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$$E = mc^2$$



My Favorite Guide On **SCIENCE & TECHNOLOGY-II**

विज्ञान व तंत्रज्ञान भाग-2

Std 10th - Semi English



DNYANADA PUBLICATION, PUNE

**महाराष्ट्रात
प्रथमच...**

11th आणि 12th (Science) ची पुस्तके
English व Scientific मराठी मधून...

Authors :
Qualified and Experienced Staffs From :
PUNE | LATUR PATTERN

TOPIC - 01

HEREDITY AND EVOLUTION

Q.1 Can you recall?

1) Which component of the cellular nucleus of living organism carries hereditary characters?

Ans: The chromosomes made up of nucleic acids and proteins, present in the nucleus of the cell are the component that carry hereditary characters in living organism.

2) What do we call the process of transfer of physical and mental characters from parents to the progeny?

Ans: The process of transfer of physical and mental characters from parents to the progeny is called inheritance or heredity.

3) Which are the components of the DNA molecule?

Ans: DNA molecule is made up of two helical strands consisting of deoxyribose sugar, phosphoric acid and pairs of nitrogenous bases.

Introduction:

Heredity and Evolution (आनुवंशिकता व उत्क्रांती):

Q.१ थोडे आठवा:

१) Living organism च्या cellular nucleus (पेशीकेंद्रक) मधील hereditary characters (आनुवंशिकता गुणधर्म) वाहून नेणारा Component (घटक) कोणता?

Ans: Living Organism च्या Cellular Nucleus मधील hereditary characters वाहून नेणारा Component हा chromosome आहे. जो की nucleic acid (केंद्रकीय आम्ल) आणि Proteins (प्रथिने) या पासून बनलेला आहे आणि cell च्या nucleus मध्ये Present असतो.

२) आपल्या Parents ची Physical आणि mental characters त्यांच्या Progeny (संतती) मध्ये transfer होण्याच्या process ला काय म्हणतात ?

Ans: आपल्या Parents ची Physical आणि mental characters त्यांच्या Progeny (संतती) मध्ये Transfer होण्याच्या process ला inheritance of heredity (आनुवंशिकता) म्हणतात.

३) DNA molecule कोणत्या component पासून बनलेला आहे?

Ans: Deoxyribose sugar, Phosphoric Acid and Pairs of nitrogenous bases consist असणाऱ्या two helical strands नी DNA बनलेला असतो.

1.1 Heredity and hereditary changes

Q.2 What is the heredity and hereditary changes?

Ans: Heredity and hereditary changes:

- i) You know that heredity is the transfer of biological characters from one generation to another via genes.
- ii) Johann Gregor Mendel is pioneer of the modern genetics.
- iii) Around the period of 1886, it took a long time for him to understand the conclusion of his research about heredity.
- iv) In 1901, the reasons behind the sudden changes were understood due to mutational theory of Hugo de Vries.
- v) Meanwhile in 1902, Walter and Sutton observed the paired chromosomes in the cells of grasshopper; until then it was not known anyone
- vi) Research started in the direction of finding the nature of genetic material when it was proved that genes are carried via chromosomes.
- vii) Through which 1944, trio of scientists Oswald Avery, Mcllyn McCarthy and Colin MacLeod proved that expect viruses, all living organisms have DNA as genetic material.
- viii) In 1961, the French Geneticists Francois Jacob and Jack Monad proposed a model for process of protein synthesis with the help of DNA in bacterial cells. It helped to uncover the genetic codes hidden in DNA.
- ix) Thereby, the technique of recombinant DNA technology emerged which has vast scope in the field of genetic engineering.
- x) The science of heredity is useful for diagnosis, treatment and prevention of hereditary disorders, production of hybrid varieties of animals and plant and in industrial processes in which microbes are used.

Q.२ Heredity and hereditary changes (आनुवंशिकता व आनुवंशिक बदल):

i) आपल्याला माहित आहे की, heredity हे एक Biological character (जैविक लक्षण) चे एका generation (पिढी) कडून दुसऱ्या generation कडे genes (जनुके) द्वारे transfer होय.

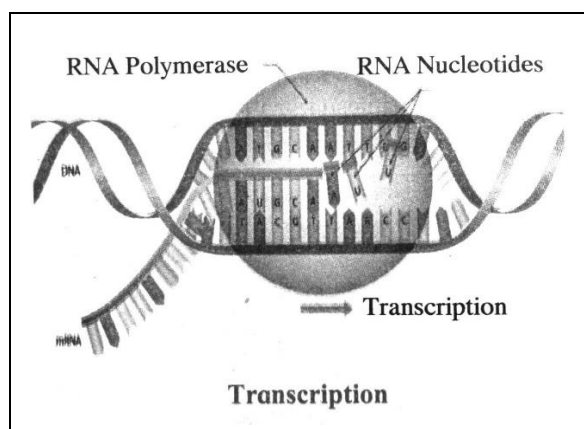
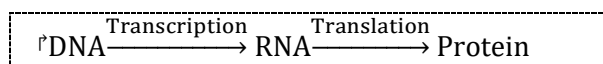
1.2 Transcription, Translation and Translocation:

1.2.1 Transcription:

Q.5 Write note short on Transcription.

Ans: Transcription:

- i) With the help of RNA, the genes present in the form of DNA participate in the functioning of cell and thereby control the structure and functioning of the body.
- ii) Information about protein synthesis is stored in the DNA and synthesis of appropriate proteins as per requirement is necessary for body.
- iii) These proteins are synthesized by DNA through the RNA.



- iv) This is called as 'central Dogma'.
- v) m RNA is produced as per the sequence of nucleotides on DNA.
- vi) Only one of the two strands of DNA is used in process.
- vii) The sequence of nucleotides in mRNA being produced is always complementary to the DNA strand used for synthesis.
- viii) Besides, there is uracil in RNA instead of thymine of DNA.
- ix) This process of RNA synthesis is called as 'transcription'.

Q.५ Transcription (प्रतिलेखन):

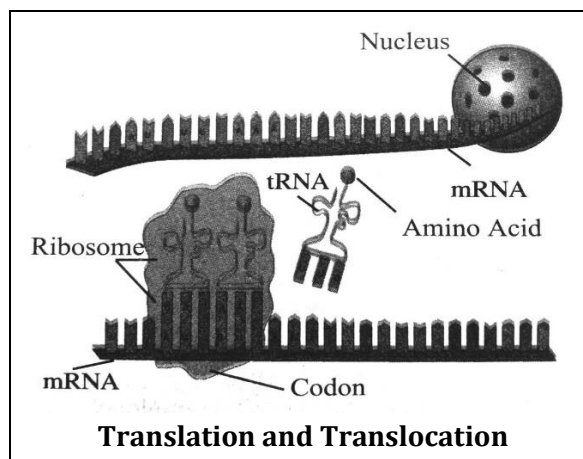
- i) DNA मध्ये असलेली genes, RNA च्या साहाय्याने cell च्या functioning मध्ये participate होतात तसेच body चे structure व functioning यावर control ठेवतात.
- ii) Genes मध्ये protein synthesis विषयी information साठवलेली असते व appropriate (योग्य) protein ची requirement नुसार होणारे synthesis body करता ponnecessary असतात.
- iii) या protein ची synthesis DNA मुळे RNA च्या through होते.
- iv) यालाच central dogma असे म्हणतात.
- v) DNA वरील nucleotide च्या sequence नुसार m RNA ची निर्मिती होते.
- vi) ही process होताना DNA च्या दोन strands पैकी एकाचा use होतो.
- vii) तयार होणाऱ्या m- RNA molecule मधील आणि तो produce करण्यासाठी use केलेला DNA चा एक strand या दोन्हीच्या nucleotide चा sequence हा एकमेकांना complementary असतो.
- viii) याशिवाय DNA मधील thymine ऐवजी m- RNA मध्ये uracil असते.
- ix) या RNA synthesis च्या process ला transcription (प्रतिलेखन) म्हणतात.

1.2.2 Translation and Translocation:

Q.6 What is the Translation and Translocation?

Ans: Translation:

- i) The mRNA formed in nucleus comes in cytoplasm.
- ii) It brings in the coded message from DNA. The message contains the codes for amino acids.
- iii) The code for each amino acid consists of three nucleotides. It is called as 'triplet codon'.



