Q.P. SET CODE
C

MT - y

Seat No. | | | | | | | |

2013 ___ ___ 1100 - **MT - y** - SCIENCE & TECHNOLOGY (72) - SET - C (E)

Time : 3 Hours **(Pages 5)** **Max. Marks : 80**

Note :

(i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Draw neat and labelled diagrams wherever necessary.

SECTION - A

Q.1. (A) Answer the following sub-questions : **5**

(1) Find the odd man out :

Myopia, Hypermetropia, Colour blindness, Presbyopia.

(2) Fill in the blanks :

(i) When acids and alkalis react together, ... and ..... is formed.

(ii) Stratosphere, the second layer of the atmosphere reaches ..... above the earth surface.

(3) State whether the following statements are true or false.

(i) Sodium chloride is a neutral salt.

(ii) The unit of potential difference is ampere.

Q.1. (B) Rewrite the following statements by selecting the correct options : **5**

(1) A ray of light parallel to principal axis after reflection from concave mirror passes through ..... .

(a) centre of curvature (b) focus

(c) pole (d) optical centre

(2) Solenoid has properties similar to ..... .

(a) magnet (b) resistance

(c) electric motor (d) optical instruments

(3) The SI unit of resistivity is ..... .

(a) ohm–metre (b) ohm-(metre)^2

(c) ohm (d) joule

(4) The ..... period is the longest period in the modern periodic table.

(a) 1st (b) 5th

(c) 6th (d) 7th

(5) ..... is liberated when bleaching powder comes in contact with atmospheric CO_2 gas.

(a) H_2 (b) CO

(c) Cl_2 (d) NH_3

Q.2. Attempt any FIVE of the following : 10

(1) Draw symbol of :

(a) Battery of cells

(b) Wire joint

(2) Distinguish between : Conductors and Insulators.

(3) The materials used for fuse has low melting point.

(4) An image is formed 5 cm behind a convex mirror of focal length 10cm. At what distance is the object placed from the mirror ?

(5) Distinguish between : Washing soda and Baking soda.

(6) Explain the following chemical reaction with the help of balanced equation : Silver nitrate reacts with sodium chloride solution.

Q.3. Attempt any FIVE of the subquestions : 15

(1) Write a note on eutrophication.

(2) Define 1 Ampere and Solve : A current of 0.2 A is flowing through a bulb for 5 minutes. Find the charge that is flowing through the circuit.

(3) What do you mean by dispersion ? Name the different colours of light in the proper sequence in the spectrum of light.

(4) Define magnetic field and state the characteristics of magnetic lines of force.

(5) What is corrosion? Do gold ornaments corrode, if not why?

(6) Paste of substance 'A' is used to decorate the ceiling of your home.

(a) Name the substance A and write its formula.

(b) Write the reaction of substance A with H_2O. State the name of the product (B).

(c) Where and how is 'B' useful ?

Q.4. Attempt any ONE of the following : 5

(1) Explain myopia with its correction.

(2) Explain the modern periodic table. (10 points)

SECTION - B

Q.5. (A) Answer the following sub-questions : 5

(1) Name the metals that do not react with water.

(2) Fill in the blanks :

(i) The valency of aluminium is ..... .

(ii) When sugarcane stalks are crushed to extract juice, the biomass left behind is called ..... .

(3) Find the odd man out :

Coal, Wind, Oil, Gas.

(4) Write the correlated terms :

Fossil fuel : Petrol : : Animal dung : .....

Q.5. (B) Rewrite the following statements by selecting the correct options : **5**

(1) A solution of ..... in water is blue in colour.

(a) $CuSO_4$ (b) $FeSO_4$

(c) $ZnSO_4$ (d) $Al_2(SO_4)_3$

(2) ..... is liberated when acetic acid reacts with sodium metal.

(a) H_2 (b) O_2

(c) CO_2 (d) NH_3

(3) The process of absorption of water into raisins occurs through its membranes. This process is known as ..... .

