



*Sample Paper
&
Question Paper Pattern*

2022
2023

GOA BOARD

To,
The Secretary,
Goa Board of Secondary and Higher Secondary Education,
Alto Betim, Goa

16/05/2022

Subject: New assessment scheme 2022-23 in biology for standard XII

Respected Madam,

I hereby submit following documents pertaining to assessment scheme 2022-23 in Biology for standard XII.

The document submitted as follows :

1. Syllabus of Biology (Theory & practical)
2. Semester wise portion in biology
3. Design of question paper for semester 1
4. Design of question paper for semester 2
5. Portion for First Internal Test
6. Portion for Second Internal Test
7. Design of question paper for first / second internal test.
8. Model papers, Answer Keys and Blue Prints for Semester 1 & Semester 2.

Thanking You

Yours faithfully

Mrs.Meeta Bandekar

(convenor)

Syllabus of Biology (Theory)– ClassXII

Unit-VI Reproduction

Chapter-2: Sexual Reproduction in Flowering Plants

Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; out breeding devices; pollen-pistil interaction; double fertilization; post fertilization events - development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony;

Chapter-3: Human Reproduction

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis -spermatogenesis and oogenesis; menstrual cycle; fertilization, embryo development up to blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Chapter-4: Reproductive Health

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).

Unit-VII Genetics and Evolution

Chapter-5: Principles of Inheritance and Variation

Heredity and variation: Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; Sex determination - in humans, birds and honey bee; linkage and crossing over; sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans - thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Chapter-6: Molecular Basis of Inheritance

Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Human genome project; DNA fingerprinting.

Chapter-7: Evolution

Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy - Weinberg's principle; adaptive radiation; human evolution.

Unit-VIII Biology and Human Welfare

Chapter-8: Human Health and Diseases

Pathogens; parasites causing human diseases (malaria, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

Chapter-10: Microbes in Human Welfare

Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers.

Unit-IX Biotechnology and its Applications

Chapter-11: Biotechnology - Principles and Processes

Principles of biotechnology, Tools of Recombinant DNA Technology, Processes of Recombinant DNA Technology.

Chapter-12: Biotechnology and its Applications

Application of biotechnology in health and agriculture: Human insulin, Molecular Diagnosis, gene therapy; genetically modified organisms - Bt crops; transgenic animals; biosafety issues, bio piracy and patents.

Unit-X Ecology and Environment

Chapter-13: Organisms and Populations

Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution, Organism and its Environment, Major Abiotic Factors, Responses to Abiotic Factors, Adaptations.

Chapter-14: Ecosystem

Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy, Ecological Succession and Nutrient Cycles.

Chapter-15: Biodiversity and its Conservation

Biodiversity-Concept, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries.

Mrs. Meeta Bandekar

(Convenor)

Syllabus of Biology Practical – ClassXII

List of Experiments :

Section A – Physiology Experiment

- 1) To determine the pH and water holding capacity of garden or paddy field soil.
- 2) To detect presence of phosphate, nitrate and sulphate salts in paddy field soil.
- 3) To study B.O.D. of the given sample of pond water.
- 4) To study the effect of different temperature on the action of salivary amylase on starch.
- 5) To study the effect of different pH on the action of salivary amylase on starch.

Section B – Preparation of temporary stained slide

- 1) Onion root tip for mitosis
- 2) Onion/Rheo anther for meiosis.

Section C – Identification/Spotting

- 1) Adaptations in insect pollinated flower (Ocimum/Leucas/Salvia)
- 2) Adaptations in wind pollinated flower (Maize/Grass)
- 3) Study of T.S. of Testis (Any vertebrate)
- 4) Study of T.S. of Ovary (Any vertebrate)
- 5) Study of V.S. of Blastula (Any vertebrate)
- 6) Prepared pedigree chart of inability to roll the tongue.
- 7) Prepared pedigree chart of Widow's peak.
- 8) Identification of organisms and symptoms of disease caused.
 - a. Ascaris
 - b. Entamoeba
 - c. Plasmodium
- 9) Adaptation of plant to dry condition (Suitable specimen to be given)

- 10) Adaptation of plant to aquatic condition (Suitable specimen to be given)
- 11) Adaptation of animal to dry condition (Suitable specimen/chart/model to be given)
- 12) Adaptation of animal to aquatic condition (Suitable specimen to be given)
- 13) Identification of Homologous organs in plants. (eg. Thorn of bougainvillea and tendrils of Cucurbita)
- 14) Identification of Homologous organs in animals.(eg. Fore limbs of frog and Flipper of turtle/ Wings of bird).
- 15) Identification of Analogous organs in plants. (eg . tuber of potato and sweet potato).
- 16) Identification of Analogous organs in animals. (eg. Wings of bird and butterfly).

