

SPECTRA CLASSES

Sample Practice paper 2024-25 XIth BIOLOGY

Time Allowed: 3 hours

Max. Marks: 70

General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper has five sections and **33 questions**.
- (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 labeled diagrams should be drawn

SECTION-A

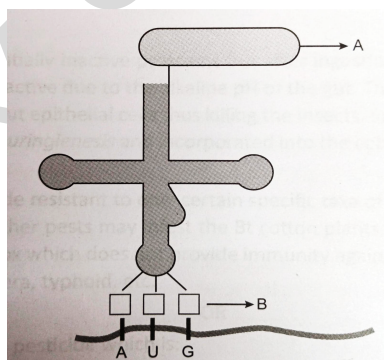
1) The correct sequence of hormone secretion from beginning of menstruation is

- (a) FSH, progesterone, estrogen
- (b) estrogen, FSH, progesterone
- (c) FSH, estrogen, progesterone
- (d) estrogen, progesterone, FSH

2) The wall layer of microsporangium which nourishes the pollen grain is:

- (a) epidermis
- (b) endothecium
- (c) middle layers
- (d) tapetum

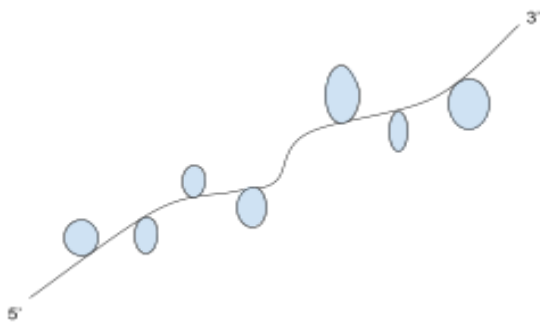
3)



AUG on the mRNA will result in the activation of which of the following RNA having correct combination of amino acids?

- | Site A | Site B |
|----------------|---------------|
| (a) UAC | Methionine |
| (b) Methionine | UAC |
| (c) Methionine | AUG |
| (d) AUG | Methionine |

4) Given below is a heterogeneous RNA formed during eukaryotic transcription. How many introns and exons respectively are formed in this hnRNA.



- (a) 7,7
- (b) 8,7
- (c) 8,8
- (d) 7,8

5) Select the correct sequence of processing of PCR.

- (a) Extension, primer annealing, denaturation
- (b) Denaturation, primer annealing, extension
- (c) Denaturation, extension, primer annealing
- (d) Primer annealing, denaturation, extension

6) Primary treatment of sewage waste involves which processes ?

- (a) Filtration and incubation
- (b) Sedimentation and decantation
- (c) Filtration and sedimentation
- (d) Sedimentation and microbial proliferation

7) Given below is a sequence of bases in mRNA of a bacterial cell. Identify the amino acid that would be incorporated at codon position 3 and codon position 5 during the process of its translation.

3'AUCAGGUUUGUGAUGGUACGA 5'

- (a) Phenylalanine, Methionine
- (b) Cysteine, Glycine
- (c) Alanine, Proline
- (d) Serine, Valine

8) Evolutionary convergence is development of a

- (a) common set of functions in groups of different ancestry.
- (b) dissimilar set of functions in closely related groups.
- (c) common set of structures in closely related groups.
- (d) dissimilar set of functions in unrelated groups.

9) A patient was advised to have a kidney transplant. To suppress the immune reaction, the doctor would administer him:

- (a) statins produced from *Monascus purpureus*
- (b) statins produced from *Streptococcus thermophilus*
- (c) cyclosporin A produced from *Trichoderma polysporum*
- (d) cyclosporin A produced from *Clostridium butylicum*

10) In *Antirrhinum*, RR is phenotypically red flowers, rr is white and Rr is pink. Select the correct phenotypic ratio in F₁ generation when a cross is performed between RR x Rr:

- (a) 1 red: 2 pink: 1 white
(b) 2 pink: 1 white
(c) 2 red: 2 pink
(d) All pink

11) In a certain species of insects, some have 13 chromosomes, and the others have 14 chromosomes. The 13 and 14 chromosome bearing organisms are

- (a) males and females, respectively
(b) females and males, respectively
(c) all males
(d) all females

12) Arun thinks that identifying the exact mRNA sequence from the protein sequence is difficult. Is he correct and why?

