BIOLOGY

PAPER 1

(THEORY)

ANSWER KEY

SECTION A – 20 MARKS

Question 1

In answering Multiple Choice Questions, candidates have to write either the correct option number or the explanation against it. Please note that only ONE correct answer should be written.

(i)	*Neisseria gonorrhoeae*	**[1]**
(ii)	80	**[1]**
(iii)	8 cycles	**[1]**
(iv)	'Saheli'	**[1]**
(v)	60 plants	**[1]**
(vi)	5'- CATATG -3' 3'- GTATAC -5'	**[1]**
(vii)	Mitochondrion / Mitochondria	**[1]**
(viii)	Plasma cells / B-Lymphocytes	**[1]**
(ix)	(b) 5'- AUG AAC UAA CCA CUC - 3'	**[1]**
(x)	(c) III	**[1]**
(xi)	(c) Assertion is true and Reason is false.	**[1]**
(xii)	(c) Assertion is true and Reason is false.	**[1]**
(xiii)	Helps in retaining parental characters.	**[1]**
(xiv)	By recommending him to use cyanobacteria and / or Nitrogen-fixing bacteria	**[1]**
(xv)	(a) Mucosal Associated Lymphoid Tissues	**[1]**

(b) Sanger **[1]**

(xvi) Diploid (2n) **[1]**

(xvii) Morula **[1]**

(xviii) (a) More than one restriction site for the same RE **[1]**

(b) Because the weaker alleles become homozygous and exhibit their harmful effects. So, such plants die and get eliminated out of population. In this way, the population becomes free of such genes **[1]**

SECTION B – 14 MARKS

Question 2 **[2]**

(i) Cell – A: The haustorial cell absorbs and transfer nutrients from the endosperm to the proembryo.

Cell – B: Hypophysis forms radicle

OR

(ii) Seed A- Non-endospermic/ Exalbuminous, Seed B-Endospermic or Albuminous
Seed A – Pea, bean, Cucurbita, Seed B- Castor, maize – (Any relevant points to be accepted)

Question 3 **[2]**

Insect pollinated.
One characteristic feature of pollen grain - pollen kit / sticky pollen grains

Question 4 **[2]**

(i) Protein remains insoluble at low pH in the bacterial cell, but in stomach of insects it becomes soluble and damages the epithelial cells

(ii) No, because the toxin is species-specific.

Question 5 **[2]**

(i) The inferior competitor will be eliminated as per Gause' 'Competitive exclusion principle'.

(ii) The inferior competitor expands its territory as per 'Competitive release'.

Question 6 **[2]**

Embryos show the presence of gills to prove that the ancestors were aquatic.
The concept of "ontogeny recapitulates phylogeny".

Question 7 **[2]**

Technique: ELISA
Principle: Presence of specific anti-viral antibodies

Question 8 **[2]**

Habitat loss and fragmentation, Alien species invasion

SECTION C - 21 MARKS

Question 9 **[2]**

(i) Zygote Intra Fallopian Transfer, Gamete Intra Fallopian Transfer

(ii) STDs like AIDS and Hepatitis – B do not directly affect the genital organs because AIDS affects only the immune system and Hepatitis affects the liver.

Question 10

(i) Lane A – DNA of *E. coli*
Lane B – DNA of *Plasmodium vivax*

Because the circular DNA of *E. coli* was cut to release just one fragment, while the linear DNA of *Plasmodium* was cut to release two fragments

OR

(ii) Blue-white selection

LacZ codes for β-galactosidase
The product (β-galactosidase) becomes inactive due to insertion of foreign protein (coded by foreign gene)
Chromogenic substrate converted into blue coloured product in non-recombinant colonies, remains colourless in recombinant colonies

Question 11 **[3]**

(i) $S = CA^Z$

Island 'A'	Island 'B'	
$Sa = 20 \times (45 \times 10^3)^1$	$Sb = 10 \times (12 \times 10^5)^1$	1 mark
$Sa = 900 \times 10^3$	$Sb = 120 \times 10^5$	1 mark

(ii) Sb > Sa, therefore, species richness of Island 'B' is greater than that of Island 'A', because Island B has optimum environmental conditions / temperature / higher productivity.