Mrs. Meeta Bandekar
(Convenor)

**GOA BOARD OF SECONDARY AND HIGHER SECONDARY
EDUCATION**
ALTO – BETIM 403521
SEMESTERWISE PORTION IN BIOLOGY
ASSESSMENT SCHEME FOR THE ACADEMIC YEAR 2022-23.
STD: XII

PORTION FOR SEMESTER – 1

Sr No.	Units	Marks
1.	REPRODUCTION	
	Chapter 2: Sexual Reproduction in Flowering plants	6
2.	GENETICS AND EVOLUTION	
	Chapter 5: Principles of Inheritance and Variations	7
	Chapter 7 : Evolution	5
3.	BIOTECHNOLOGY	
	Chapter 11: Biotechnology: Principles and Processes	6
	Chapter 12: Biotechnology and its Applications	4
4.	BIOLOGY IN HUMAN WELFARE	
	Chapter 8: Human Health and Diseases	7
	ECOLOGY	
5.	Chapter 13: Organisms and Population	5
	Total	40

PORTION FOR SEMESTER – 2

Sr. No.	Units	Marks
6.	REPRODUCTION	
	Chapter 3: Human Reproduction	6
	Chapter 4: Reproductive Health	5
7.	GENETICS AND EVOLUTION	
	Chapter 6: Molecular Basis of Inheritance	7
8.	BIOLOGY IN HUMAN WELFARE	
	Chapter 10: Microbes in Human Welfare	4
9.	ECOLOGY	
	Chapter 14 : Ecosystem	4
	Chapter 15: Biodiversity and Conservation	4
	Total	30

**GOA BOARD OF SECONDARY AND HIGHER SECONDARY
EDUCATION
ALTO – BETIM 403521
DESIGN OF THE QUESTION PAPER FOR SEMESTER 1 (2022-23)**

CLASS: XII

TIME: 90 mins

SUBJECT: BIOLOGY

Max. Marks: 40

The weightage of the distribution of marks over different dimensions of the question paper shall be as follows:

1. Weightage to learning outcomes

Sr No.	Learning Outcomes	Marks	Percentage of Marks
1.	Knowledge	12	30 %
2.	Understanding	16	40 %
3.	Application	12	30 %
	Total	40	100 %

2. Weightage to difficulty level of Questions

Sr No.	Estimated Difficulty Level of Questions	Percentage
1.	Easy	20 %
2.	Average	60 %
3.	Difficulty	20 %
	Total	100 %

- Question paper will have **40** multiple choice questions (MCQs) as per the chapter wise marks distribution.
- A question may vary in difficulty level from individual to individual.
- MCQs will have four options A/ B/ C/ D.

Ms. Meeta Bandekar

(Convenor)

**GOA BOARD OF SECONDARY AND HIGHER SECONDARY
EDUCATION**
ALTO – BETIM 403521
DESIGN OF THE QUESTION PAPER FOR SEMESTER 2 (2022-23)
CLASS: XII

TIME: 90 mins

SUBJECT: BIOLOGY

MAX. MARKS: 30

The weightage of the distribution of marks over different dimensions of the question paper shall be as follows:

1. Weightage to learning outcomes

Sr No.	Learning Outcomes	Marks	Percentage of Marks
1.	Knowledge	09	30%
2.	Understanding	11	35%
3.	Application	07	25 %
4.	Skill	03	10 %
	Total	30	100 %

2. Weightage to forms of questions:

Sr No.	Form of Questions	Marks for each Questions	No. of Questions	Total Marks
1.	Long Answer types (LA)	---	----	---
2.	Short Answer Type (SA – I)	03	03	09
3.	Short Answer Type (SA – II)	02	06	12
4.	Very Short Answer Type (VSA)	01	09	09
	Total		18	30

3. **Expected Time for different types of question would be as follows**

Sr No.	Forms of Questions	Approx. Time for each Question in mins (t)	No. of Questions (n)	Approx. Time for each form of Questions in mins (n x t)
1.	Long Answer types (LA)	-----	---	-----
2.	Short Answer Type (SA – I)	10 min	03	3 x 10min = 30
3.	Short Answer Type (SA – II)	07 min	06	6 x 7min = 42
4.	Very Short Answer Type (VSA)	02 min	09	9 x 2min = 18
	Total		18	90 mins

As the total time is calculated on the basis of the number of questions required to be answered and the length of their anticipated answers. It would, therefore be advisable for the candidates to budget their time properly by cutting out the superfluous words and be within the expected time limits.

Scheme of options

(There will be no overall choice. However, there is an internal choice in 01 sub question of 03 marks & 02 marks category)

4. **Weightage to difficulty level of Questions**

Sr No.	Estimated Difficulty Level of Questions	Percentage
1.	Easy	30 %
2.	Average	50 %
3.	Difficulty	20 %
	Total	100 %

- Question paper will have three sections A, B, C.
- Section A will have 09 questions of 01 mark. **(strictly No MCQs)**
- Section B will have 06 questions of 02 marks.
- Section C will have 03 questions of 03 marks.
- Question shall be from all the chapters specified above.
- Total number of questions will be 18.

