

GSEB
Batch :
10th Std.
Eng. Medium

MAHESH TUTORIALS
Subject : Science And Technology
Chapter : 4, 5, 10, 11, 15, 16, 17, 18
Model Answer Paper

Test -
Date:
Marks : 100
Time: 3 Hrs.

PART - A

Select a proper option (a), (b), (c) or (d) from those given below each questions : 50

1. (b) 10^3
2. (d) Thomson
3. (b) Dilute sulphuric acid
4. (c) Straight line
5. (c) 4 times
6. (a) Conductor
7. (b) Electric motor
8. (b) Oersted
9. (c) Electric motor
10. (b) Inductor
11. (b) Chandra
12. (a) East, West
13. (b) Saturn
14. (b) 9.46×10^{12}
15. (b) 13.7
16. (b) Jupiter
17. (b) Helbopp
18. (a) Lignite
19. (b) Coal gas
20. (b) Pyridine
21. (a) Tar
22. (a) 1 : 4
23. (d) Ester
24. (a) C_5H_{12}
25. (c) Blue
26. (b) 5
27. (c) Methanal
28. (c) Formalin
29. (c) Acetone
30. (d) Amoeba
31. (c) Hydra
32. (c) Gametes
33. (c) Hydra (or Planaria)
34. (c) In scrotum
35. (a) DNA
36. (a) Virus responsible for AIDS
37. (c) 22 pairs
38. (c) A + Y
39. (d) 9 : 3 : 3 : 1
40. (a) Ecosystem
41. (a) 310 to 200 nm
42. (b) Food chain
43. (a) Unidirectional
44. (c) both biotic and abiotic factors.
45. (c) Sardar sarovar dam
46. (a) Khejrli
47. (d) Coal and petroleum
48. (c) Use of own vehicle and not to waste time in public transpot system
49. (d) Deforestation
50. (b) 88, 4



PART - B
SECTION - A

Answer the following questions : [2 marks]

10

1. Various substances of different sizes keep on coming to the earth regularly. Such substances are known as meteors. ½
- ⇒ When they enter the earth's atmosphere, they burn due to friction caused by the earth's gravity and a streak of light is seen. ½
- ⇒ This, in ordinary language, is called shooting star. In fact, they are not stars. ½
- ⇒ Maximum number of meteors are seen in the period between August to November. ½
- ⇒ Sometimes, the heavenly body of large size cannot burn completely and strike the earth surface as fire ball. ½
- ⇒ Such burning fire balls are known as meteorites. ½

OR

1. Mars is also our neighbouring planet away from the sun. It is reddish in colour. ½
- ⇒ The surface of the mars has large valleys, mountains and dry rivers. It has negligible atmosphere (1% of the atmosphere of the earth). ½
- ⇒ This atmosphere mainly contains carbon dioxide. It also contains nitrogen (N₂) and argon (Ar) in small amounts. ½
- ⇒ It is believed that its poles are covered by dry ice (solid CO₂). Information available from Path Finder Mission of 1997 indicates existence of flowing water on the mars in the past. ½
- ⇒ At present, probability of existence of life on the mars is negligible. It has two moons, namely Phobos and Demos. ½

2. According to definition of electrical power, ½

$$P = \frac{W}{t}$$

$$m W = P \times t$$

m 1 joule = 1 watt × 1 second ½

- ⇒ The unit 'watt sec' is smaller for electrical energy, so in practice a unit kilo watt hour (kWh) is used. ½
- ⇒ 1 kWh = 1000 watt × 3600 second ½
- m 1 kWh = 3.6 × 10⁶ joule ½
- ⇒ Electricity which you use in your house for domestic purpose is calculated in kWh. It is called 'unit'. ½