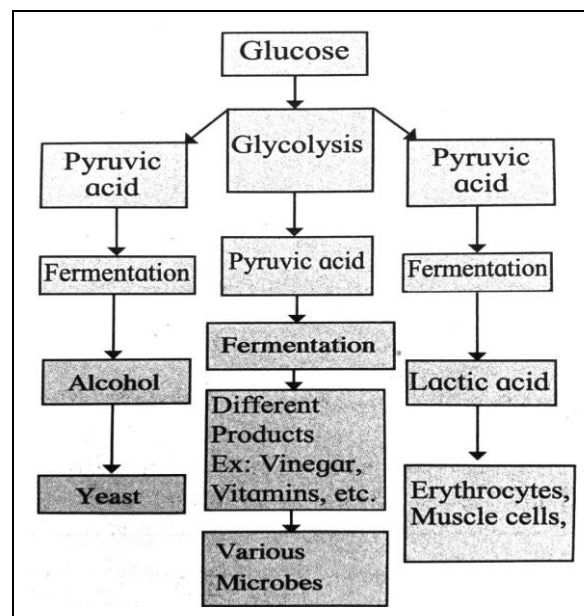
Ans: i) ATP molecule हा energy rich (उर्जा समृद्ध) molecule आहे.

ii) Adenine हा nitrogenous compound, ribose ही pentose शर्करा आणि तीन phosphate groups हे तीन compound ATP मध्ये असतात.

iii) अशाप्रकारे triphosphate molecule हा adenosine ribonucleoside पासून form होतो.

iv) याटिकाणी energy bond मध्ये store केली जाते ज्यामध्ये phosphate groups एकमेकांना जोडलेले असतात. Cell (पेशी) च्या गरजेनुसार phosphate bond break करून ATP पासून energy obtain केली जाते.

v) ATP molecule हे गरजेनुसार cell मध्ये store केले जातात.



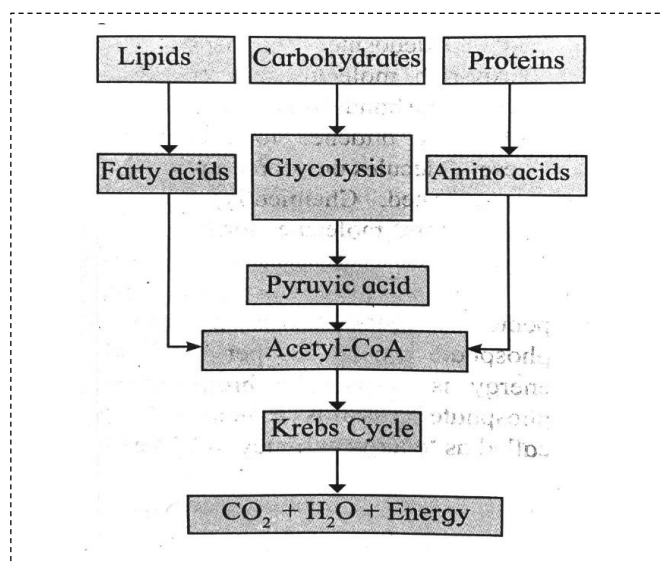
2.4 The cellular process and their researchers:

Process	Synonym	Researcher
Glycolysis	Embden, Meyerhof, Parnas pathway (EMP pathway)	Gustav Embden, Otto Meyerhof, and Jacob Parnas
Tricarboxylic acid cycle	Krebs cycle / TCA cycle	Sir Hans Krebs

२.४ वरील table मध्ये cellular process आणि त्यांचे researcher दिले आहेत. त्याचे वाचन करून, लक्षात ठेवावेत.

a) आणि b) मध्ये aerobic respiration आणि anaerobic respiration मधून होणारी energy production ची process दिली आहे. ती काळजीपूर्वक वाचून लक्षात ठेवावी.

a) Process of energy production through aerobic respiration of carbohydrates, proteins and fats:



b) Anaerobic respiration in living organisms/cells:

2.5 Energy production in Microorganisms through Anaerobic Respiration:

i) Some bacteria and lower organisms do not live in presence of oxygen. They perform anaerobic respiration for energy production.

ii) Anaerobic respiration has two steps: Glycolysis and fermentation. During this glucose is incompletely oxidized releasing less amount of energy.

iii) Pyruvic acid produced through glycolysis is converted into other acids or alcohol (C_2H_5OH) in process which is called fermentation. This process is aided by some enzymes.

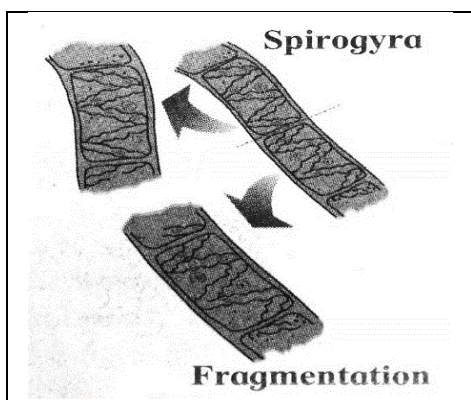
iv) If there is deficiency of oxygen level in the surrounding, some higher plants, animals and aerobic microorganisms also perform anaerobic respiration.

v) E.g. If the soil is submerged under water during germination, seeds perform anaerobic respiration. Similarly, human muscle cells while performing the exercise may also switch to anaerobic respiration.

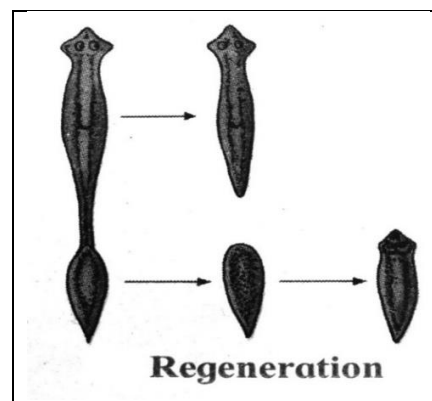
vi) This makes the person feel tired due to less amount of release of energy and due to lactic acid accumulation.

B) Asexual reproduction in multicellular organisms:**Q.5 Explain the asexual reproduction in multicellular organisms.****Ans: 1) Fragmentation:**

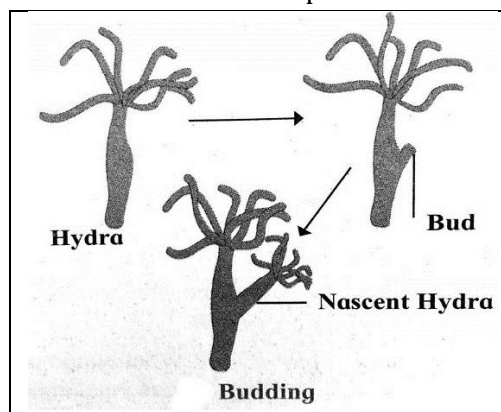
- i) This type of asexual reproduction occurs in multicellular organism.
- ii) In this type of reproduction, the body of parent organism breaks up into many fragments and each fragment starts to live as an independent new organism.
- iii) This type of reproduction occurs in algae like Spirogyra, and sponge like sycon.
- iv) Whenever there is plenty of water and nutrients are available to Spirogyra, its filaments grow up very fast and break up into many small fragments.
- v) Each fragment starts to live independently as a new Spirogyra fiber.
- vi) If the body of sycon breaks up accidentally into many fragments, each fragment develops into new Sycon.

**2) Regeneration:**

- i) You may know that the wall lizard breaks up and discards some part of its tail in emergency. Discarded part regenerated after a period. This is example of limited regeneration.
- ii) However, under certain situations, an animal-Planaria breaks up its body into two parts and thereafter each part regenerates remaining part of the body and thus two new Planaria are formed. This is called as regeneration.

**3) Budding:**

- i) In case of Hydra, under favorable conditions at specific part of its body, an outgrowth is formed by repeated division of regenerative cells of body wall. This outgrowth is called as bud.
- ii) Bud grows up progressively and finally forms a small hydra. Dermal layers and digestive cavity of the budding hydra are in continuity with those of parent hydra.
- iv) Parent hydra supplies nutrition to the budding hydra.
- v) Budding hydra separates from parent hydra and starts to lead an independent life when it grows up and becomes able to lead an independent life.

**4) Vegetative Propagation:**

- i) Reproduction in plants with the help of vegetative parts like root, stem, leaf and bud is called as vegetative reproduction.

4.10 Three Endangered Heritage Places of the Country

Q.16 Which are the Three Endangered Heritage Places of the Country?

Ans: i) The Western Ghat spread over the states of Gujarat, Maharashtra, Goa, Tamilnadu and Kerala has been endangered due to mining industry and search for natural gas. Habitats of Asiatic lion and wild bison of this region have been under threat.

ii) Manas sanctuary of the Assam is under threat due to dams and indiscriminate use of water. Tiger and rhino of that region are under threat.

iii) Sunderban sanctuary of West Bengal is reserved for tigers. However, the tiger population and overall local environment is seriously challenged by dams, deforestation, excessive fishing, trenches dug for same, etc.

