Adyasha

CLASS XII:BIOLOGY (044)
MIDTERM ASSESSMENT
SESSION: 2024-25

Name _____ Roll No. _____

Weightage: 70 marks.
Time Duration: 3 hr

- All questions are compulsory.
- The question paper comprises of five sections A , B, C, D and E you are to attempt all the sections.
- Section A: Q. No 1 to 14 in section A are multiple choice questions carrying 1 mark each.
- Section B: Q. NO. 15 to 21 in section B are short answer questions carrying 2 marks each.
- Section C: Q. No. 22 to 26 in section C are short answer questions carrying 3 marks each.
- Section D: Q. No. 27 to 29 in section D are CASE BASED questions carrying 4 marks each.
- Section E: Q. No. 30 to 32 in section E are long type questions carrying 5 marks each.
- Draw diagrams wherever required.

SECTION-A (1x 14=14)

1. A typical angiosperm anther is not: (1)

a) bilobed with each lobe having two theca
b) dithecous i.e. having two theca
c) tetrasporangiate- have four pollen sacs
d) bisporangiate - having two lobes -

2. Choose the incorrect statement- (1)

a) The hollow foliar structure that encloses the leaf primordia in a grass embryo is called coleoptile.
b) In apples, the thalamus also contributes to fruit formation and becomes edible.
c) In Zostera, the pollen grains are long and ribbon-like and released inside the water.
d) In cereals such as rice and wheat, pollen grains lose viability within 10 minutes of their release

3. If the coding strand reads as 5' -TACGTACGTACGTACGTACGTACG-3' then the m RNA would be: (1)

a) 3' -ATGCATGCATGCATGCATGCATGC-5'
b) 3' -AUCAUGCAUGCAUGCAUGCAUGC-5'
c) 5'-UACGUACGUACGUACGUACGUACG-3'
d) 3'-UACGUACGUACGUACGUACGUACG-5'

4. Which of the following statements is correct concerning sickle cell anemia? (1)

a) Glutamic acid is replaced by Valine at the 6th position of the beta chain of Hg due to point mutation.
b) Valine is replaced by Glutamic acid at the 6th position of the beta chain of Hg due to point mutation.
c) This occurs due to single base substitution of 6th codon of alpha-globin gene from GAG to GUG
d) This occurs due to single base substitution of 6th codon of beta-globin gene from CTC to GUG

5. Choose the incorrect pair -
a) Non- albuminous seed- pea
b) Non- endospermic seed - groundnut
c) Albuminous seed- maize
d) Endospermic seed -beans (1)

6. Which of the following statements about the megasporangium in angiosperms is correct:
1) Enclosed within the integuments is a mass of cells called the nucellus
2) Located in the nucellus is the embryo sac or female gametophyte.
3) Megasporangium is attached to the placenta by means of a hilum
4) Ovules generally differentiate a single MMC in the chalaza region

a) 1 & 2 b)1 & 4 c) 3 & 4 d) only 3 (1)

7. A bilobed dithecous anther has 500 microspore mother cells per microsporangium. How many male gametophytes can this anther produce? (1)
a) 10,000 b) 25,000 c) 20,000 d) 8,000

8. Read the following statements. (1)
I. Each testes has 25 compartments called testicular lobules.
II. Each testicular lobule contains one to three highly coiled seminiferous tubules in which sperms are produced.
III. Sertoli cells provide nutrition to testes
IV. Sertoli cells are activated by FSH
Which of the above statements are incorrect?
a) I and II b) only I c) I and IV d) III and IV

9. Which of the following statements are correct regarding the menstrual cycle? (1)
a) LH induces rupturing of Graafian follicle
b) Proliferative phase is characterized by increased secretion of progesterone
c) Corpus luteum secretes large amount of estrogen
d) both FSH and LH attain peak level at secretory phase

10. In human foetus the limbs and digits develop after: (1)
a) 8 weeks b) first trimester c) 5th month d) 12 weeks

For question numbers 11, 12, 13 and 14 two statements are given-One labeled Assertion(A)and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:
a) Both A and R are true, and R is the correct explanation of the assertion.
b) Both A and R are true, but R is not the correct explanation of the assertion.
c) A is true, but R is false.
d) A is false, but R is true.

11. ASSERTION: The placenta is connected to the embryo through an umbilical cord
REASON: Placenta produces several hormones like hCG, hPG, estrogens, and oxytocin. (1)

12. ASSERTION: Breaking the dormancy of seed is a problem faced by farmers in agriculture.
REASON: Seeds of a large number of species live for several years. (1)

13. ASSERTION:The inner cell mass have the potency to give rise to all the tissues and organs.
REASON: The inner cell mass have totipotent stem cells (1)

14. ASSERTION:The edges of the oviduct possess finger-like projections called infundibulum
REASON:The infundibulum leads to a wider ampullary region in the oviduct. (1)

SECTION-B (7 x 2=14)

15. Mention the specific contributions of the following scientist in deciphering of genetic code
a) Marshall Nirenberg b) Severo Ochoa c) Har Gobind Khorana d) George Gamow (2)

16. Compare and contrast between the two human ancestor species - *Homo habilis* and *Homo erectus* on the basis of their habits and their brain capacities.