3. CNG (Compressed Natural Gas) contains mostly methane and in some proportion ethane and propane are present. ½
- ⇒ By reducing its volume at high pressures, it is used as a fuel in place of petrol in automobile engines like trucks, buses, etc. ½
- ⇒ As CNG is completely combusted, the additional poisonous gas does not spread pollution but sometime because of incomplete combustion it heats up the mechanical machinery of the vehicle which is the disadvantage of CNG. 1

OR

3. The industrial name of ethyne is acetylene. Ethyne is industrially very important. ½
- ⇒ The substances like ethanol, acetic acid, vinyl polymer and plastic like substances can be prepared from it. ½
- ⇒ Ethyne is used in oxyacetylene flame used for welding of metals. ½
- ⇒ On kite flying day, acetylene gas is filled in rubber balloons and are flown high in sky. ½

4. **Given** : P = 100 watt = 0.1 kilowatt

$$t = 2 \text{ hrs.}$$

$$W = ?$$

The energy spent in 1 day,

$$\begin{aligned} W &= P \times t \\ &= 0.1 \text{ kW} \times 2 \text{ hr} \\ &= 0.2 \text{ kWh} \end{aligned}$$

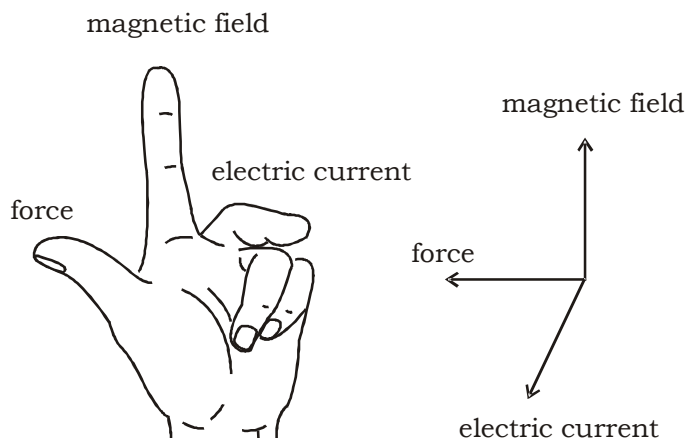
½

½

The energy spent in 30 day,

$$W = 0.2 \times 30 \\ = 6 \text{ kWh}$$

5.



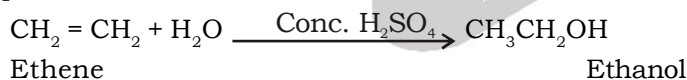
Fleming's left hand rule

- ⇒ Arrange the left hand such that the forefinger, the center finger and thumb remain at right angle to one another.
- ⇒ Arrange the forefinger pointing in the direction of magnetic field and the Center finger in the direction of an Electric current, the direction of thumb gives direction of magnetic force.

SECTION - B

Answer the following questions : [2 marks]

6. The industrial production of ethanol is carried out by hydration of ethene ($\text{CH}_2 = \text{CH}_2$) obtained from petrochemical.
- ⇒ Ethanol is formed by hydration of ethene with water in presence of concentrated sulphuric acid.



7. Sexual reproduction takes place by union of two types of sex cells i.e male sex cells and female sex cells.
- ⇒ The sex cells involved in sexual reproduction are known as Gametes.
 - ⇒ In sexual reproduction, male gamete unit with a female gamete to produce zygote.
 - ⇒ This zygote then develops into a new organisms.
8. The main compounds behind the depletion of ozone layer are:
- (i) Addition of Cl^- in air
 - (ii) Chloroflouro carbon(CFC)
 - (iii) Freon used in refrigerator and air conditioners.

9. Heredity is transmission of characters from parents to the offsprings.
- This involves the tendency of every individual to resemble their parents.
 - Hereditary information is present in the fertilized egg or zygote.

OR

9. Fossils- The impressions of dead plants or animals that lived in the past.
- Plants or animals when die are decomposed by micro organisms in the presence of moisture and oxygen.
 - Due to some environmental conditions bodies do not decompose completely.
 - Such body parts of the plants or animals become fossils.

