DESIGN OF THE QUESTION PAPER
BIOLOGY-CLASS XII

Hrs : 3 Hrs. **Max. Marks : 70**

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

Weigthtage to content/subject units

Units	Content	Marks
1.	Reproduction	14
2.	Genetics and evolution	18
3.	Biology and Human Welfare	14
4.	Biotechnology and its applications	10
5.	Ecology and environment	14
	Total	**70**

Weightage to different form of questions

S. No.	Form of Questions	Marks for each	No. of Questions	Total Marks
1.	Very Short Answer(VSA)	1	8	08
2.	Short Answer (SA II)	2	10	20
3.	Short Answer (SA I)	3	09	27
4.	Long Answer (LA)	5	3	15
	TOTAL	**-**	**30**	**70**

Scheme of Qptions

1. There will be no overall option.
2. Internal choices (either/or type) on a very selective basis has been provided. This choice has been given in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage.

Weightage to difficulty level of questions.

S.No.	Estimated difficulty level	Percentage
1.	Easy	15
2.	Average	70
3.	difficult	15

About 20% weightage has been assigned to questions testing higher order thinking skills of learners.

BLUE PRINT I

BIOLOGY

CLASS XII

S. No	Type of Questions ⟶ ↓ Units	VSA (1 mark)	SA II (2 marks)	SA I (3 marks)	LA (5 marks)	Total -
1.	Reproduction	2(2)	4(2)	3(1)	5(1)	14(6)
2.	Genetic and Evolution	2(2)	2(1)	9(3)	5(1)	18(7)
3.	Biology in Human Welfare	1(1)	10(5)	3(1)	-	14(7)
4.	Biotechnology	1(1)	-	9(3)	-	10(4)
5.	Ecology and Environment	2(2)	4(2)	3(1)	5(1)	14(6)
	Total	**8(8)**	**20(10)**	**27(9)**	**15(3)**	**70(30)**

SAMPLE QUESTION PAPER - 1

XII- BIOLOGY

(2010)

Time : 3 Hrs **MM: 70**

General Instructions :

(i) All questions are compulsory.

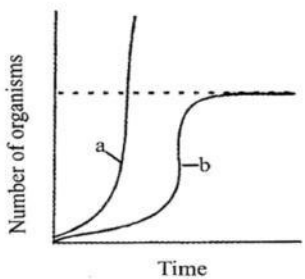
(ii) This question paper consists of four Sections A, B, C and D. Section A contains 8 questions of one mark each, Section B is of 10 questions of two marks each, Section C is of 9 questions of three marks each and Section D is of 3 questions of five marks each.

(iii) There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.

(iv) Wherever necessary, the diagrams drawn should be neat and properly labelled.

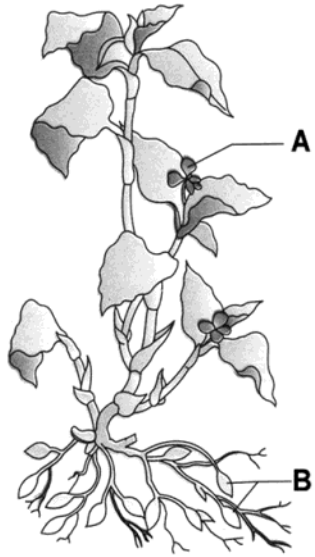
Section - A

1. The turkey usually produces females for several generations. How is this possible?
2. The meiocyte of an onion plant contains 32 chromosomes. Workout the number of chromosomes found in its endosperm.
3. The gene I that controls the ABO blood grouping in human beings has three alleles IA, IB and i.
   (a) How many different genotypes are likely to be present in the human population ?
   (b) Also, how many phenotypes are possibly present ?
4. Pick out the ancestral line of Cycads from the list given below -
   Ferns, herbaceous lycopods, seed ferns, and horsetails
5. Name the source of smack. Mention one way in which it affects the human body.
6. In plants, how is alien DNA introduced into the host cell ?
7. Mr. Galgotia eats curd / yoghurt. In this case, which trophic level will he occupy?
8. In the absence of the predators, which curve, a) or (b) would appropriately depict the prey population ?



Section - B

9.



Identify the type of flower shown in A and B. Which out of the two will produce an assured seed set.

10. Fed up of a large family, a couple wanted to adopt a terminal method of contraception. Describe the process conducted by the doctor in either of the cases (male / female partner)

OR

A mother of a one year old daughter wanted to space her second child. Her doctor suggested CuT. Explain its contraceptive actions.

