

## 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:

### Weightage to content/subject units

<u>Units</u>	<u>Content</u>	<u>Marks</u>
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
	<b>Total</b>	<b>70</b>

### Weightage to different form of questions

<u>S. No.</u>	<u>Form of Questions</u>	<u>Marks for each</u>	<u>No. of Questions</u>	<u>Total Marks</u>
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
	<b>TOTAL</b>	<b>-</b>	<b>30</b>	<b>70</b>

### Scheme of Options

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.

<u>S.No.</u>	<u>Estimated difficulty level</u>	<u>Percentage</u>
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)
	<b>Total</b>	<b>8(8)</b>	<b>20(10)</b>	<b>27(9)</b>	<b>15(3)</b>	<b>70(30)</b>

**SAMPLE QUESTION PAPER**  
**XII- BIOLOGY**  
**(2010)**

**Time : 3 Hrs**

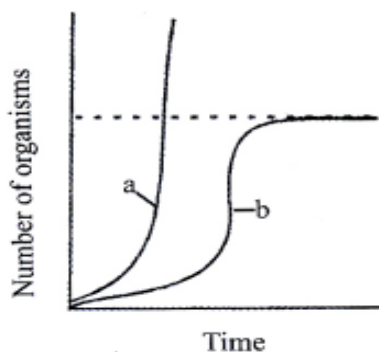
**MM: 70**

**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. Work out the number of chromosomes found in its endosperm.
3. The gene I that controls the ABO blood grouping in human beings has three alleles  $I^A$ ,  $I^B$  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**

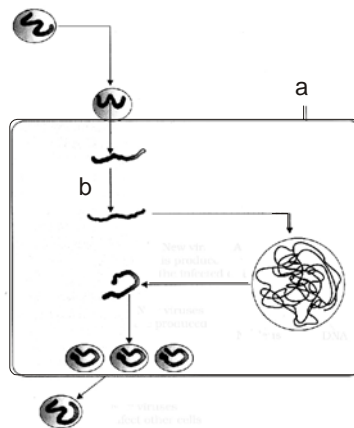
A mother of a one year old daughter wanted to space her second child. Her doctor suggested CuT. Explain its contraceptive actions.

11. The human male and female bird are heterogametic while the human female and male bird 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) Fertilisation
  - (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 defence mechanisms in plants against herbivory, with an example each.
18. Compare the grazing food chain and detritus food chain in the aspect of their (a) origin and (b) energy status.

**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  $\times$  Heterozygous smooth
  - (ii) Heterozygous smooth  $\times$  Homozygous wrinkled
  - (iii) Heterozygous smooth  $\times$  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.



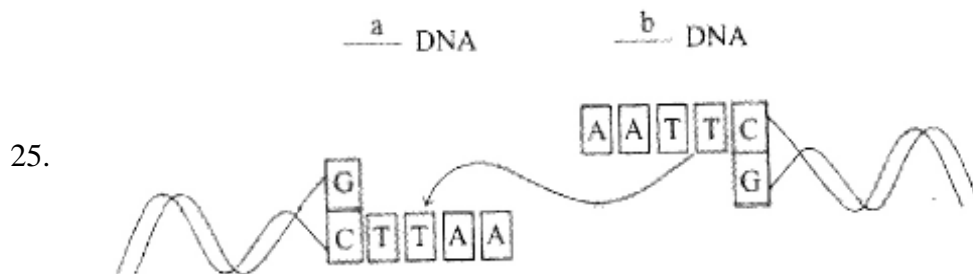
- (i) What does this diagrammatic sketch depict ?
- (ii) Identify 'a' and 'b'
- (iii) Name the widely used diagnostic test when a person gets this disease.

OR

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

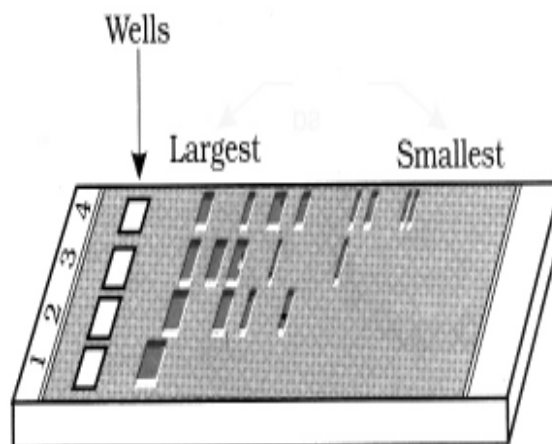
Disease	Casual organisms	Medium of transfer	Symptoms
Amoebiasis	Entamoeba histolytica	a	Diarrhoea
Typhoid	b	Contaminated food	sustained high fever
c	Plasmodium	Bite of infected female Anopheles mosquito	Chill and high fever
Pneumonia	Streptococcus	d	Fever and cough

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



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 fragments.
- 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 amplification in PCR. Name the bacterium from which it is isolated and state how its thermostable nature is helpful.
  - (b) Explain its use in molecular diagnosis.