10. Forests are our most valuable resources-

→ We get food, fodder, fibers, timber, fuel wood, medicines, gum, resins and bamboo from the forest.

→ Bamboos are mostly used to make slats for huts & basket for storing things.

1
½

SECTION - C

Answer the following questions : [3 marks]

15

11. In the field of communication, we use satellites for television transmission, radio networks and computer networks.

1

⇒ Country-wide classroom and tele-conferencing have enabled us to spread education in remote villages of the country.

1

⇒ For this purpose India has launched INSAT series. So far we have launched INSAT 1,2,3 series for these purposes.

1

12. $R_1 = 30 \Omega$, $R_2 = 30 \Omega$, $R_3 = 30 \Omega$, $V = 2V$

R_2 and R_3 are in series connection.

½

$$R' = R_2 + R_3$$

$$R' = 30 + 30$$

$$R' = 60 \Omega$$

R_1 and R' are in parallel connection.

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R'}$$

½

$$\frac{1}{R} = \frac{1}{30} + \frac{1}{60}$$

$$\frac{1}{R} = \frac{2 + 1}{60}$$

½

$$\frac{1}{R} = \frac{3}{60}$$

$$\frac{1}{R} = \frac{1}{20}$$

½

$$R = 20 \Omega$$

$$\text{Now, } V = IR$$

$$I = \frac{V}{R}$$

½

$$I = \frac{2}{20}$$

$$I = \frac{1}{10}$$

$$I = 0.1 \text{ A}$$

½

OR

12. $P = 4.4 \text{ kw} = 4.4 \times 1000 \text{ W} = 4400 \text{ W}$

$$V = 220 \text{ V, } t = 2 \text{ hours} = 2 \times 3600 = 7200 \text{ seconds}$$

$$I = \frac{P}{V}$$

½

$$I = \frac{4400}{220}$$

$$I = 20 \text{ A}$$

½

$$\text{Energy} = P \times t$$

$$w = 4400 \times 7200$$

$$w = 31680000$$

$$w = 3.168 \times 10^7 \text{ W}$$

½



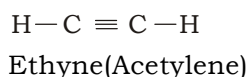
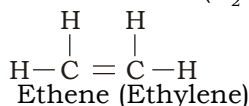
$$V = IR$$

$$mIR = \frac{V}{I}$$

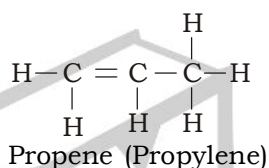
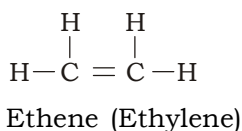
$$mIR = \frac{220}{20}$$

$$mIR = 11 \Omega$$

13. In unsaturated hydrocarbons, the nearby any two carbon - carbon atoms are combined by a double bond (- C = C -) or triple bond (- C ≡ C -) i.e. there is double bond or triple bond because of sharing of two-two or three-three electrons of any two nearby carbon atoms viz. Ethene (C₂H₄), ethyne (C₂H₂) etc.



- ⇒ The hydrocarbons in which any two nearby carbon atoms are combined by a double bond unsaturated hydrocarbons are called alkenes. viz ethene (C₂H₄) propene (C₃H₆), butene (C₄H₈), pentene (C₅H₁₀).



14. A Trophic level is each step or level of food chain.

- (i) **Producers** - First trophic level.
 (ii) **Herbivores** - Second trophic level.
 (iii) **Carnivores** - Third trophic level.

OR

14. Waste are classified into two major terms:

- (a) Solid and
 (b) Liquid forms.

- ⇒ All the waste material produced by the various activities of man and animals are poisonous to some extent and can be divided into two major groups-

- (a) **Biodegradable Waste:-** The waste material which can be broken down by biological processes i.e. by the action of microorganisms into non-poisonous substances in nature is called as Biodegradable waste. Example vegetables, fruits, cow dung etc.
 (b) **Non-biodegradable Waste:-** The waste material which cannot be broken down by biological processes i.e. by the action of microorganism into non-poisonous substances is called non-biodegradable waste. Example plastic, polyethene, DDT, glass, metals.