(a) diffusion (b) absorption

(c) adsorption (d) osmosis

(4) Excess if carbohydrates stored in the plant body is in the form of ..... .

(a) salt (b) nitrogenous substances

(c) starch (d) lipid

(5) The kidney shaped cells which regulate the closing and opening of stomata are called ..... .

(a) kidney cells (b) guard cells

(c) guarding cells (d) water cells

Q.6. Attempt any FIVE of the following : 10

(1) Translocation is needed in all higher plants. Why?

(2) Write short note on co-ordination in plants.

(3) Distinguish between : Voluntary movements and Involuntary movements.

(4) Draw a neat and labelled diagram of Longitudinal section of flower.

(5) Write short note on lamarckism (Lamarckian inheritance).

(6) Explain vegetative propagation.

Q.7. Attempt any FIVE of the following : 15

(1) Explain the properties of ionic compounds.

(2) What are closed chain hydrocarbons? Give examples.

(3) Which are the different parts of the human nervous system?

(4) How will you obtain alternative fuel?

(5) Explain the structure and function of a nephron.

(6) Describe budding in hydra with neat labelled diagram.

Q.8. Attempt any ONE of the following : 5

(1) What is corrosion and explain the methods to prevent corrosion.

(2) Explain Mendel's Dihybrid cross with a suitable example. Give the phenotypic and genotypic ratio.

Best Of Luck 👍

A.P. SET CODE
C

MT - y

2013 ___ __ 1100 - **MT - y** - SCIENCE & TECHNOLOGY (72) - SET - C (E)

Time : 3 Hours **Preliminary Model Answer Paper** **Max. Marks : 80**

	SECTION - A	
Q.1.	**(A) Answer the following sub-questions :**	
(1)	**Colour blindness.** It cannot be corrected, whereas the rest can be corrected.	**1**
(2)	(i) When acids and alkalis react together, **salt** and **water** is formed.	**1**
	(ii) Stratosphere, the second layer of the atmosphere reaches **48km** above the earth surface.	**1**
(3)	(i) **True.**	**1**
	(ii) **False.** The unit of potential difference is volt.	**1**
Q.1.	**(B) Rewrite the following statements by selecting the correct options :**	
(1)	A ray of light parallel to principal axis after reflection from concave mirror passes through **focus.**	**1**
(2)	Solenoid has properties similar to **magnet.**	**1**
(3)	The SI unit of resistivity is **ohm–metre**.	**1**
(4)	The **6th** period is the longest period in the modern periodic table.	**1**
(5)	**Cl_2** is liberated when bleaching powder comes in contact with atmospheric CO_2 gas.	**1**
Q.2.	**Attempt any FIVE of the following :**	
(1)	(a)	**2**
	(b)	

(2) **2**

Conductors	Insulators
1. The substances which have very low electrical resistances are called conductors.	1. Those substances which have infinitely high electrical resistances are called Insulators.
2. They contain a large number of free electrons.	2. They contain practically no free electrons.
3. Conductors are mostly metals.	3. Insulators are mostly non metals.

(3) **2**

1. Fuse wire is made of an alloy like lead and tin having low melting point.
2. If excess current passes through the fuse, the fuse wire melts.
3. As the fuse wire melts, the circuit breaks immediately. Fuse protects the electrical appliances by melting, at low temperature, thus limiting the current passing through device.
   Thus, fuse is made of material having low melting point.

(4) **2**

Given : Image distance (v) = 5 cm

Focal length (f) = 10 cm

To find : Object distance (u) = ?

Formula : $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

Solution : $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

$\therefore \frac{1}{u} = \frac{1}{f} - \frac{1}{v}$

$\therefore \frac{1}{u} = \frac{1}{10} - \frac{1}{5}$

$\therefore \frac{1}{u} = \frac{1-2}{10}$

$\therefore \frac{1}{u} = \frac{-1}{10}$

$\therefore u = -10cm.$

The object is placed in front of the convex mirror at a distance of 10 cm.