**Section - D**

28. A woman has conceived and implantation has occurred 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) 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) What is biogenesis?
  - (iv) 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**  
**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  $16 \times 3 = 48$  chromosomes (3n)
- [1 Mark]
- A3 (a) 6, (b) 4 [1 Mark]
- A4 Seed ferns [1 Mark]
- A5 Source - latex of poppy plant (*Papaver somniferum*) =  $\frac{1}{2}$   
Effect - Acts as a depressant. =  $\frac{1}{2}$  [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 =  $\frac{1}{2}$   
B - Cleistogamous flower =  $\frac{1}{2}$   
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

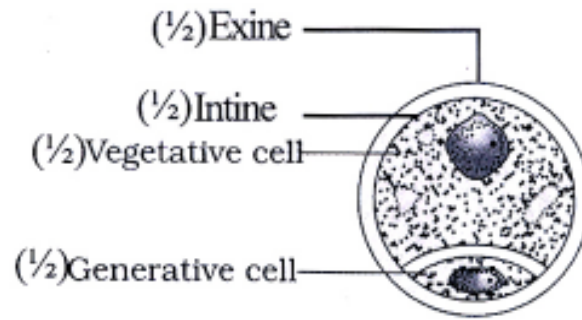
CuT release  $\text{Cu}^+$  ions, increases phagocytosis of sperms, suppresses sperm motility, reduces fertilising capacity. =  $\frac{1}{2} \times 4 = 2$

[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<sub>2</sub>, 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 defence 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 an ecosystem = 1  
 [ 1 + 1 = 2 Marks]

### Section - C

A19



$$= \frac{1}{2} \times 4 = 2$$

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.

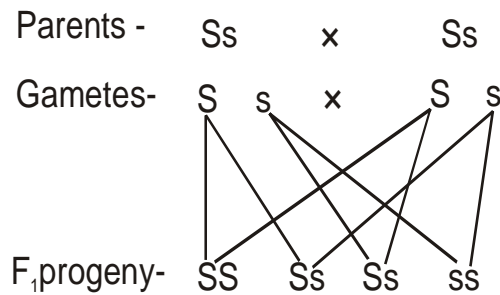
Generative Cell - It divides mitotically to give rise to two male gametes. (any two =  $\frac{1}{2} \times 2 = 1$ )

[ 2 + 1 = 3 Marks]

A20 Smooth seed coat (dominant) = S

Wrinkled seed coat (recessive) = s

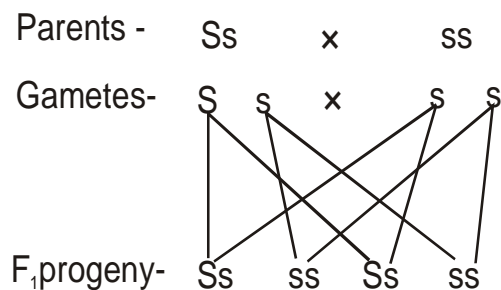
(i) Heterozygous smooth  $\times$  Heterozygous smooth



3 smooth : 1 wrinkled

= 3 : 1 ratio

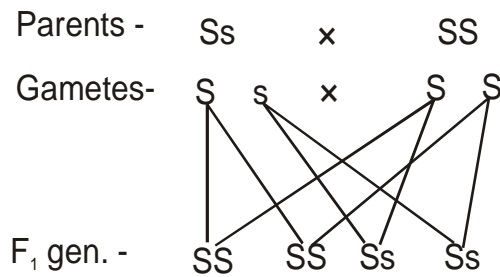
(ii) Heterozygous smooth  $\times$  Homozygous wrinkled



Phenotype - 2 smooth : 2 wrinkled

= 1 : 1

(iii) Heterozygous smooth  $\times$  Homozygous smooth



Phenotype - All smooth  
= 1 : 0

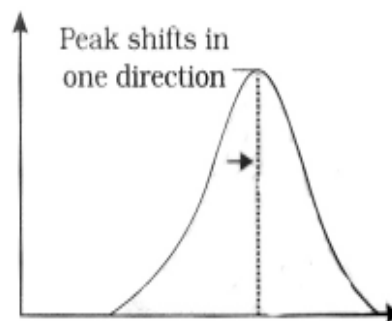
[1+1+1 = 3 Marks]

- A21 (i) Initiation = 1  
(ii) mRNA codon = AUG = 1  
(iii) The densely packed and dark stained / transcriptionally 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 =  $\frac{1}{2} \times 2 = 1$ )

(b)



[1 + 1 + 1 = 3 Marks]

- A23 (i) Replication of retrovirus = 1  
(ii) a - Plasmamembrane  
b- formation of viral DNA by reverse transcriptase  $\frac{1}{2} \times 2 = 1$   
(iii) ELISA (Enzyme linked immunosorbent 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  
(d) Pneumonia spreads by cough and sneezes by sharing drinking glasses and eating utensils with an infected person and contact with used tissues or handkerchief.

[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<sub>2</sub> & nutrients to the embryo and removes CO<sub>2</sub> & 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 give 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 =  $1 \times 5 = 5$

[5 Marks]

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 repellent 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  
Buried 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, whereas 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.

Soil is absent at the time of beginning of primary succession.

Takes a long time for completion.

It occurs in an area which has been denuded recently.

Soil is present in the area where secondary succession begins.

Takes less time for completion

(any two differences  $1 \times 2 = 2$ )

[ 1 + 2 + 2 = 5 Marks]