Ms. Meeta Bandekar
(Convenor)

**GOA BOARD OF SECONDARY AND HIGHER SECONDARY
EDUCATION**
ALTO – BETIM 403521
ASSESSMENT SCHEME FOR THE ACADEMIC YEAR 2022-23.
STD : XII

FIRST TERM

PORTION FOR FIRST INTERNAL TEST (FORMATIVE TEST)

Sr No.	Units	Marks
	REPRODUCTION	
1.	Chapter 2: Sexual Reproduction in Flowering plants	7
	GENETICS AND EVOLUTION	
2.	Chapter 5: Principles of Inheritance and Variation	7
	ECOLOGY	
3.	Chapter 13: Organisms and Populations	6
	Total	20

PORTION FOR SECOND INTERNAL TEST (FORMATIVE TEST)

Sr. No.	Units	Marks
	BIOLOGY IN HUMAN WELFARE	
1.	Chapter 8: Human Health and Disease	8
2.	BIOTECHNOLOGY	
	Chapter 11: Biotechnology: Principles and Processes	7
	Chapter 12: Biotechnology and its Applications	5
	TOTAL	20

**DESIGN OF QUESTION PAPER FOR FIRST / SECOND INTERNAL TEST
(FORMATIVE)**

The weightage of the distribution of marks over different dimensions of the question paper shall be as follows:

1. **Weightage to learning outcomes**

Sr No.	Learning Outcomes	Marks	Percentage of Marks
1.	Knowledge	08	40 %
2.	Understanding	06	30 %
3.	Application	04	20 %
4.	Skill	02	10 %
	Total	20	100 %

2. **Weightage to forms of questions:**

Sr No.	Form of Questions	Marks for each Questions	No. of Questions	Total Marks
1.	Long Answer types (LA)	---	---	---
2.	Short Answer Type (SA – I)	03	02	06
3.	Short Answer Type (SA – II)	02	05	10
4.	Very Short Answer Type (VSA)	01	04	04
	Total		11	20

3. **Expected Time for different types of question would be as follows**

Sr No.	Forms of Questions	Approx. Time for each Question in mins (t)	No. of Questions (n)	Approx. Time for each form of Questions in mins (n x t)
1.	Long Answer types (LA)	---	---	---
2.	Short Answer Type (SA – I)	10 min	02	2 x 10 min = 20
3.	Short Answer Type (SA – II)	05 min	05	5 x 5 min = 25
4.	Very Short Answer Type (VSA)	02 min	04	4 x 2min = 08
	Total		11	53min

As the total time is calculated on the basis of the number of questions required to be answered and the length of their anticipated answers. It would, therefore be advisable for the candidates to budget their time properly by cutting out the superfluous words and be within the expected time limits.

Scheme of options

(There will be no overall choice. However, there is an internal choice in 01 sub question of 03 marks category)

4. Weightage to difficulty level of Questions

Sr No.	Estimated Difficulty Level of Questions	Percentage
1.	Easy	30 %
2.	Average	50 %
3.	Difficulty	20 %
	Total	100 %

- Question paper will have three sections A, B, C.
- Section A will have 04 questions of 01 mark.
- Section B will have 05 questions of 02 marks.
- Section C will have 02 questions of 03 marks.
- Question shall be from all the chapters specified above.
- Total number of questions will be 11.

Diagrams for evaluation for 2nd internal test:

1. Figure 8.4 Structure of an antibody molecule
2. Figure 11.7(a) Simple stirred -tank bioreactor

Ms. Meeta Bandekar
(Convenor)

SECOND TERM

THIRD INTERNAL TEST (INNOVATIVE TEST) (20 MARKS)

(As per Circular No 39 dated 02/08/2021)

Innovative Test of 20 Marks is bifurcated as follows:

1. Practical ----- 10 Marks

- Section A-----Physiology Experiment (4mks)
- Section B-----Preparation of temporary stained slide (3mks)
- Section C----- Identification / spotting (3mks)

2. Innovative Methods -----10 Marks

Guidelines For Innovative Methods as Follows:

- Assessment to be conducted on any topic from syllabus.
- Teachers can use methods like quizzes, ppt, videos, concept maps, concept flow charts for assessment.
- Teachers are free to make their own innovative methods for assessment.

Ms. Meeta Bandekar
(Convenor)

Goa Board Of Secondary And Higher Secondary Education
Alto- Betim, Goa
Model question paper
1st Semester- 2022-23

Std: XII
Time: 90 minutes

Sub: Biology
Max. Marks: 40

Instructions:

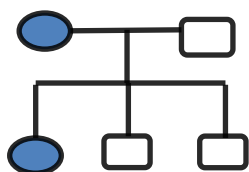
1. There are 40 questions in the Question Paper. Each question has FOUR options. You will have to mark the correct Option in the ANSWER SHEET and NOT in the question paper.
 2. Four Circles are provided in front of each question in the ANSWER SHEET. For each question, Fill/Darken the circle under the correct option 'A' or 'B' or 'C' or 'D'.
 3. If more than one circle is darkened for one question, zero will be awarded for that question.
 4. Each correct answer will be awarded ONE mark. There are No Negative Marks.
-

1) Which one of the following is a characteristic of Turner's syndrome?

