Bangalore Sahodaya Schools Complex Association Pre-Board Examination I (2019-2020)

Class 12 Biology (Code - 044) – Set - 2

Duration: 3 Hours

Maximum Marks: 70

Section - A (1 Mark)

1. Algae and Fungi shift to sexual reproduction just before the onset of adverse conditions because:

a) Sexual reproduction produces many offspring
b) Brings about genetic recombination for adaptation
c) Helps in preserving the parental traits
d) Destroys unwanted traits
Ans: b) Brings about genetic recombination for adaptation

OR

Availability of fruits like mango and apple are seasonal because:

a) Seasonal reproduction brings better variation
b) Flowering is induced by temperature and duration of light
c) It provides for other organisms dependent on it
d) All of the above
Ans: b) Flowering is induced by temperature and duration of light

2. SCPs are considered as one of the promising source of food because:

(i) They are complete in nutrition content
(ii) easy to culture
(iii) yield is good
(iv) they also fix atmospheric nitrogen

a) option (i) is correct
b) (i) and (iii) are correct
c) both (i) and (ii) are correct
d) (i) and (iv) are correct
Ans: c) both (i) and (ii) are correct

3. Genes encoding for antibiotic resistance are considered as useful markers because:

a) Normal E.coli cells do not carry resistance to any antibiotics
b) They are easy to identify by molecular scissors
c) Help in easy selection of recombinants
d) All of these

Ans: a) Normal E.coli cells do not carry resistance to any antibiotics

4. Purpose of setting up GEAC by Indian government is:
a) To check biopiracy
b) to manage patents
c) to encourage GM research
d) to prevent unpredictable effects of GM research.
Ans: d) to prevent unpredictable effects of GM research.

5. Which of these can drastically reduce global warming?
a) Complete shift from fossil fuels to renewable sources
b) Planting trees and stopping deforestation
c) controlling population growth
d) improving efficiency of engines
Ans: a) Complete shift from fossil fuels to renewable sources

SECTION –B (2 Marks)

6. Fertilization is a chance phenomenon. How have some plants minimised the effort needed to bring about fertilization?
Ans: By maintaining an obligate relationship with the pollinators.
By producing cleistogamous flowers.

OR
In a bisexual flower, in spite of young stamens being removed artificially, the flower produces fruit. Give two suitable explanations for the above situation.
Ans:
(i) Parthenogenesis – development of fruits without fertilization
(ii) Cross-pollination - by pollens from another flower
(iii) Apomixis – cells of the nucellus divide and protrude into the ovule

7. How are the cells of the inner cell mass different from the cells of the trophoblast?
Ans: Inner cell mass has totipotent stem cells. It can divide and differentiate into any kind of cell. Trophoblast is not totipotent.

8. Give reasons:
a) Haemophilia is a sex-linked disease
b) Haemophilia is an X-linked disease
Ans:
a) It generally affects males as they have a single X chromosome
b) The gene for haemophilia is located on the X chromosome

9. How did Marshall Nirenberg make use of Severo Ochoa's enzyme? How did it contribute to molecular Biology?
Ans: Severo Ochoa's enzyme was used for polymerising RNA with defined sequences
This was used to decipher the genetic code.

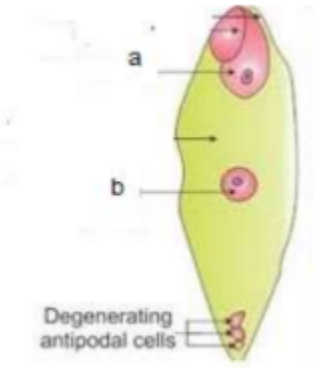
10. Which plant breeding technique has helped to improve sugarcane industry in North India? Describe briefly.
Ans: Interspecific hybridization
Saccharum barberi is a north Indian variety with low sugar content
It was hybridised with the South Indian variety *Saccharum officinarum* to improve sugar content

11. What is the significance of plasmids in prokaryotes? How is it used in biotechnology?
Ans: Plasmids provide antibiotic resistance to prokaryotes.
They are used to introduce foreign genes into host cells for making GMOs

12. Explain with two examples how degradation of natural resources can occur due to improper utilization of the same.
Ans: (i) Soil erosion and desertification are caused due to overgrazing and deforestation.
(ii) Waterlogging and salinity are caused due to poor irrigation practices.