४.१० Three Endangered Heritage Places of the Country (धोक्यात आलेली देशातील तीन वारसास्थळे):

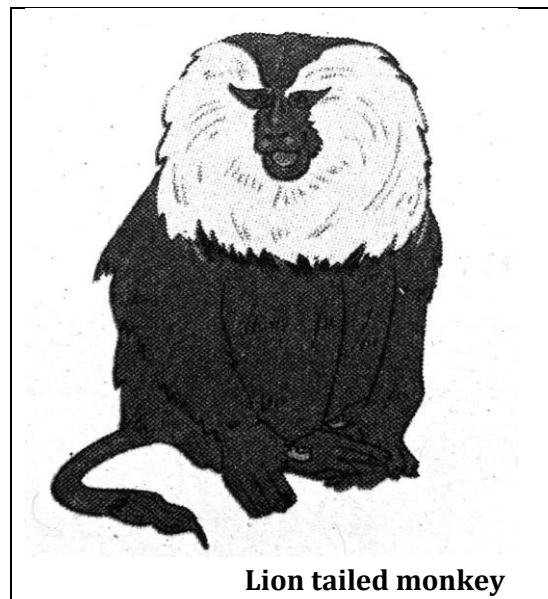
Q.१६ - i) Gujarat, Maharashtra, Goa, Tamilnadu, Karnataka, Kerala या ५ state मध्ये spread झालेल्या western ghat हा mining industry (खाण उद्योग) आणि natural gas च्या search साठी सुरू असलेल्या work मुळे धोक्यात (endanger) आला आहे. या ठिकाणी असलेल्या Asiatic lion आणि wild bison (रानगवे) यांचे habitat (अधिवास) धोक्यात येत आहे.

ii) Assam च्या Manas sanctuary (अभयारण्य) मधील Dam (धरणे) आणि water चा होत असलेला indiscriminate (बेसुमार) वापर यांचा फटका (threat) बसलेला आहे. या ठिकाणी असलेले tigers आणि rhino (एकशिंगी गेंडा) यांना धोका (threat) निर्माण झाला आहे.

iii) West Bengal मधील Sunderban Sanctuary (अभयारण्य) हे tiger साठी reserve आहे. पण dams, deforestation (वृक्षतोड), excessive fishing (अतिरिक्त मासेमारी) व त्यासाठी खोदलेले चर (trenches dug) यामुळे तेथील tiger व environment समोर serious challenge (मोठे आव्हान) उभे राहिले आहे.

4.11 Classification of Threatened Species

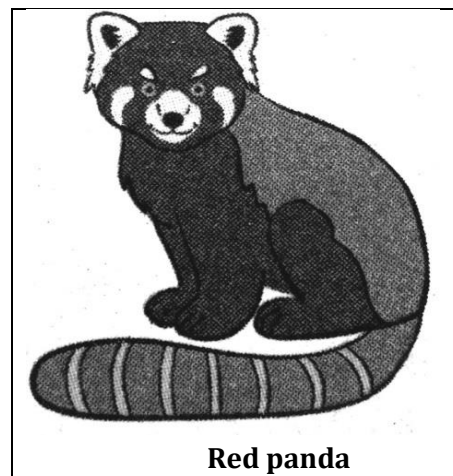
1) Endangered Species



Lion tailed monkey

i) Either number of these organisms is declined or their habitat is shrunk to such an extent that they can be extinct, in near future if conservative measures are not implemented. Example, lion tailed monkey, lesser florican.

2) Rare Species



Red panda

i) Number of these organisms is considerably declined.
ii) Organisms of these species being endemic may become extinct very fast. Example, Red panda, Musk deer.

3) Vulnerable Species

i) Number of these organisms is extremely less and continues to decline.
ii) Continuous decline in their number is worrisome reason. Example, tiger, lion.

2) Thermal electricity generation and solar thermal electricity generation

Ans:

No.	Thermal electricity generation	Solar thermal electricity generation
i	After burning the coal, the heat that is produced is used in the generation of thermal electricity.	Solar radiations are used in solar thermal electricity production.
ii	For producing heat, the coal is burnt in the boilers.	For production of heat, many reflectors are used which reflect the radiations of the sun into the absorbent.
iii	The combustion of coal produces heat. This heat converts water into steam, which is under very high temperature and pressure. By its force the turbines move. The turbines in turn are connected to generator which rotates and produces energy.	Sun's heat converts water into steam that rotates the turbine. The turbines then rotate the generator. This generates the electricity.
iv	Thermal energy is polluting and not eco-friendly.	Solar energy is not polluting, it is eco-friendly.
v	The fuel here is coal, its reserves are limited.	The solar radiations are in abundance and are sustainable and persistent.

Q.१६ २) हे distinguish (फरक) लिहण्यासाठी thermal electricity generation आणि solar thermal electricity generation च्या point (मुद्दा) मधील explanation वाचावे.

Q.17 Explain with diagram step-by-step energy conversion in:

1) Thermal power plant:

2) Nuclear power plant:

3) Hydroelectric power plant:

4) Solar thermal power plant:

Q.१७ खालील power plant मध्ये energy कशाप्रकारे step-by-step (टप्प्या-टप्प्याने) convert करतात-

१) Thermal power plant (औष्णिक विद्युत केंद्र) - यासाठी ५.३ thermal energy based electric power station आणि ५.३.१ schematics of thermal plants चे वाचन करावे.

२) Nuclear power plant - यासाठी ५.४ मधील power plant based on nuclear energy चे वाचन करावे व त्यानुसार आत्मसात करावे.

३) Hydroelectric power plant - यासाठी ५.७ hydroelectric power plant या point (मुद्दा) मधील explanation वाचावे.

४) Solar thermal power plant - यासाठी ५.१० solar thermal power plant यामधील explanation वाचावे.

Q.18 Give scientific reasons:

1) The construction of turbine is different for different type of power plants.

Ans: The construction of turbine is different for different type of power plants, because -

- Generators work on the principle of electromagnetic induction. For this the generator must be rotated.
- For this purpose, there is a turbine for each generator. For rotation of a turbine, energy is needed.
- The turbines of different according to the type of energy source that is used for its rotation.
- Therefore, the construction of turbine is different for each power plant.

Q.१८ Give scientific reasons (शास्त्रीय कारणे):

१) Turbine चे construction (आराखडा) हा power plant च्या different type नुसार different (वेगवेगळा) असतो.

Ans: i) Electromagnetic induction principle (विद्युत चुंबकीय प्रवर्तन चे तत्त्व) नुसार generator चे कार्य चालते. यासाठी generators rotate (फिरणे/चालणे) गरजेचे असते.

b) Triploblastic:

- i) Three germinal layers, ectoderm, mesoderm and endoderm present.
- ii) e.g. All other animals.

4) Body cavity:**Body symmetry (सममिती) चे types:****Ans: a) Asymmetrical body system (असममित शरीर):**

- i) कोणताही imaginary axis हा body चे दोन equal halves (समान भाग) मध्ये विभाजन करू शकत नाही.
- ii) उदा. अमिबा, पॅरामेशियम आणि काही sponges (स्पंज)

b) Radial symmetry (अरिय सममिती):

- i) Body च्या बरोबर central axis (मध्य अक्ष) मधून जाणाऱ्या कोणत्याही plane (प्रतल) मधून cut केल्यास दोन equal (भाग) होतात.
- ii) म्हणून पाच different planes ही central axis मधून cut केल्यास दोन समान halves मिळू शकतात.
- iii) उदा. तारामासा आणि इतर कंटकचर्मी प्राणी (echinoderms)

c) Bilateral symmetry (द्विपार्श्व सममिती):

- i) Body चा एकच axis असा असतो की फक्त त्या axis मधूनच imaginary cut घेतल्यास दोन equal halves (भाग) होतात.
- ii) उदा. किटक, मासे, बेडूक, पक्षी, मानव इ.

3) Germinal layers (आद्यस्तर / जननस्तर):**Germinal layer च्या conditions खालीलप्रमाणे-****a) Diploblastic (द्विस्तरीय):**

- i) Ectoderm (बहिर्जनस्तर) आणि endoderm (अंतर्जनस्तर) हे दोनच germinal layers असतात.
- ii) उदा. Coelenterata आणि cnidarian संघातील प्राणी.

b) Triploblastic (त्रिस्तरीय):

- i) Ectoderm, endoderm आणि mesoderm (मध्यस्तर) हे तीन germinal layer असतात.
- ii) उदा. सर्व इतर प्राणी.