11. Male humans and female birds are heterogametic while the female humans and male birds are homogametic. Why are they called so?
12. What are interferons. Explain its role in providing immunity. Also name the kind of immunity provided by it.
13. What is allergy? Name the antibody responsible for it. Also mention two chemicals released from the mast cells during an allergic reaction.
14. Give reason -
    (a) Bottled fruit juices bought from the market are clearer as compared to those made at home.
    (b) Large holes are found in "Swiss cheese".
15. In which parts of the body of the hosts do the following events in the life cycle of *Plasmodium* take place. Along with the body parts name the hosts too -
    (i) Fetilisation
    (ii) Development of gametocytes
    (iii) Release of sporozoites
    (iv) Asexual reproduction
16. What are the latest methods of detection of cancer?

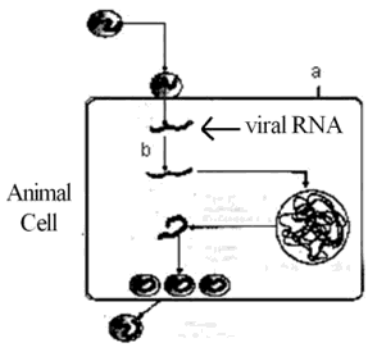
17. State two important defense mechanisms in plants against herbivory, with an example each.
18. a) Compare the grazing food chain and detritus food chain in terms of their origin.
    b) Which among the two is the major contributer to energy flow in aquatic ecosystem?

Section - C

19. Draw a labelled diagram of the sectional view of a mature pollen grain of angiosperms. Explain the function of any two of its parts.
20. In a pea plant, smooth seed coat is dominant over wrinkled seed coat. What will be the expected ratio of phenotypes of the offspring in a cross between
    (i) Heterozygous smooth × Heterozygous smooth
    (ii) Heterozygous smooth × Homozygous wrinkled
    (iii) Heterozygous smooth × Homozygous smooth

21. A tRNA is charged with aminoacid methionine
    (i) Name the process involved in the attachment
    (ii) Point out the mRNA codon and anticodon on tRNA for this aminoacid.
    (iii) What is heterochromatin?
22. (a) State Hardy Weinberg principle. Name any two factors which affect it.
    (b) Draw a graph to show that natural selection leads to directional change.

23.



    (i) What does this diagrammatic sketch depict ?
    (ii) Identify 'a' and 'b'

    (iii) Name the widely used diagnostic test when a person gets this disease.

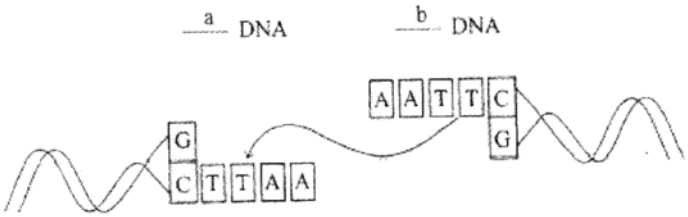
OR

Fill in the blanks in the different column of the table given below :

Disease	Casual organisms	Medium of transfer	Symptoms
Amoebiasis	Entamoeba histolytica	a	Diarrhoea
Typhoid	b	Contaminated food	sustained high fever
c	Plasmodium	Bite of infected female Anopheles mosquito	Chill and high fever

24. A crane had DDT level as 5 ppm in its body. What would happen to the population of such birds ? Explain giving reasons.

25.



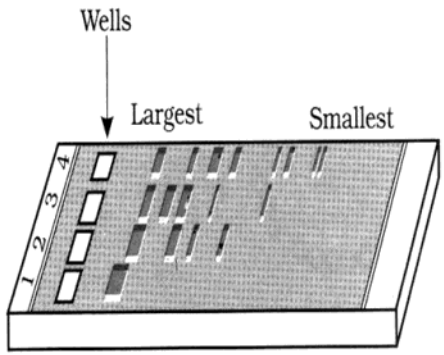
Study the linking of DNA fragments shown above.

(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 fragements.

26.



(a) What does this diagram depict?

(b) What is meant by largest and smallest in the picture.

(c) Name the compound used to visualise them.

(d) Define elution.

27. Explain with reference to PCR

(a) A specific enzyme helps in amplication in PCR. Name the bacterium from which it is isolated and state how its thermostable nature is helpful.

(b) Explain the use of PCR in molecular diagnosis.

Section - D

28. A woman has conceived and implantation has occured in her uterus. Explain the sequence of changes upto parturition which take place within her body.

OR

" Incompatibility is a natural barrier in the fusion of gametes". Justify the statement.

