2001 Biology - I Answers

Que No	Ans No	Que No	Ans No	Que No	Ans No	Que No	Ans No	Que No	Ans No	Que No	Ans No
01.	4	11.	3	21.	3	31.	1	41.	2	51.	1
02.	2	12.	2	22.	3	32.	5	42.	1	52.	4
03.	3	13.	3	23.	2	33.	4	43.	4	53.	1
04.	1	14.	2	24.	2	34.	2	44.	5	54.	4
05.	2	15.	3	25.	2	35.	2	45.	4	55.	4
06.	2	16.	2	26.	all	36.	3	46.	2	56.	3
07.	4	17.	2	27.	3	37.	3	47.	1	57.	1
08.	3	18.	5	28.	3	38.	3	48.	2	58.	1
09.	3	19.	4	29.	4	39.	3	49.	2	59.	3
10.	3	20.	4	30	all	40.	3	50.	1	60.	4

2001 Biology II Answers

Part A - Structured Essay

01.

(A) (i) A. Monera / Prokaryote
B. Protista / protoctista
C. Protista / Protoctista
D. Fungi

(ii) **Features of Kingdom of A**
- Prokaryotic / any prokaryotic character
- Autotrophic nutrition (photosynthetic) and heterophic nutrition (Absorptive nutrition)
- Unicellular
- cell wall: mucopolysaccharide/murein

Features of Kingdom of D
- Eukaryotic/ any Eukarytic character
- Absorptive nutrition / heterotrophs
- Multicellular not differentiated / mycellial body
- Non-motile / absence of flagellated / reproductive cells.

(iii) • B photo - autotrophic
• C chemo - heterotrophic

(iv)

Bacteria	Virus
• has cellular structure	• non- cellular
• contains DNA and RNA/ DNA and genetic materia	• virus contain either RNA or DNA
• mostly saprophytic	• only parasitic
• reproduces freely	• reproduces only in host cells
• can be seen with light microscope	• Electrons micro scopic
• Metabolic machinery present in Bacteria	•Metabolic machinery absent in virus
• Non crystalize	• crystalize

(B) (i) E- Nucleus / Nucleoplam
F- smooth ER
G- Rough ER / Granular ER / RER/ GER
H- Golgi body

(ii) G - • Synthesis
• Transport of protein
• Supporting function
H - • Collection
• Packaging
• Distribution
• Glycolipid synthesis.
• Glycoprotein synthesis
• Lysosome formation

(C) (i) • Carbohydrates • Proteins
• Lipids /fats • Nucleic acids

(ii) a- • Cellulose • Hemicellulose • Pectin
b- • Mucopoly saccharides/glycopeptides/mureins
c- • Glycogen
d- • Proteins • RNA

(iii) Glucose

(iv) • Crush the germinating seedlings in water and filter to get the extract
• Add Benedicts(or Fehlings A+ B) solution to this and heat
• Brick red precipitate indicates the presence of reducing sugars

(D) (i) P- Prophase Q- Metaphase

Major events in 'P'
- Nuclear membrane disintegerates
- Nucleous disappears/ disintegrates
- Chromosomes shorten / condense
- A spindle starts to form
- Centrioles move to opposite ends

Major events in 'Q'
- Chromosomes get arranged at the equator of the spindle
- after moving to the middle of the cell
- Each chromosome (pair of chromatids) gets attached to the spindle by the centromere

(ii) • Genetic stability/ produce two nuclei which have the same number of chromosome as the parent cell
• Growth / the number of cells with in an organism increase
• Asexual reproduction / regeneration / cell replacement

02.

(A) (i) • in the animal that evolved first, transport of material occurred by diffusion
• During evolution by diffusion
• complexity,
• and effiesency increased/ Distance increased
• therefore, transport and diffusion was not sufficient for efficient transport and the blood circulatory system develped

(ii) • This is asystem without veins, where the blood flows from the heart through
• into the haemocoel (which is a system of blood-filled spaces where the organs are bathe in blood),
• and the blood returns to the heart through ostea (which are tiny holes.)