4) Body cavity (देहगुहा):**Q.8 Write the conditions of body cavity in animal.****Ans: Conditions of body cavity:****a) Eucoelomate:**

- i) Body cavity present. During initial embryonic development period body cavity is formed from either mesoderm or gut.
- ii) e.g. all animal phyla from Annelida to higher phyla.

b) Acoelomate:

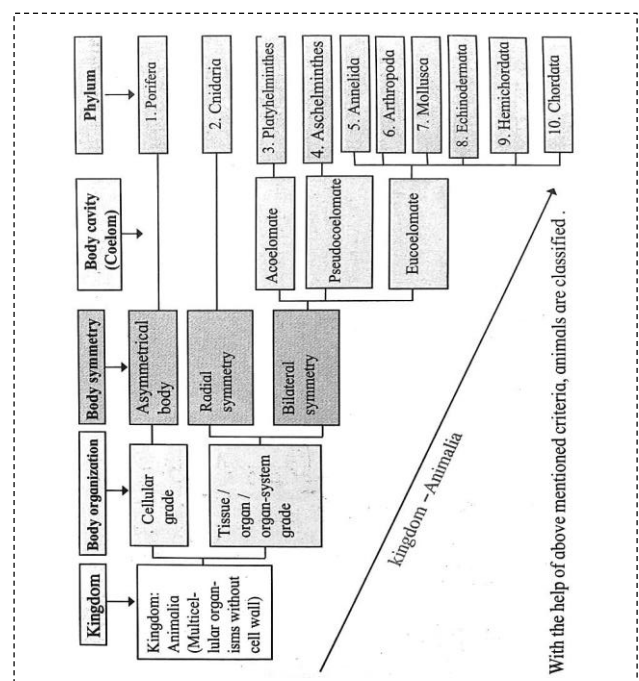
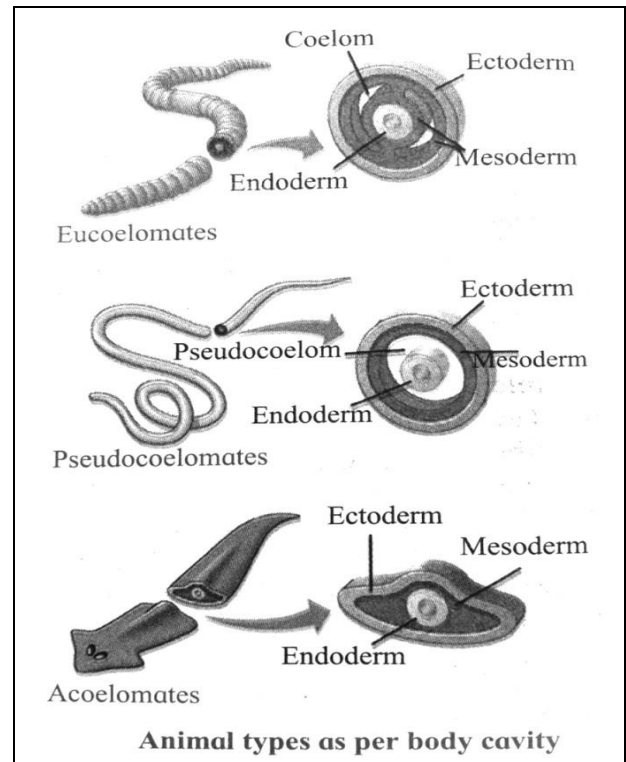
- i) Absence of coelom.
- ii) e.g. Porifera, Cnidaria and Platyhelminthes.

c) Pseudocoelomate:

- i) Body cavity is present. But it is not formed by the mesoderm or gut. Hence it is not true coelom.
- ii) e.g. Aschelminthes.

5) Segmentation:

- i) Segmentation is the phenomenon in which the body of animals is divided into segments which are small, similar units.
- ii) Body with segments is segmented body. E.g. Phylum Annelida shows segmented bodied animals.



Q.30 Identify the following symbols and state their significance.

i)



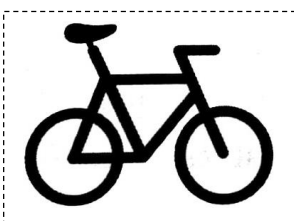
This symbol tells us to keep our wastes carefully. The garbage should not be strewn anywhere. But it should be properly managed. Waste if managed properly can be a wealth.

ii)



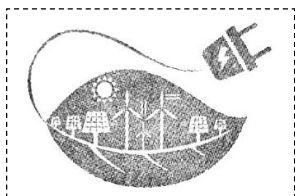
This symbol tells us to save electricity. If electricity is carefully used, we can save our natural resources.

iii)



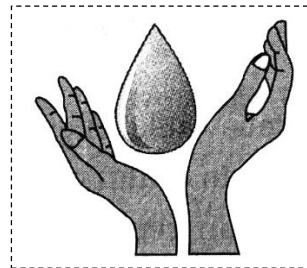
Use of bicycle means use of green energy. By riding on a bicycle, we save on fuel and use our own muscular energy. It is the best eco-friendly, non-polluting vehicle.

iv)



The symbol shows types of green energy such as solar energy and wind energy. It also expresses that people should use such sources of energy for their use.

v)



This symbol is giving the message "Save water". Sustainable use of water is necessary for our future.

Q.३० खालील symbol ओळखा आणि त्यांचे significance (महत्त्व) लिहा.

i) आपला waste carefully ठेवा, हे या symbol मधून सांगण्यात येते. Garbage इतरत्र कोठेही फेकू (strew) नये. पण त्याचे योग्य प्रकारे management केले पाहिजे. जर waste properly (योग्यरीतीने) manage केले तर ते संपत्ती (wealth) आहे.

ii) Electricity (विजेचा) save (बचत) करा, हे या symbol मधून दर्शवते. जर electricity चा use carefully केला, तर आपण natural resources ची बचत (save) करू शकतो.

iii) Bicycle चा वापर म्हणजे green energy (हरित उर्जा) चा वापर होय. Bicycle चालवून (ride) आपण fuel ची बचत (save) करू आणि आपण आपली muscular (स्नायू) energy वापरू शकतो. ते एक eco-friendly (पर्यावरणस्नेही) आणि non-polluting (प्रदूषणविरहीत) vehicle आहे.

iv) Solar energy आणि wind energy (पवनऊर्जा) यासारख्या green energy चे type symbol मध्ये दर्शवले आहेत. लोकांनी अशा energy source चा use केला पाहिजे हे या symbol मधून express करण्यात आले आहे.

v) Save water हा message या symbol मधून दिला आहे. पाण्याचा sustainable (शाश्वत) वापर हा आपल्या future साठी necessary (गरजेचे) आहे.

Q.२६ सांगा पाहू!

१) तुम्ही पाहिले असेल किंवा dead fish ची news वाचली असेल किंवा sea coast च्या ठिकाणी oily water accumulate (गोळा होणे) झालेले news वाचली असेल, हे कशामुळे घडते?

Ans: i) Marine water मध्ये oil spill घडण्याची अनेक causes आहेत.

ii) उदा. Crude oil transport करणाऱ्या oil tankers चे accident, oil wells, effluents मधून release होणारे pollutants यापासून होणारे spillage.

iii) Water surface वरती oil film पासून oil spill होते.

iv) water मधील oxygen depletion साठी हे कारणीभूत ठरते.

v) यामध्ये hazardous hydrocarbon असतात की जे fish च्या death साठी कारणीभूत असतात.

Q.27 Fill in the blanks:

i) Milk is ----- at the beginning to destroy unwanted microbes.

Ans: Pasteurized

ii) Methane can be obtained by ----- decomposition of urban agriculture and industrial waste.

Ans: microbial anaerobic

iii) ----- Is considered to be the fuel of future.

Ans.: Hydrogen gas

iv) Biofuels in the gaseous form are ----- and -----.

Ans: gobar gas, coal gas.

Q.२७ यासाठी अगोदर दिलेली explanation वाचावीत तसेच संपूर्ण topic काळजी पूर्वक वाचावा.

वरील प्रमाणे दिलेले Question आणि त्याची answer काळजी पूर्वक वाचावीत व त्यानुसार लिहण्याचा प्रयत्न करावा.

Q.28 Rewrite the following statements using correct of the option and explain the completed statements.

(Gluconic acid, coagulation, amino acid, 4% acetic acid, clostridium, lactobacilli)

i) Process of ----- of milk proteins occurs due to lactic acid.

Ans: Coagulation

Explanation: The lactobacilli are the bacteria carrying out fermentation of the milk. In this process, the lactose sugar in the milk is converted into lactic acid. This lactic acid causes coagulation of the proteins present in the milk.

ii) Harmful bacteria is like ----- in the intestine are destroyed due to probiotics.

Ans: clostridium:

Explanation: In probiotics, there are lactobacilli which are useful. They control other bacteria present in the alimentary canal and also their metabolism. These bacteria thus stop the action of clostridium which harmful bacteria.

iii) Chemically, vinegar is -----.

Ans: 4 % acetic acid:

Explanation: Chemically, vinegar is 4 % acetic acid. It is a good preservative of the food and thus while using it as additive to the food, it is called vinegar.

iv) Salts which can be used as supplement of calcium and iron are obtained from ----- acid.

Ans: Gluconic acid:

Explanation: The microbe *Aspergillus niger* is used on the source material of glucose and corn steep liquor to produce amino acid called Gluconic acid. Gluconic acid is used for the production of minerals used as supplement for calcium and iron.

Q.२८ दिलेल्या Option मधून योग्य answers लिहली आहेत आणि त्यांचे explanation सुद्धा दिले आहे. ते काळजीपूर्वक वाचून पुन्हा लिहण्याचा प्रयत्न करावा.

Q.29 Match the pairs:

1)

'A' group	'B' group
i) Xylitol	a) Pigment
ii) Citric acid	b) To impart sweetness
iii) Lycopene	c) Microbial restrictor
iv) Nycin	d) Protein binding emulsifier
	e) To impart acidity

Ans:

i) Xylitol - To impart sweetness

vi) ----- can absorb uranium and arsenic.

