SAMPLE QUESTION PAPER - 2

CLASS - 12

BIOLOGY

Maximum Marks : 70 **Time Allowed : 3 hours**

General Instructions : *Same as in Sample Question Paper -1.*

SECTION – A

Q.1. Which one cannot be synthesised from DNA directly
(a) mRNA (b) tRNA
(c) rRNA (d) Protein

Q.2. The test-tube baby programme employs which one of the following techniques ?
(a) Zygote intra fallopian transfer (ZIFT)
(b) Intra uterine insemination (IUI)
(c) Gamete intra fallopian transfer (GIFT)
(d) All of these

Q.3. Match the following columns.

Column I (Female reproductive parts)	Column II (Related to)
A. Ovaries	1. Fertilisation
B. Oviduct	2. Ovulation
C. Uterus	3. Pregnancy
D. Cervix	4. Childbirth

Codes	A	B	C	D
(a)	2	1	3	4
(b)	1	2	3	4
(c)	4	3	1	2
(d)	2	3	4	1

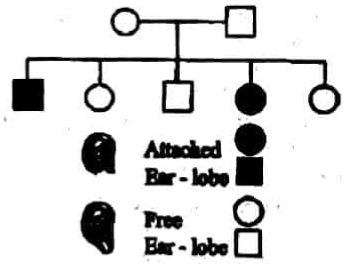
Q.4. Analogous organs arise due to
(a) divergent evolution
(b) artificial selection
(c) genetic drift
(d) convergent evolution

Q.5. Anti-venom against snake poison contains
(a) antigens
(b) antigen-antibody complexes
(c) antibodies
(d) enzymes

Q.6. Damage to thymus in a child may lead to
(a) a reduction in the amount of plasma proteins
(b) loss of antibody mediated immunity
(c) loss of cell mediated immunity
(d) a reduction in the haemoglobin content in blood.

Q.7. Amensalism is an association between two species where :
(a) one species is harmed and other is benefitted
(b) one species is harmed and other is unaffected
(c) one species is benefitted and other unaffected
(d) Both the species are harmed.

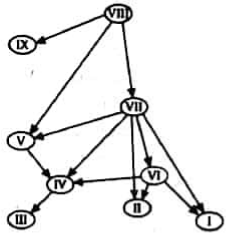
Q.8. Given below is a pedigree chart of a family with five children. It shows the inheritance of attached ear lobes as opposed to the free ones. The squares represent the male individuals and circles the female individuals.



Which one of the following conclusions drawn is correct ?
(a) The parents are homozygous recessive
(b) The trait is Y-linked
(c) The parents are homozygous dominant
(d) The parents are heterozygous

Q.9. If N is the population density at time t, then its density at time $t + 1$ is given by
$N_{t+1} = N_t + [(B + I) - (D + E)]$.
In the above equation, the letter B, I and D stand for, respectively :
(a) mortality, natality and immigration
(b) immigration, natality and mortality
(c) mortality, immigration and death rate
(d) natality, immigration and mortality

Q.10. In the illustration given below of a simplified food web on an island, the arrows indicate the direction of energy flow and the Roman numbers indicate species within the food web.

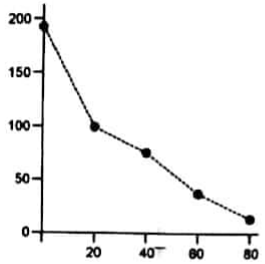


At which trophic level or levels does the species VIII function ?
(a) 2nd and 3rd consumer
(b) 1st consumer
(c) Producer
(d) 3rd and 4th consumer

Q.11. Which of following related to genetic engineering
(a) Plasmid
(b) Mutation
(c) Plastid
(d) none of these

Q.12. Study the graph carefully and answer the question that follow :

The graph is related to
(a) Northern hemisphere from equator to arctic region
(b) Plain to alpline region
(c) Gradient of oxygen availability
(d) Gradient of availability of sunshine



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.

Q.13. **Assertion :** In apomixis, plants of new genetic sequences are produced.
Reason : In apomixis, individuals of same genetic sequences meet.

Q.14. **Assertion :** Mendel used true-breeding pea lines for artificial pollination experiments for his genetic studies.
Reason : For several generations, a true-breeding line shows the stable trait inheritance and expression.

