

BUDHA DAL PUBLIC SCHOOL, PATIALA

PRE BOARD EXAMINATION

Class : XII

Subject : BIOLOGY (044)

Time:3 hrs.

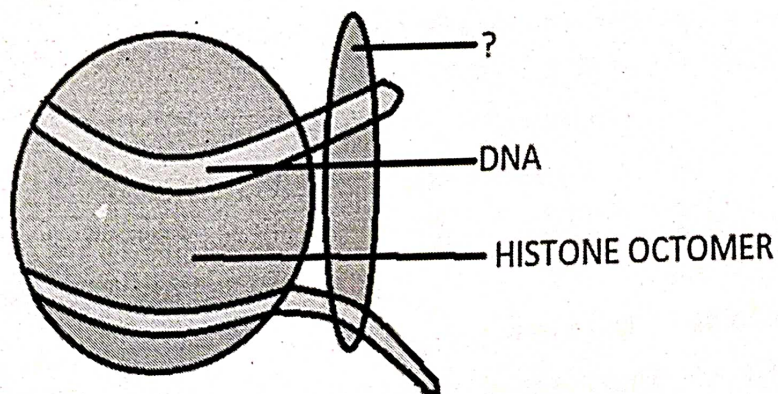
MM: 70

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 labeled diagrams should be drawn.

Section – A

- Q1) Which drug is called superman
(a) Amphetamine (b) Heroin (c) Cocain (d) LSD
- Q2) The relationship between the alga Cladophora and the snail shell on which it grows corresponds to:
(A) Neutralism (B) Predation (C) Commensalism (D) Mutualism
- Q3) Which of the following statements are true about Saheli?
i) It was developed at the CDRI, Lucknow.
ii) It is estrogen based steroidal preparation.
iii) It is once a week pill.
iv) The preparation causes many side effects.
v) It has high contraceptive value.
a) i) and ii) b) iii) and iv) c) ii), iii)and iv) only d) i), iii) and iv) only
- Q4) Intensely lactating mothers do not generally conceive due to the
a) suppression of gonadotrophins b) hyper secretion of gonadotrophins
c)suppression of gamete transfer d)suppression of fertilisation.
- Q5) The DNA helical structure is linked to which type of histone protein in the following diagram?



- a) H2A histones b) H1 histones c) H2B histones d) H3 histones

Q6) Ferns and conifers dominated during

- a) Devonian period b) Permian period c) Silurian d) Jurassic period

Q7) Anti-venom against snake poison contain

- a) enzymes b) hormones c) immunoglobulins d) immunogens

8) Choose incorrect option w.r.t. amount of living material present in different trophic levels at a given time:

- (a) Can be measured as number
(b) Is equivalent to standing crop
(c) Is always represented as dry weight only
(d) Expressed both as biomass and number

Q9) A biologist must first isolate DNA from an affected person's cells before studying the genetic basis of the inherited human disease sickle-cell anemia. The next step is to use

- (a) restriction enzymes that break the DNA into small pieces at known points
(b) gel electrophoresis to separate the DNA from the other cell fragments.
(c) ligases that make the DNA stick together
(d) DNA polymerase to make new copies of the DNA

Q10) Stability of an ecosystem depend upon

- a) primary productivity
b) interchange between producer and consumers.
c) number of producers.
d) number of consumers

Q11) Which relationship does an orchid growing as an epiphyte on a tree describe?

- a) Commensalism b) Mutualism c) Parasitism d) Amensalism

Q12) Which of the following is not an in situ technique?

- (a) Cryopreservation (b) National parks (c) Sanctuaries (d) Sacred forests

Reason Directions (13-16) In the following questions, a statement of assertion is followed by a statement of reason.

Mark the correct choice as:

- (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) If Assertion is true but Reason is false.
(d) If both Assertion and reason are false

Q13) **Assertion:** In the testis, spermatogenesis occurs in the seminiferous tubules and testosterone secretion takes place from the Sertoli cells.

Reason: Testosterone brings growth and maturation of primary sex organs and also development of accessory sex characters.

Q14) **Assertion :** The primitive atmosphere was reducing once i.e., without oxygen.

Reason : In the primitive atmosphere, oxygen was involved in forming ozone.

Q15) **Assertion:** Natality increases both population size and population density.

Reason : Natality increases the number of individuals in an area by birth.