Ans: Sunflower

Q.26 Rewrite the following wrong statements after corrections:

1) Changes in gene of the cells are brought about in non-genetic technique.

Ans: Non-genetic biotechnology involves use of either **cell or tissue**.

2) Gene from bacillus thuringiensis in introduced into soyabean.

Ans: Gene from Bacillus thuringiensis in introduced with gene of **cotton**.

3) Malaria arises due to genetic changes in hepatocytes.

Ans: **Phenylketonuria (PKT)** arises due to genetic changes in **hepatocytes**.

Q.27 Match the pairs:

Column 'A'	Column 'B'
i) Interferon	a) diabetes
ii) Factor VIII*	b) Dwarfness
iii) Somatostatin	c) Viral infection
iv) Interleukin	d) Cancer
	e) Haemophilia

Ans:

- i) Interferon - Viral infection
- ii) Factor VIII* - Haemophilia
- iii) Somatostatin - Dwarfness
- iv) Interleukin - Cancer

[Note: Factor VIII* is an important protein factor and it should not be just factor as given in the textbook.]

Q.28 Identify and complete the following correlations:

1) Insulin: Diabetes :: Interleukin : -----

Ans: Cancer

2) Interferon: ----- :: Erythropoietin : Anaemia.

Ans: Viral infection

3) -----: Dwarfness :: Factor VIII : Haemophilia

Ans: Somatostatin

4) White revolution: dairy:: Blue revolution : -----.

Ans: Fishery

5) White revolution: Increase in dairy production :: green revolution :: ----- (M- 19)

Ans: Increase in agriculture production or crop yield

6) Nostoc, anabaena: Biofertilizers : : Alfalfa : -----.

Ans: Phytoremediation.

Q.29 Answer the following questions:

1) Write a comparative note on usefulness and harmfulness of biotechnology. OR

"Biotechnology is not only beneficial but it has some harmful effects too". Express your opinion about this statement.

Ans: Usefulness and harmfulness of biotechnology:

i) Biotechnology has proved to be useful in the field of agriculture, medicine, clean technology and industrial products.

ii) Due to various biotechnological experiments, the food production is increased substantially. The milk and milk products are now freely available. People no longer die of hunger due to abundant food supply.

iii) The sophisticated vaccines have stopped the spread of epidemics.

iv) The diseases like diabetes can be controlled due to human insulin injections that can be manufactured by biotechnology.

v) The problems of pollution control, solid waste management and fuels are partially tackled by biotechnological alternatives.

vi) Though all such positive aspects are there, the biotechnology also poses some problems. The genetic changes are breaking the principles of nature. By inserting human genes in bacteria or virus, the products that are needed only for humans are produced.

vii) Human cloning is also a debatable issue. It will cause social and ethical problems. The new generations formed by cloning will have mothers but no fathers. If man tries to manipulate the genomes of other living organisms, it will cause disturbances in the natural balance. The long term effects of all such genetic manipulations can be disastrous. Thus, according to some views, biotechnology can be dangerous too.

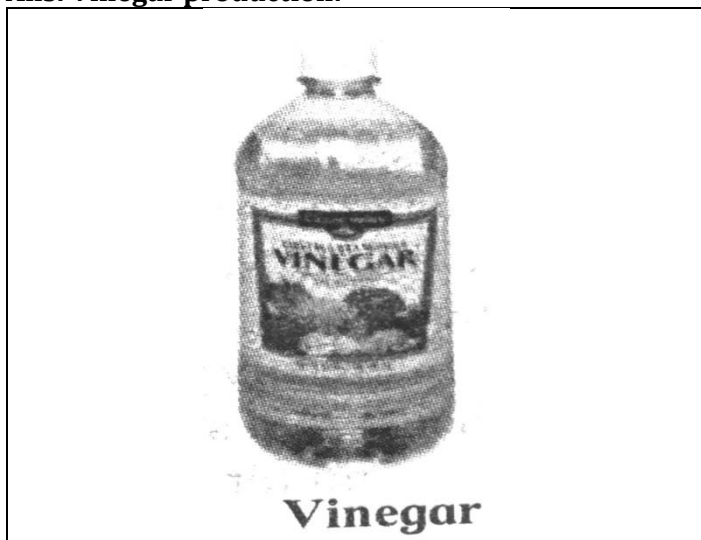
iii) Due to changing pattern of our life style, there is increase in old age homes. In order to maintain the social health, we have to care for the older people in our community.

iv) Similarly, mentally disturbed patients should be given love and care along with prompt medical help.

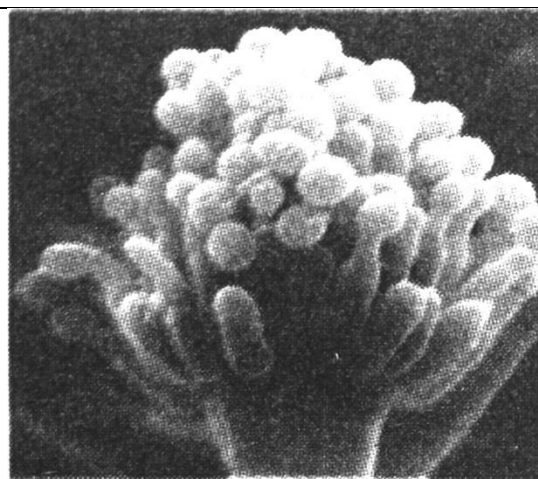
7.6 Vinegar Production

Q.11 Explain the term vinegar production.

Ans: Vinegar production:



- i) Vinegar is used in each country of the world to impart sour taste to food materials and for preservation of pickles, sauce, ketch-up, chutneys, etc.
- ii) Chemically, vinegar is 4% acetic acid (CO_3COOH).
- iii) Ethanol, an alcohol is obtained by fermentation of carbon compounds like fruit juices, maple syrup, sugar molasses, starch of the roots; with the help of yeast *Saccharomyces cerevisiae*.
- iv) Mixture of bacterial strains like *Acetobacter* and *Glucanobacter* is mixed with ethanol for its microbial degradation.
- v) Acetic acid and other by-products are obtained through it. Acetic acid is separated from mixture by rarefaction.
- vi) Acetic acid is bleached with the help of potassium ferrocynide.
- vii) Then, it is pasteurized. Finally, very small quantity of SO_2 gas is mixed to produce vinegar.
- vii) Soya sauce is produced by fermentation of the mixture of flour of wheat or rice and soyabean with the help of the fungus *Aspergillus oryzae*.



Aspergillus oryzae

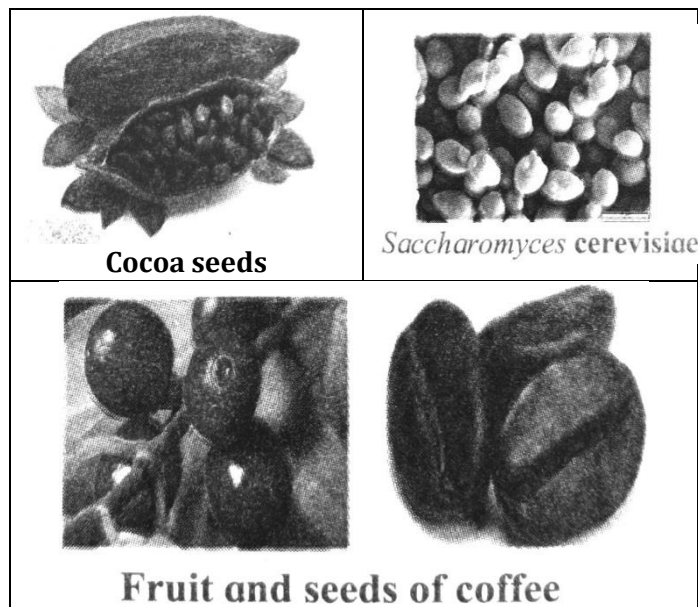
७.६ Vinegar Production (व्हिनेगार उत्पादन) :-

Q.११ Vinegar production ही term explain स्पष्ट करा.

- Ans: i) World मधील अनेक country मध्ये food materials (खाद्य पदार्थ) ला sour test (आंबटपणा) आणण्यासाठी तसेच pickles, sauce, ketchup, chutneys यासारखे पदार्थ preserve (टिकवणे) करण्यासाठी vinegar वापरतात.
- ii) chemically (रासायनिक दृष्ट्या) vinegar हे ४% acetic acid होय.
- iii) fruit juices, maple syrup, sugar molasses (साखर कारखान्यातील उसाची मळी), roots (वनस्पतीची मुळे) मधील starch अशा carbon compound चे *saccharomyces cerevisiae* ह्या yeast च्या साहाय्याने fermentation करून ethanol हे alcohol मिळवले जाते.
- iv) Ethanol मध्ये *acetobacter* आणि *glucanobacter* या bacteria चे mixture मिसळून त्याचे microbial degradation (सुक्ष्मजैविक अपघटन) केले जाते.
- v) यामुळे acetic acid व इतर byproduct मिळतात. या मिश्रणाचे rarefraction (विरलन) करून त्यामधून acetic acid separate केले जाते.
- vi) Potassium ferrocynide वापरून acetic acid चे bleaching (विरंजन) करतात.
- vii) त्यानंतर त्याचे pasteurization (पाश्चरीकरण) होते. finally small quantity चे SO_2 gas मिसळून vinegar तयार होते.
- viii) Wheat किंवा rice आणि soyabean चे flour (पीठ) चे mixture चे *aspergillums oryzae* या fungus च्या साहाय्याने fermentation (किण्वण) करून soya sauce बनवतात.