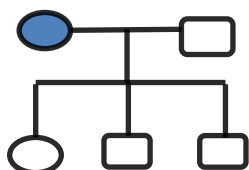
- A. It is found in males only
- B. It is found in males as well as females.
- C. An individual with this disorder shows gynaecomastia
- D. An individual with this disorder has 45 chromosomes.

2) Colourblind woman has married a man with normal vision. They have 2 sons and one daughter. Which pedigree chart shows the correct description?

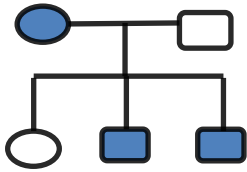
A.



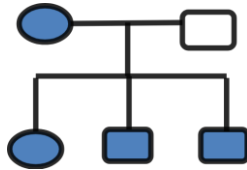
B.



C.



D.



- 3) Active immunity is achieved when a child receives.....
- A. Polio vaccine
 - B. Anti Tetanus injection
 - C. Antivenom to treat snakebite
 - D. Antibodies from mother through placenta during foetal stage.
- 4) Which of the following is an example of behavioural adaptation?
- A. Migration of certain bird species to escape cold winter.
 - B. Excretion of concentrated urine by desert animals.
 - C. Sweating in humans during hot weather.
 - D. Increase in the number of R.B.Cs in humans after climbing high altitudes.
- 5) Though there are four types of blood groups in ABO blood grouping system, there are six genotypes. This is due to
- A. Polygenic inheritance
 - B. Multiple allelism
 - C. Pleiotropy
 - D. Incomplete dominance.
- 6) A pro-insulin is different from insulin because.....
- A. Pro-insulin has no disulphide bonds
 - B. Pro-insulin is more active than insulin
 - C. Pro-insulin is from animals other than human beings.
 - D. Pro-insulin has C peptide.
- 7) In the following cross the F1 progeny would be.....
- TtYY × TTYy**
- A. Phenotypically similar to parents
 - B. 50% would be TtYy and 50% would be TTYy
 - C. All would be heterozygous dominant for the two traits
 - D. All would be recessive for the two traits

8) As per the table given below, which options shows correct ploidy.

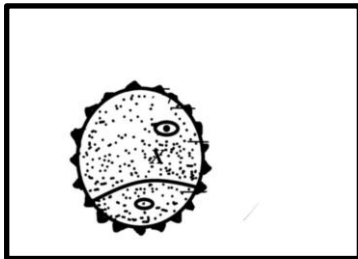
I. Synergeids	2n
II. Tapetum	2n
III. MMC	3n
IV. Megaspore	1n

- A. I and II
- B. I and IV
- C. II and IV
- D. I and III

9) According to the Big Bang theory of origin of universe the earth was initially

- A. A tiny planet
- B. A molten mass releasing gases
- C. Covered with rocky surface
- D. Covered with oceans

10) Identify the following structure.



- A. It is a microspore mother cell
- B. It is a male gametophyte
- C. It is a female gametophyte
- D. It is an ovule

11) Black ants show high reproductive fitness and higher intrinsic rate of increase compared to red ants though both share same resources and habitat. This is due to

- A. Ammensalism
- B. Commensalism
- C. Mutualism
- D. Competition

12) Which of the following is **not** a vector?

- A. EcoRI
- B. YAC
- C. BAC
- D. Bacteriophage

- 13) If hybrids are made into apomicts, the progeny would show
- Segregation of parental characters
 - No seed production
 - Parthenocarpy
 - Same characters as that of parent
- 14) In PCR, the two DNA strands separate from each other. This is due to the breakdown of
- Phosphodiester bonds
 - Hydrogen bonds
 - Bonds between N base and sugar
 - Phosphodiester as well as hydrogen bonds.
- 15) A limit called carrying capacity for a species in a habitat brings about
- S shaped growth curve
 - Exponential growth
 - Enormous population density increase in short time
 - No rise in population density at all
- 16) Which one of the following is an opioid drug?
- Charas
 - Crack
 - Heroin
 - Marijuana
- 17) The purpose of using gel electrophoresis in biotechnology is
- To cut DNA polymer into fragments
 - To join two or more DNA fragments
 - To separate DNA fragments from each other
 - To separate the two DNA strands
- 18) According to Hardy Weinberg equilibrium the gene pool of a population undergoes.....
- No change generation after generation
 - Small changes generation after generation
 - Major changes generation after generation
 - A change only in organisms with short life span
- 19) To cut the following palindromic sequence into sticky ends, the cut should be between which two bases of the two strands of DNA?

5 AAGCTT 3

3 TTCGAA 5

- Between G and C of both the strands
- Between T and T of one strand and A and A of the other strand
- Between A and A of both the strands
- Between C and T of one strand and G and A of other strand

- 20) A mutant hemoglobin leads to a disorder in human beings where RBCs become sickle

shaped. The mutation changes the codon from.....

- A. GUG TO GAG
- B. GAG TO UAG
- C. GUG TO AUG
- D. GAG TO GUG

21) Neoplastic growth of about 1.5 cm size found in Mrs. Gupta's pancreas was surgically removed. It's location and size was detected through.....