- (a) No, as the genetic code is universal.
(b) Yes, as the genetic code is degenerate.
(c) No, as the mRNA is translated into a protein sequence.
(d) Yes, as the mRNA contains introns which are non-coding sequences

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 Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

13) **Assertion (A):** Primary endosperm nucleus is diploid.
Reason (R) : It is the product of double fertilisation.

14) **Assertion (A):** PCR is a powerful technique to identify genetic disorders.
Reason (R) : PCR can detect mutations in low amounts of DNA.

15) **Assertion :** Primary treatment of sewage is also called biological treatment.
Reason : Primary sewage treatment depends only on density of materials in sewage.

16) **Assertion (A):** Nuclear DNA extracted from a cell is visible to the naked eye but unstained plasmid DNA running in an agarose gel is not.
Reason (R) : Plasmid DNA is transparent but nuclear DNA is not.

SECTION-B

17) Though filariasis is not fatal, but the disease in humans is responsible for considerable suffering, gross deformities and disability. Write the scientific name of any two helminth worms causing the disease and state two chronic manifestations of filariasis.

18) Write the function of each one of the following:

(a) (Oviducal) Fimbriae

(b) Oxytocin

OR

State the role of enzymes in parturition. What triggers its release from the pituitary?

19) Draw a schematic representation of dinucleotide. Label the following:

(a) The components of a nucleoside

(c) N-glycosidic linkage

(b) 5' end

(d) Phosphodiester linkage.

OR

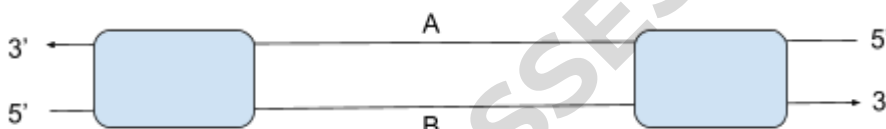
Describe the structure of a RNA polynucleotide chain having four different types of nucleotides.

20) Biomass of a standing crop of phytoplankton is 4 kg / m^2 which supports a large standing crop of zooplankton having a biomass 11 kg / m^2 . This is consumed by small fishes having biomass 25 kg / m^2 which are then consumed by large fishes with the biomass 37 kg / m^2 . Draw an ecological pyramid indicating the biomass at each stage and also name the trophic levels. Mention whether it is an upright or inverted pyramid.

21) How is Ti plasmid of *Agrobacterium tumefaciens* modified to convert it into a cloning vector?

SECTION-C

22)



(a) Identify strands 'A' and 'B' in the diagram of transcription unit given above and write the basis on which you identified them.

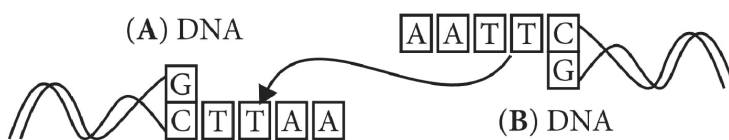
(b) Write the functions of RNA polymerase-I and RNA polymerase-III in eukaryotes.

23) What are SNPs? Where are they located in a human cell? State any two ways the discovery of SNPs can be of importance to humans.

24) During an excavation assignment, scientists collected pollen grains of a plant preserved in deeper layers of soil. Analyse the properties of pollen grains which help in the fossilisation.

25) What is colostrum? How is milk production regulated by hormones in human females?