OR

16. 360 out of 1000 individuals in a population have a genotype of AA while 480 have Aa genotype. The rest 160 belong to aa. Frequency of allele A in this population is ____ (2)

17. What is the source of coke/crack and what are its effects on the human system? (2)

18. Using Punnett square, try to find out the nature of offspring of a test cross of a tall violet flowered peas plant. What ratio did you get?
b) Using the genotypes of this cross, can you give a general definition for a test cross? (2)
19.What is polyembryony and how does this process solve a huge problem for farmers? (2)

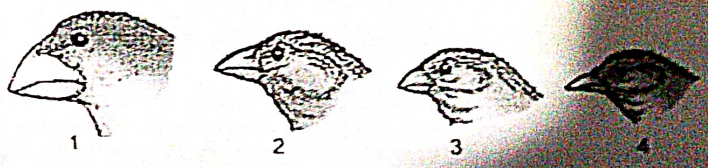
OR

What is perisperm? Where is perisperm seen in plants? (2)
20. Draw the structure of the Graafian follicle and label four structures on it. (2)
21. Oogenesis is initiated during the embryonic development stage and the process continues after puberty- trace the stage of development of oogonia till fertilization occurs to produce a zygote. (2)

SECTION-C (5 x 3=15)

22. a) Explain the process of transcription in a bacteria. What are the steps involved in this process?
b) What are the two additional complexities seen in eukaryotes to the process of transcription from that of prokaryotes ? Explain. (2+1)

23. a) Write your observations on the variations seen in Darwin's finches shown in the diagram. How did Darwin explain the existence of different varieties of finches on Galapagos Islands ?
b) Give two other examples of this phenomenon and explain briefly what is the name given to this type of evolution.



(1.5+1.5)

OR

23. i) What are the key concepts in the evolution theory of Darwin?
ii) With the help of two examples explain Darwin's theory. (2+1)

24. a) What does Chromosomal Theory of Inheritance state?
b)Who provided the experimental verification of the chromosomal theory of inheritance ? What is the material he used for his experiments?
c) What was Alfred Sturtevant's contribution to this field of study ? *(1+1+1)*

25. a) Using the example of the disease phenylketonuria explain the pleiotropy effect of genes.
b) Which sex determination mechanism is designated to be the example of male heterogamety ? Explain briefly.
(2+1)

26. a) Explain what is meant by (i) Flocs (ii) Activated Sludge in biological treatment of sewage.
b) What is the full form of BOD? What does this term mean during sewage treatment when is the BOD reading high and when is it low?
(2+1)

SECTION-D (4x3=12)

CASE BASED QUESTIONS:

27. Everyday we are exposed to a large number of infectious agents. However, only a few of these exposures result in disease. Why? This is due to the fact that the body is able to defend itself from most of these foreign agents. This overall ability of the host to fight the disease-causing organisms, conferred by the immune system is called immunity.

a) What are the two types of immunity and how do they differ?

OR

a) Sketch the diagram of the protein molecules seen in the serum at the time of the immune response?

b) What are the immunity barriers that you possess from birth? (4 types)

OR

b) How does a body generally react to antigen entering the body? What is the characteristic of such an immunity response ?
(2+2)

28. Microbes cause a large number of diseases in human beings. They also cause diseases in animals and plants. But this should not make you think that all microbes are harmful; several microbes are useful to man in diverse ways. A common example is the production of curd from milk. Micro-organisms such as Lactobacillus and others commonly called lactic acid bacteria (LAB) grow in milk and convert it to curd.

a) In what way does LAB help to enhance human health? (2 Points)

b) Which microorganism is used in the manufacture of varieties of Cheese ?

c) How did scientists save lives during World War II with contributions from microbes?

d) Which is the lifesaving drug used as a blood-cholesterol lowering agent ? Which microorganism produces this biomolecule?

OR

d) Which microorganism provides us with a bioactive molecule which can be used as an immunosuppressive agent in organ-transplant patients? Name this bioactive molecule.

29. Specialised health care units (infertility clinics, etc.) could help in diagnosis and corrective treatment of some of these disorders and enable these couples to have children. However, where such corrections are not possible, the couples could be assisted to have children through certain special techniques commonly known as assisted reproductive technologies (ART).

a) Which ART is used to treat infertility cases which arise either due to inability of the male partner to inseminate the female or due to very low sperm counts ?
b) What is the difference between GIFT and ZIFT?
c) Explain the steps in the popularly known test tube baby programme ? (1÷1÷2)

SECTION-E (5x3=15)

30. a) "Each metabolic reaction is controlled by a set of genes"- Explain how gene expression is controlled at various levels in eukaryotes.

b) Explain an operon in prokaryotes and the method by which it is controlled ? What triggers this operon to turn on? (2÷3)

OR

a) Human Genome Project (HGP) was called a mega project- Why?

b) What were the two major methodologies followed by the HGP ?

c) Mention six of the salient observations drawn from the human genome project? (1÷1÷3)

31. a) Name the law that states that the sum of allelic frequencies in a population remains constant. What are the five factors that influence these values?

b) Sketch a diagrammatic representation of the operation of natural selection on different traits giving examples for each type of natural selection. (3÷2)

OR

a) What is the difference in the inheritance pattern between Haemophilia and Sickle Cell Anaemia? Explain yourself with the aid of a cross.

b) What has led to the defect in Sickle cell anaemia patients? (3÷2)

32. a) How is a cancerous cell different from a normal cell?

b) Enlist the physical, chemical or biological carcinogens.

c) Early detection of cancers is essential as it allows the disease to be treated successfully in many cases - what are the various methods of detection of cancer in humans?

OR

32 a) Biocontrol refers to the use of biological methods for controlling plant diseases and pests- What are the ways in organic farming that use microbes as pesticides and insecticide to protect human health? (Three ways)

b) Mention two in which microbes are useful as biofertilizers to safeguard our health and the environment.