(5) **2**

Washing soda	Baking soda
1. It is sodium carbonate.	1. It is sodium bicarbonate or sodium hydrogen carbonate.
2. Its molecular formula is Na_2CO_3, $10H_2O$.	2. Its molecular formula is $NaHCO_3$.
3. It is a crystalline substance.	3. It is an amorphous powder.
4. It is used in manufacturing soaps and detergent.	4. It is used in bakery for making cakes and bread light and spongy.

(6) When silver nitrate solution reacts with sodium chloride solution it gives a white precipitate of silver chloride and sodium nitrate. **2**

This reaction is a double displacement reaction.

$AgNO_{3(aq)} + NaCl_{(aq)} \rightarrow AgCl\downarrow + NaNO_{3(aq)}$

Silver nitrate Sodium chloride Silver chloride Sodium nitrate

Q.3. Attempt any FIVE of the subquestions :

(1) **3**

(i) The enrichment of water bodies by inorganic plant nutrients like nitrate, phosphate occurring either naturally or due to human activity is called eutrophication.

(ii) The process of eutrophication takes place due to introduction of nutrients and chemicals through discharge of domestic sewage, industrial effluents and fertilizers from agricultural fields.

(iii) These promote excessive growth of phytoplankton and algae.

(iv) When algae die, decomposition of organic substances use oxygen. This results is depletion of oxygen in water.

(v) The bloom of algae blocks penetration of oxygen, light and heat into water body.

(vi) As a result most of the organisms die below the surface of water.

(2) **3**

1 Ampere :

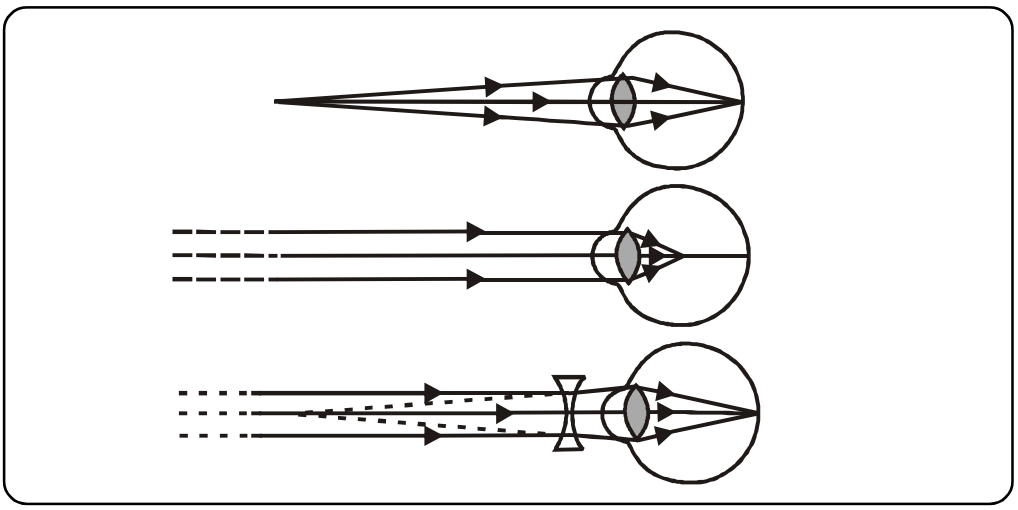
The current flowing through a conductor is called as one ampere if one coulomb of charge is passing through any cross-section of a conductor in one second.