Q.15. **Assertion :** The uptake of DNA during transformation is an active, energy requiring process.
Reason : Transformation occurs in only those bacteria, which possess the enzymatic machinery involved in the active uptake and recombination.

Q.16. **Assertion :** With increase, in population size, environmental resistance tends to increase.
Reason : This is nature's way to check the expression of biotic potential.

SECTION – B

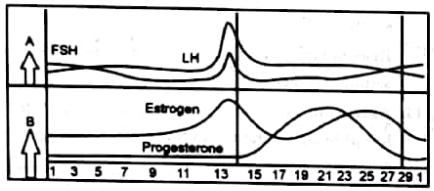
Q.17. Using a Punnett Square, workout the distribution of phenotypic features in the first filial generation after a cross between a homozygous female and a heterozygous male for a single locus.

Q.18. The following is the illustration of the sequence of ovarian events (*a* – *i*) in a human female :

(*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.

Q.19. In the figure given below, parts A and B show the level of hormones which influence the menstrual cycle. Study the figure and answer the questions that follow :

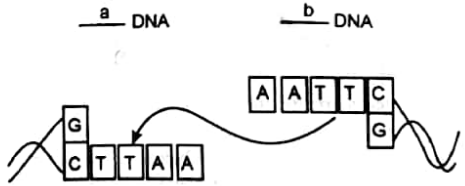


Days in the menstrual cycle →

(*a*) Name the organs which secrete the hormones represented in parts A and B.

(*b*) State the impact of the hormones in part B on the uterus of the human female during 6 to 15 days of menstrual cycle ?

Q.20. Study the linking of DNA fragments shown below.



(*i*) Name 'a' DNA and 'b' DNA.

(*ii*) Name the restriction enzyme that recognises this palindrome.

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

Q.21. (*a*) Define an ecosytem. Give a few instances of an ecosystem.

(*b*) Explain the term pyramid of biomass.

Or

An ecosystem can be visualised as a functional unit of nature, where the living organisms intract among themselves and also with the surrounding physical environment. Ecosystems vary greatly in size from a small pond to a large forest or an ocean.

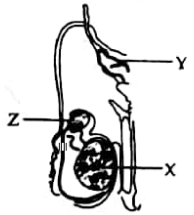
(*a*) Interaction of biotic and abiotic components results in a physical structure that is characteristic of each ecosystem. Mention two features that characterise the structure of an ecosystem.

(*b*) Mention the four functional components of an ecosystem.

(*c*) Give two examples of man-made ecosystem.

SECTION – C

Q.22. The diagram below shows human male reproductive system (one side only).



(*a*) Identify 'X' and write its location in the body.

(*b*) Name the accessory gland 'Y' and its secretion.

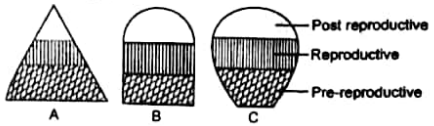
(*c*) Name and state the function of 'Z'.

Q.23. What are chasmogamous flowers ? Can cross-pollination occur is cleistogamous flowers ? Give reasons for your answer.

Q.24. (*a*) A DNA segment has a total of 1000 nucleotides, out of which 240 of them are adenine containing nucleotides. How many pyrimidine bases this DNA segment possesses?

(*b*) Draw a diagrammatic sketch of a portion of DNA segment to support your answer.

Q.25. The following diagrams are the age pyramids of different populations. Comment on the status of these populations.



Q.26. (*a*) What is cancer ?

(*b*) How is cancer cell different from normal cell?

(*c*) How do cells attain cancerous nature ?

Or

In an *E. coli* cloning vector pBR 322, state the role of the following :

(*a*) Ori gene

(*b*) Antibiotic-resistance gene

(*c*) Rop gene

Q.27. (*a*) Explain the menstrual phase in a human female. State the levels of ovarian and pituitary hormones during this phase.

(*b*) Why is follicular phase in the menstrual cycle also referred to as proliferative phase? Explain.

(*c*) Explain the events that occur in a graafian follicle at the time of ovulation and thereafter.

(*c*) Draw a graafian follicle and label antrum and secondary oocyte.

Or

(*a*) As a senior biology student you have been asked to demonstrate to the students of secondary level in your school, the procedure (s) that shall ensure cross-pollination in a hermaphrodite flower. List the different steps that you would suggest and provide reasons for each one of them.