7.7 Production of beverages

Sr.No.	Fruit	Microbe used	Role of microbe	Name of beverage
1	Coffea Arabica	Lactobacillus brevis	Separating seeds from fruit	Coffee
2	Theobroma cacao	Candida, Hansenula, Pichia, Saccharomyces	Separating seeds from fruit	Cocoa
3	Grapes	Saccharomyces cerevisiae	Fermentation of juice	Wine
4	Apple	Saccharomyces cerevisiae	Fermentation of juice	Cider

**७.७ Production of beverages (पेयनिर्मिती) -**

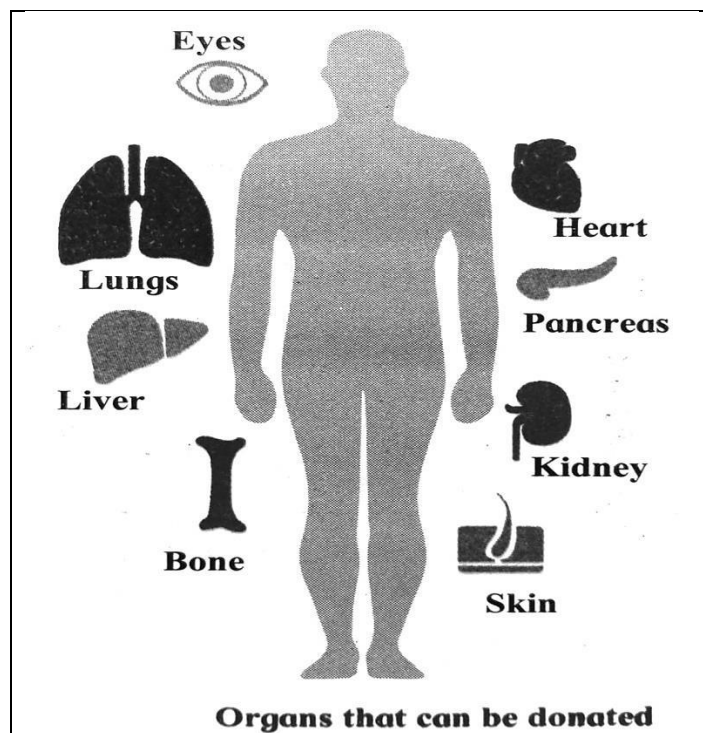
वरील तक्त्यामध्ये production of beverages साठी वापरण्यात येणारी fruits, microbes त्या microbe चा role आणि beverage चे नाव देण्यात आले आहे. त्यानुसार त्याचा study करावा.

8.5 Organ transplantation

Q.6 Write short note on organ transplantation. Or In what condition organ transplantation can be done?

Ans: Organ transplantation:

- i) various organs in the human body either become less efficient or completely functionless due to various reasons like aging, accidents, infections, disorders, etc.
- ii) Life of such person becomes difficult or even fatality may occur under such conditions.
- iii) However, if a person gets the necessary organ under such conditions, its life can be saved.
- iv) Availability of donor is an important requirement in organ transplantation.



v) Each person has a pair of kidneys. As the process of excretion can occur with the help of single kidney, person can donate another one.

vi) Similarly, skin from certain parts of the body can also be donated.

vii) Various factors like blood group, diseases, disorders, age, etc. of the donor and recipient need to be paid attention during transplantation.

viii) However, other organs cannot be donated during life time.

ix) Organ like liver, heart, eyes can be donated after death only.

x) This has led to the emergence of concepts like posthumous (after death) donation of body and organs.

८.५ Organ transplantation (अवयव प्रत्यारोपण) -**Q.६**

i) Human body मध्ये organ हे aging (वाढते वय), accidents, infection (रोग/संसर्ग), disorders इ. सारख्या various reasons मुळे various organ हे less efficient (कार्यक्षमता) किंवा completely functionless (निकामी) होतात.

ii) अशा condition मध्ये संबंधित person ची life difficult किंवा even fatality (जीवास धोका) निर्माण होतो.

iii) तथापि जर अशा condition मध्ये person ला necessary organ मिळेल तर त्याची life वाचू शकते.

iv) organ transplantation मध्ये donor (अवयवदाता) ची availability (उपलब्धता) असणे खुप important आहे.

v) प्रत्येक person ला kidney ची एक pair असते. body मध्ये एका kidney च्या साहाय्याने excretion (उत्सर्जन) ची काम चालू शकत असल्याने other kidney donate करता येते.

vi) त्याचप्रमाणे body च्या certain part मधील skin donate करता येते.

vii) Blood group (रक्त गट), diseases, disorders, age इ. Doner आणि recipient च्या factors ची transplantation च्या वेळी attention (दक्षता) घेणे गरजेचे आहे.

viii) तथापि other organ चे donation life time च्या वेळी करता येत नाही.

ix) Liver, heart, eyes यासारखे अवयव फक्त death (मृत्यू) नंतर donate करता येतात.

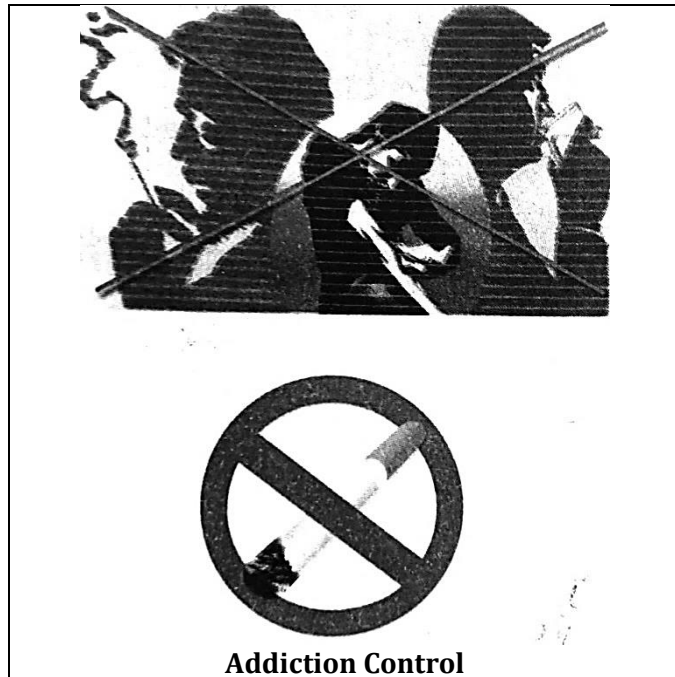
x) यातूनच मरणोत्तर देहदान (posthumous) आणि donation of body यासारख्या संकल्पना पुढे आल्या आहेत.

Q.8 Recall a Little:**1) What is biotechnology?****Ans: Biotechnology:**

The techniques of bringing about improvements in living organisms by artificial genetic changes and by hybridization for the welfare of human beings are called biotechnology.

2) In which various fields, the biotechnology has been useful?**Ans: Various fields, the biotechnology has been useful:**

Biotechnology can be used in the fields of agriculture, horticulture, medical field, diagnosis of diseases etc. Biotechnology is used in the production of cash crops, improvement in varieties of cash crops, increase in abilities of plants to withstand environmental stresses, vaccine production, early diagnosis of congenital

9.4.2 Addiction:**Q.5 How addiction is responsible for disturbing or endangering the social health?****Ans: Responsible for disturbing or endangering the social health:**

i) In adolescent age group, there is tremendous pressure of peers. This peer-group influence can be at times wrong, if the friends are not good. Instead of following advice of parents, the adolescent girls and boys tend to listen to the wrong advices of their friends.

ii) Due to lack of parental supervision, children in their early age start using tobacco, cigarette, gutkha, alcoholic drinks, drugs etc. They may be due to peer group-pressure.

iii) The children fall into the trap of addictions either due to peer group-pressure or due to false symbol of high standard living. Sometimes they try to imitate their elders.

iv) The additive substances are hazardous and they cause long term effects. Some are temporarily intoxicating substances obtained from the plants. While some of the chemical ingredients in them can permanently damage the human nervous system, muscular system, heart etc. Some tobacco like substances are carcinogenic in action especially on the mouth and lungs.