	Given : Current (I) = 0.2 A Time (t) = 5 min. = 300 sec. **To find :** Electric charge (Q) = ? **Formula :** Q = It ∴ Q = 0.2 × 300 ∴ Q = 60 C **The charge flowing through the circuit is 60 C.**	
(3)	1. The phenomenon of splitting of light into its component colours is called as dispersion. 2. The band of coloured components of light beam is called as spectrum. The colours in the order from bottom to top are violet, indigo, blue, green, yellow, orange, red (VIBGYOR).	**3**
(4)	**Magnetic field :** The area adjoining the magnet comprising of magnetic lines of force is called magnetic field. **Characteristics of magnetic lines of force :** 1. Magnetic lines of force are closed continuous curves. They start from north pole and ends on south pole. 2. The tangent at any point on the magnetic lines of force gives the direction of the magnetic field at that point. 3. No two magnetic lines of force can intersect each other. 4. Magnetic lines of force are crowded where the magnetic field is strong and far from each other where the field is weak.	**3**
(5)	1. The slow process of decay or destruction of metal due to effect of air, moisture, acids on it is called as corrosion. 2. Gold is a yellow shining metal. Gold metal does not corrode because it is a highly unreactive metal that remains unaffected by air, water vapour, and other gases in the atmosphere. Gold does not tarnish and retains its lustre for years. Since gold does not corrode, gold ornaments look new after years.	**3**
(6)	(a) The substance A is plaster of Paris and its formula is 2 $CaSO_4.H_2O$. (b) The reaction of A with H_2O is $2CaSO_4.H_2O + 3H_2O \rightarrow 2CaSO_4.2H_2O$ Plaster of Paris Gypsum (B) + Heat (c) Gypsum is the raw material used in manufacturing cement.	**3**

Q.4. Attempt any ONE of the following :

(1) **5**

1. It is the defect in which a human eye can see nearby objects clearly but is unable to see distant objects clearly.
2. In myopia, the image of distant object is formed in front of retina.
3. There are two possible reasons of myopia :
   (a) As ciliary muscles do not relax sufficiently, converging power of eye lens becomes high.
   (b) The distance between eye lens and retina increases as the eyeball is lengthened or lens is curved.
4. A concave lens of suitable focal length can correct this defect.
5. The power of concave lens is so chosen that it creates required divergence and hence after the converging action of eye lens, the image is formed on the retina.



(2) **5**

1. In 1913, Henry Moseley, an English physicist found that it was atomic number (Z) and not atomic mass which was the fundamental property of an element. Thus atomic number is useful for arrangement of elements in the periodic table.
2. The modern periodic table is also called as long form of periodic table.
3. In the modern periodic table, elements are arranged in the increasing order of atomic number (Z).
4. The modern periodic table contains 7 horizontal rows called as periods and 18 vertical columns called as groups.
5. Apart from the seven rows, there are two additional rows called lanthanide series and actinide series placed at the bottom of the periodic table.
6. Based on electronic configuration, the modern periodic table is divided into four blocks namely, s-block, p-block, d-block and f-block.

	7. The blocks gives rise to 4 types of elements namely normal elements, zero group elements, transition elements and inner-transition elements. 8. Elements belonging to a particular group show strong resemblance in their chemical properties like valency, formulae of compound and chemical reactions. 9. Elements show gradual variation in chemical properties along a period. 10. Neighbouring elements within a period show some similarities but non-neighbours show appreciable dissimilarity in their chemical properties.	
	SECTION - B	
Q.5.	**(A) Answer the following sub-questions :**	
(1)	Gold, silver and copper do not react with water at all.	**1**
(2)	(i) The valency of aluminium is **3.**	**1**
	(ii) When sugarcane stalks are crushed to extract juice, the biomass left behind is called **bagasse.**	**1**
(3)	**Wind.** Others are fossil fuels.	**1**
(4)	**Biogas.**	**1**
Q.5.	**(B) Rewrite the following statements by selecting the correct options :**	
(1)	A solution of **$CuSO_4$** in water is blue in colour.	**1**
(2)	**H_2** is liberated when acetic acid reacts with sodium metal.	**1**
(3)	The process of absorption of water into raisins occurs through its membranes. This process is known as **osmosis.**	**1**
(4)	Excess if carbohydrates stored in the plant body is in the form of **starch.**	**1**
(5)	The kidney shaped cells which regulate the closing and opening of stomata are called **guard cells.**	**1**
Q.6.	**Attempt any FIVE of the following :**	
(1)	1. Food manufactured in the cells of the leaves has to be transported to each cell of the plant. Besides amino acids, excess food has to be taken to the storage organs like roots, fruits and seeds. 2. This process is called translocation and it takes place through phloem in upward as well as downward direction. 3. Translocation allows the phloem to move material according to the plant's needs. 4. In the flowering season, sugar stored in the roots or stems is translocated to the buds for growing them into flowers. 5. Therefore, translocation is needed in all higher plants.	**2**