(*b*) Draw a diagram of a section of a megasporangium of an angiosperm and label funiculus, micropyle, embryo sac and nucellus.

Q.28. What are the two types of desirable approaches to conserve biodiversity ? Explain with examples bringing out the difference between the two types.

SECTION – D

Question No. 29 and 30 are case-based questions. Each question has 3 subparts with internal choice in one subpart.

Q.29. Study a part of the life cycle of malarial parasite given below. Answer the questions that follows:

(*i*) Mention the role of A in the life cycle of the malarial parasite.

(*ii*) Name the event C and the organ where this event occurs.

(*iii*) Identify the organ B and name the cells being released from it.

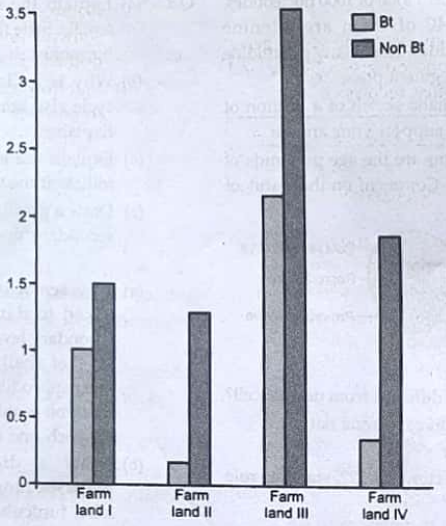
Or

Write symptoms of Malaria in Humans.

Q.30. GM crops especially Bt crops are known to have higher resistance to pest attacks. To substantiate that the experimental study was conducted in 4 different farmlands growing Bt and Bt-Cotton crops. The farmlands had the same dimensions, fertility and were under similar climatic conditions. The histogram below shows the usage of pesticides on Bt crops and non-Bt crops in these farmlands.

(*a*) Which of the above 4 farmlands has successfully applied the concepts of Biotechnology to show better management practices and use of agrochemicals ?

(*b*) If you had to cultivate, which crop would you prefer Bt or Non-Bt and why ?



(c) Cotton Bollworms were introduced in another experimental study on the above farmlands wherein no pesticide was used. Explain what effect would a Bt crop have on the pest.

Or

What effect would non-Bt crop have on pest ?

SECTION – E

Q.31. Draw a labelled diagram of the sectional view of a mature pollen grain in angiosperms. Explain the functions of its different parts.

Or

Study the table given below in regard to population interactions and answer the questions that follow :

Species A	Species B	Name of Interaction
–	0	(a)
+	–	(b)
–	–	(c)
+	+	(d)
+	0	(e)

[Note : (+) plus = beneficial interaction ; (–) minus = detrimental interaction ; (0) zero = neutral interaction]

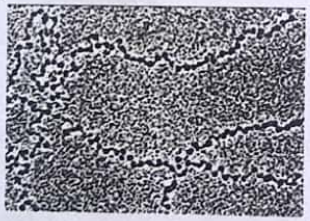
(A) Identify the interactions (a) to (e).

(B) Explain the terms :

(a) Amensalism (b) Parasitism

(c) Competition

Q.32.



Shown above is the Electron Micrograph (EM) picture of "beads-on-string".

(a) Identify and explain the detailed structure of a bead with the help of a labelled diagram.

(b) Describe the packaging of "beads-on-string" in a eukaryotic cell.

Or

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

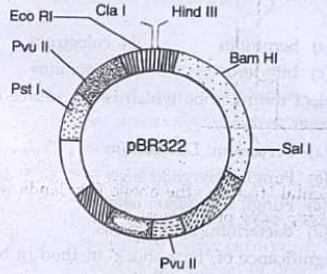
p	i	p	o	z	y	a

(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 referrred 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.

Q.33.



(i) Name the organism in which the vector shown is inserted to get the copies of the desired gene.

(ii) Mention the area labelled in the vector responsible for controlling the copy number of the inserted gene.

(iii) Name and explain the role of a selectable marker in the vector shown.

Or

Unless the vector and source DNA are cut, fragments separated and joined, the desired recombinant vector molecule cannot be created.

(i) How are the desirable DNA sequences cut ?

(ii) Explain the technique used to separate the cut fragments.

(iii) How are the resultant fragments joined to the vector DNA molecule ?

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Note : Solution of this paper will be available on 15th November 2023.