

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

Class 12 Biology (Code - 044) – Set - 1

Duration: 3 Hours

Maximum Marks: 70

Section - A (1 Mark)

1. Which among these is a common feature seen in earthworm and sponges?

- a) Hermaphroditism
- c) Indirect development
- b) External fertilization
- d) All of these

Ans: a) Hermaphroditism

OR

Maize grains are albuminous because:

- a) They are monocots
- b) Their endosperm is not utilized completely
- c) It is rich in proteins
- d) They contain more stored food

Ans: b) Their endosperm is not utilized completely

2. A 'suitable gene' in the context of DNA vaccine means:

- a) A gene that could be cloned
- b) A gene with selectable marker
- c) A gene that codes for surface antigen
- d) A gene that codes for antibody resistance

Ans: c) A gene that codes for surface antigen

3. Outbreeding is done between:

- a) Animals of the same breed with no common ancestors on either side of the pedigree up to 4-6 generations.
- b) Superior male of the breed with superior female of another breed.
- c) Male and female of two different species
- d) All of the above

Ans: d) All of the above

4. To introduce a desired DNA segment into a plant cell, the method followed is:

- a) Microinjection
- b) Biolistics
- c) Heat shock method
- d) using disarmed pathogen vectors

Ans: b) Biolistics

5. A stable community should not

- a) get affected by variation in temperature and rainfall
- b) provide scope for speciation
- c) resistant to alien species invasion
- d) all of the above

Ans: a) get affected by variation in temperature and rainfall

SECTION –B (2 Marks)

6. Explain how the parents and offspring of the sexually reproducing organisms have the same number of chromosomes.

Ans: Parents produce gametes by meiosis, reducing the no. of chromosomes to half in gametes. On fertilisation chromosome number is restored.

In haploid organisms, a gamete is produced by mitosis, diploid zygote undergoes meiosis.

OR

Name the steps in artificial hybridization and mention how it ensures cross-pollination in an autogamous flower.

Ans:

- (i) Emasculation – prevents self-pollination
- (ii) Bagging – prevents contamination of stigma with unrelated pollen

7. How does undersecretion of LH affect human males? Explain.

Ans:

- LH acts on Leydig cells and induces spermatogenesis
- Deficiency will lead to very low sperm production

8. Why are the glycoproteins not found on the RBCs of a person with O blood group? Compare it with those having AB blood group.

Ans: People with O blood group have the recessive gene “i”, which does not code for proteins. People with the AB blood group have the co-dominant genes “IA” and “IB”, which code for glycoproteins A and B.

9. What is the need for an adapter molecule in the process of translation? Give two points in support of your answer.

Ans: The sequence of nucleotides has to be converted into a sequence of amino acids. There is no structural or theoretical complementarity between the two.

10. Which plant breeding technique other than conventional hybridization is used to produce disease-resistant crops? Why?

Ans: Mutation breeding- due to the limited number. of disease-resistant genes. New varieties are created by inducing mutation by exposing the plants to mutagenic chemicals or radiation.

11. What is the significance of the process of RNAi in eukaryotic organisms? How is it applied in preventing nematode infestation in tobacco plants?

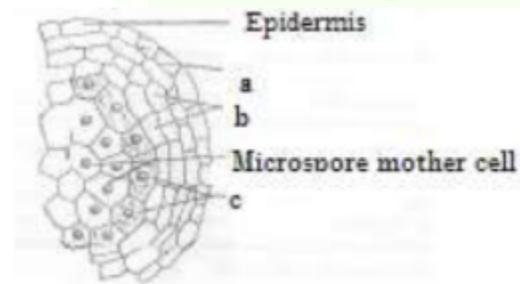
Ans: RNAi is a method of cellular defence in eukaryotes
Nematode-specific genes are introduced into the tobacco plant which elicits RNAi against the nematode. Nematodes cannot produce the needed proteins and die.

12. What is Ecosan? How does it help in preventing environmental degradation?

Ans: Ecosan is a method to handle human excreta using dry composting toilets. It recycles human excreta into manure. It is a hygienic and cost-effective method.

SECTION –C (3 Marks)

13. Given below is the enlarged view of one microsporangium of a mature anther:



(i) Name a, b, and c wall layers.

(ii) Mention the characteristics and function of the cells forming the wall layer 'c'

(iii) Which tissue occupies the centre of the Microsporangium?

Ans:

(i) a - Endothecium, b - Middle layer, c- Tapetum

(ii) Tapetal cells are binucleate and nourish the developing pollen.

(iii) Sporogenous tissue.

14. Differentiate between embryo of a grass and embryo of castor.

Ans:

Embryo of grass	Embryo of castor
It has a single cotyledon	It has two cotyledons
Radicle and plumule are covered by Coleorrhizae and coleoptile	Radicle and plumule not covered by Coleorrhizae and coleoptiles
Scutellum present	Scutellum absent

15. Explain how PCR can help in the detection of mutant genes.

Ans:

- A single-stranded DNA/RNA is tagged with a radioactive probe
- Allowed to hybridise with DNA from the cloned cells of the patient
- Viewed by autoradiography
- A clone having a mutated gene will not appear because the probe has no complementary DNA

16. Explain how to find whether an *E.coli* bacterium has transformed or not when a plasmid bearing ampicillin resistance gene and a recombinant DNA (at the tetracycline site) is transferred into it.