15. Following steps can be taken to conserve energy resources-

- Switch off the lights, fans, T.V. when not needed.
- Make use of stairs instead of lift at least upto two to three floors in a building.
- Pressure cookers should be used to save the fuels.
- Public transport system should be made available so people do not use their vehicles to commute.
- Bicycles can be used to cover short distances.

SECTION - D

Answer the following questions : [5 marks]

16. Chemically, detergents are the sodium salts of organic sulphonic acid.

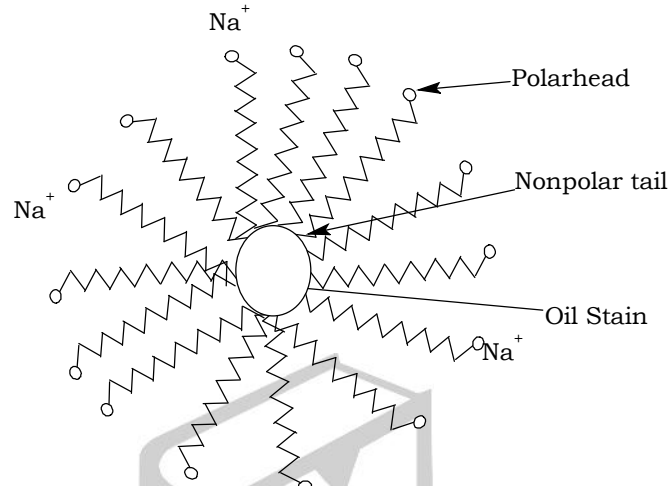
Molecule of soap



Molecule of detergent

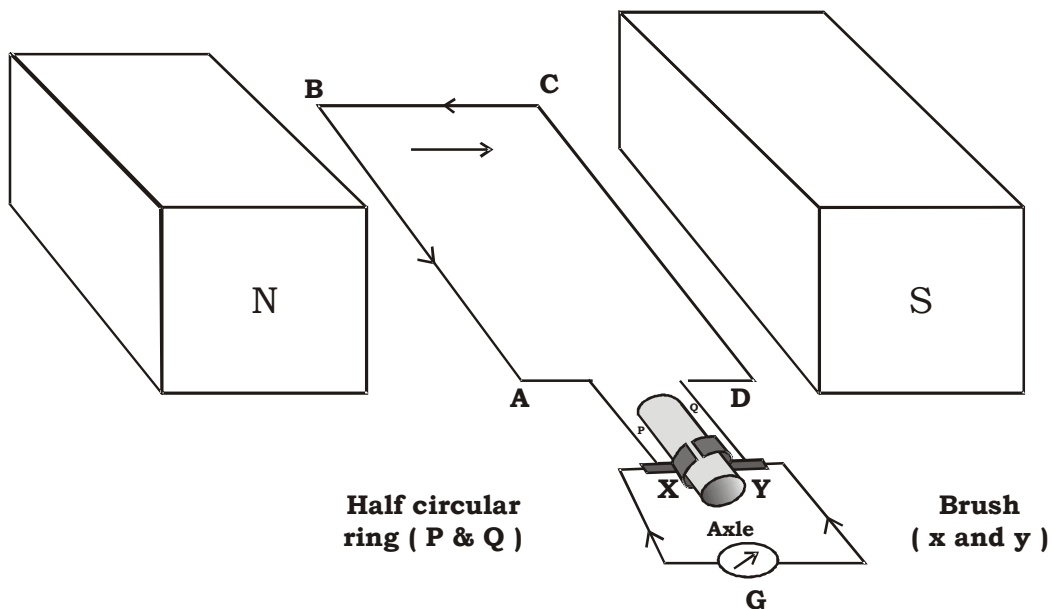


- ⇒ The cleansing effect of the detergent is more effective because Ca^{2+} and Mg^{2+} ions present in hard water do not give precipitates with ions which are in the soluble form. ½
- ⇒ They remain in the solution and so detergent in more quantity is not used. Hence, the use of detergent has increased. ½
- ⇒ The cleansing process of soap and detergent is same. ½
- ⇒ There are two parts in the structure of soap and detergent. One part of a long hydrocarbon chain known as nonpolar tail. It does not possess attraction towards water but possesses attraction towards dirt or stain. ½