26)



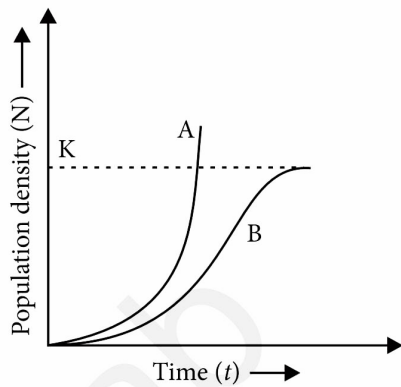
Study the linking of DNA fragments shown above.

(a) Name 'A' DNA and 'B' DNA.

(b) Name the restriction enzyme that recognises this palindrome.

(c) Name the enzyme that can link these two DNA fragments.

27)



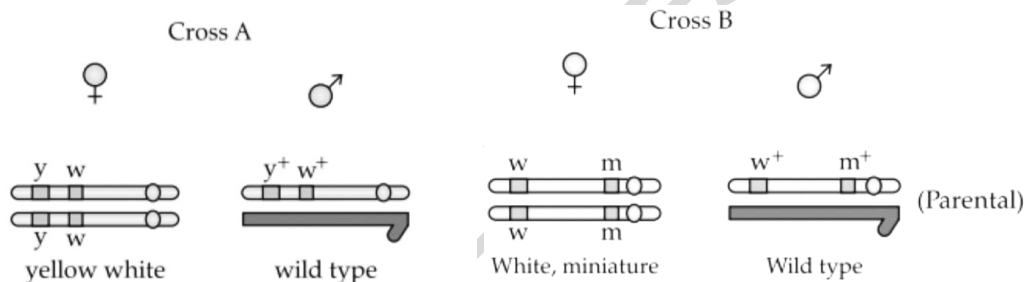
- (a) Which one of them is considered a more realistic one and why?
 (b) If $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$ is the equation of the logistic growth curve, what does K stand for?

28) How does the application of the fungal genus, *Glomus*, to the agricultural farm increase the farm output?

SECTION-D

Q no. 29 and 30 are Case based questions. Each question has subparts with internal choice in one sub-part

29) Study the figures given below and answer the questions that follow.

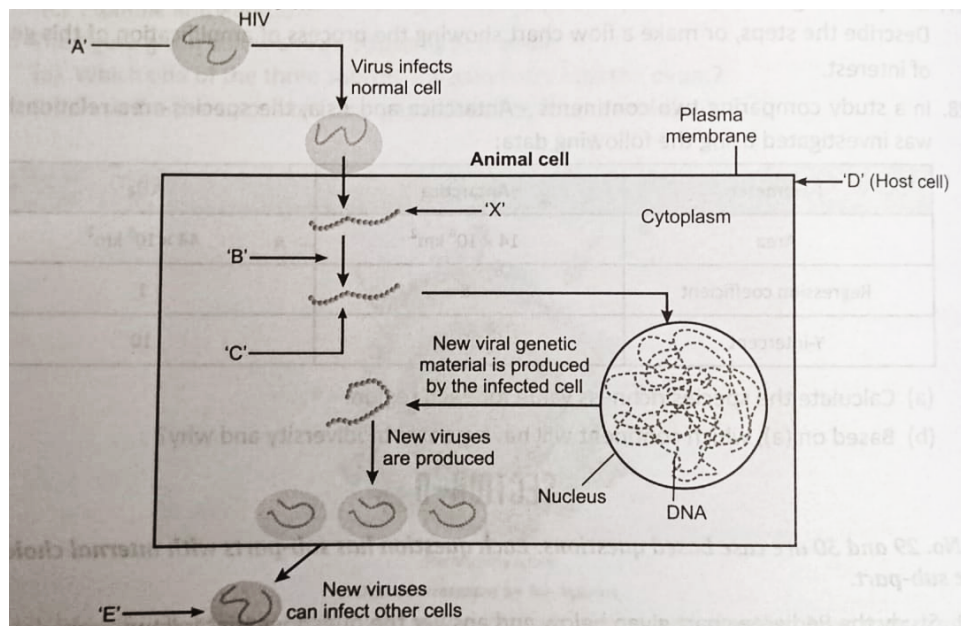


- (a) In a dihybrid cross, when would the proportion of parental gene combinations be much higher than non-parental types, as experimentally shown by Morgan and his group?
 (b) If two genes are located far apart from each other on a chromosome, how the frequency of recombination will get affected?
 (c) What are 'true breeding lines' that are used to study inheritance pattern of traits in plants?