Ans:

- *E.coli* bearing transferred rDNA at the tetracycline site loses tetracycline resistance.
- They are first grown on an ampicillin-containing medium to eliminate non-transformants
- Then they are grown on tetracycline-containing medium to eliminate non-recombinants

17. Lifestyle diseases are increasing alarmingly in India along with large-scale malnutrition. Identify the method by which both issues could be addressed and how?

Ans:

17. Both can be addressed through Biofortification
 Nutrient content and quality are improved by increasing
- (i) Protein content and quality
 - (ii) Oil content and quality
 - (iii) Vitamin content
 - (iv) Micro nutrient and mineral content.

18. A dihybrid heterozygous round, yellow-seeded garden pea (*Pisum sativum*) was crossed with a double recessive plant.

a) What type of cross is this?

b) Work out the genotype and phenotype of the progeny.

c) Which Mendelian principle of inheritance is illustrated through this cross?

Ans:

a) Test Cross

b)

Parents	Round Yellow	wrinkled green
	RrYy	rryy
Gametes	RY, Ry, rY, ry	ry

Progeny

	RY	Ry	rY	ry
ry	RrYy	Rryy	rrYy	rryy
Phenotype	Round Yellow	Round wrinkled	Wrinkled Yellow	Wrinkled green

c) It illustrates the principle of independent assortment

OR

Phenylketonuria is an example of pleiotropism. Justify and describe the cause and phenotypic expression of the disease.

Ans: Phenylketonuria, although caused by a single gene it exhibits multiple phenotypic expressions.

Caused by a mutation in the gene that codes for the enzyme phenylalanine hydroxylase.
Phenotypic expression: mental retardation, reduction in hair and skin pigmentation.

19. Read the sequence of nucleotides in the given segment of mRNA and the respective mRNA: AUGUUUAUGCCUGUUUCUUA A

Polypeptide : Met-Phe-Met-Pro-Val- Ser- ___

a) Provide the codon for (i) Valine, (ii) Proline

b) Write the nucleotide sequence of the DNA strand from which this mRNA was transcribed?

c) What does the last codon of this mRNA stand for?

Ans:

a) Valine- GUU, Proline- CCU

b) TAC AAA TAC GGA CAA AGA ATT

c) Last codon is a termination codon which does not code for any amino acid

20. a) What was the theory proposed by Oparin and Haldane on the origin of life?

b) State the theory.

c) How did S. L. Miller's experiment support their theory?

Ans:

- a) The theory of chemical evolution was proposed by Oparin and Haldane.
- b) Life originated from non-living organic molecules.
- c) Stanley Miller experimented by simulating the primitive atmospheric conditions in a flask and observed that organic molecules were formed out of inorganic chemicals

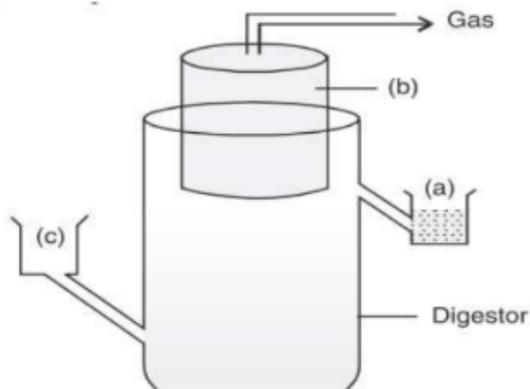
21. What is the influence of biodiversity on the ecosystem? Mention three possible consequences that loss of biodiversity in a region could lead to?

Ans:

- (i) Ecosystems with more species diversity show less year-to-year variation in total biomass production
- (ii) They show more productivity.
 - Consequences of loss of biodiversity
 - Decline in crop productivity
 - Increased variability in certain ecosystem processes
 - Decreased resistance to environmental disturbances

SECTION –D (3 Marks)

22.



a) What does (c) contain?

b) What does (b) hold? Name the constituents.

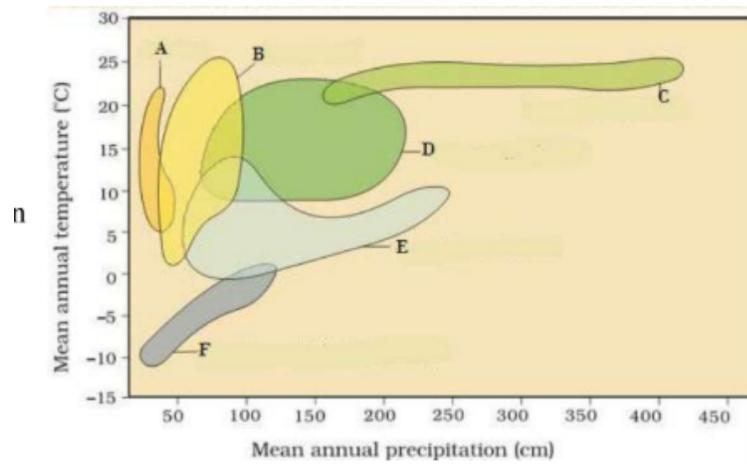
c) Briefly describe the action in the digester.

d) Will this action take place if only plant wastes are added? Why?/ Why not?

