

# BIOLOGY

## PAPER 1

### (THEORY)

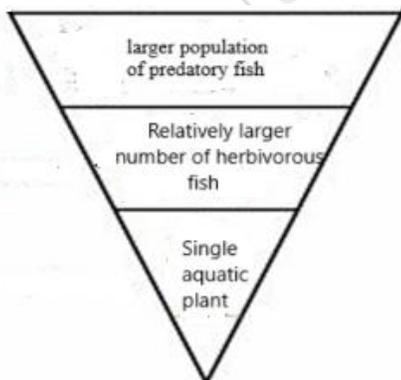
#### ANSWER KEY

#### 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) *Epidermophyton / Trichophyton / Microsporum* [1]
- (ii) 8 [1]
- (iii) 64 [1]
- (iv) 8 – 16 blastomeres [1]
- (v) 3/8 [1]
- (vi) TaqYIV [1]
- (vii) [1]



- (viii) *Anopheles* [1]
- (ix) (c) or Pleiotropy [1]
- (x) (d) or Only P, Q and R [1]
- (xi) (a) or Both Assertion and Reason are true and Reason is the correct explanation for Assertion. [1]
- (xii) (d) or Both Assertion and Reason are false. [1]

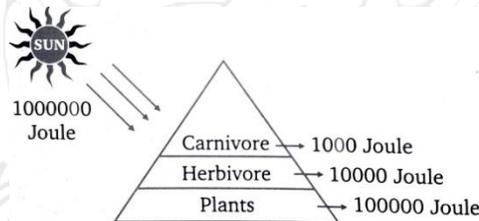
- (xiii) Tendrils of vine are modified stems and of pea are modified leaves or leaflets. They perform the same function – climbing and supporting the plants. [1]
- (xiv) He should use cyanobacteria (*Anabaena*, *Nostoc*, *Aulosira*) or Nitrogen-fixing bacteria (*Azospirillum*) *Azolla* (fern plant that harbours *Anabaena*) [1]
- (xv) (a) Net Primary Productivity [1]  
(b) Chargaff [1]
- (xvi) 1600 [1]
- (xvii) Placenta / Chorionic villi [1]
- (xviii) (a) Tail part has been labelled in the middle piece of sperm. Head is labelled as middle piece. [1]  
(b) Millipedes' chitinous exoskeleton decomposes more slowly. [1]

**SECTION B – 14 MARKS**

**Question 2**

[2]

(i)



**OR**

- (ii) (a) Brazil- Tropical region  
France- Temperate region  
Norway- Polar region  
(b) India- Tropical region

**Question 3**

[2]

- (i) Initial viral spike → T-cell drop → partial recovery → eventual immune suppression
- (ii) No; virus integrates/latent in host cells.

**Question 4** [2]

Condom – Physical barrier

Vasectomy – No release of sperm

**Question 5** [2]

- (i) Anode end is towards 'b'.
- (ii) Agarose gel, containing DNA fragments is stained with ethidium bromide and exposed to UV radiation. Orange color bands of DNA become visible.

**Question 6** [2]

- (i) *Saccharomyces cerevisiae*
- (ii) Wine, Beer

**Question 7** [2]

- (i) GEAC
- (ii) Alpha – 1 antitrypsin

**Question 8** [2]

- (i)  $30 + [(5 + 8) - (6 + 7)] = 30$
- (ii) Habitats are species specific and have resources up to a limit that can support maximum number of individuals to grow and reproduce, this limit of habitat to subsist a species is called carrying capacity

### SECTION C – 21 MARKS

**Question 9** [3]

- (i) (a) Father I<sup>A</sup>i                      Mother I<sup>B</sup>i
- (b) IAi/ IBi/, ii
- (ii) A or O

**Question 10****[3]**

- (i) Darwin on voyage on the ship H.M.S Beagle, **Galapagos** Island separated from mainland South America – 13 species of Ground finches found on different islands. Original finches were found on mainland- seed eating **beak**; different islands – different types of beaks-for e.g. Vegetarian tree finches, insectivorous eating, Cactus eating. Beak got modified according to the food available on that particular island. It supports **adaptive radiation**.

