COMMON PRE-BOARD EXAMINATION 2022-23

Subject: BIOLOGY (044)

Class: XII | Time: 3 Hours

Date: | Max. Marks: 70

General Instructions:

(i) All questions are compulsory.

(ii) The question paper has five sections and 33 questions. All questions are compulsory.

(iii) Section-A has 16 questions of 1 mark each; Section-B has 5 questions of 2 marks each; Section-C has 7 questions of 3 marks each; Section-D has 2 case-based questions of 4 marks each; and Section-E has 3 questions of 5 marks each.

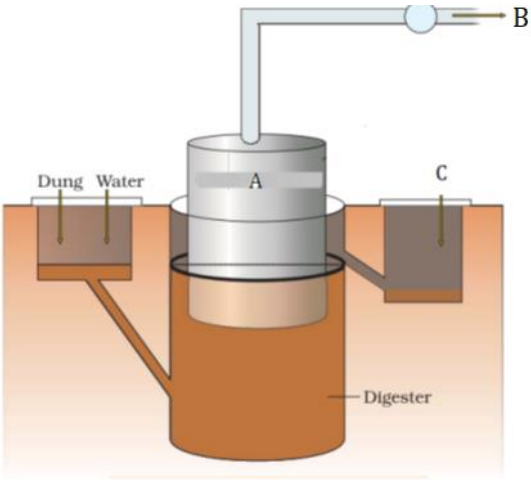
(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labelled diagrams should be drawn.

	Section A	
1.	Cross-pollination is preferred over self-pollination because it a. produces better offspring b. removes inbreeding depression c. forms new varieties d. all of these	1
2.	The method of directly injecting a sperm into ovum in Assisted Reproductive Technology is a. GIFT b. ZIFT c. ICSI d. ET	1
3.	While analysing the DNA of an organism a total number of 5386 nucleotides were found, out of which the proportion if different bases were: Adenine = 29%, Guanine = 17%, Cytosine = 32%, Thymine = 17% a. It is a double stranded circular DNA b. It is a single stranded DNA c. It is a double stranded linear DNA d. No conclusion can be drawn	1
4.	In the Hardy-Weinberg equation, the term 2pq represents the a. overall gene frequency of the population b. frequency of both homozygous genotypes. c. frequency of the heterozygous genotype. d. allele frequencies of the population.	1
5.	Damage to thymus in a child may lead to – a. a reduction in haemoglobin content of blood b. a reduction in stem cell production c. loss of antibody mediated immunity d. loss of cell mediated immunity	1
6.	The foetus gets immunized after receiving antibodies from mother through placenta. This type of immunization is called a. active immunity c. passive immunity b. innate immunity d. humoral immunity	1
7.	Activated sludge should have the ability to settle quickly so that it can a. be rapidly pumped back from sedimentation tank to aeration tank b. absorb pathogenic bacteria present in waste water while sinking to the bottom of the settling tank c. be discarded and anaerobically digested d. absorb colloidal organic matter	1

8.	Which of the following forms the basis of DNA finger printing? a. The relative proportions of purines and pyrimidines in DNA. b. Satellite DNA occurring as highly repeated short DNA segments. c. The relative difference in the DNA occurrence in blood, skin and saliva. d. The relative amount of DNA in the ridges and grooves of the fingerprints.	1
9.	A population of 500 that experiences 55 births and 5 deaths during a one-year period. What is the reproductive rate for the population during the one-year period? a. 0.01/year b. 0.05/year c. 0.1/year d. 50/year	1
10.	Interactions in which the consumer lives within the host and does slow damage to the host are referred to as a. commensalism b. parasitism c. mutualism d. competition	1
11.	Decomposition rate is slow if the detritus is rich in a. Sugars b. Nitrogen c. Lignin and chitin d. Water soluble substances	1
12.	Match Column I with Column -II and choose the correct option Column I — Column II A. Nile Perch in Lake Victoria — 1. Obvious reasons for biodiversity conservation B. Narrowly utilitarian — 2. Habitat destruction C. Main cause for biodiversity loss — 3. High endemism D. Hot spots — 4. Alien species a. A - 2, B - 1, C - 4, D - 3 b. A - 4, B - 1, C - 2, D - 3 c. A - 1, B - 3, C - 2, D - 4 d. A - 2, B - 1, C - 3, D – 4	1
	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below. a. Both A and R are true, and R is the correct explanation of A b. Both A and R are true, and R is not the correct explanation of A c. A is true but R is false d. A is false but R is true	
13.	**Assertion (A)**: An angiospermous flower represents the modified condensed shoot which performs the function of sexual reproduction. **Reason(R):** The fertile leaves of the shoot become modified into microsporophylls and megasporophylls which bear ovules and anthers respectively.	1
14.	**Assertion (A):** Cross of F1 individual with recessive homozygous parent is test cross. **Reason (R**): No recessive individual is obtained in the monohybrid test cross progeny.	1
15.	**Assertion (A):** RNAi takes place in all eukaryotic organisms as a method of cellular defense. **Reason (R)** : Complementary dsRNA molecule binds to specific mRNA and prevents its translation (silencing).	1
16.	**Assertion (A) :** Tropical rain forests are disappearing fast from developing countries such as India. **Reason (R):** No value is attached to these forests because these are poor in biodiversity.	1