- ⇒ While the other negatively charged part ($-\text{COONa}$ or $-\text{SO}_3\text{Na}$) is known as head. It possesses attraction towards water molecules. ½
- ⇒ Concentrated solution of soap or detergent is applied on the dirty or oily stained surface. The nonpolar part possessing attraction towards dirt or stain. ½
- ⇒ When polar part remains in water, it possesses attraction towards water. The spherical structure formed around the stain is called micelle. ½
- ⇒ The hydrocarbon part remains attached with the surface containing dirt or oil while polar part remains in water. ½
- ⇒ The part on which detergent is applied, is being dragged by water so that the water gets dirty and the surface becomes clean. ½

17.



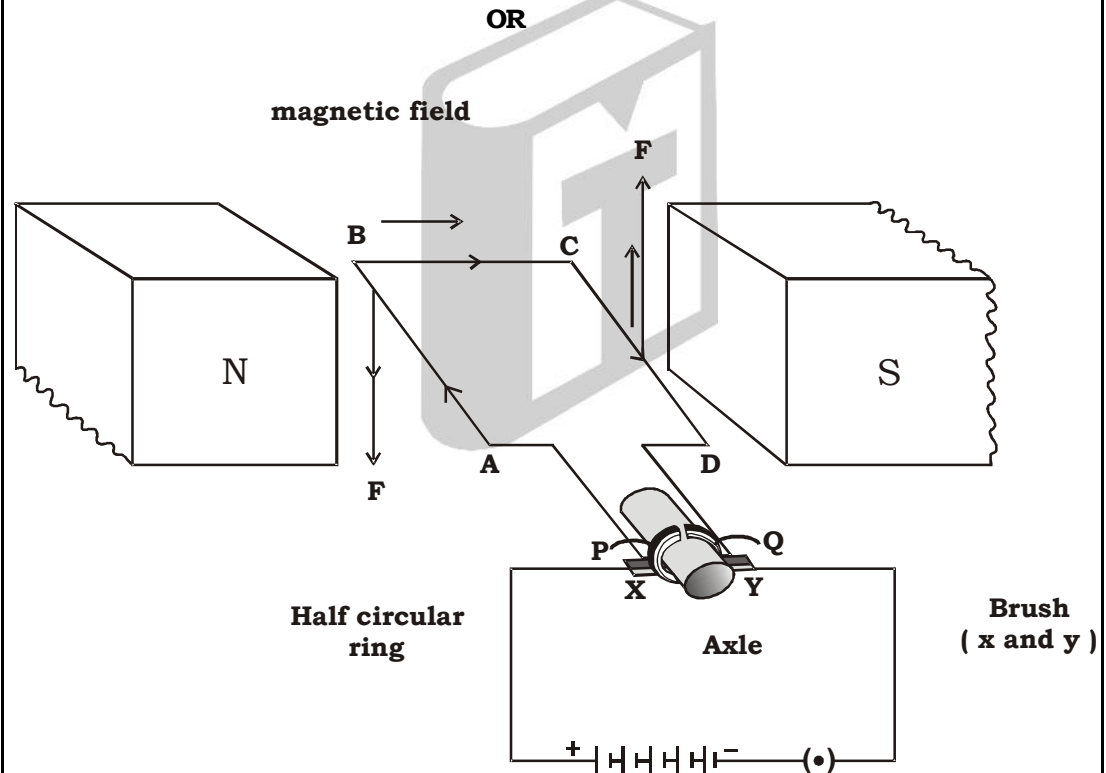
Construction of electric generator

- ⇒ Electric generator converts mechanical energy into electrical energy. It works on the principle of an electromagnetic induction. ½
- ⇒ The construction of an electric generator is like the construction of an electric ½

motor which is shown in Figure.

