

Paper Set : SET-I(HT) SUBJECT : Science & Technology Part II

SSC Board - Sample Paper - II Solutions

Q.1 A

- i. (D) Placenta
- ii. (B) Leprosy
- iii. (A) Liver
- iv. (C) Transcription
- v. (D) Prophase

Q.1 (B)

- i. Synthesis of proteins by DNA through the RNA is called central dogma.
DNA → Transcription → mRNA → Translation → Protein.
- ii. Phylum : Coelenterata
Example : Jellyfish
- iii. Coffee : Lactobacillus brevis : : Cider : Saccharomyces Cerevisiae
- iv. Bartholin's gland: All others are glands associated with male reproductive system while it's associated with female reproductive system.
- v. (a) Interferon - (3) Viral infection
(b) Factor VIII - (5) Hemophilia

Q.2 A

- i. The hazards of tobacco chewing will be explained to child. Different photographs and videos showing the conditions of oral cancer will be shown to child to persuade them, so that they can stay away from tobacco. This addiction has to be removed, so help of parents will be taken. They will be told about the child's habit and asked to help them free from his addiction.
- ii. In stead of using chemical catalyts in the chemical industry, using microbial enzymes is beneficial for the following reasons :
 - (1) Microbial enzymes are active at low temperature, pH and pressure.
 - (2) Due to this property, the energy is saved. The costlier erosion-proof instruments need not be used.
 - (3) In enzymatic reactions, the unnecessary byproducts are not formed as the reactions are highly specific.
 - (4) The expenses on purification of the product are minimized as no unnecessary products are formed.
 - (5) The elimination and decomposition of waste material is avoided and enzymes can be reused again. Hence, microbial enzymes are said to be ecofriendly.
- iii. (1) Biotechnology for human health management takes into consideration two important tasks, these are diagnosis and treatment of the diseases.
 - (2) Identifying the role of gene, in disease of a person. Diagnosis of diabetes and heart diseases can now be done even before the onset of symptoms.
 - (3) AIDS and dengue can be diagnosed within few minutes due to biotechnology. Treatment in such cases can be done at the earliest.

(iv) Through biotechnology, medicines needed for the treatment can be manufactured. E.g. with the help of bacteria, human insulin can be made now. The human insulin gene is incorporated in bacterial genome for this purpose.

(v) Various vaccines and antibiotics are also made in this way.

Q.2 B

i.

Aerobic respiration	Anaerobic respiration
1. Oxygen is required for aerobic respiration.	1. Oxygen is not required for anaerobic respiration.
2. Aerobic respiration takes place in mitochondria as well as in cytoplasm.	2. Anaerobic respiration occurs only in the cytoplasm.
3. At the end of aerobic respiration CO ₂ and H ₂ O is formed.	3. At the end of anaerobic respiration CO ₂ and C ₂ H ₅ OH are formed.
4. Energy is produced in large amount in aerobic respiration.	Energy is produced in lesser amount in anaerobic respiration.
5. Glucose is completely oxidized in aerobic respiration.	Glucose is incompletely oxidized in anaerobic respiration.
6. 38 molecules of ATP are formed during aerobic respiration.	6. 2 molecules of ATP are formed during anaerobic respiration.
7. Chemical reaction : C ₆ H ₁₂ O ₆ + 6O ₂ → 6H ₂ O + 6CO ₂ + 686 Kcal	7. Chemical reaction : C ₆ H ₁₂ O ₆ → 2C ₂ H ₅ OH + 2 CO ₂ + 50Kcal

ii. Distinguishing characters of Echinodermata :

(1) Marine organisms with skeleton made up of calcareous spines. Calcareous material on the body hence the name is Echinodermata. Some are sedentary while some are free swimming.

(2) Body is triploblastic, eucoelomate and radially symmetrical when adult. The larvae are bilaterally symmetrical.

(3) Locomotion with the help of tube-feet which are also used for capturing the prey.

(4) Echinoderms have regeneration capability. Hence they can restore their lost parts.

(5) Most of them are unisexual.

(6) Examples : Starfish, sea-urchin, brittle star, sea-cucumber, etc.

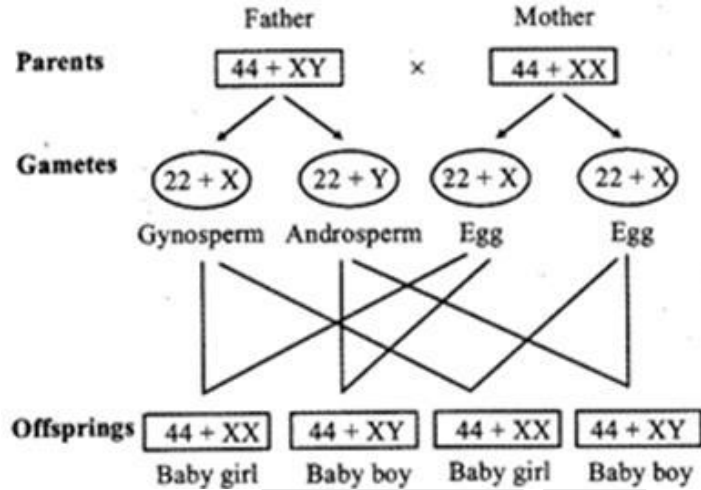
iii.