Q16) **Assertion :** RNAi is silencing of a specific transfer tRNA due to complementary dsRNA molecule.

Reason: RNAi takes place in all the eukaryotic organism as a method of cellular defence.

Section - B

- Q17. a) Why are menstrual cycles absent during pregnancy?
b) Name the main hormone involved in parturition.
- Q18. In peas, tallness is dominant over dwarfness and red colour of flowers is dominant over the white colour. When a tall plant bearing red flowers was pollinated by a dwarf plant bearing white flowers, the different phenotypic groups were obtained against them.
Tall, Red = 138, Tall white = 132, Dwarf, Red = 136, Dwarf white = 128
Mention the genotypes of the two parents and of the types of four offspring.
- Q19. Give the full form of CT and MRI. How are they different from each other? Where are they used?
- Q20. While doing a PCR, 'denaturation' step is missed. What will be its effect on the process?
- Q21. In the context of the transfer of energy in an ecosystem, what does 10kg of deer's meat is equivalent to 1kg of lion's flesh means?

Section - C

- Q22. Study the flow chart given below. Name the hormones involved at each stage and explain their functions.
- | | | | |
|--------------|-----------|--------|-------|
| Hypothalamus | Pituitary | Testis | Sperm |
|--------------|-----------|--------|-------|
- Q23a) Draw a labelled diagram of the sectional view of a mature pollen grain of angiosperms.
- b) The generative cell of a two celled pollen divides in the pollen tube but not in a three celled pollen. Give reasons.
- Q24. 1951, Chargaff analysed bovine thymus DNA and calculated the relative amount of four nitrogenous bases. His result is as follows:
- | | |
|-----------------|----------------|
| Purines | Pyrimidines |
| Adenine – 28.2% | Base 2 – 27.8% |
| Base 1 – 21.5% | Base 3 – 22.5% |
- i) What are the bases 1, 2, and 3?
ii) Find out the number of base pairs in E. Coli DNA, if its DNA is 1.36mm long.

OR

- a) What is adaptive radiation?
b) Explain with the help of a suitable example where adaptive radiation has occurred to represent convergent evolution.
- Q25. Write the product, Biological activity and Medical use for following microbe
a) Streptococcus b) Trichoderma polyspora
- Q26a) Myocardial infarction patient is diagnose with high cholesterol and blood clot in his coronary artery. Name two bioactive agents and their mode of action that can improve his condition.
b) Which bioactive molecule is used for transplant surgery.
- Q27. a) What is the principle underline gel electrophoresis?
b) Do eukaryotic cells have restriction endonuclease. Justify your answer.
- Q28a) India has greater ecosystem diversity than Norway. Do you agree with the statement? Give reason.
b) Write the differences between genetic biodiversity and species biodiversity.

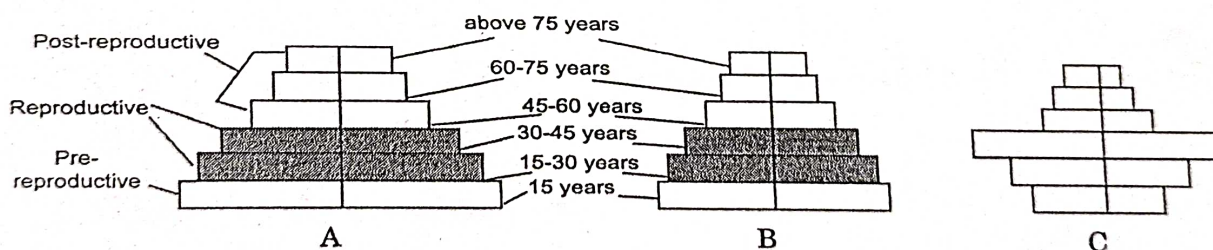
Section - D

Q 29) Read the passage given below and answer the following questions.