SECTION –C (3 Marks)

13.



(i) Name the parts 'a' and 'b' develop into.
(ii) Explain the process of development of 'b' resulting in albuminous and non-albuminous seeds.
Ans:
(i) a – develops into embryo b - develops into endosperm
(ii) 'b' undergoes repeated free nuclear divisions forming liquid endosperm.

- If all the liquid endosperm gets consumed, it is called a non-albuminous seed.

- If all the liquid endosperm does not get consumed, it is called an albuminous seed.

14. Differentiate between microsporogenesis and megasporogenesis.
Ans:

Microsporogenesis	**Megasporogenesis**
It is the formation of microspores/ male gametes	It is the formation of megapores/ female gametes
Occurs in the anther	Occurs in the ovule
Many microspore mother cells undergo this process in the microsporangium	Only one megaspore mother cells undergo this process in the megasporangium
All the microspores formed by a microspore mother cell develop into pollen	Only one of the megaspores formed by the megaspore mother cells develops into egg cells.

15. Name the molecular diagnostic technique by which the presence of AIDS virus can be detected. Mention the principle on which it works and explain how it is done.
Ans: AIDS can be detected by ELISA
Principle: Antigen-antibody interaction.
It can be detected by the presence of antigens (glycoproteins) of the pathogen or by detecting the presence of an antibody produced by the host.

16. How are recombinant vectors created? How many restriction endonucleases are required to create one recombinant vector? Why? 3
Ans: Recombinant vectors are created by linking a foreign gene to a plasmid containing antibiotic resistance genes.
The plasmid DNA acts as the vector and transfers the attached DNA to the host.
Only one type of restriction endonuclease is required because the foreign gene and the vector DNA should have the same sticky ends for ligation to occur.

17. State the use of the following enzymes produced by microbes.
a) Streptokinase b) Pectinase c) Lipase 3
Ans:
a) Streptokinase is used to remove clots from the blood vessels of patients who have undergone myocardial infarction/heart attack.
b) Pectinase is used to prepare clear bottled fruit juices
c) Lipase is used in detergent formulations to remove oily stains from clothes

18. In a true-breeding experiment on garden peas (Pisum sativum) Mendel observed that the progeny developed by selfing a plant showed the following phenotypes. 75% with green pods and 25% with yellow pods.
a) Which of the two pod colours is dominant?
b) Give the phenotype and genotype of the parent.
c) Give the phenotype and genotype of the individuals in the progeny 3
Ans:
a) Green pod colour is dominant
b) Phenotype: Green colour, Genotype: Dominant
c) Progeny: gg- yellow pods, GG- homozygous green pods, Gg- heterozygous green pods

OR
Both haemophilia and thalassemia are genetic disorders in humans. Mention how the two diseases affect humans, and write any two differences between the two.
Ans:

	Haemophilia	Thalassemia
How it affects :	A single protein involved in the clotting of blood is affected	A defect in the synthesis of or globin is affected, resulting in the formation of abnormal haemoglobin
Differences	Sex-linked disorder Causes excessive bleeding A single gene is involved	Autosomal disorder Causes anaemia Many genes are involved

19. a) Why is RNA regarded as the first genetic material?
b) A hypothetical sequence of DNA is shown below
3'- AGTATCGACTACAT – 5'
5'- TCATAGCTGATGTA – 3'
(i) Which of these strands will be transcribed? Write the sequence of bases in the mRNA transcript.
(ii) Give the names of the strand that is transcribed and that is not transcribed.
Ans:
a) RNA can function as a genetic material as well as a catalyst for many biochemical reactions
b) (i) The strand with 3' 5'polarity is transcribed
The RNA transcript will be 5 UCAUAGCUGAUGUA - 3'
(ii) Template strand is transcribed, Coding strand is not transcribed

20. a) Where was the first man-like animal found?
c) Write the order in which Neanderthals, Homo erectus, and Homo habilis
d) When did modern Homo sapiens appear on this planet?
Ans:
a) In Ethiopia and Tanzania
b) Homo habilis, Homo erectus, and Neanderthals.
c) 75,000 – 10,000 years ago.