- ⇒ The two ends of a loop ABCD are placed in a magnetic field and are connected with two semi-circular rings P and Q. 1/2
- ⇒ These two rings are insulated from each other. These rings can slide while remaining in contact with the brushes X and Y. 1/2
- ⇒ A galvanometer is connected between the two ends of brush. By applying mechanical rotation to the loop ABCD in the magnetic field, the number of magnetic field lines associated with it changes so that an electric current is induced which is observed from the deflection of galvanometer. 1/2
- ⇒ Thus, the mechanical energy is converted into electrical energy. 1/2
- ⇒ By rotating the loop in a magnetic field, the side AB moves upward and the side CD move downwards. The direction of an induced electric current in wire AB and CD can be known by Fleming's right hand rule. As shown in the Figure, induced electric current flows in a path B-A-G-D-C. 1/2
- ⇒ After the half rotation of a loop, the ring P comes in the contact with brush Y and the ring Q with the brush X. Here, the brush X is always in contact with the side moving upwards while the brush Y is always with the side moving downwards as a result of which the current flows only in one direction. 1/2
- ⇒ This current is called direct or DC current. This type of generator is called DC generator. Similarly instead of half ring if full ring is used then A.C. current can be generated and such generator is called A.C. generator. 1/2

17.



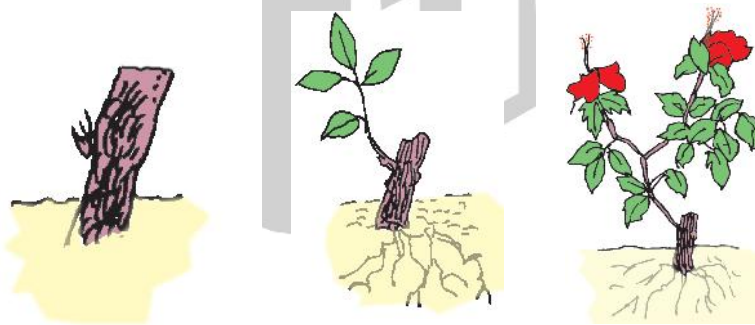
Construction of an electric motor

- ⇒ An electric motor is a device that converts electrical energy into mechanical energy. 1/2
- ⇒ The construction of an electric motor is as shown in Figure. A loop ABCD of an insulated copper wire is placed in a permanent magnetic field such that AB and CD remain perpendicular to the magnetic field. 1/2
- ⇒ The ends of this wire are connected to the two semicircular rings P and Q. The inner part of both the rings is insulated. 1/2
- ⇒ Both the rings are arranged on an axle such that they can rotate easily on it. 1/2
- ⇒ The outer position of the ring is in contact with a stationary brush X and Y. (In actual motor, a loop containing many turns is arranged on axis. This arrangement is called an armature). 1/2

- ⇒ The electric current flows through a loop ABCD by connecting a battery between the brushes X and Y. The current flowing through BC and AD is either parallel or antiparallel to magnetic field, so force does not act on them. ½
- ⇒ But the currents flowing in wires AB and CD are perpendicular to the magnetic field, hence force act on them.
- ⇒ The direction of this force is obtained from Fleming's left hand rule. As shown in Figure, the force on AB acts in the downward direction and the force on CD acts in upward direction. As these two forces are in the mutual opposite directions, the loop ABCD is rotated.
- ⇒ After the completion of half rotation, the ring Q comes in contact with the brush X and the ring P with the brush Y, so that the direction of an electric current gets reversed. ½
- ⇒ Due to this, the direction of force acting on AB and CD is also reversed. As a result, the loop continues to rotate in the same direction. At the end of one rotation loop comes to the earlier position.
- ⇒ Thus, after every half rotation the direction of an electric current in a loop changes and loop rotates continuously. ½