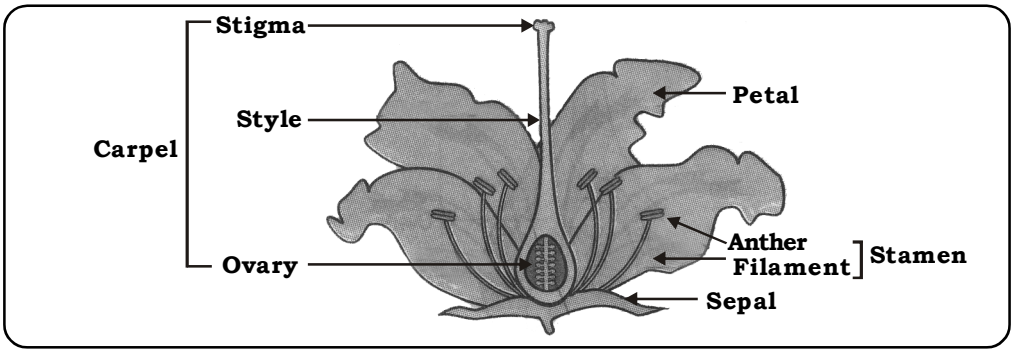
(2) **2**

1. Plants do not have a nervous system or muscular system.
2. The movements exhibited by plants are mainly in response to the stimulus.
3. In certain sensitive plants like Mimosa, movement is in response to the stimulus of touch. This movement is known as seismonastic movement. There is no growth involved in this movement.
4. On the other hand, the movement of a seedling is because of growth. If growth is prevented, it does not exhibit any movement.
5. Thus, we conclude that plants exhibit two types of movement, one which is growth dependent movement and the other which is growth independent movement.

(3) **2**

Voluntary movements	Involuntary movements
1. Movements which are under our control are called voluntary movements.	1. Movements which are not under our control are called involuntary movements.
2. Voluntary movements require thinking.	2. Involuntary movements do not require thinking.
3. Voluntary movements are controlled by cerebellum.	3. Involuntary movements are controlled by midbrain and hindbrain.
4. Eg. Moving a table, kicking a ball, walking, clapping hands etc.	4. Eg. Blood flow, breathing, sneezing etc.

(4) **2**



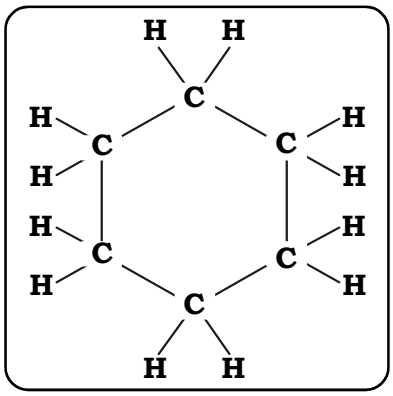
(5) **2**

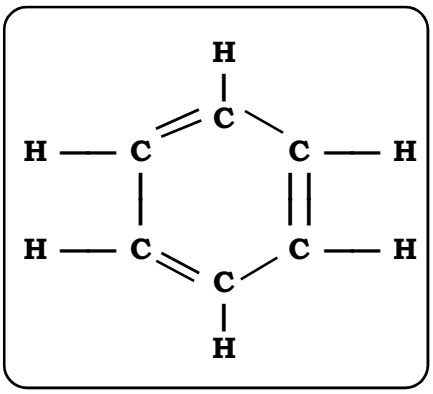
1. Lamarckism (Lamarckian inheritance) is the idea than an organism can pass on characteristics that it acquired during its lifetime to its offspring (also known as heritability of acquired characteristics or soft inheritance).
2. It is named after the French biologist Jean-Baptiste Lamarck (1744 - 1829), who incorporated the action of soft inheritance into his evolutionary theories.

