum.

20. a) The species like A and B are found exclusively in an area which means that they are endemic species. They are endemic to a particular area, vegetation on island & found only there.

b) The species listed in the Red Data Book is an endangered species. The species on the basis of perceived risk to their existence are there on the Red Data Book.  
endangered - face risk of extinction in near future  
vulnerable - face risk of extinction in middle-term future

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c.) Species like D and E no longer exist on the earth so they are extinct species.

- Q. 21. a) Farmers in North India grow legumes in one season and wheat in the next season in their field. It is simply because plants like wheat use a lot of nitrogen of the soil. The nitrogen thus lost can be replenished in the soil by growing leguminous plants as it enriches the soil with nitrogenous compounds. This practice is known as crop rotation.

b) The advantages of using manures in the field are -

- It increases the fertility of the soil.
- It enhances the overall quality of the soil.
- It enhances the water retaining capacity of the soil.
- If it is not made chemically and hence is eco-friendly.
- It provides humus to the soil.

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### SECTION-D

22) a) ~~The refractive index of medium X is 1.4.~~

~~The refractive index of medium Y is 1.8.~~

~~We know that the refractive index is a measure  
and an indicator of its optical density, of the medium.  
More the refractive index - More the optical density.  
Hence, here medium X is an optically rarer medium  
than Y as  $1.4 < 1.8$ .~~

~~∴ Therefore, the ray of light will bend maximum~~

p.s.O.

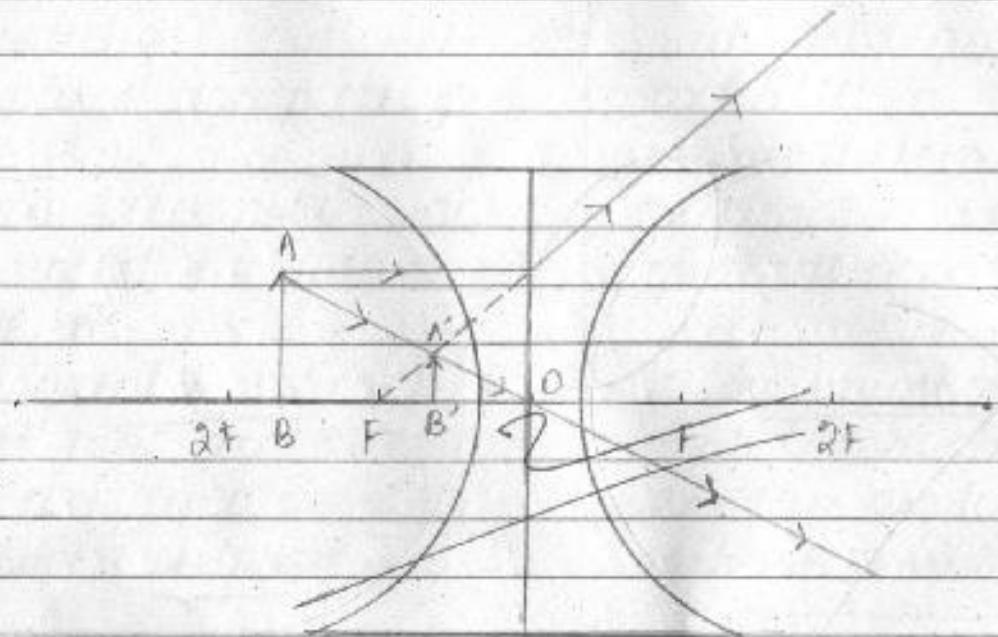
SECTION-D

W

22. a) i) The types of lens that can be used to make a virtual, erect and magnified image  
~~u the convex type. It produces such an image when the object is kept between the focus and optical centre. (converging lens.)~~
- ii) The convex lens can be used to make a real and inverted image of same size when the object is kept at the 2f points on the principal axis. (converging lens)
- iii) The concave lens can be used to make a virtual, erect and diminished image. No matter where the object is kept it makes an virtual, erect and diminished image between 'F' and 'O' or focus and optical centre. (Diverging lens).

p.g.o

b)



The concave lens is also known as Diverging lens.  
When the object is placed between  $F$  and  $2F$  points of the lens it produces -