29. (a) Give reasons for -
    (i) Both strands of DNA are not copied during transcription.
    (ii) Transcription and translation in bacteria can be coupled.
    (b) Name the regions of a transcription unit.
    (c) Differentiate between the process of transcription in prokaryotes and eukaryotes.

OR

Stanley Miller performed an experiment by recreating in the lab the probable conditions of the atmosphere of the primitive earth.

(i) What was the purpose of the experiment ?
(ii) In what form was the energy supplied for the chemical reaction to occur?
(iii) Give a diagrammatic representation of Miller's experiment.

30. (a) On seeing the bad state of roads in your locality, as a student, you have recommended to the Municipal Corporation to use polyblend.
    (i) What is polyblend? Point out its raw material?
    (ii) How will it be advantageous?
    (b) What are e-wastes? Explain the method of their disposal.

OR

(a) What is meant by ecological succession? How does it occur? Explain.
(b) Differentiate between Primary and Secondary succession.

MARKING SCHEME

SAMPLE QUESTION PAPER-I

XII - BIOLOGY

(2010)

Section - A

A1 In a turkey, female gametes undergo development without fertilisation. This phenomenon is called parthenogenesis. [1 Mark]

A2
- meiocyte has 32 chromosomes (2n)
- hence its gamete will have 32/2 = 16 chromosomes
- therefore endosperm will have
  16 × 3 = 48 chromosomes (3n)

[1 Mark]

A3 (a) 6 , (b) 4

[1 Mark]

A4 Seed ferns

[1 Mark]

A5 Source - latex of poppy plant (*Papaver somniferum*) = ½
Effect - Acts as a depressant. = ½

[1 Mark]

A6 The plant cells are bombarded with high velocity micro - particles of gold or tungsten coated with DNA in a method known as biolistics or gene gun.

[1 mark]

A7 Third trophic level

[1 Mark]

A8 Curve 'a'

[1 Mark]

Section - B

A9 A - Chasmogamous flower = ½
B - Cleistogamous flower = ½
Cleistogamous flower produces an assured seed set.

[1 Mark]

A10 **Male Partner :** Vasectomy - a small part of the vas deferens is removed or tied up through a small incision in the scrotum.

Female Partner : Tubectomy - a small part of the fallopian tube is removed or tied up through a small incision in the abdomen or through vagina.

[1 Mark]

OR

Ca^{++} ions, increases phagocytosis of sperms, suppresses sperm motility, reduces fertilising capacity. = ½ × 4 = 2

[2 Marks]

A11 Genotype of human male is - XY

Genotype of female bird is - ZW = ½

The sex chromosomes are dissimilar and hence are called heterogametic. = ½

Genotype of human female is XX

Genotype of male bird is ZZ = ½

The sex chromosomes are similar, hence homogametic = ½

[½ + ½ + ½ + ½ = 2 Marks]

A12 Interferons are proteins secreted by virus - infected cells. = ½

Role : It protects non - infected cells from further viral infection = 1

Innate Immunity = ½

[½ + 1 + ½ = 2 Marks]

A13 The exaggerated response of the immune system to certain antigens present in the environment = ½

IgE = ½

Histamine and serotonin = ½ + ½ = 1

[½ + ½ + 1 = 2 Marks]

A14 (a) Bottled juices are clarified by the use of pectinases and proteases = ½ + ½ = 1

(b) Large holes are due to production of large amount of CO_2, by a bacterium named *Propionibacterium sharmanii* = ½ + ½ = 1

[1 + 1 = 2 Marks]

A15 (i) Inside stomach / intestine of Mosquito host

(ii) In the blood of human host

(iii) Into the blood of human host

(iv) Inside liver cells and RBCs of human host.

A16 Surgery, radiation therapy, chemotherapy and immunotherapy

[½ × 4 = 2 Marks]

A17 (a) Thorns are the most common morphological means of defense eg. Acacia and Cactus = 1

(b) Many plants produce and store toxic chemicals such as cardiac glycosides to discourage browsing animals. eg. Calotropis = 1

[1 + 1 = 2 Marks]

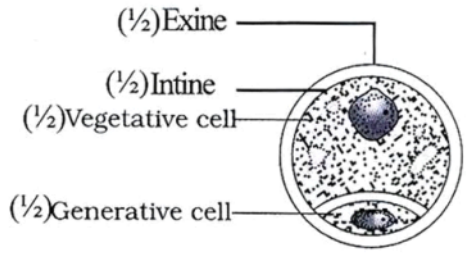
A18 (a) Grazing food chain starts from producers while detritus food chain starts from organic matter = 1

(b) Grazing food chain is the major conduit of energy flow in aquatic ecosystem = 1

[1 + 1 = 2 Marks]

Section - C

A19



= ½ × 4 = 2

Exine - It can withstand high temperature / strong acids / alkali

Intine - It is a thin and continuous layer made up of cellulose and pectin

Vegetative Cell - It is bigger, has abundant food reserve.