Question 12 **[3]**

The frequency of individuals with the dominant genotype: $p^2 = 0.49$
The frequency of individuals with the heterozygous genotype: $2pq = 0.42$
The frequency of individuals with the recessive genotype: $q^2 = 0.09$

Question 13 **[3]**

(i) Cell mediated Immunity. It is the type of immunity provided by the T – lymphocytes

(ii) Administration of immunosuppressants

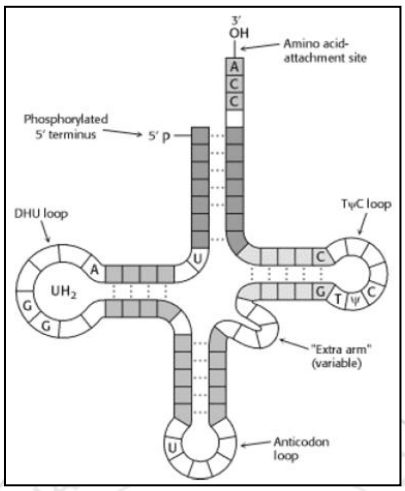
Question 14 **[3]**

(i) *ex situ* method of conservation

(ii) cryopreservation/ tissue culture/ gene banks

Question 15 **[3]**

(i)

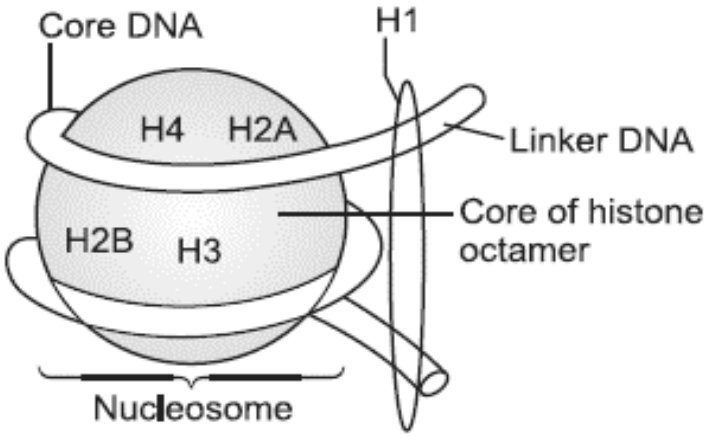


- Proper shape (5'- arm at a lower level than 3'-arm)

Three loops with proper orientation (with reference to 3' and 5'-ends)

OR

(ii)



SECTION D – 15 MARKS

Question 16 **[5]**

(i) a Biocontrol agents do not pollute the environment and are highly specific in nature

(b) Baculovirus – Specifically attack insect pests.

Bacillus thuringiensis – Specifically destroys cotton bollworm/ corn borer

OR

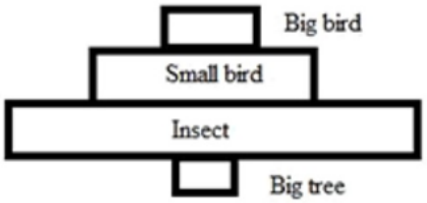
(ii) Bioactive molecules modulate the metabolic pathways of the living organism.
(a)

(b) Streptokinase: Source – *Streptococcus*: Use – Intravascular clot buster

Cyclosporin: Source – *Trichoderma polysporum:* Use– Immunosuppressant

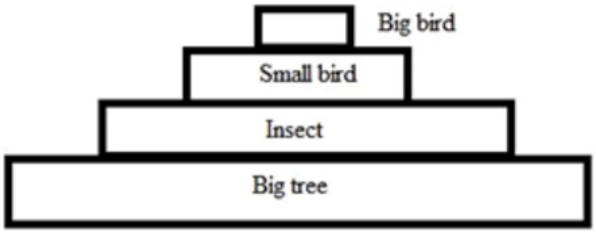
Question 17 **[5]**

(i)



Pyramid of number

(ii)

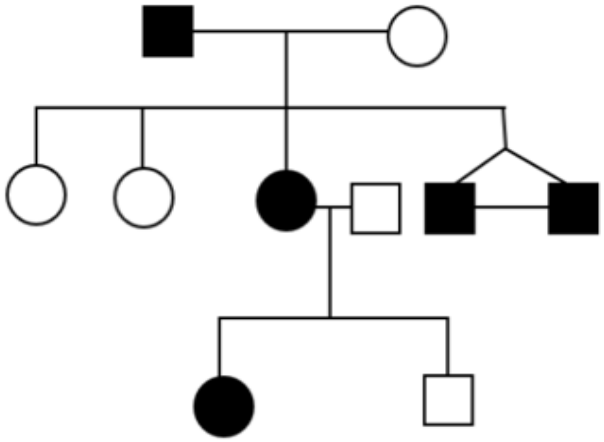


Pyramid of biomass

[5]

Question 18

(i)



(ii) Cause: Deficiency of the enzyme phenylalanine hydroxylase

Symptom: Retarded mental growth/ light skin pigmentation