	3. He is often incorrectly cited as the founder of soft inheritance, which proposes that individual efforts during the lifetime of the organisms were the main mechanism driving species to adaptation as they supposedly would acquire adaptive changes and pass them on to their offspring.	
(6)	1. When new plants are produced from the vegetative parts (roots, stems, leaves and buds), it is known as vegetative propagation. 2. For example, new plants of potato develop from eyes (buds on potato), Bryophyllum reproduces from the buds on the leaf margin, the roots of sweet potato give rise to new plants etc. 3. All plants produced by vegetative propagation are similar to the parent, as they are produced from a single parent. 4. Plants produced by vegetative propagation take less time to grow and bear flowers and fruits earlier than those produced from seeds.	**2**
Q.7.	**Attempt any FIVE of the following :**	
(1)	1. Ionic compounds are solids and hard due to strong force of attraction between positive and negative ions. 2. They are generally brittle and break into pieces when pressure is applied. 3. Ionic compounds have high melting and boiling points, as a considerable amount of energy is required to break the strong intermolecular attraction. 4. They are generally soluble in water and insoluble in solvents such as kerosene, petrol etc. 5. Ionic compounds in the solid state do not conduct electricity because the movement of ions in the solid state is not possible due to their rigid structure, but they conduct electricity in the molten state & solution state because ions are free to move towards opposite electrodes in these states.	**3**
(2)	1. Closed chain hydrocarbons are the hydrocarbons in which carbon atoms linked to each other in a ring form thus forming a closed chain or cyclic or ring structure.	**3**

2. Eg. Cyclohexane. OR Benzene

Structural formula :





(3) The human nervous system can be divided into : **3**

1. **The Central Nervous System (CNS) :** It comprises of the brain and spinal cord and regulates all activities of the body.
2. **The Peripheral Nervous System (PNS) :** It includes all the nerves. The nerves form a network and spread throughout the body. They are instrumental in connecting all parts of the body to the central nervous system.
3. **The Autonomic Nervous Sytem (ANS) :** If comprises of all the nerves present in the involuntary organs like heart, stomach, lungs etc.
4. On the basis of their function, the nerves are categorized as afferent and efferent nerves.
5. The nerves are composed of neurons and neuroglia. The neurons are specialized cells capable of creating and transmitting electrochemical impulses. The neuroglia are supportive cells which assist the neurons in their function.

(4) (i) Alternative fuels are obtained through research. **3**

(ii) The organic waste from agriculture, factories and domestic use is utilized to produce alternative fuels. Biogas, bagasse and ethanol are some of the examples.

(iii) Biogas is obtained by the fermentation of organic waste and animal dung in the biogas plant.

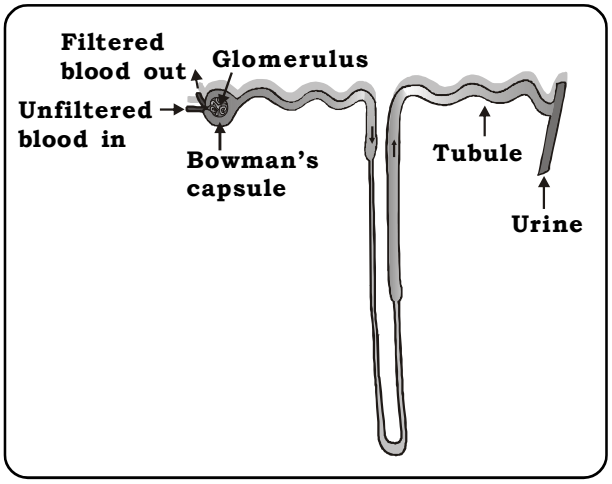
(iv) Bagasse is the biomass left behind when sugarcane stalks are crushed to extract juice. This bagasse is used as fuel for boilers, and for manufacture of paper and production of ethanol.