99.9 per cent of base sequence among humans is the same. It is these differences in sequence of DNA which make every individual unique in their phenotypic appearance. If one aims to find out genetic differences between two individuals or among individuals of a population, sequencing the DNA every time would be a daunting and expensive task. Imagine trying to compare two sets of 3×10^9 base pairs. DNA fingerprinting is a very quick way to compare the DNA sequences of any two individuals. DNA fingerprinting involves identifying differences in some specific regions in DNA sequence called as **repetitive DNA**, because in these sequences, a small stretch of DNA is repeated many times. These repetitive DNA are separated from bulk genomic DNA as different peaks during density gradient centrifugation. The bulk DNA forms a major peak and the other small peaks are referred to as **satellite DNA**. Depending on base composition (A : T rich or G:C rich), length of segment, and number of repetitive units, the satellite DNA is classified into many categories, such as **micro-satellites (1-6 bp)**, **mini-satellites (11-60 bp)** etc. These sequences normally do not code for any proteins, but they form a large portion of human genome. These sequence show high degree of polymorphism and form the basis of DNA fingerprinting. Since DNA from every tissue such as blood, hair-follicle, skin, bone, saliva, sperm etc., from an individual show the same degree of polymorphism, they become very useful identification tool in **forensic applications**. Further, as the polymorphisms are inheritable from parents to children, DNA fingerprinting is the basis of **paternity testing**, in case of disputes.

- How many percent of base sequence are similar in the humans
 - 70%
 - 80%
 - 90%
 - 99.9%
- Repetitive DNA are separated from bulk genomic DNA by
 - Electrophoresis
 - Density gradient centrifugation
 - Southern blotting
 - Northern blotting
- Microsatellite is composed of
 - 1 to 6 base pairs
 - 2 to 8 base pairs
 - 3 to 10 base pairs
 - 4 to 12 base pairs
- Minisatellite has how many base pairs
 - 9 to 49 base pairs
 - 11 to 60 base pairs
 - 15 to 70 base pairs
 - 20 to 80 base pairs
- DNA fingerprinting helps in the study of
 - Forensic applications
 - Paternity testing
 - Biological father or mother
 - All of the above

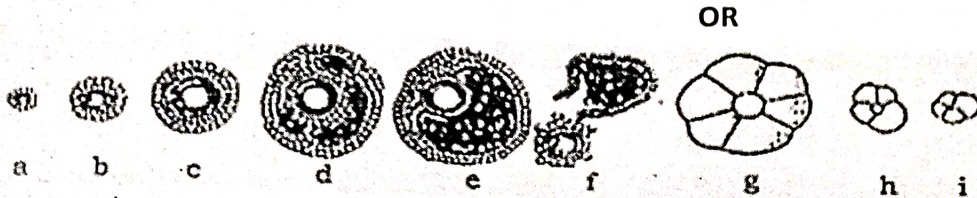
Q 30) Study the three representative figures of age pyramid relating to human population given below and answer the questions from (i) to (iv):



- Which of the above figures of the age pyramid refers to a stable population?
 - A
 - B
 - C
 - Both B and C
- A population has more young individuals as compared to the older individuals. What will be the status of the population after some years?
 - It will decline.
 - It will stabilise.
 - It will increase.
 - It will first decline and then stabilise.
- An age pyramid with broad base indicates:
 - High percentage of young individuals
 - Low percentage of young individuals
 - High percentage of old individuals
 - Low percentage of old individuals
- The formula of growth rate for a population in a given time is:
 - $dt/dN = rN$
 - $dt/rN = dN$
 - $dN/dt = rN$
 - $dN/rN = dt$

Section – E

- Q31. a) Briefly describe the process of megasporogenesis
b) Define Apomixis
c) List the post pollination events upto double fertilisation that occur in angiosperm.



1. Identify the figure that illustrates corpus luteum and name the pituitary hormone that influences its formation.
2. Specify the endocrine function of corpus luteum. How does it influence the uterus? Why is it essential?
3. What is the difference between 'd' and 'e'?
4. Draw a neat labelled sketch of oogenesis

- Q32. a) Explain the process of post transcriptional modification.
b) Draw the well labelled diagram of transcriptional unit.
c) Differentiate between transcription in prokaryotes and eukaryotes.

OR

- Q32) Draw a schematic diagram of lac operon in its switched on position. Label the following
(i) Structural genes
(ii) Repressor bound to its correct positions
(iii) Promoter gene
(iv) Regulatory gene

- Q33. a) With an example explain how biotechnology have been applied in each of the following:
i) In curing diabetes mellitus
ii) In raising pest resistant plant.
b) What is bio-piracy? Give example also.

OR

- a) What is the cause of adenosine deaminase deficiency in a person? Why is it that even after infusion of genetically engineered lymphocyte into the patient suffering from deaminase deficiency, the cure is not permanent?
- b) What is bio-patent?