1 Fruit	Microbe used	Name of Beverage
<u>Coffea arabica</u>	<u>Lactobacillus brevis</u>	Coffee
Theobroma cacao	<u>Candida, Hansenula, Pichia, Saccharomyces.</u>	<u>Cocoa</u>
Grapes	Saccharomyces cerevisiae	<u>Cider</u>

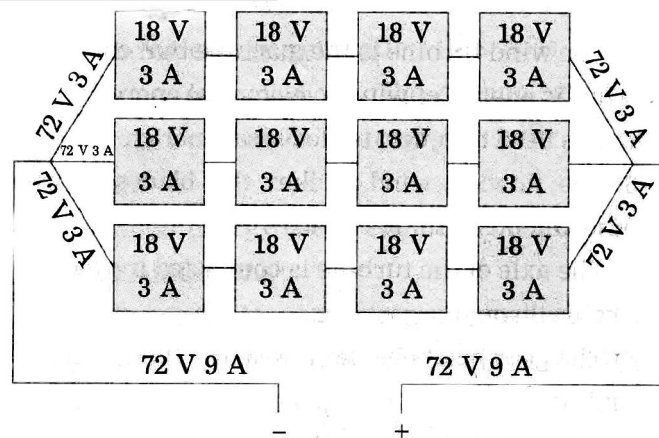
iv. Sacred grove is the green patch of the forest which is conserved by local people in the name of God. It does not belong to forest department. It is like a sanctuary that is conserved by the common people and tribals in the area. It is rich in the biodiversity. It is conserved as there is a faith that God or deity reside in the sacred grove. Hence in local language, they are known as Deorai. Due to this reason, people do not fell the trees. Also hunting of any wild life is not done here. More than 13000 sacred groves have been reported in India. Most of these are in Western Ghats in Maharashtra, Karnataka and Kerala. Also, in remaining parts of India sacred groves are reported. Role of sacred grove is tremendous in conserving the biodiversity.

- v. (1) Geological : Earthquake, volcano, tsunami, landslide, landfall, erosion, alkalization, flooding, etc.
 (2) Climatic : E.g. Hot and cold waves, snow-storms, snowfall, cyclones, hailstorm, drought, flood, meteorite, sunspots, etc.

Q.3



- i. (1) The statement Gender of child is determined by the male partner of couple is true.
 (2) It is clearly seen from the diagram that there are two types of sperms produced by males. One sperm has a X chromosome while the other has a Y chromosome, apart from autosomes. The mother on the other hand has all X bearing oocytes. Thus the sperm that fertilizes the oocyte decides the sex of the child.
 (3) If X bearing sperm fertilizes the oocyte, daughter is born and when Y bearing sperm fertilizes the oocyte, son is born.
 (4) Thus father or male partner is responsible for the determination of the sex.
- ii. Given potential difference is 18V and current is 3A. The requirement is potential difference of 72V and current is 9A voltage remains the same if connected in parallel and gets added if they are connected in series. Current remains the same if connected in series but adds if connected in parallel.

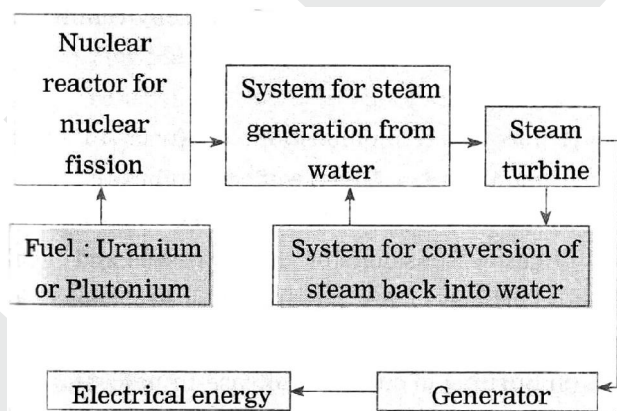


- iii. (a) tRNA.
 (b) CUA
 (c) Peptide bond

- iv. Ethanol an alcohol is a clean smokeless fuel. It is obtained during fermentation of molasses by yeast *Saccharomyces*. Whenever ethanol is mixed with petrol and diesel, CO₂ emission from automobiles reduces by 30%. As a result, pollution decreases. Ethanol, when mixed with petrol and diesel, serves as a great cleaning agent for car engines over a long run. It also helps to increase and improve the quantity of fuel.

Benefits of mixing ethanol with petrol and diesel

- * Ethanol mixed with petrol/diesel is less harmful than petrol/diesel alone.
 - * It causes less pollution because less carbon monoxide is liberated from combustion.
 - * Addition of ethanol reduces the cost of fuel as ethanol is cheaper (produced by fermentation).
- v. (1) IVF means In Vitro Fertilization (IVF)
- (2) This is the technique in the modern medical field where childless couples can be blessed by their own child.
- (3) IVF technique is used for childless couples who are faced with problems such as less sperm count, obstacles in oviduct, etc.
- (4) The IVF technique is done by removing the oocyte from the mother and artificially fertilizing by the sperms collected from father. This fertilization is done in a test-tube. Thus it is also called test tube baby. The embryo formed is implanted in uterus of real mother or a surrogate mother at appropriate time.
- vi.