- A. C. T. Scan
- B. ELISA
- C. PCR test
- D. Blood test

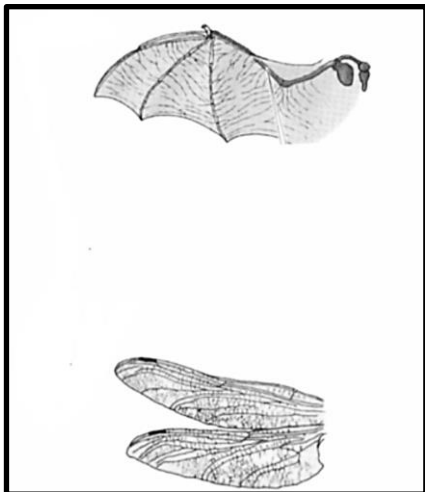
22) Name the transgenic protein used to treat emphysema.

- A. α -1-antitrypsin
- B. α -lactalbumin
- C. α -interferon
- D. α -galactosidase

23) Most of the food rich in healthy monounsaturated fats are high in cost. Hence high oleic acid soybean is a good option for the same nutritional benefit. It is produced by manipulating and altering its genes. Therefore it is an example of

- A. Hybridisation
- B. Genetically modified organisms
- C. Gene therapy
- D. Agrochemical based crops

24) The two pictures shown here indicate.....



- A. Homology
- B. Divergent evolution
- C. Convergent evolution
- D. Common ancestry

25) Smoking reduces the concentration of heme bound oxygen by.....

- A. Increasing CO₂ content in blood
- B. Increasing the CO content in blood
- C. Degrading the hemoglobin in blood

D. Decreasing the R.B.C production.

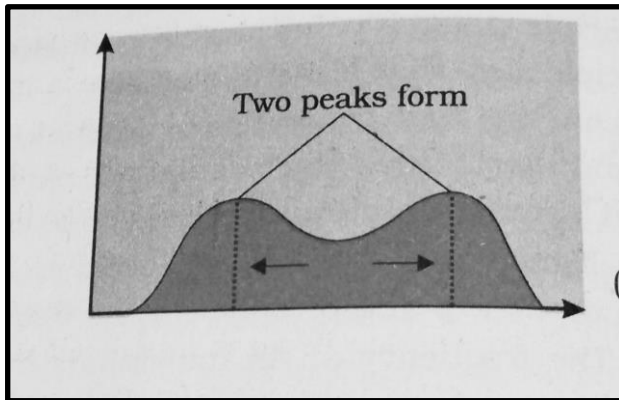
26) Which statement is true for plasmids?

- A. It cannot replicate on its own
- B. It is a linear DNA
- C. It is cut by exonuclease
- D. It is an extra chromosomal matter

27) A microsporangium of a flowering plant in its transverse section is.....

- A. Bilobed
- B. Ditheous
- C. Nearly circular in outline
- D. Tetragonal in outline

28) From the given diagrammatic representation of natural selection for a human trait, what can you conclude?



- A. Natural selection is disruptive
- B. Natural selection is directional.
- C. Natural selection does not operate
- D. Natural selection is stabilising.

29) Gene A and B are tightly linked and gene X and Y are loosely linked . Which statement is true in this case?

- A. Gene A and B are on the same chromosome but Gene X and Y are on two separate chromosomes.
- B. Gene A and B shows 1.6 % gene recombination frequency and gene X and Y show 33.2 % gene recombination
- C. Gene A and B are distantly located and gene X and Y are closely located on same chromosome.
- D. Gene A and B as well as gene X and Y are located on two separate chromosomes.

30) Match the two columns correctly by selecting one of the following options.

A	B
1. Pseudocopulation	a. transfers energy across trophic levels
2. Immigration	b. enables organism to survive and reproduce in its habitat
3. Adaptation	c. occurs by employing sexual deceit.
4. Predation	d. increases the population density

- A. 1- c, 2 - d, 3 - a, 4 -b
- B. 1- d, 2 - c, 3 - b, 4 - a
- C. 1- c, 2 - d, 3 - b, 4 - a
- D. 1 - b, 2- a, 3 - d, 4 - c

31) In a particular plant, the seed shows perisperm. This plant is diploid with 24 chromosomes. Therefore the cells of perisperm have.....

- A. 12 chromosomes
- B. 24 chromosomes
- C. 36 chromosomes
- D. 48 chromosomes

32) Growth is a result of basal metabolism, activities and physiological functions carried out by enzymes. Hence mango trees do not grow naturally in Canada and Germany. This explains the importance of which abiotic factor in geographical distribution of organisms?

- A. Water
- B. Light
- C. Soil
- D. Temperature

33) Enzyme protease was used to open the first barrier of a cell and isolate DNA during biotechnology experiment. The researchers must be working on

- A. Human cell
- B. Fungal cell
- C. Bacterial cell
- D. Algal cell

34) Sarika's symptoms include diarrhea with blood and mucus in the stools, fatigue, mild fever. She is suffering from.....

- A. Pneumonia
- B. Common cold
- C. Amoebiasis
- D. Ringworm

35) RNAi has been applied successfully in producing which of the following?