21. What are the probable reasons given for justifying greater level of species richness in the tropics as compared to the temperate regions? 3
Ans:
(i) Speciation is a function of time: Temperate regions were subjected to frequent glaciations in the past. The tropics remained undisturbed, allowing for a longer period of time for speciation.
(ii) Tropics are less seasonal, providing a constant environment for speciation.
(iii) Availability of more solar radiation directly increases productivity and biodiversity

SECTION –D (4 Marks)

22. Study the flow chart given below and answer the questions that follow. 3

Cow is administered with FSH

□

(1)

□

6-8 eggs per cycle

□

Artificially inseminated

□

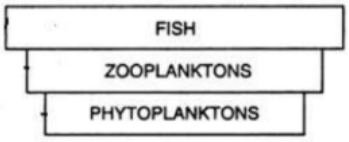
Fertilized eggs (8-32 cells) recovered

□

(2)

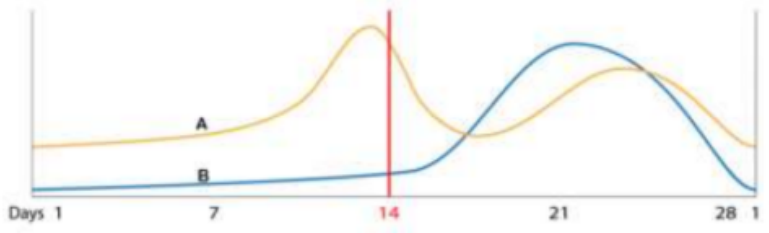
a) What is the purpose of administering FSH?
b) Identify the events that take place in (1) and (2) respectively.
c) Give two reasons why step (2) is performed.
Ans:
a) A cow is injected with FSH to induce multiple ovulation (6-8 eggs/cycle)
b) (1) – Follicular maturation, (2) Transfer to surrogate mothers
c) Many embryos cannot develop in one cow. The superior quality cow will be ready for another cycle of ovulation.

23. a) What does the given diagram represent?



b) Identify the secondary producers and primary consumers.
c) Is this a sustainable ecosystem? Explain.
Ans:
a) It represents the pyramid of biomass in an aquatic ecosystem.
b) Zooplanktons
c) Yes. Even though the biomass of phytoplanktons is less, it can sustain due to its high rate of reproduction.

24.



a) Identify A and B.
b) Specify the source of the hormones A and B.
c) Mention the role of A and B.
Ans:
a) A- Oestrogen, B- Progesterone
b) A- Follicles, B- Corpus luteum
c) Oestrogen – proliferation of endometrium, Progesterone-Maintenance of endometrium

SECTION E (5 Marks)

25. What is meant by Ozone hole? Mention its cause. How does it develop?
Ans:
The thinning of the ozone layer is the ozone hole.
Cause: release of CFCs into the atmosphere

- In the stratosphere, UV rays act on CFCs and release Chlorine atoms.
- Chlorine atoms act on O_3 and convert it into O_2 and O.
- Since Chlorine atoms are not consumed in the reaction, they continuously perform the above reaction, leading to ozone depletion