९.४.२ Addiction (व्यसनाधीनता)-**Q.५**

i) Adolescent group age (कुमार अवस्था) मध्ये peers (समवयस्क) चा tremendous pressure (प्रभाव) असतो. जर त्याचे friends (मित्र) योग्य नसतील तर या peer group वर चुकी च्या वेळी प्रभाव (influence) होऊ शकतो. Parents (पालक) च्या advice (सल्ला) follow (अनुसरणे) करण्याऐवजी (instead) adolescent girls and boys हे त्यांच्या friends ची wrong advice ऐकतात.

ii) Lack of parental supervision (उच्च राहणीमानाचे प्रतिक) म्हणून तर कधी peer-pressure (समवयस्कांचा प्रभाव/दबाव/आग्रह) म्हणून लहान मुले त्यांच्या लहान वयात tobacco (तंबाखू), cigarette, gutkha, alcoholic drinks (अंमली पदार्थ व मद्य) drugs इ.चव पाहतात.

iii) कधी high standard living (उच्च राहणीमानाचे प्रतिक) म्हणून तर कधी peer group pressure मुळे मुलं ही addiction (व्यसनाधिनता) च्या जाळ्यात अडकतात. काही वेळा ते त्यांच्या मोठ्यांचे अनुकरण (imitate) करतात.

iv) Additive substances (नशा देणारे पदार्थ) हे hazardous (घातक) असतात आणि ते जास्त काळासाठी effect (परिणाम) घडवतात. काही temporarily intoxicating substance (तात्पुरती नशा देणारे पदार्थ) हे plants पासून मिळवले जातात. असे असले तरी त्यातील काही chemical ingredients (रासायनिक घटक) हे human nervous system (मानवी चेता संस्था) muscular system (स्नायू संस्था) heart (हृदय) यांच्यावर effect करून permanently damage (कायमस्वरूपी हानी) करतात. काही tobacco like substance हे carcinogenic (कर्करोग) असून त्यामुळे mouth आणि lungs यावर effect करतात.

९.४.३. Incurable disease (दुर्धर आजार)-

Q.६

i) AIDS, TB आणि Leprosy (कुष्ठरोग) यानुसार incurable disease हे social health spoil करू शकतात.

ii) Mental disorder (मानसिक विकृती) असणारे patients आणि तसेच वृद्ध व्यक्ती ना सांभाळताना त्यांची care (काळजी) योग्य प्रकारे घेतली नाही व त्यांची दिवसेंदिवस वाढवणारी संख्या ही सुद्धा social health साठी dangerous ठरू शकते.

iii) आपल्या life style (जीवनशैली) च्या changing pattern मुळे old age homes (वृद्धाश्रम) ची संख्या increase होत नाही. social health maintain करत असताना, आपणा old people ची आपल्या community (समाज) मध्ये काळजी घेणे आवश्यक आहे.

iv) त्याचप्रमाणे, mentally disturbed patient (मनोरुग्ण) ना prompt medical help (तत्कालीन वैद्यकीय मदत) बरोबरच त्याला प्रेम आणि त्याची care (काळजी) घेणे गरजेचे आहे.

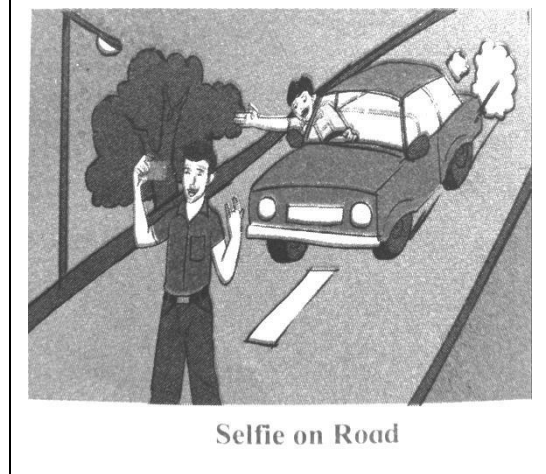
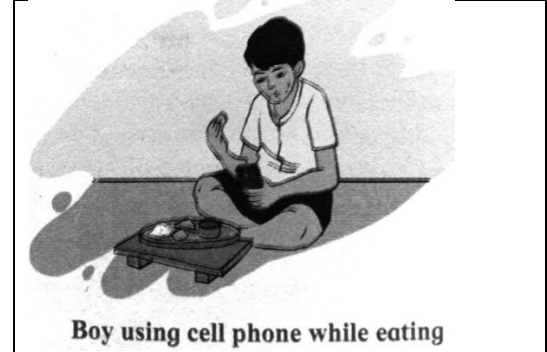
9.4.4 Communication media and excessive use of modern technology:

Q.7 How Communication media and excessive use of modern technology are responsible for disturbing or endangering the social health?

Ans: i) Modern technology and Communication media have drastically changed the lives of people.

ii) Mobile phone has become an addiction that can endanger the social health. People remain constantly in the phones.

iii) Due to addiction of electronic media, various physical problems like tiredness, headache, insomnia (inability to sleep), forgetfulness, tinnitus (ringing or buzzing in the ear), joint pains and problems in vision are in rise. This may be due to radiation of cell phones.



iv) Such radiations penetrate the bones of children causing damage. Person who are on computers and internet continuously become solitary.

v) They remain aloof and do not have contact with his or her relatives and members of society. This leads to self-centredness. They lose the sensitivity towards others.

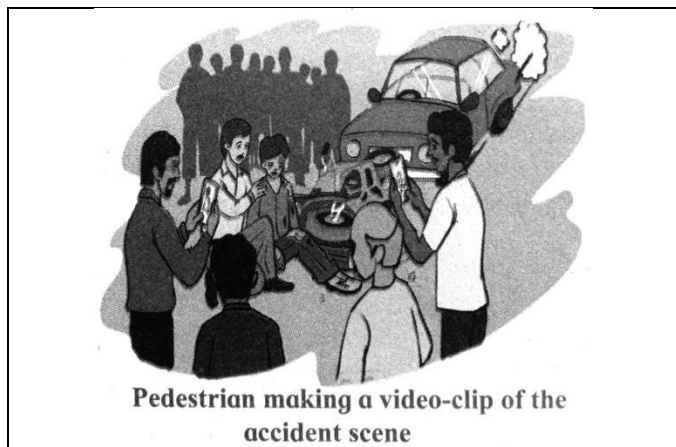
vi) Negative computer and cell phone games cause children to become negative in their thoughts and actions. They are tremendously time consuming. The concentration in the studies is lost and memorization, understanding of the subjects also become a problem

vii) Some activities like these cause financial loss and it may cost life too. Therefore, one should be vigilant while using such media.

viii) The internet has such huge information that it can provide information for every question. But its use

should be done for only positive purposes. There are many inappropriate contents on the web. These should not be seen by young people.

ix) Though Government has banned such sites, elders in the house should supervise in the use of the internet.



10.10.1 Objectives of Mock Drill

Q.17 What are the objectives of mock drill?

Ans: Objectives of mock drill:

- Evaluating the response to the disaster.
- Improving the coordination between various departments of disaster control.
- Identification of own abilities.
- Improving the ability of quick response to disaster.
- Checking the competency of the planned actions.
- Identifying the possible errors and risks.

१०.१०.१ Objectives of Mock Drill (अभिरूप सरावाची ध्येये) Q.१७

- Disaster ला response देण्याचे evaluation (मूल्यमापन) करणे.
- Disaster control च्या अनेक department मध्ये coordination improve करणे.
- स्वतःच्या abilities (क्षमता) identify करणे.
- Disaster ला quick response देण्याची ability improve करणे.
- Planned actions (नियोजतकृती) ची competency (खात्री) check करणे.
- possible errors (चुका) आणि risk (धोका) identify करणे.

Always remember

i) Do not chaos and push each other while using staircase in the school.

ii) Remind important help-lines and use as per need. Ex. Police 100, fire fighting force 101, Disaster Control Unit 108, Ambulance 102, etc.

iii) Follow the traffic rules. Look at left and right sides while crossing the road and ensure that any vehicle is not passing by.

iv) Do not touch any unclaimed object. Do not spread rumors.

v) Do not make chaos at the crowded places.

हे नेहमी लक्षात ठेवा !

i) School मध्ये staircase (जिना) चा use करताना chaos (गर्दी, गोंधळ) आणि एकमेकांना push करू नये.

ii) Important help lines आणि त्यांचा गरजेच्या वेळी वापर किंवा remind (आठवणे) करणे आवश्यक आहे.

iii) Traffic (रहदारी/वाहतुक) rule follow करणे, road cross करताना left आणि right कडे पहा आणि कोणतेही vehicle येत नाही याची खात्री (ensure) करा.

iv) कोणत्याही unclaimed object (बेवारस वस्तू) ला touch करू नका आणि rumors (अफवा) पसरवू नका.

v) Crowded places च्या ठिकाणी गोंधळ (chaos) करू नका.

Q.18 Fill in the blanks.

1) ----- phase is highly complicated phase.

Ans: Reconstruction

2) There had been a huge ----- in the village malin, Tal.Ambegaon in 2014.

Ans: Landslide

3) The atomic energy plant at Chernobyl was used only for -----.