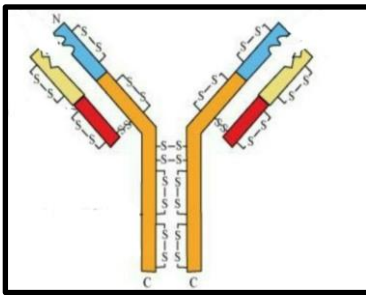
- A. Bt Cotton plant.

- B. Golden rice enriched with vitamin A
- C. Human insulin in *E.coli*
- D. Tobacco plant to prevent nematode infestation.

36) A student picked up 15 flowers from a plant to study pollen germination. He discarded 5 flowers as they had only pistils and took the remaining flowers to the laboratory. This plant must be exhibiting

- A. Geitonogamy only
- B. Geitonogamy and Xenogamy
- C. Autogamy only
- D. Autogamy and geitonogamy

37) Which of the following is **incorrect** about the diagram shown below.



- A. It is called H1L2 molecule.
- B. It has heavy and light protein chains
- C. It is an immunoglobulin
- D. It has an antigen binding site.

38) Which organisms originated first on earth in the evolutionary history from the following?

- A. Giant ferns
- B. Jawless fishes
- C. Ichthyosaurs
- D. Monocots

39) A test cross was performed on *Pisum sativum* and the F1 progeny was 50 % tall and 50% dwarf. Which of the following represents the parental generation of this cross?

- A. $TT \times Tt$
- B. $Tt \times Tt$
- C. $TT \times tt$
- D. $Tt \times tt$

40) To trap microbes and prevent their entry in our body which of the following play a role?

- A. Macrophages
- B. Acid in stomach
- C. Mucus coating in gastrointestinal tract
- D. Saliva in the mouth

Goa Board Of Secondary And Higher Secondary Education
Alto- Betim, Goa
Model question paper- Answer key
1st Semester- 2022-23

Class: XII
Time: 90 minutes

Sub: Biology
Max. Marks: 40

- 1) D
- 2) C
- 3) A
- 4) A
- 5) B
- 6) D
- 7) A
- 8) C
- 9) B
- 10) B
- 11) D
- 12) A
- 13) D
- 14) B
- 15) A
- 16) C
- 17) C
- 18) A
- 19) C
- 20) D
- 21) A
- 22) A

23) B

24) C

25) B

26) D

27) C

28) A

29) B

30) C

31) B

32) D

33) A

34) C

35) D

36) B

37) A

38) B

39) D

40) C

Blue print of the model question paper

Std: XII

Sub: Biology

1st Semester- 2022-23

Unit	Content Area	Marks	Objectives			Total
			Knowledge 30% VSA	Understanding 40% VSA	Application 30% VSA	
Reproduction	Sexual Reproduction in flowering plants	06	1(1)	3(1)	2(1)	06
Genetics and evolution	Principles of inheritance and variations	07	1(1)	3(1)	3(1)	07
	Evolution	05	3(1)	2(1)	-	05
Biotechnology	Biotechnology: Principles and processes	06	-	3(1)	3(1)	06
	Applications of biotechnology	04	1(1)	2(1)	1(1)	04
Biology in human welfare	Human health and diseases	07	5(1)	1(1)	1(1)	07
Ecology	Organisms and population	05	1(1)	2(1)	2(1)	05
Total		40	12	16	12	40

Goa board of secondary and higher secondary Education

Alto- Betim Goa

Second Semester Model paper 2022- 2023

Subject : Biology
Time : 90 min

Std : XII
Max marks: 30

Instructions :

- (i) All questions are compulsory.
- (ii) Draw diagrams in lead pencil only.
- (iii) Question paper consists of three (3) sections A, B, C.
Section A has 09 questions of 01 mark each,
Section B has 06 questions of 02 marks each.
Section C has 03 questions of 03 marks each.
- (iv) Total number of questions is 18.
- (v) There is no overall choice, however internal choice is provided in one question of section B and one question of section C.

Section A [I mark questions]

- 1) What is humification?
- 2) Name the membrane that surrounds the Oocyte just before ovulation.
- 3) If the anticodon on t-RNA is UAC. Which amino acid will bind to the 3' end of that t-RNA.
- 4) Comment on succession in dry area.
- 5) Mr. Shambu was using chemical fertilisers for paddy cultivation. He wants to try organic farming. Recommend him some biofertilisers suitable for paddy cultivation.
- 6) African Black Panther population is decreasing at an alarming rate. Suggest a suitable method to preserve the gametes of these animals, so as to prevent them from becoming extinct.
- 7) Cattle dung is an essential component of a Gobar gas plant. Give reason.
- 8) Species of the plant *Lantana* is considered a threat to ecosystem why?
- 9) Estimate the time required in seconds for polymerization of 6000bp DNA in *E.coli*.

Section B [2 marks questions]

- 10) Describe the structure of Human sperm.
- 11) Explain the early symptoms and complications of sexually transmitted diseases.
- 12) The sequence of single strand of DNA in a bacterial cell is

3` TACGTACGTACGATT 5`

- (i) Construct m-RNA from the given strand.
 - (ii) How many amino acids will be present in the protein after translation?
- 13) How *Monascus* and *Trichoderma* can be used for human welfare?