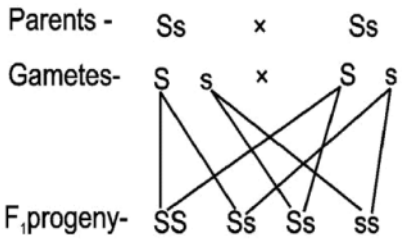
Generative Cell - It divides mitotically to give rise to two male gametes. (any two = ½ × 2 = 1)

[2 + 1 = 3 Marks]

A20 Smooth seed coat (dominant) = S

Wrinkled seed coat (recessive) = s

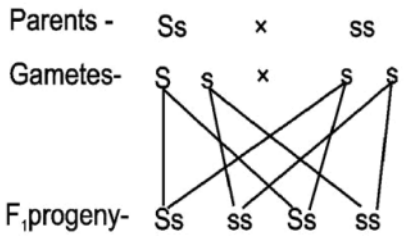
(i) Heterozygous smooth × Heterozygous smooth



3 smooth : 1 wrinkled

= 3 : 1 ratio

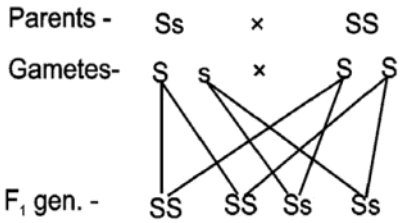
(ii) Heterozygous smooth × Homozygous wrinkled



Phenotype - 2 smooth : 2 wrinkled

= 1 : 1

(iii) Heterozygous smooth × Homozygous smooth



Phenotype - All smooth

= 1 : 0

[1+1+1 = 3 Marks]

A21 (i) Initiation = 1

(ii) mRNA codon = AUG tRNA anticodon = UAC =1

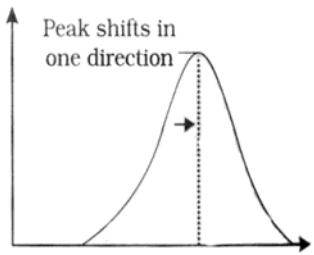
(iii) The densely packed and dark stained / transcripitionally inactive chromatin is called as heterochromatin = 1

[1+1 + 1 = 3 Marks]

A22 (a) Allelic frequencies in a population are stable and constant from generation to generation. = 1

Gene flow, genetic drift, mutation, genetic recombination, natural selection (any two = ½ × 2 =1)

(b)



[1 + 1 +1 = 3 Marks]

A23 (i) Replication of retrovirus = 1

(ii) a - Plasmamembrane

b- formation of viral DNA by reverse transcriptase ½ × 2 = 1

(iii) ELISA (Enzyme linked immunosurbent assay) = 1

[1 + 1 + 1 = 3 Marks]

OR

(a) Water, vegetables, fruits etc. contaminated with the eggs of the parasite.

(b) Salmonella typhi

(c) Malaria

[1 + 1 + 1 = 3 Marks]

A24 Population of birds will decrease. High concentration of DDT disturbs calcium metabolism in birds which causes thinning of eggshell and their premature breaking, eventually causing decline in bird populations.

[3 Marks]

A25 (i) 'a' – Vector DNA; 'b' – Foreign DNA = ½

(ii) EcoRI

(iii) DNA ligase

[½ + 1 + 1½ = 3 Marks]

A26 (a) Gel electrophoresis = ½

(b) DNA fragments / bands = ½

(c) Ethidium bromide = 1

(d) The separated bands of DNA are cut out from agarose gel and DNA extracted from gel piece = 1

[½ + ½ + 1 + 1= 3 Marks]

A27 (a) *Thermus aquaticus* = 1

It remains active during the high temperature induced denaturation = 1

(b) Very low concentration of a bacteria or virus can be detected by amplification of their nucleic acid by PCR = 1

[1 + 1 + 1 =3 Marks]