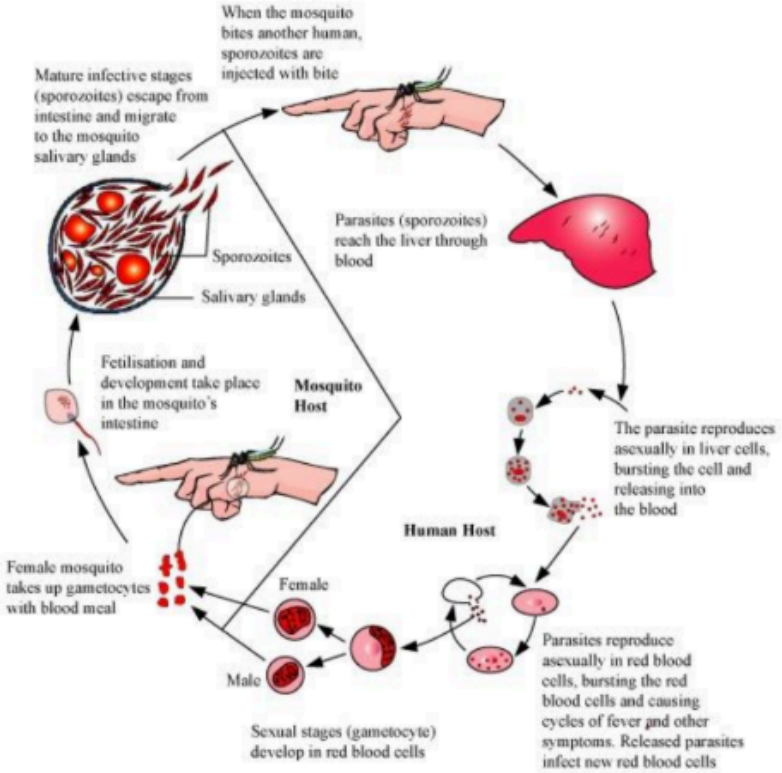
OR
a) Though thermal power plants are necessary for our country, they can cause harm to the environment and people.

b) Mention how they are harmful to the environment and people.
c) What precaution can be taken to avoid such harmful effects?
Ans:

a) Thermal power plants release both particulate and gaseous pollutants into the atmosphere.
b) Harmful effects:
   i) (i) CO_2 and methane cause global warming.
   ii) (ii)Particulate matter causes respiratory disorders, irritation and inflammation of the lungs.
c) Precautions: Installing scrubbers to remove gaseous pollutants, and Installing Electrostatic precipitators to remove particulate matter.

26. Why is using tobacco in any form injurious to health? Explain.
Ans:
(i) Tobacco contains nicotine, which stimulates the adrenal gland to release adrenaline.
(ii) This increases heart rate and blood pressure.
(iii) It also causes cancer of the throat, lungs, and urinary bladder.
(iv) It causes bronchitis, emphysema, and coronary heart disease
(v) It increases CO content in blood and reduces the concentration of haem-bound oxygen.

OR
Give a schematic representation of various stages in the lifecycle of *Plasmodium*.
Ans:



27. a) Explain any two methods of Assisted Reproductive Technology that have helped childless couples to bear children.
b) What are the different ways by which IUDs prevent pregnancy?
Ans:

- GIFT- Transferring an ovum into the oviduct of a female who cannot produce an ovum, or transferring sperm into the oviduct of a female, as the sperm count or motility is low in her Husband.
- ZIFT- Fertilisation is done in vitro, and the zygote is transferred into the fallopian tube of the mother

b) IUDs prevent pregnancy by:

- (i) Phagocytosing sperms within the uterus
- (ii) Cu ions released by IUDs suppress sperm motility
- (iii) Make the uterus unsuitable for implantation

OR
Explain five advantages seeds offer to angiosperms.
Ans: Advantages of seeds in angiosperms:

- (i) It has made the process of pollination and fertilisation independent of water.
- (ii) Seeds have better adaptive strategies for dispersal to new habitats
- (iii) Hard seed coat protects the embryo from adverse conditions
- (iv) Since they are products of sexual reproduction, they show more variation.
- (v) Presence of seed dormancy enables the seed to develop only with the onset of favourable conditions.