OR

- 13) How do aerobic and anaerobic microbes play important role in secondary sewage treatment?
- 14) The Amazon Forest has about 80,000 species of plants, whereas the Arctic Tundra has only 1700 species. What are the probable reasons for the difference in number of species?
- 15) Succession on cooled lava is different from succession on burnt forest land. Explain.

Section C [3 marks questions]

- 16) Draw a neat diagram showing sectional view of female reproductive system in Humans.
- 17) Discuss the various methods of assisted reproductive technologies (ART).

OR

- 17) Discuss various Natural methods of contraception.
- 18) State the salient features of Genetic code.
-

ANSWER KEY- SECOND SEMESTER BIOLOGY MODEL PAPER

Section A [1 mark questions]

- 1) Humification is the accumulation of a dark coloured amorphous substance called humus that is highly resistant to microbial action and undergoes decomposition at an extremely slow rate. (1mk)
- 2) Zona pellucida surrounds the ovum just before ovulation. (1mk)
- 3) amino acid that will bind to the 3' end of t-RNA is methionine. (1mk)
- 4) **xerarch succession** takes place in dry areas and the series progress from xeric to mesic conditions. (1mk)
- 5) Cyanobacteria are recommended as bio fertilizers for paddy fields. (1mk)
- 6) Gametes of threatened species can be preserved in viable condition for long periods using cryopreservation technique. (1mk)
- 7) Cattle dung contains anaerobic bacteria called methanogens that produce methane in a Gobar gas plant. (1mk)
- 8) *Lantana* is an invasive weed that can grow and cause harm to native or indigenous species. (1mk)
- 9) The rate of polymerisation of DNA in *E.coli* is 2000bp per second, hence for polymerisation of 6000bp 3 seconds time duration will be required. (1mk)

Section B (2 marks questions)

- 10)
 - sperm is a microscopic structure composed of a head, neck, a middle piece and a tail. (1/2 mk)
 - A plasma membrane envelops the whole body of sperm. The sperm head contains an elongated haploid nucleus, the anterior portion of which is covered by a cap-like structure, acrosome. The acrosome is filled with enzymes that help fertilisation of the ovum. (1mk)
 - The middle piece possesses numerous mitochondria, which produce energy for the movement of tail that facilitate sperm motility essential for fertilisation. (1/2mk)

11)

- Early symptoms of most of these are minor and include itching, fluid discharge, slight pain, swellings, etc., in the genital region. Infected females may often be asymptomatic and hence, may remain undetected for long. (1mk)
- This could lead to complications later, which include pelvic inflammatory diseases (PID), abortions, still births, ectopic pregnancies, infertility or even cancer of the reproductive tract.(1mk)

12) i) The m-RNA is

5`AUGCAUGCAUGC UAA 3` (1mk)

ii) UAA is stop codon hence the amino acids in protein are 4. (1mk)

13)

- *Trichoderma polysporum* is used to produce cyclosporin A which is a immunosuppressive agent used in organ transplant.(1mk)
- *Monascus purpureus* is used to produce statins which is a blood cholesterol lowering agent which acts by competitively inhibiting enzyme responsible for synthesis of cholesterol.(1mk)

OR

13)

- **Aerobic microbes** : Primary effluent is passed through large aeration tanks where it is Constantly agitated and air is passed through it. This vigorous growth of aerobic microbes form flocs [mass of bacteria and fungi] this processes significantly reduces the BOD. (1mk)
- **Anaerobic microbes** : The bacterial flock sediment called activated sludge is pumped in anaerobic sludge digester. Here anaerobic bacteria and fungi produce mixture of gases methane ,hydrogen sulphide and carbon dioxide. (1mk)

14)

- Speciation is generally a function of time, unlike temperate regions subjected to frequent glaciations in the past, tropical latitudes have remained relatively undisturbed for millions of years and thus, has long evolutionary time for species diversification (1mk)
- -Tropical environments, unlike temperate ones, are less seasonal, relatively more constant and predictable. Such constant environments promote niche specialisation and lead to a greater species diversity (1mk)
- -There is more solar energy available in the tropics, which contributes to higher productivity; this might contribute indirectly to greater diversity. (1mk)