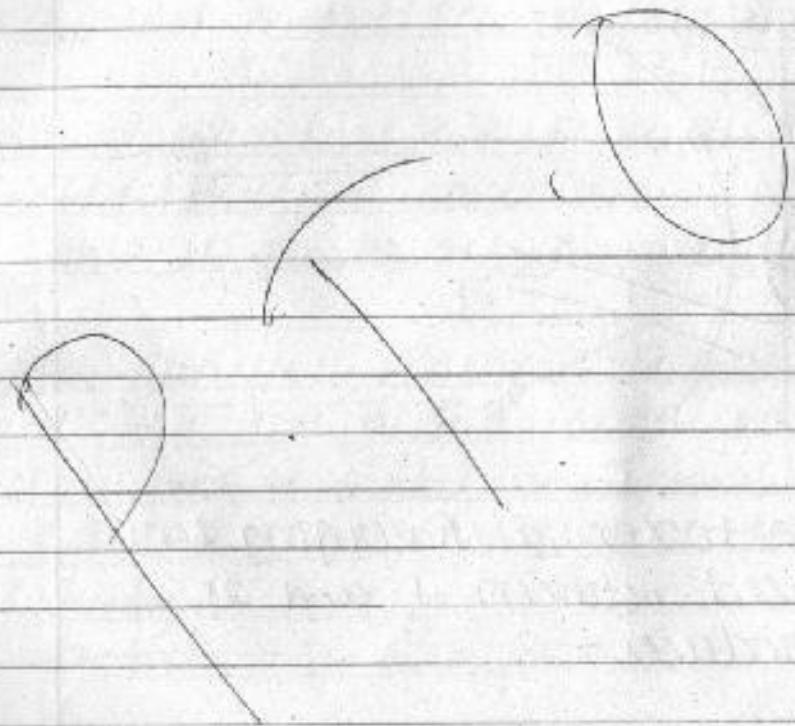
Nature

- Virtual, erect image
- Diminished image
- Formed between  $F$  and  $O$  of the same side.

(down) (optical  
centre)

16)

NO matter where, the concave lens always forms image of this nature.



### 23. Strong Electrolyte

- The electrolytes (conductive ionic solution) that get decomposed completely (ionized)

to form free mobile ions in the solution. A strong electrolyte.

- More number of free mobile ions are there.
- Ex - Pure sulphuric Acid, copper sulphate solution.

### Weak Electrolyte

- The electrolytes that get ionised only partially to form free mobile ions in the solution is weak electrolyte.

- Less number of free mobile ions are there.
- ex - tap water, carbonic Acid.

b) Strong Electrolyte ex - pure sulphuric Acid

weak electrolyte ex - oxalic Acid, tap water.

c) The three prominent effects of chemical reactions taking place at electrodes and solution during electrolysis are -

- Metals may get deposited on the electrode surface.

- gaseous bubbles may get formed near the electrodes.
- A change in the colour of the solution due to dissolution of various ions in it.

24. *i)* Non-metals generally do not react with water. Hence, some highly reactive non-metals like Phosphorus is kept in water in order to avoid their contact with air. Phosphorus on contact with air reacts vigorously and catches fire easily.

*ii)* The Sodium metal and Potassium metal reacts vigorously with water to evolve hydrogen gas.

During this process, they give out so much heat that the hydrogen evolved catches fire. Hence, sodium metal is stored under kerosene or paraffin wax to avoid its reaction with water.

*iii)* The metals are known to produce a ringing sound when struck with something hard. This property of metals is known as sonorosity. Hence, metals are sonorous. All Non-metals are not sonorous. Hence, metals are used for making bells.

iv) copper is a metal. Hence it is a good conductor of heat and electricity. Electrical conductivity is the measure with which the electric current can flow from one point to another. It is for this reason that copper is mostly used for making wires in electrical fittings. It is also highly ductile - the property in which metals can be drawn into thin wires.

v) The synthetic plastics are non-conductors / insulators of electricity. Hence, the electric current cannot flow from one point to another easily. Hence, the screw driver used by an electrician has a plastic handle so as to avoid any possible electric shock to the person holding it. It is very useful.

25. a) The conditions required for producing and sustaining combustion is -

- combustible material
- continuous supply of air / oxygen
- The temperature should be above the ignition temperature of the material.

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b) The characteristics of a good fuel are-

- It should be easily available and easy to store and transport.
- It should undergo complete and controllable combustion and produce lot of heat energy.
- It should have a low ignition temperature but it should not be around or below the room temperature. Not produce harmful gases after burning.

26. a) The animals are classified into three groups on the basis of reproductive patterns. They are -

- i) internal fertilisation and internal development - Both the fertilisation and development of zygote takes place inside the body of the female.
- ii) internal fertilisation and external development - The fertilisation takes place inside the female body but develops outside it in the environment.
- iii) external fertilisation and external development - Both the fertilisation and development of zygote takes place outside.

