

PRE-BOARD Examination - 2020-21

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Subject - Biology

Time - 3 Hours

Class - XII

M.M.- 70

General Instruction :

1. *All questions are compulsory.*
2. *This question paper has four sections : Section A, Section B, Section C, Section D. There are 33 questions in the question paper.*
3. *Section A has 14 questions of 1 mark each and 02 case based question. Section - B has 9 questions of 2 marks each. Section C has 5 questions of 3 marks each and Section D has 3 questions of 5 marks each.*
4. *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.*
5. *Wherever necessary, neat and properly labelled diagrams should be drawn.*

Section - A

- Q.1. Name the parts of the flower which the tassels of corn cob represent. 1
- Q.2. Where is acrosome present in humans? Write its function. 1
- Q.3. Mention the DNA sequence coding for serine and the anticodon of. 1
- Q.4. Define test cross. 1
- Q.5. Name one symbiont, which serve as biofertiliser. Mention its specific role. 1
- Q.6. Mention the useful as well as the harmful drug obtained from the latex of opium plant. 1
- Q.7. Give the roles of immune system. 1
- Q.8. What do you mean by palindromic sequence? 1
- Q.9. Which of the three forests - Temperate, Mangroves and Tropical Evergreen is more vulnerable to invasion by outside animals and plants? 1
- Q.10. Mention any two events that are inhibited by the intake of oral contraceptives pills to prevent pregnancy in humans.

Direction (Q. No. - 11 - 14)

In each of the following questions, a statement of Assertion (A) is given followed by corresponding statement of reason (R) of the statements, mark the correct answers :

- (a) If both A and R are true and R is the correct explanation of A.
 - (b) If both A and R are true, but R is not the correct explanation of A.
 - (c) If A is true, but R is false.
 - (d) If both A and R are false.
- Q.11. Assertion (A) The predominant site for control of gene expression in prokaryotes is transcription initiation.
Reason (R) The activity of RNA polymerase is regulated by accessory proteins. Which affect recognition of start sites.
- Q.12. Assertion (A) The female external genitala include mons pubis, clitoris and labia minora.

Reason (R) The glandular tissue of each breast contains single mammary lobe. kv1

Q.13. Assertion (A) Phenylpyruvic acid is excreted through urine in case of phenylketonuria.

Reason (R) The affected individual lacks enzyme phenylalanine hydroxylase.

Q.14. Assertion (A) Proto-oncogenes are cellular genes required for normal growth.

Reason (R) Overexpression of these genes destroy malignant cells.

Or

Assertion (A) USA patent of brazzein is an example of biopiracy.

Reason (R) Brazzein, a protein obtained from west African plant, *Pentadipland brazzeana* and the gene encoding it has been patented by USA.

Q.15. Direction- Read the following and answer any four questions from 15 (1) to 15 (v) given below: 4

Interferons (IFNs) are proteins produced by a variety of cells in the inflammatory response to infections. Their production is triggered by the immune system in response to pathogens or cytokines. Once triggered they induce numerous molecular changes that affect cellular responses including cell growth and inflammation. IFNs can play both pathological and beneficial roles in the nervous system. There are two major classes of IFNs, i.e. type I (IFN- α subtypes, IFN- β , etc.) and type II (IFN- γ). Types I and II IFNs use distinct but similar receptor systems.

(i) The interferons can be used as

- | | |
|-------------------------|-----------------------|
| (a) antibacterial drugs | (b) antiviral drugs |
| (c) antibiotic drugs | (d) immunosuppressive |

(ii) Interferon is a type of protein which can be used to counter

- | | |
|---------------------------------|-------------------------------|
| (a) homeostatic disorder | (b) hepatitis caused by virus |
| (c) common cold caused by virus | (d) Both (b) and (c) |

(iii) A person has developed interferons in his body. He seems to carry an infection of

- | | |
|-------------|----------------|
| (a) typhoid | (b) filariasis |
| (c) malaria | (d) measles |

(iv) Antibodies are

- | |
|--|
| (a) Proteins produced in response to pathogens in our body. |
| (b) secreted by the action of both T-lymphocytes and B-lymphocytes |
| (c) molecules that specifically interacts with an antigen |
| (d) All of the above |

(v) Assertion (A) Interferons are a type of glycoproteins produced by body cells infected by virus.

Reason (R) Interferons interfere with viral replication at the site of injury.

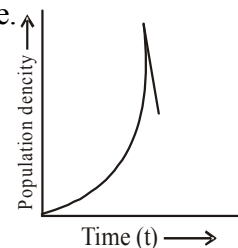
- | |
|---|
| (a) If both A and R are true and R is the correct explanation of A |
| (b) If both A and R are true, but R is not the correct explanation of A |

- (c) If A is true, but R is false kv1
 (d) If both A and R are false

Q.16. Direction - Read the following and answer any four questions from 16 (i) to 16 (v) given below : **4**

Growth of a population with time shows specific and predictable pattern. Today, ecologists are concerned about unbridled human population growth and problems created by it in our country. This therefore makes us to be curious if different animal populations in nature behave the same way or show some restraint on growth. This growth patterns can be illustrated by two types of growth models that is exponential growth model and logistic growth model.