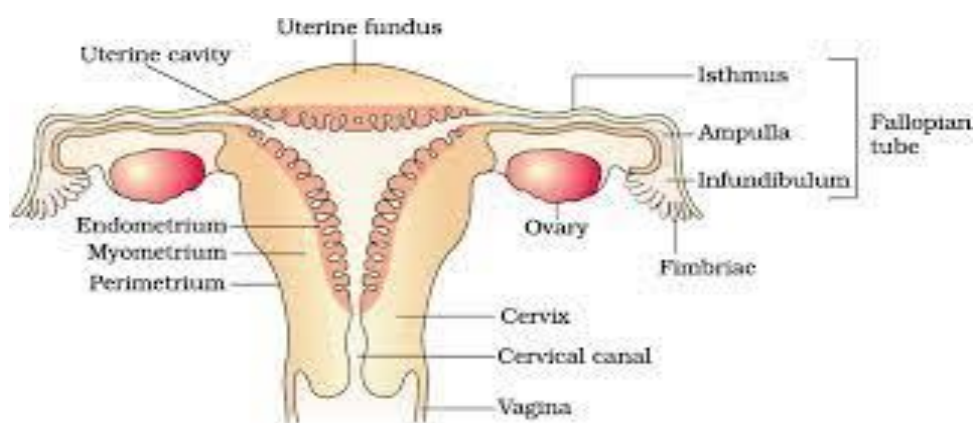
(Any two points)

15)

- Succession on cooled lava is called primary succession where no life existed earlier whereas succession on burnt area is a secondary succession where life existed earlier but is destroyed.(1 mark)
- On cooled lava, development of biotic communities is slow as soil sediment is absent whereas in a burnt forest it is fast as soil sediment is already present.(1 mark)

Section C (3 marks questions)

16)



(Labelling not expected)

17)

- In vitro fertilisation (IVF–fertilisation outside the body in almost similar conditions as that in the body) followed by embryo transfer (ET) is one of such methods. In this method, popularly known as test tube baby programme, ova from the wife/donor (female) and sperms from the husband/donor (male) are collected and are induced to form zygote under simulated conditions in the laboratory. The zygote or early embryos (with up to 8 blastomeres) could then be transferred into the fallopian tube (ZIFT–zygote intra fallopian transfer) and embryos with more than 8 blastomeres, into the uterus (IUT – intra uterine transfer), to complete its further development. Embryos formed by in-vivo fertilisation (fusion of gametes within the female) also could be used for such transfer to assist those females who cannot conceive. (1mk)
- Transfer of an ovum collected from a donor into the fallopian tube (GIFT – gamete intra fallopian transfer) of another female who cannot produce one, but can provide suitable environment for fertilisation . (1mk)

- Intra cytoplasmic sperm injection (ICSI) is another specialised procedure to form an embryo in the laboratory where sperm is injected in the ovum. (1mk)
- Infertility cases either due to inability of the male partner to inseminate the female or due to low sperm counts in the ejaculates, could be corrected by artificial insemination (AI) technique. In this technique the semen collected either from the husband or a healthy donor is artificially introduced either into the vagina or into the uterus (IUI – intra-uterine insemination) of the female. (1mk)

[Any three methods]

OR

17)

- Natural methods work on the principle of avoiding chances of ovum and sperms meeting. Periodic abstinence is one such method in which the couples avoid or abstain from coitus from day 10 to 17 of the menstrual cycle when ovulation could be expected. As chances of fertilisation are very high during this period, it is called the fertile period. Therefore, by abstaining from coitus during this period, conception could be prevented. (1mk)
- Withdrawal or coitus interruptus is another method in which the male partner withdraws his penis from the vagina just before ejaculation so as to avoid insemination. (1mk)
- Lactational amenorrhea (absence of menstruation) method is based on the fact that ovulation and therefore the cycle do not occur during the period of intense lactation following parturition. Therefore, as long as the mother breast-feeds the child fully, chances of conception are almost nil. (1mk)

18) The salient features of genetic code are as follows:

- The codon is triplet. 61 codons code for amino acids and 3 codons do not code for any amino acids, hence they function as stop codons.
- Some amino acids are coded by more than one codon, hence the code is degenerate.
- The codon is read in mRNA in a contiguous fashion. There are no punctuations.
- The code is nearly universal: for example, from bacteria to human UUU would code for Phenylalanine (phe). Some exceptions to this rule have been found in mitochondrial codons, and in some protozoans.
- AUG has dual functions. It codes for Methionine (met) , and it also act as initiator codon.
- UAA, UAG, UGA are stop terminator codons.

(six points ½ mk each)

BLUE PRINT OF BIOLOGY MODEL PAPER (STD XII)

SECOND SEMESTER-2022-23

Sr.NO	UNIT & CHAPTER	Knowledge			Understanding			Application			Skill			Total
		VSA 1mk	SA2 2mk	SA1 3mk	VSA 1mk	SA2 2mk	SA1 3mk	VSA 1mk	SA2 2mk	SA1 3mk	VSA 1mk	SA2 2mk	SA1 3mk	
I	REPRODUCTION													
1.	Human Reproduction		1(2)		1(1)								1(3)	6
2.	Reproductive Health			1(3)*		1(2)								5
II	GENETICS AND EVOLUTION													
3.	Molecular Basis of Inheritance			1(3)	1(1)			1(1)	1(2)					7
III	BIOLOGY IN HUMAN WELFARE													
4.	Microbes in Human Welfare				1(1)	1(2)*		1(1)						4
IV	ECOLOGY													
5.	Ecosystem	1(1)			1(1)	1(2)								4
6.	Biodiversity and Conservation				1(1)			1(1)		1(2)				4
	Total	9			11			7			3			30
	Weightage	30%			35%			25%			10%			