**OR**

- (ii) (a) Frequency of homozygous dominant individuals-0.04 or 4%

(b)

	<i>Homo habilis</i>	<i>Homo erectus</i>
	<ul style="list-style-type: none"><li>• 4-4.5 feet in height</li><li>• Cranial capacity-680-735 cc</li></ul>	<ul style="list-style-type: none"><li>• 5.5 feet in height</li><li>• 1125 cc</li></ul>

**Question 11****[3]**

- (A) Plague  
(B) *Streptococcus pneumoniae*  
(C) *Wuchereria bancrofti*

**Question 12****[3]**

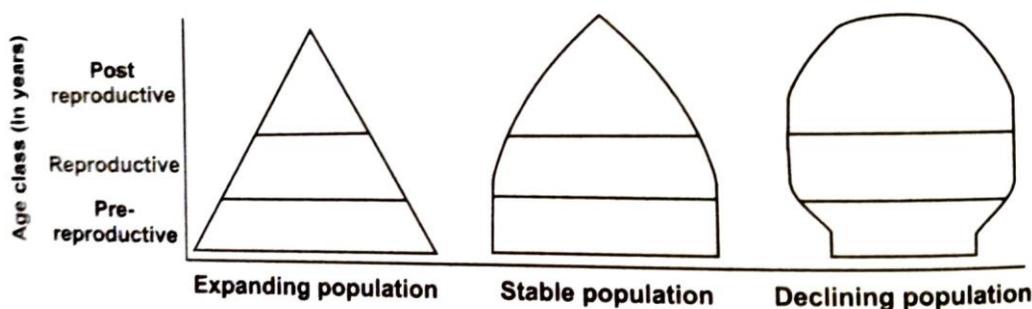
- (i) Consumption in social gathering, to relieve social or physical discomforts, desire for excitement, to escape from disappointments, family atmosphere. (*Any two*)
- (ii) Avoid undue peer pressure, education, and counselling, seeking help from parents and peers, looking for danger sign, seeking professional and medical help. (*Any one*)

**Question 13****[3]**

- (i) Plasmid is circular, therefore when cut by RE it produces only one fragment, whereas the linear DNA is cut to release two fragments.
- (ii) Agarose is non-reactive and large pore size allows easier separation of fragments.
- (iii) EcoRI is an endonuclease, it cuts the specific inner bonds while exonucleases cut outer bonds starting either from 3'-terminus or from 5'-terminus.

**Question 14****[3]**

- (i) 2-Geitonogamy  
3-Xenogamy/Allogamy
- (ii) Pollinated by insects

**Question 15****[3]****SECTION D – 15 MARKS****Question 16****[5]**

- (i) (*In-situ* and *ex-situ* conservation methods respectively.  
In-situ conservation is the conservation of biotic resources in their natural habitats. Ex-situ conservation is the conservation of threatened species outside their natural habitats.
- (ii) Cryopreservation is *in vitro* conservation of tissues, organs, embryos, seeds etc. at low temperature of  $-196^{\circ}\text{C}$ .
- (iii) Captive breeding is *ex-situ* conservation method because threatened and endangered species are bred and reared in zoological parks under human supervision

**Question 17****[5]**

- (i) (a) Griffith's experiment  
Two strains of *Streptococcus pneumoniae*- Smooth Virulent Strain (S-III) and Rough Avirulent Strain (R-II).  
R-II were injected into mice- mice remained healthy  
S-III were injected into mice; mice developed pneumonia and died.

S-III were heated to 60°C and killed. These heat-killed bacteria were injected to mice; mice remained healthy.

A mixture of R-II and heat killed S-III bacteria were injected into mice; mice developed pneumonia and died.

**Conclusion:** Heat killed S-III bacteria introduced some transforming principle that caused transformation of R-II avirulent into virulent S-III bacteria.

- (b) A- Promoter; B Coding /Anti template /Sense strand

**OR**

- (ii) (a) X = Repressor protein. This molecule gets deactivated in the presence of inducer (Lactose).  
(b) gene 'z' - B-galactosidase;  
gene 'y' -permease;  
gene 'a' -transacetylase  
(c) RNA polymerase

**Question 18**

**[5]**

- (i) A- Follicle Stimulating Hormone (FSH);  
B-Estrogen;  
C-Luteinizing Hormone (LH);  
D -progesterone  
(ii)  $33 - 14 = 19^{\text{th}}$  day