(v) Ethanol is produced by fermentation of wheat, maize, potatoes or sugarcane. This ethanol is mixed with petrol or diesel. Hence it is an alternative source of fuel.

(vi) Solar power, wind power, tidal power, hydropower, geothermal power, etc. are also alternate sources of energy which are non polluting and inexhaustible.

(5) 3

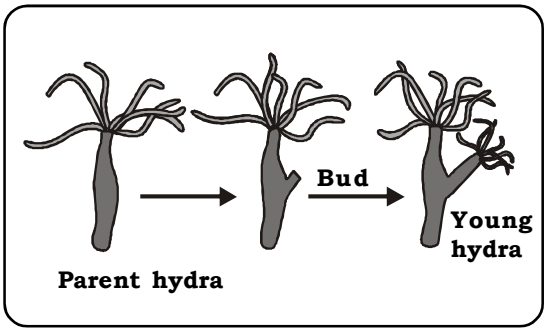
1. The basic filtration unit in the kidney is a cluster of thin walled blood capillaries called as a Nephron. Each kidney has approximately a million nephrons. Each nephron has a cup shaped thin walled upper end called Bowman's capsule which contains a bundle of blood capillaries called glomerulus.



2. Urea formed in the liver enters the blood. When blood containing urea enters the glomerulus, it gets filtered through glomerular capillaries.
3. The selectively permeable wall of the Bowman's capsule allows the water molecules and small molecules of other substances to pass through them and forms glomerular filtrate.
4. The glomerular filtrate collected in the Bowman's capsule further passes through the nephron tubule where reabsorption of water and useful molecules takes place.
5. The remaining fluid containing the waste, forms the urine which eventually enters long tube called the ureter. It is further stored in the urinary bladder and from there it is thrown out through the urethra.
6. As the bladder is muscular, it is under the control of nerves. As a result, we can usually control the urge to urinate.

(6) 3

1. Organisms such as hydra use regenerative cells for reproduction in the process of budding.



2. When hydra reaches maturity and is well fed, its body wall begins to form a rounded growth from the stalk of the adult.
3. This growth is called a bud which develops in time into a miniature hydra.

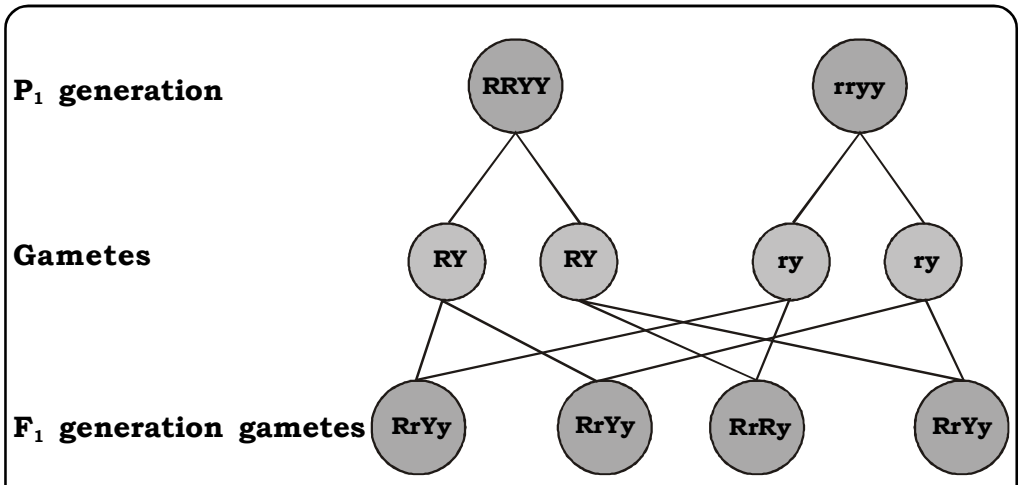
4. The body layers, body cavity and the digestive cavity of the young hydra are continuous with that of the parent hydra. The young hydra gets nourishment from the parent.
5. When the young hydra is sufficiently developed to take up an individual existence, the base of the new hydra seals off and thus allows the new individual to break off from the parent hydra.