Section - D

A28
- After implantation the chorionic villi and uterine tissue become interdigitated to form placenta.
- Placenta facilitates supply of O_2 & nutrients to the embryo and removes CO_2 & excretory materials produced by the embryo.
- Increased production of hormones like estrogens, progesterone, prolactin are essential for supporting foetal growth, metabolic changes in the mother & maintenance of pregnancy.
- The inner cell mass differentiates into three distinct germ layers (mesoderm, ectoderm & endoderm) which given rise to all tissues (organs) in adults.
- After one month of pregnancy the embryo's heart is formed.
- By the end of the second month of pregnancy the foetus develops limbs & digits.
- By the end of 12 weeks (first trimester) most of the major organ systems are formed.
- By the end of 24 weeks (second trimester) the body is covered with fine hair, eye-lids separate and eyelashes are formed.
- The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex.
- This triggers release of oxytocin from maternal pituitary along with stimulatory reflex resulting in stronger contractions leads to parturition. = ½ × 10 = 5

[5 Marks]

OR

- Incompatibility is considered as the most widespread & effective device to prevent inbreeding and outbreeding.
- Pollen pistil interaction is a dynamic process involving pollen recognition followed by promotion or inhibition of the pollen.
- It acts as a natural barrier by the interaction of chemical substances produced by the style.
- Normally the pollen belonging to right mating type germinate on stigma, develop pollen tube &

bring about fertilization.

- The pollen grains belonging to other mating type are discarded = 1 × 5 = 5

[5 Marks]

29. (a) (i) If both strands act as a template, they would code for RNA molecule with different sequences in turn, they code for proteins, the sequence of amino acids in the proteins would be different. One segment of the DNA would be coding for two different proteins, and this would complicate the genetic information transfer machinery. Second, the two RNA molecule if produced simultaneously would be complementary to each other. Hence would form a double stranded RNA. This would prevent RNA from being translated into protein and the exercise of transcription would become a futile one. (Any one) 1

(ii) Transcription and translation take place in the same compartment since there is no separation of cytosol and nucleus in bacteria 1

(b) A promotor

The Structural Gene

A terminator 1

(c) There is a single DNA dependent RNA polymerase that catalyses transcription of all types of RNA in bacteria.but in eukaryotes the RNA polymerase I transcribes rRNAs,RNA polymerse III for transcription of tRNA and RNA polymerse II transcribes precursor of mRNA.

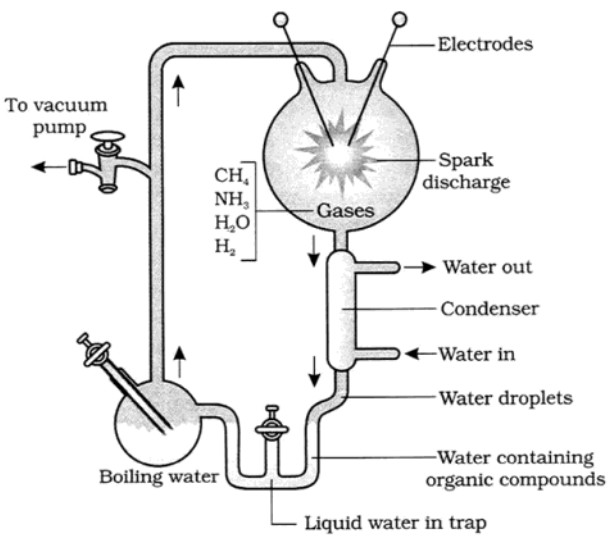
The primary transcripts contain both exons and introns and it is subjected to a process called splicing. Also hnRNA undergo two additional processing called as capping and tailling. 2

OR

(i) To prove Oparin Haldane Theory which proposed that the first form of life could have come from pre-existing non living organic moleucles and that formation of life was preceeded by chemcial evolution = 1

(ii) He created electric discharge in a closed flask containing CH_4 , H_2, NH_3 and water vapour at 800°C = 1

(iii)



3

30. (a) (i) It is a fine powder of recycled modified plastic. This mixture is mixed with bitumen used to lay roads = 1

Raw material - Plastic film waste = 1

(ii) Blends of polyblend & bitumen, when used to lay roads, enhances the bitumen's water repellant properties and helps to increase road life by a factor of three = 1

(b) Irreparable computers and other electronic goods are known as e-wastes = 1

Burried in landfills or incinerated = 1

[1+1+1+1+1 = 5 Marks]

OR

(a) The gradual and fairly predictable change in the species composition of a given area = 1

During succession some species colonise an area & their populations become more numerous, where as populations of other species decline and even disappear = 1 + 1 = 2

(b)

Primary Succession	**Secondary Succession**
It occurs in an area which has been bare from the beginning.	It occurs in an area which has been denuded recently.
Soil is absent at the time of beginning of primary succession.	Soil is present in the area where secondary succession begins.
Takes a long time for completion.	Takes less time for completion

(any two differences 1 × 2 = 2)

[1 + 2 + 2 = 5 Marks]