- (i) In the exponential growth equation, if $b - d$ is represented by 'r' then 'r' may be called as
- intrinsic rate of natural increase
 - extrinsic rate of natural increase
 - morphological rate of natural increase
 - phenotypical rate of natural increase
- (ii) Exponential growth occurs when
- there is only sexual reproduction.
 - there is only asexual reproduction
 - there is a fixed carrying capacity.
 - no inhibition from crowding
- (iii) Carrying capacity is the capacity of
- habitat that has resources to sustain certain number of individuals
 - population to reproduce and competitiveness
 - Population to reproduce
 - Individuals to fit among the natural environment
- (iv) Logistic growth occurs when there is
- No resistance from increasing population
 - Unlimited food
 - Fixed carrying capacity
 - All of the above
- (v) Given population growth curve represents the growth curve.



Choose the correct conclusion drawn from the curve above.

- No population can grow exponentially for long.
- Exponential growth slows down as the population nears its log phase
- Bacterial colonies have been observed to maintain exponential growth always.

IV. Exponential growth is a commonly observed in large slow-growing species such as humans and elephants.

- (a) I is true
(b) I and II are true
(c) II and III are true
(d) IV is true

Section - B

Q.17. The advent of birth control pills resulted in increased risks of sexually transmitted diseases. Assess the fact given above and present your opinion on it. **2**

Or

In a flowering plant, a microspore mother cell produces four male gametophytes. While a megaspore mother cell forms only one female gametophyte. Explain.

Q.18. Differentiate between monohybrid cross and dihybrid cross.

Or

Differentiate between cistron and exon.

Q.19. Highlight and two structural features which allow tRNA to adopt its role in translation.

Q.20. Why are some untranslated sequences of bases seen in mRNA coding for a polypeptide? Where exactly are they present on mRNA?

Q.21. How does a restriction enzyme function in RDT?

Q.22. How does recombinant DNA technology help in detecting the presence of a mutant gene in cancer patients? **2**

Q.23. How does the application of cyanobacteria help to improve agricultural output? **2**

Q.24. Why are psychedelic drugs known as 'vision producing drugs'? **2**

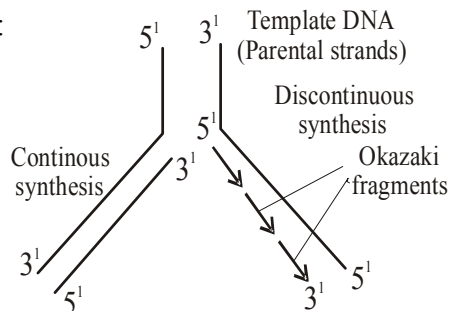
Q.25. How do prickles help cactus to survive in the desert? Give two methods. **2**

Section - C

Q.26. Mention the two different categories of microbes naturally occurring in sewage water. Explain their roles in cleaning sewage water. **3**

Q.27. How can *Agrobacterium tumefaciens* be used as a cloning vector? Explain. **3**

Q.28. DNA replication occurs in a replication fork and not over its entire length as depicted in the figure given below : **3**



- (i) Why is DNA replication continuous and discontinuous on the two strands of DNA?
(ii) Explain the importance of 'origin of replication' in a replication fork.

Or

Gregor Johann Mendel demonstrated the mechanism of transmission of characters from

one generation to the other. He used pea plants for his experiments. What were the advantages of selecting pea plants for the same?

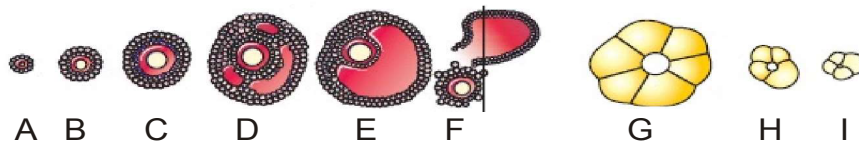
Q.29. Insulin extracted from the pancreas of slaughtered pigs and cattle was helpful in treating diabetes, then why was there a need to develop genetically engineered insulin? **3**

Q.30. Give reasons for the following : **3**

- (i) Integuments of an ovule harden and the water content is highly reduced as the seed matures
- (ii) Apple and cashewnuts are called false fruits.
- (iii) Tubectomy is considered as a contraceptive measure.

Section - D

Q.31. The following is the illustration of the sequence of ovarian events (A - I) in a human female. **5**



- (i) Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents.
- (ii) Name the ovarian hormone and the pituitary hormone that have caused the above mentioned event.
- (iii) Explain the changes that occur in the uterus simultaneously in anticipation.
- (iv) Write the differences between C and H.
- (v) Draw a labelled sketch of the structure of a human ovum prior to fertilisation.

Or

Differentiate between microsporogenesis and megasporogenesis. Name the structures formed at the end of the two events.

Q.32. Study the schematic representation of the genes involved in the lac operon given below and answer the questions that follows : **5**



- (i) Identify and name the regulatory gene in this operon. Explain its role in switching off the operon.
- (ii) Why is lac operon's regulation referred to as negative regulation?
- (iii) Name the inducer molecule and the products of the genes 'z' and 'y' of the operon. Write the function of these gene products.

Or

- (i) How is the amino acid sequence of a polypeptide chain related to the nucleotide

sequence of m RNA?

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- (ii) Write the characteristics of the genetic code.

Q.33. List the different ways by which organisms cope or manage with abiotic stresses in nature. Explain any three ways. **5**

Or

- (i) Taking an example of habitat loss and fragmentation, explain how are the two responsible for biodiversity loss.
- (ii) Explain two different ways of biodiversity conservation.