	Section B	
17.	Expand IUD. Why is hormone releasing IUD considered a good contraceptive to space children?	2
18.	During a medical investigation, an infant was found to possess an extra chromosome 21. Describe the symptoms the child is likely to develop later in the life.	2
19.	a) Name the causative agent of typhoid in humans. b) How does the pathogen enter the human body? c) Mention the body organ that gets affected in severe cases. d) Name the test administered to confirm the disease.	2
20.	a)Explain the significance of palindromic nucleotide sequence in the formation of recombinant DNA. b) Explain the use of restriction endonuclease in the above process.	2
21.	a) What is common to *Lantana, Eichhornia* and African catfish. b) What is the main reason for the extinction of passenger pigeon? c) What are sacred groves? Give an example. OR a) What would happen to the successive trophic levels in the pyramid of energy, if the rate of reproduction of phytoplankton was slow down? Suggest two factors which could cause such a reduction in phytoplankton reproduction.	2
	Section C	
22.	Explain parturition and the role of hormones involved in the induction of parturition.	3
23.	a) How does a farmer use the dormancy of seed to his advantage? b) Fertilisation is not an obligatory event for fruit formation in certain plants. Explain the statement with the help of an example. c) How does coconut kernel differ from coconut water?	3
24.	During his studies on genes in Drosophila that were sex-linked. T.H. Morgan found population phenotypic ratios deviated from expected 9: 3:3: 1. Explain the conclusion he arrived at.	3
25.	Explain co-evolution with reference to parasites and their hosts. Mention the special adaptive features evolved in parasites for their parasitic mode of life.	3
26.	a) It is generally observed that the children who had suffered from chicken pox in their childhood may not contract the same disease in their adulthood. Explain giving reasons the basis of such an immunity in an individual. Name the kind of immunity. b) Mention the role of interferons.	3
27.	a) List the three steps involved in Polymerase Chain Reaction. b) Name the source organism of Taq polymerase. Explain the specific role of tis enzyme in PCR.	3
28.	Explain rivet popper hypothesis. Name the ecologist who proposed it.	3
	Section D	
Q. 29 and 30 are case based questions. Each question has subparts with internal choice in one.		
29.	**Read the following passage and answer the following questions given below.** RNA was the first genetic material. There is now enough evidence to suggest that essential life processes (such as metabolism, translation, splicing, etc.), evolved around RNA. RNA used to act as a genetic material as well as a catalyst (there are some important biochemical reactions in living systems that are catalysed by RNA catalysts and not by protein enzymes). But, RNA being a catalyst was reactive and hence unstable. Therefore, DNA has evolved from RNA with chemical modifications that make it more stable. DNA being double stranded and having complementary strand further resists changes by evolving a process of repair. a) Which nucleic acid is less reactive? b) Which evidence suggest that RNA used to be the genetic material rather than DNA? c) DNA has evolved from RNA with chemical modifications that make it more stable. Explain the chemical modification referred here.	4

	OR Name the genetic material of retroviruses. Do they follow Central Dogma?	
30.	**Study the diagram of biogas plant and answer the following questions.**  a) Name the group of organisms and substrate they act on to produce biogas. b) How do they generate biogas? c) Identify the products A and C and discuss their significance. OR Name the organisations that developed the technology of biogas in India.	4
	Section E	
31.	a) Draw a labelled diagrammatic view of human male reproductive system. b) Differentiate between: (i) Vas deferens and vasa efferentia (ii) Spermatogenesis and spermiogenesis OR Explain the ovarian and uterine events that occur during a menstrual cycle in a human female, under the influence of Pituitary and Ovarian hormones respectively.	5
32.	a) Explain the process of DNA replication with the help of a schematic diagram. b) In which phase of the cell cycle does replication occur in eukaryotes? What would happen if cell division is not followed after DNA replication? OR a) How are the following formed and involved in DNA packaging in a nucleus of a cell? (i) Histone octamer (ii) Nucleosome (iii)Chromatin b) Differentiate between Euchromatin and Heterochromatin.	5
33.	a) What is Gene therapy? b) Name the first clinal case where it was used. c) Mention the cause of this disease. d) Explain the process of gene therapy in this case. Mention two disadvantages of this procedure. OR a) Name the nematode that infests and damages tobacco roots. b) How are transgenic tobacco plants protected against *Meloidogyne incognita*? Explain the procedure.	5

******