Ans: Electricity generation

4) Spreading of weeds is ----- types of disaster.

Ans: Biological

5) ----- is arranged on disaster of fire in various schools by the fire fighters.

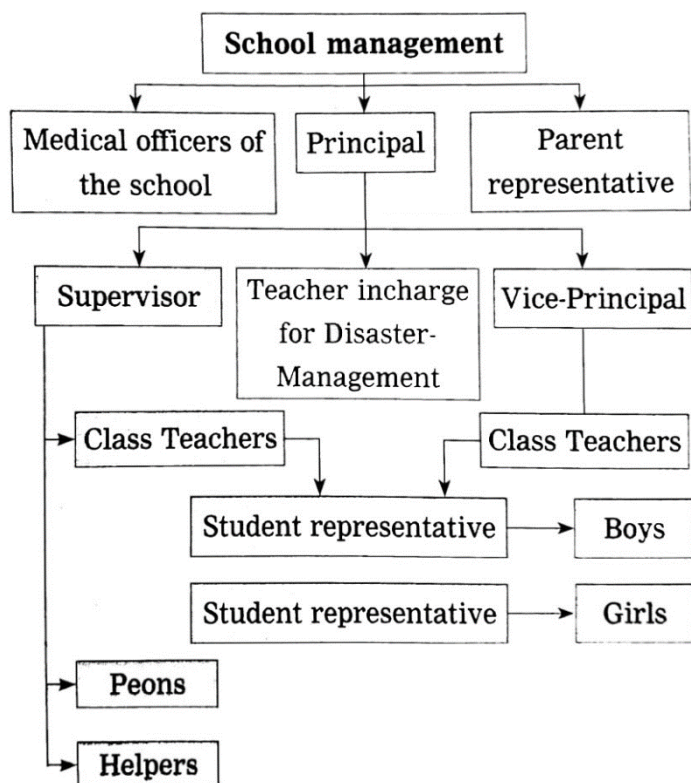
Ans: Mock drills

6) It is necessary to have material for ----- with us.

Ans: First aid

7) On the basis of the structure of disaster management authority, from the same for your school.

Ans:



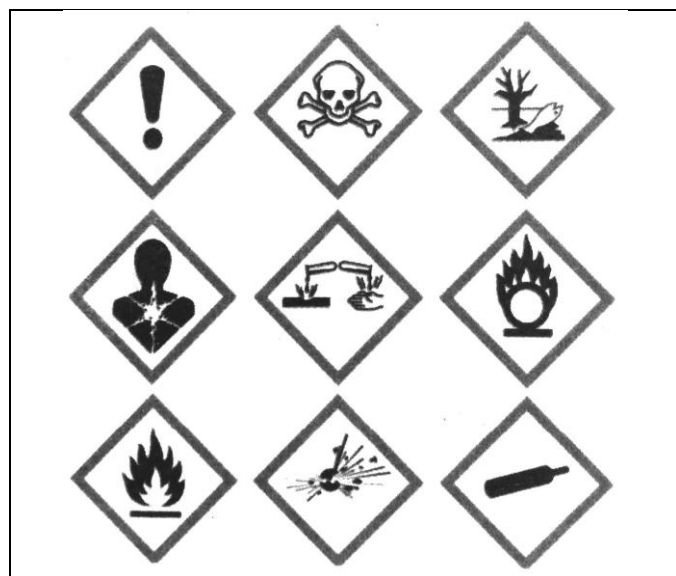
७) वरील माहिती व्यवस्थित वाचावी तसेच वरील question चे examination वाचावे.

8) Write down the reasons, effects and remedial measures taken for any two disasters experienced by you.

Ans: Students are expected to write the answer based on their own experiences.

८) वरील question चे answer, विद्यार्थ्यांनी स्वतःच्या experience नुसार लिहणे अपेक्षित आहे.

Q.23 Some symbols are given below. Explain those symbols. Which disasters may occur if those symbols are ignored?



Ans: i) The above signs are warning symbols which should never be ignored.

ii) The meaning of each is given below. They are giving warnings about explosive, inflammable, oxidizing, compressed gas, corrosive, toxic, irritant, environmentally hazardous and health hazard.

i) Explosive:

i) Some materials are explosive. While handling such materials care should be taken. We should not take anything that would cause fire leading to explosion.

ii) If explosion occurs, there would be a major disaster causing great loss of life and property. Thus if this sign is seen, great care has to be taken.

ii) Inflammable:

i) Similar to explosive substances, the inflammable materials can also catch fire easily.

ii) Therefore, to warn people such sign is given on materials that can cause hazard by burning.

iii) Oxidizing:

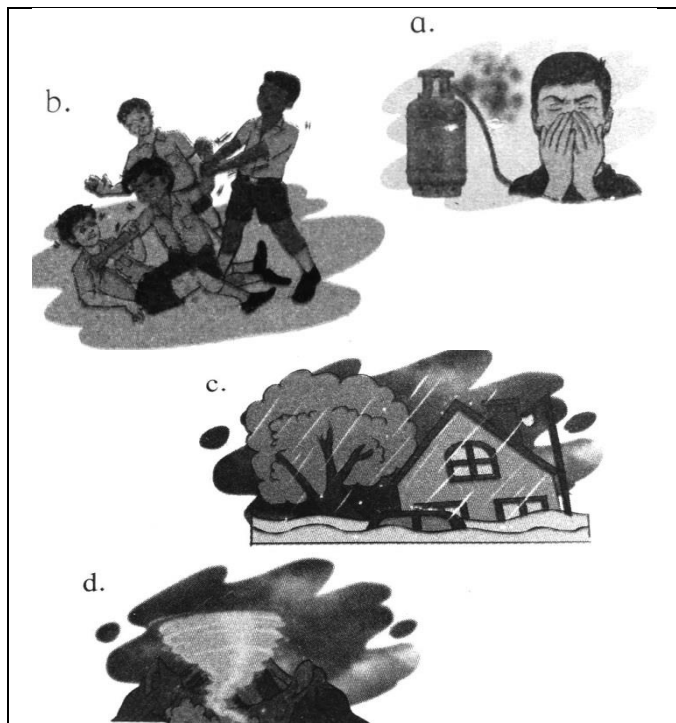
i) Some chemical substances are oxidizing. They carry out chemical reactions with a rapid speed. E.g. If potassium permanganate falls on the cloth, it starts the reaction on its C-C bonds.

ii) Due to such property of carrying out reaction, the cloths may catch fire. Therefore, oxidizing substances should be handled with care.

Q.24 Following are the pictures of some disasters. How will be your pre and post-disaster management in case you face any of those disasters?

Ans: In the pictures given, following disaster are shown:

- i) Two groups of children are fighting with each other.
- ii) There is gas leakage from the LPG cylinder.
- iii) There is heavy downpour due to cloud bursting which has led to waterlogging in the town.
- iv) There is cyclone causing a tornado. (Commonly called a twister)



1) Disaster- Fight between the two groups

a) Pre- disaster management: We will try to sort out problem between the two groups. If that is not possible, will call the elders or teachers. If the fight is among the elders then police should be called.

b) Post- disaster management: If the fight is taking place, we shall try to separate the two. We shall check-up if anyone is injured. If injured, we shall give him first aid. We will also counsel them that they should not fight like this.

2) Disaster-Gas leakage:

a) Pre- disaster management: First and foremost, the windows and the doors will be opened immediately. We shall call the gas agency customer care department for help. The lights and the electrical equipment will not be turned on to avoid the accidents.

b) Post- disaster management: If the gas is already leaked in the house, we shall move out immediately along with pets if any.

3) Disaster-Downpour due to cloud bursting

a) Pre- disaster management: If the warning of the heavy rains is broadcast then people staying in low lying areas should be taken to the safe places. Schools and colleges are kept closed. If such students or young children are stranded anywhere, they should be helped to reach their destinations before the rain starts.

b) Post- disaster management: By heavy rains, the transportation comes to halt. The water enters the houses in low lying areas. We shall help the people to deal with this disaster. Help can be bodies open the storm water drains in such cases. With the help of elders, we shall spread the message of warning in such places. We will not play in the clogged water, but will help the people who are in need.

4) Disaster- Tornado

a) Pre- disaster management: The warning of cyclonic tornado is given much before its approach due to modern techniques used at Meteorological department. The consequences of such event will be disastrous so as far as possible we shall not go out of house. If house is not in proper condition, then shelter is to be taken in any safe place.

b) Post- disaster management: We shall help the people who are in need.

Q.२४ या question च्या preparation साठी picture मधील disaster नुसार disaster management (आपत्तीपूर्व व्यवस्थापन) आणि post-disaster management (आपत्ती उत्तर व्यवस्थापन) हे मुद्दे लिहावेत.

Q.25 Questions based on tables and charts:

1) Complete the table:

(Motor accident, land sliding, forest fire, theft, riot, war, epidemic, drought, locust attack, financial crisis, flood, famine)

Note: Here the information of above disaster is given as text. You can prepare same for the exam.

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