OR

- (c) If the frequency of a parental form is higher than 25% in a dihybrid test cross, what does that indicate about the two genes involved?

30) Study the diagram showing replication of HIV in humans and answer the following questions accordingly:



- What type of virus causes AIDS? Name its genetic material.
 - Name the enzyme 'B' acting on 'X' to produce molecule 'C'. Name 'C'.
 - Name the type of cells the AIDS virus enters into after getting in the human body.
- OR
- Is AIDS a contagious disease? Why or why not?

SECTION-E

31 (a) "India has greater ecosystem diversity than Norway." Do you agree with the statement? Give reasons in support of your answer.

(b) Write the difference between genetic biodiversity and species biodiversity that exists at all the levels of biological organisation.

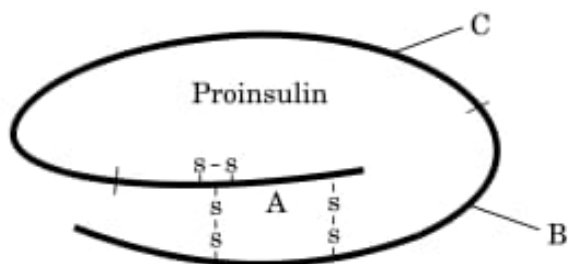
OR

(a) 'The Evil Quartet' describes the rates of species extinction due to human activities. Explain how the population of organisms is affected by fragmentation the habitats.

(b) Introduction of alien species has led to environmental damage and decline of indigenous species. Give any one example of how it has affected the indigenous species?

(c) Could the extinction of Steller's sea cow and passenger pigeon be saved by man? Give reasons to support your answer.

32) Insulin in the human body is secreted by pancreas as prohormone/proinsulin. The schematic polypeptide structure of proinsulin is given below. This proinsulin needs to undergo processing before it becomes functional in the body. Answer the questions that follow.

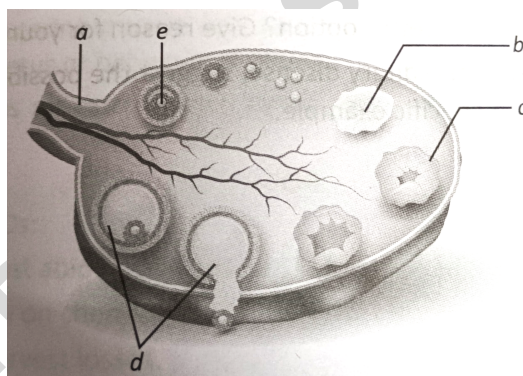


- State the change the proinsulin undergoes at the time of its processing to become functional.
- Name the technique the American company Eli Lilly used for the commercial production of human insulin,
- Why is the functional insulin thus produced considered better than the ones used earlier by diabetic patients?

OR

Gene therapy is an attempt to correct a genetic defect by providing a normal gene into the individual. By this the normal function can be restored. An Alternative method would be to provide the gene product (protein/enzyme) known as enzyme replacement therapy, which would also restore the function.

- Which in your opinion is a better option? Give reason for your answer.
 - A person is born with a hereditary disease, suggest the possible corrective method for it. Illustrate by giving a specific example.
- 33) (a) Given below is the T.S. of human ovary. Identify the following in the diagram:



- | | |
|-------------------|-----------------------|
| (i) Corpus luteum | (ii) Secondary oocyte |
| (iii) Antrum | (iv) Primary follicle |
| (v) Blood vessels | |
- (b) Explain the changes the primary oocyte undergoes while in different follicular stages before ovulation.

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