Q.8. (1) **Attempt any ONE of the following :** **5**

1. Corrosion of metals can be prevented if the contact between metal and air is cut off. This is done in a number of ways. Some of the methods are given below :
   (a) Corrosion can be prevented if the metal is coated with something which does not allow moisture and oxygen to react with it.
   (b) Coating of metals with paint, oil, grease or varnish prevents the corrosion of metals e.g rusting of iron can be prevented by this method.
   (c) Coating of corrosive metals with non corrosive metals also prevents corrosion. Some of the methods by which metals can be coated with non-corrosive metals are:
2. **Galvanizing :** It is process of giving a thin coating of zinc on iron or steel to protect them from corrosion. E.g shiny iron nails, pins extra.
3. **Tinning :** It is the process of giving a coating of tin, i.e., molten tin over other metal.
   Eg. : Cooking vessels, made of copper and brass get a greenish coating due to corrosion. This greenish coating is poisonous. Therefore they are given a coating of tin to prevent corrosion. (Kalhai)
4. **Electroplating :** In this method a metal is covered with another metal using electrolysis. Silver-plated spoons, gold-plated jewellery, etc, are electroplated.
5. **Anodizing :** In this method metals like copper and aluminum are electrically coated with a thin strong film of their oxides. This film protects the metals from corrosion.
6. **Alloying :** An alloy is an homogenous mixture of two or more metals or a metal and a non-metal in definite proportion. The resultant metals called alloys do not corrode easily, e.g. stainless steel.
   Name of Alloy , constituent elements.
   (a) Brass (copper and zinc)
   (b) Bronze (copper and tin)
   (c) Stainless steel (iron, nickel and chromium)
   If one of the metal is mercury, then the alloy is known as an amalgam.

(2) **5**

1. A dihybrid cross is a cross involving two pairs of contrasting characters.
2. Mendel crossed pea plants having round and yellow seeds with plants having wrinkled and green seeds.
3. Round and yellow seeds (RRYY) are dominant characters while wrinkled and green seeds (rryy) are recessive characters.
4. In P_1 generation, a plant with round and yellow seeds (RRYY) was crossed with a plant with wrinkled and green seeds (rryy).
5. Each pair of genes segregates independently from the other. So, RRYY parents produced RY type of gametes and rryy parents produced ry type of gametes.
6. The F_1 generation plants produced four types of gametes i.e. RY, Ry, rY, and ry.



Mendel's dihybrid cross (formation of gametes)

7. When F_1 plants undergo self pollination, they give rise to F_2 generation.
8. The four types of male gametes and the four types of female gametes give rise to 16 mating combinations.

♀ \ ♂	ry	RY	rY	Ry
ry	rryy	RrYy	rrYy	Rryy
RY	RrYy	RRYY	RrYY	RRYy
rY	rrYy	RrYY	rrYY	RrYy
Ry	Rryy	RRYy	RrYy	RRyy

Phenotype	No. of squares in chequer board	Genotype	No. of squares in chequer board
Round-yellow	9	RRYY	1
Wrinkled-yellow	3	RrYy	4
Round-green	3	RRyy	1
Wrinkled-green	1	rrYY	1
		RrYY	2
		RRYy	2
		rrYy	2
		Rryy	2
		rryy	1

The phenotypic ratio is 9:3:3:1 and genotypic ratio is 1:4:1:1:2:2:2:2:1.

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