Ans:

- a) (c) contains dung and water.
- b) (b) holds the biogas. Constituents- Methane, CO_2 and H_2
- c) Methanogens present in animal dung break down cellulose, resulting in biogas production.
- d) No. Plant wastes do not contain methanogens.

23.

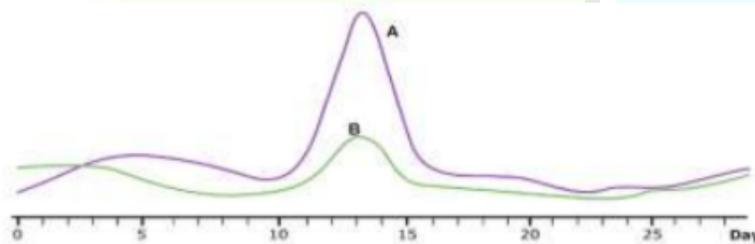


- Name the biomes represented by D and C.
- Give two examples for A
- Mention any two adaptations seen in organisms inhabiting F.

Ans:

- D-temperate forest, E- Tropical forest
- Examples of A- Sahara desert, Thar desert (or any other)
- Shorter ears and limbs, a thick layer of fat/ fur, and less surface area to body volume.

24.



- Name the hormones A and B
- Identify the ovarian phases depicted in the graph between
 - 5th day and 12th day
 - 16th day and 25th day
- What is the significance of peaking out of A

Ans:

- A- FSH, B- LH
- Follicular phase / proliferative phase
 - Luteal phase
- c) It causes rupture of the Graafian follicle, resulting in ovulation.

SECTION E (5 Marks)

25. a) How does deforestation lead to global warming?

b) Explain how global warming poses a threat to plant and animal life on Earth.

Ans:

- a) Due to deforestation, a large amount of CO₂ remains in the atmosphere as the trees are major fixers of CO₂. CO₂ is a greenhouse gas and absorbs infrared radiation, increasing the average atmospheric temperature. This is global warming.
- b) Harmful effect on plant and animal life:
 - i) The melting of ice poses a threat to polar bears
 - ii) Causes the extinction of Stenothermal organisms.
 - iii) Affects plant growth and development

OR

What is algal bloom? Mention its cause. How does it affect the physical and biological factors of the water body?

Ans:

Excess growth of certain phytoplankton and algae in a water body is algal bloom. It is caused by increased nitrate and phosphate content of the lake due to agricultural runoff.

Harmful effects:

- (i) Forms a mat cover over the water and depletes the oxygen content of the lake
- (ii) Causes the death of fish and other aquatic life.
- (iii) releases toxins that can kill humans and cattle when used for drinking.

26. a) How do normal cells get transformed into cancerous neoplastic cells?

b) How do histopathologists differentiate between normal cells and cancer cells?

c) Which is the most feared property of cancer cells? Give reason.

Ans:

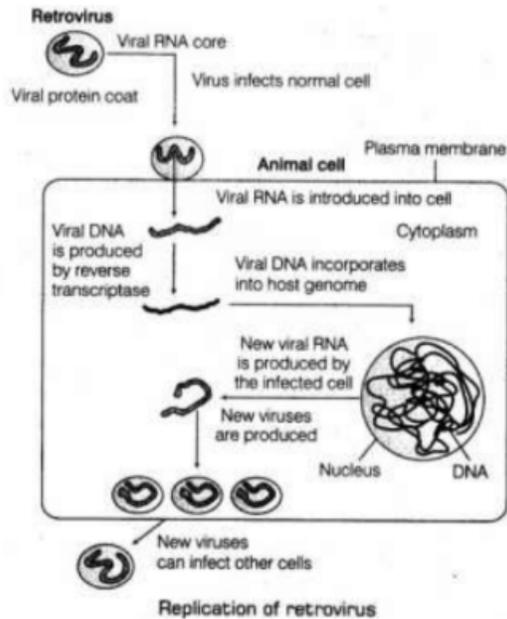
26.

- a) When normal cells are exposed to carcinogens, the proto-oncogenes get triggered, resulting in uncontrolled cell division or due to viral oncogenes- infection of such viruses can transform normal cells into cancer cells.
- b) Normal cells show growth and appear bigger than cancer cells.
- c) Metastasis : It is the property by which cancer cells slough off from the tumour, infiltrate into the blood and get carried to other places. This initiates the formation of secondary tumours, which can deplete normal cells of their nutrition.

OR

Illustrate with the help of a schematic representation, the infection of AIDS virus in the human body.

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.