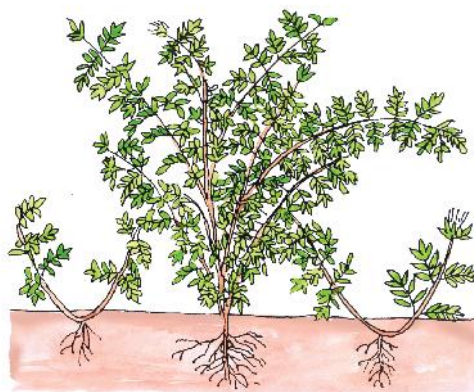
18. Artificial propagation is a artificial method to produce many plants from a single plant.

- ⇒ Three common method are - ½
- ⇒ Cutting, Layering, and Grafting.
- ⇒ **Cutting** - is a process in which a cutting of stem or leaf or shoot having some buds on it is taken and its lower part is buried in the moist soil. ½
- ⇒ The cutting later develops roots and grows into plant similar to the parent plant. ½
- Eg - Rose, Bougainvillae



Cutting

- ⇒ **Layering** - A part of stem is pulled towards the ground and covered by the soil. ½
- ⇒ Once the covered part develops its own roots it behave independently and is detached from the parent plant and grows into mature plant. ½
- Eg - Lemon, Crysanthemum.



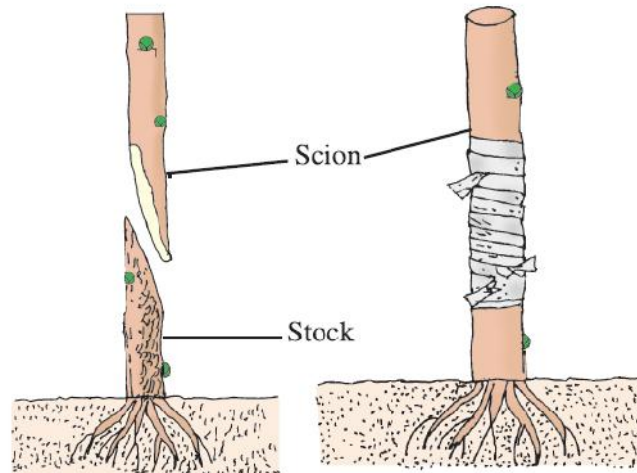
Layering

⇒ **Grafting** - The cut stems of two different plants are joined in a way that they unite and grow as one plant. ½

⇒ One plant part has roots and other is without roots.

Stock - is the stem having roots.

Scion - is the stem without root of another plant. ½



On stock of citrus scion of lemon can be grafted. ½

⇒ In this most desirable characters of the plants can be brought together. ½

OR

18.

No.	Male reproductive system	Female reproductive system	
1.	Testes, epididymis, seminal vesicle, prostate gland and penis are included in it.	Ovary, oviduct, uterus and vagina are included in it.	1
2.	Testes are located in the scrotal sac outside the abdominal cavity.	Ovaries are located in the abdominal cavity.	1
3.	The vas deference, joints with urinary duct coming from urinary bladder to form urethra.	The oviducts from two sides open in the muscular uterus.	1
4.	The anterior part of penis having genital pore, its act as urinogenital opening.	In female, the urinary opening and genital opening are separate.	1
5.	Those organs are included which are related with production of sperms and transfer sperms to place of fertilization.	Those organs are included which are related with production of ovum, implantation of embryo and birth of child.	1

★★★★ Best of Luck ★★★★★