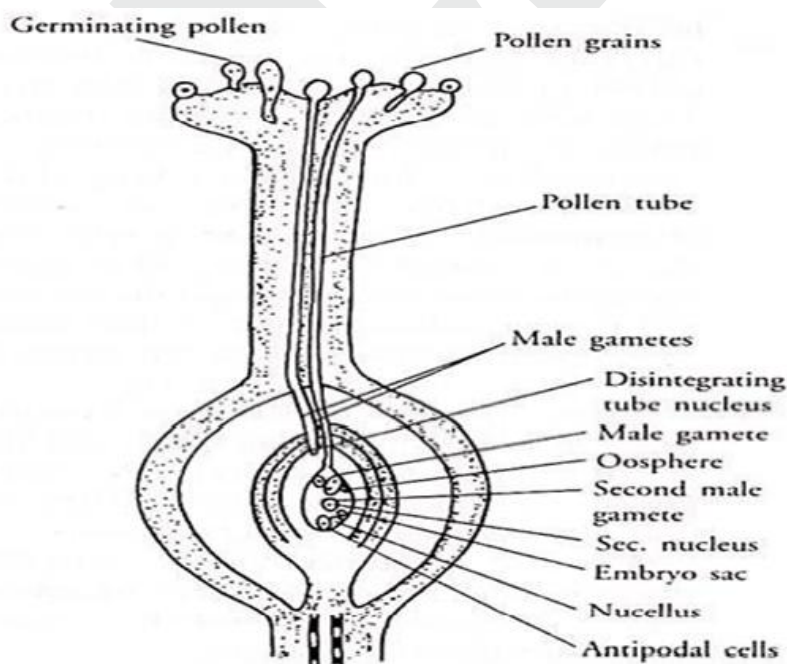
- vii. In the above disaster, the initial precautions to be taken are as follows :

In case of earthquake, one should immediately come out of house and stand in the open ground. If this is not possible, one has to go below table or any other cover. During collapse of the building, there should not be a head injury. This precaution is basically for prevention of dangerous injuries and saving our life.

- viii. (1) The numbers of Aadhaar card, PAN card, credit or debit card are obtained by the cheaters. This is a cybercrime. The PIN number can be misused and the money can be withdrawn from the bank accounts. The looters withdraw cash from our accounts in this way.
- (2) People can be cheated during online shopping.
- (3) Fake account on Facebook is opened and false information is displayed on it. Through such accounts the girls are emotionally and financially exploited.
- (4) Electronic media are misused for sending derogatory and vulgar messages, obscene pictures and provocative statements.
- (5) Through the internet, hackers can send virus to crash someone's computer or even mobile phones.
- In all such different ways, common people can be victimized by cybercrime.

Q.4

- i. (1) Plants reproduce sexually with the help of flowers.
- (2) Androecium and gynoecium are male and female parts of the flowers respectively.
- (3) In the carpel, the ovule undergoes meiosis and forms embryo sac.
- (4) A haploid egg cell and two haploid polar nuclei are present in each embryo sac.
- (5) The pollen grains from the anther reach the stigma of flower by the process of pollination. They germinate here on the stigma.
- (6) As result of germination, long pollen tube and two male gametes are formed.
- (7) The pollen tube travels through the style of flower and the male gametes present in the pollen tube are transferred till the embryo sac in ovary. Upon reaching there, tip of the pollen tube bursts releasing two male gametes in embryo sac.
- (8) One male gamete unites with the egg cell and forms zygote. While other male gamete unites with two polar nuclei forming the endosperm.
- (9) Because there are two nuclei participating in this process, therefore it is called double fertilization.
- (10) After fertilization ovule develops into seed and ovary forms a fruit. When the seed again gets favorable conditions, it can produce a new plant.



L.S. of flower Showing Fertilization

ii

a. Biodiversity hotspots: A biodiversity hotspot is a biogeographic region that is both a significant reservoir of biodiversity and is threatened with destruction. The term biodiversity hotspot specifically refers to 25 biologically rich areas around the world that have lost at least 70 percent of their original habitat.

b. Classification of threatened species:

Type of species	Endangered Species	Rare Species	Vulnerable Species	Indeterminate Species
Information	Number of organisms is declined. Shrunken habitat which can lead to extinction.	Considerably declined number of these organisms. Endemic organisms may become extinct very fast.	Extremely less number of organisms which further declines. Continuous declining number of organisms is a threat.	Organisms appear to be endangered. The data is not enough as they have typical behavioral habits (like shyness)
Examples	Lion tailed monkey, Lesser florican.	Red panda, Musk deer	Tiger, Lion.	Giant squirrel Our state animal : 'Shekhru'