CBSE Board

Class XII Biology

Sample Paper – 9 (Solution)

Section A

1. It is the transfer of pollens from one flower to the stigma of another flower on a separate plant of the same species.

2. Anticodon.

3. It is a wheat variety which has high protein content and is used as a donor for improving cultivated wheat.

4. GEAC makes decisions regarding the validity of GM research and the safety of introducing GM organisms for public services.

5. Cry gene.

6. It is the transient pore created in the cell membrane of the host for uptake of foreign DNA molecules.

7. Ocean and forest.

8. A graphical representation of biomass per unit area in different levels of a food chain is called pyramid of biomass.

Section B

9. The acrosome of a mammalian sperm carries sperm lysine, hyaluronidase enzyme which facilitates the sperm to penetrate the ovum during fertilization. When the acrosome does not function normally, the sperm fails to penetrate the walls of an ovum and causes no fertilization.

10. In honeybees, the males (drones) are haploid because they are developed from the unfertilized egg by the process of parthenogenesis. The females (queens) are diploid because they are produced by the fusion of fertilized egg and sperm. The worker honeybees are sterile.

11. The proportion of A is equal to T and also of G is equal to C. So, as per Chargaff's rule, the percentage of adenine will be 30%.

12. They did not use oxygen because reducing atmosphere was necessary for abiogenesis. If they would have used free oxygen, then it would have destroyed various intermediate products formed during abiotic synthesis.

13.

DNA	RNA
(i) The sugar in DNA is deoxyribose. (ii) The nitrogenous bases in DNA are adenine, guanine, cytosine and thymine.	(i) The sugar in RNA is ribose. (ii) The nitrogenous bases in RNA are adenine, guanine, cytosine and uracil.

14. The insecticidal protein (Bt toxin) exists as inactive protoxins but once an insect ingests the inactive toxin, it is converted into an active form of toxin due to the alkaline pH of the gut which solubilises the crystals of protein. Thus, this toxin does not kill the Bacillus.

15. In the scarcity of water, the leaves of the plant roll up to minimize the rate of transpiration. During rolling, the stomata remain unexposed to the sun so as to reduce the rate of transpiration. These plants may undergo special photosynthetic pathway (CAM) that enables their stomata to remain closed during the day time.

16.

Food chain	Food web
i. A single pathway where energy is transferred from producers to successive orders of consumers. ii. All food chains starts with green plants that is the original source of all food.	i. It is a network of various food chains which are interconnected with each other like interlocking pattern. ii. It has many linkages and intercrosses among the producers and consumers.

17. Effects of algal bloom:

(i) It causes depletion of oxygen in water for other organisms.

(ii)It releases toxins in water to inhibit the growth of other algae and aquatic animals.

18. (i) MALT – Mucosal Associated Lymphoid Tissues

(ii) NACO – National AIDS Control Organization.

Or

Prevention of taeniasis:

(i) Pork should be properly cooked before eating.

(ii)Faecal matter of infected person must be properly destroyed in pits.

Section C

19. External fertilization involves the union of an egg with the sperm outside the body of the female. Generally, it occurs in water.

Disadvantages:

(i)The organisms have to produce large number of gametes into the surrounding medium (water) in order to enhance the chances of syngamy.

(ii)The offsprings are extremely vulnerable to predators, threatening their survival upto adulthood.

20. The first half of the menstrual cycle is a stage of repair and proliferation where it is associated with the growing of follicle in the ovary. This is called as follicular phase. The immature graafian follicles start ripening in the ovary in the presence of FSH from the anterior pituitary. This occurs in the absence of inhibitory action of progesterone. Subsequently, estrogen hormone is secreted by the follicular cells which cause the repairing of endometerial lining of the uterus. The vascular supply to the uterus increases and the endometrium enlarges to receive fertilized ovum.

21. An ABO blood type in human is an example of multiple allelism where alleles I^A, I^B and i produce the four phenotypes (A, B, AB and O) of blood groups. In an individual, any two different alleles out of many (I^A, I^B and i) or the same allele in duplicate are present to represent any blood group.

    Multiple allelism is a phenomenon that occurs when more than two alleles exist at a given locus of a chromosome and in a given individual, only two of these alleles occur, one derived from each parent.

    In garden pea, the one of the allele (tallness) for any contrasting character is dominant over the other allele (dwarfness) of the same character but in case of ABO blood group, allele I^A and I^B are codominant.

22. The sex of the child will be male.

    Symptoms:

    a) Sterile
    b) Genitalia are under developed
    c) Formation of female like enlarged breast
    d) Tall with long limbs and sparse hairs on the body.

23. Diagnostic symptoms:

    a)Any wound which does not heal quickly.

    b)Any persistent lump or thickening in tissues, especially in the lip, tongue or breast.

    c)A regular change from normal in bowel movements.

24.a)Green revolution has made our country self-sufficient in food. The wheat production has increased from 11 million tons to 75 million tons and the rice production from 35 million tons to 89.5 million during the period 1960 to 2000.

    b) It has increased the buffer stocks of food grains of our country in order to meet any natural calamities.

    c)It has improved the economic conditions of farmers.

25.

(a) They have better temperature and pH control system.

(b) They have foam control system for prevention of foaming and shearing damage to cells due to agitation.

(c) They have the system sterilization.