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### examples

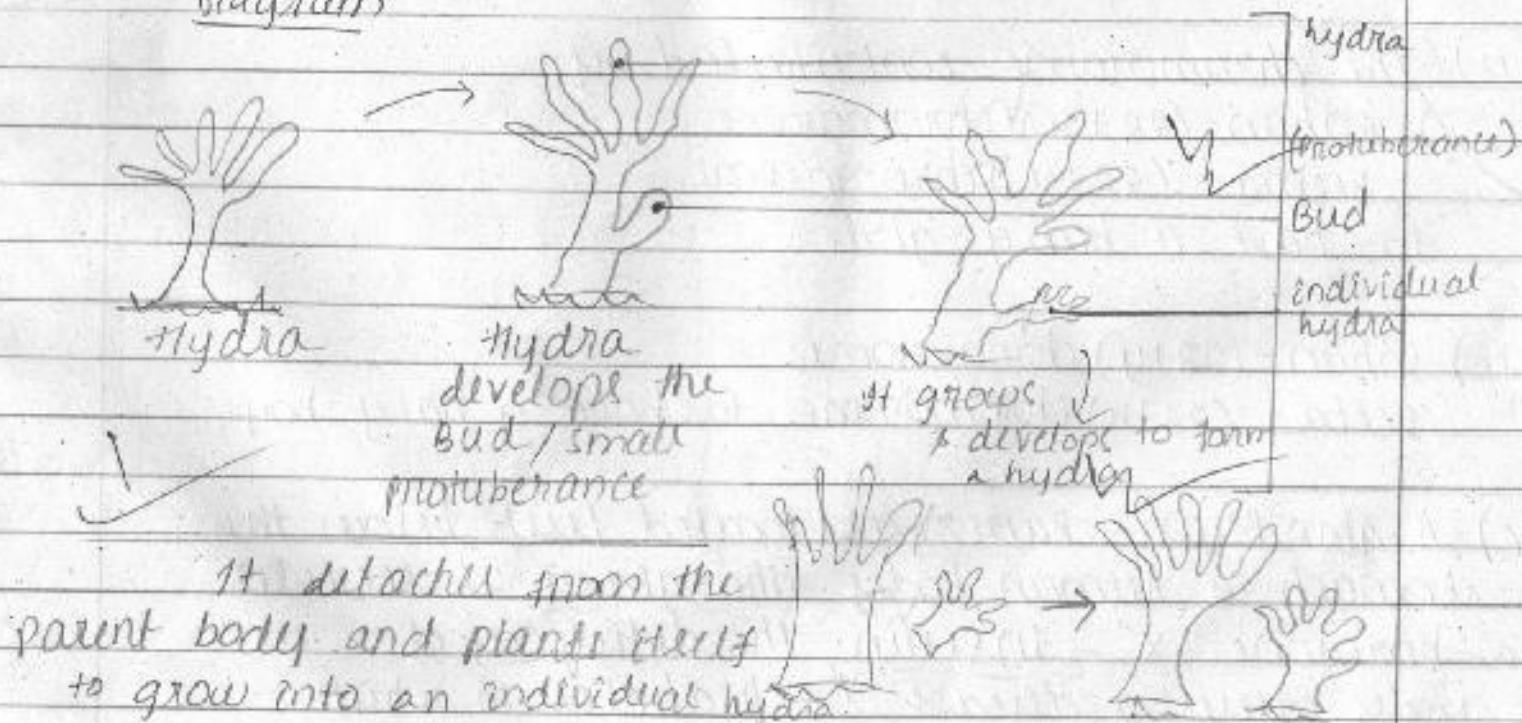
i) Human hair.

ii) Hair

iii) Fingers

b) Hydra reproduces through Budding which is an example of asexual reproduction.

### Diagram



In this method, the Hydra grows a small bud on its body. This bud then grows and develops until a specific time. At a time, the bud detaches from the parent cell and then grows to form a new individual like the parent (genetically identical).

- Q 27. a) The glands that pour their secretion directly into the blood stream are known as endocrine glands / ductless glands.
- b) The chromosome contributed by Rohan -  $(22 + n)$  chromosome  
Reema -  $(22 + n)$  chromosome  
to have a baby girl.
- i) Sohan -  $(22 + y)$  chromosome  
Reeta -  $(22 + n)$  chromosome to have a baby boy.
- c) A gland 'W' - Pancreas is located just below the stomach in human body. The gland W secretes a hormone 'X' - Insulin. The deficiency of X in the body causes a disease 'Y' - Diabetes in which

23)

the blood sugar level rises. The person having high blood glucose level is called ~~2~~- diabetic patient.

→ Strength P 9