26. Factors which affect population density are:

(a) Natality: It includes production of new individuals by birth, hatching, germination or divisions.

(b)Mortality: It includes decrease in number of individuals per unit of time due to death.

(c)Emigration: It is the number of individuals going out of a population to join another population.

27.

(a) The key criteria for determining a hot spot are:

(i) Number of endemic species i.e. the species which are found nowhere else.

(ii)Degree of threat which is measured in terms of habitat loss.

(b)Western Ghats and North-east Himalaya are the two most biodiversity rich zones of India.

Or

The food chain gets shortened if there is elimination of some trophic levels from a food chain. This happens due to undesirable activities of man in order to fulfill his needs. So, man causes the shortening of food chain either by consuming plants or herbivores or carnivores.

Effects: The shortening of food chain results in disturbing the natural ecosystem that exists in nature. It creates intraspecific and interspecific struggle among the species which causes imbalance in the functioning of ecosystem and biosphere.

Section D

28.

(i) Unisexuality: The unisexuality ensures the process of cross- pollination as male and female sex organs are found on separate plants. So, the cross-pollination is a rule in unisexual flowers e.g. maize, papaya.

(ii) Self-sterility: In some plants, the pollen grains do not germinate on the stigma of the same flower and they become sterile e.g. Petunia, apple.

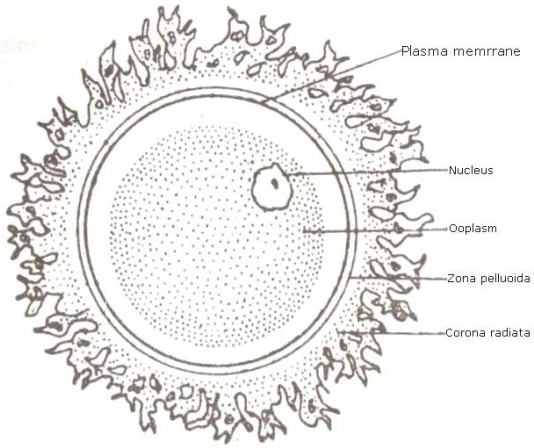
(iii) Dichogamy: In some flowers, the ripening of stamens and stigma tab place at different times and this ensures cross pollination and prevents self pollination. If the stamens mature earlier than carpels, then it is called as protandry e.g. cotton and lady's finger. If the carpels ripen earlier than stamens, it is called protogyny e.g. Solanum.

(iv) Herkogamy**:** In some flowers, the essential organs of flower mature at the same time but they are so placed at their different lengths that pollen grains from the anthers are unable to reach the stigma in the same flower e.g. Hibiscus.

(v) Heterostyly: Some flowers are dimorphic - one type of flowers bear long stamen and short style while other type of flowers have short stamens and a long style. The pollination in these flowers occurs when the short stamen of one flower and short stigma of another flower get matured at the same time. Similarly, when the long stamens ripe, the long stigma will be ripen e.g. Prime rose.

Or

The human ovum is a rounded haploid structure that lacks the yolk (alecithal). It is non-motile containing eccentric located nucleus with bulk of cytoplasm. The nucleus of an ovum is called germinal vesicle and it contains a prominent nucleolus. The cytoplasm is called as opplasm and is surrounded by vitelline membrane and again by transparent, thick and non-cellular layer, zona pellucida. The vitelline membrane is a very thin and transparent and there lies narrow previtelline space between vitelline membrane and zona pellucida. Outside the zona pellucida, there is a thick coat of radially elongated follicle cells and is called as cellular corona radiata. These follicle cells glued together by hyaluronic acid (a mucopolysaccharide) which acts as a barrier for the entry of sperms. The ovum has a polarity and the side of ovum that extrudes the polar bodies and has nucleus is called animal pole. The opposite side is called as vegetal pole.



29. The essential requirements are:

(i)The genetic material should be able to duplicate itself and to be inherited by the progeny.

(ii) It should have the susceptibility to bear occasional inheritable changes (mutation) so that adaptation and evolution may occur in an organism.

(iii)It should be able to carry all the necessary information for the control of metabolic functioning of cells.

(iv) It should be chemically and structurally stable.

(v) It should be able to express itself in the form of ' Mendelian Characters'.

Or

The original population of mosquitoes had large number of DDT sensitive mosquitoes and only few were resistant to DDT. With the sprays of DDT, the susceptible mosquitoes were killed but DDT resistant mosquitoes survived. These resistant mosquitoes multiplied and over a period of time, almost the entire population changed into resistant type. Here DDT served as an artificial selector of mosquitoes in exterminating the mosquitoes with genes for susceptibility and favoring the mosquitoes with genes for resistant to live and reproduce. Thus, DDT- susceptible mosquitoes were gradually replaced by the resistant mosquitoes.

This is an example of evolution by anthropogenic action. This also tells us that evolution is not a directed process in the sense of determinism. It is a stochastic process based on chance events in nature and chance mutation in the organisms.

30. (i)MOET (Multiple Ovulation Embryo Transfer) as success rate of this technique is more.
(ii)Cow is administered hormones, with FSH like activity, to induce follicular maturation and super ovulation-(6-8 eggs). The animal is mated. Fertilized eggs are recovered and transferred to surrogate mother.
(iii)Herd size is increased in short time. Genetic mother is available for another round of super ovulation.
(iv) Values:
(a)Critical thinking
(b)Problem solving.