(iii)• Arthropoda/ Mollusca

(iv) • Blood flows twice through the heart
• during a single (complete) cycle through the body

(v) • Mammalia / Aves

(B) (i) a. Left pulmonary vein
b. Aortic valve /Semi lunar valve
c. Bicuspid valve / Mitral valve / Left atrio-ventricular valve
d. AV node / Atrio-ventricular node / Atrioventricular bundle / Bundle of His
e. Right atrium / Right auricle

(ii) • C prevents back-flow of blood
• From (left) ventricle to (left) auricle

(iii) • wall of X needs to generate a force to pump blood throughout the body
• where as the wall of Y needs generate a force to pump blood only to the lungs

(iv) Sino-auricular node (SA)

(v) • On the wall of the right auricle
• near the opening of superior vena cava

(C) (i) • Contraction of auricles / systote of auricles
• Contraction of ventricles / systote of ventricles
• (relaxation) of heart / auricles and ventricles / diastole of heart

(ii) 120 / 80 Hg mm /16 / 11 kpa

(iii)

	Cardiac muscle fibre	Smooth muscle fibre
Striations	Present	absent
Branching	Present (branched)	absent (unbranched)
Intercalated	Present	absent

(D) (i) Haemoglobin / Haemerithrin / Chlorocruorin

(ii) Monocyte

(iii) 2- 10%

(iv) They engulf and destroy microbes (bacteria) / or destroy dead cells

03.

(A) (i) 1. Male cone
2. Microspore
3. sperm /male gamete
4. ovule
5. Megaspore
6. archegonium

(ii) Microsporophyll

(iii) Megasporophyll

(B)

	cycas	*Selaginella*
Sporophyte	Diocious (Male and Female plants separate)	Monocious (Both male and female
Seed	Present	Absent
Gamete	Muliticilliate (and shaped like a top)	Biflagellate (and oval shaped)
External water for fertilizatlon	Not required	required

(C) (i) • Protoxylem Metaxylem / Phloem / Pericycle

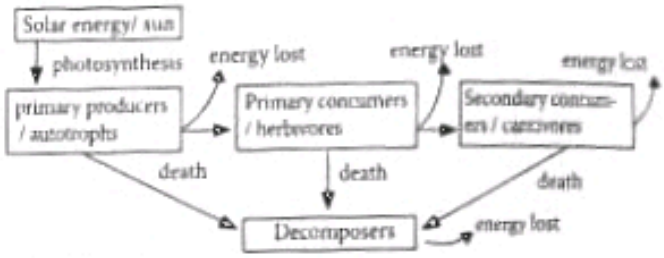
(ii) • Protoxylem / metaxylem
• Secondary xylem
• Phloem
• Peri cycle
• Cork

(D) • A growth stimulating substance is produced at the apex.
• As result of unilateral light, this substance migrates/ diffuses to darker side, and moves down that side, stimulating growth of cells, causing the stem apex to bend towards light
• (This stimulation not pass through mica)

04.

(A) (i) • An ecosystem is a community of living organisms
• interacting with
• the non-living factors of the environment

(ii)



(iii) **Lizard**
secondary consumer level / tertiary trophic level

Garden snail
primary consumer level / secondary trophic

Man
primary / secondary / tertiary consumer level
or
second / Third / and fourth trophic level

Mushrooms
Decomposer level.

Cyanobacteria
Primary producer

(B) (i) **Food chain**
• sequence of organisms exhibiting feeding relationships
• where energy absorbed and fixed by the primary producers / plarits
• is passed through a series of consumers / animals
• in thatecosystem / community.

(ii) grass/ maize → rabbit / deer → leopard → leech / tick

(iii)• Deer and • Field mouse

(iv) • Rabbit, and
• Field mouse populations will increase

(C) • Spread of pathogens
• Addition of toxic ions (metals) or NO_3
• Reduction of oxygen concentration in water / soil
• Anaerobic decomposition producing bad smell (Putrefaction)
• Rise in temperature due to microbial respiration

	(RL)	(rl)	(Rl)	(rl)
(rl)	RrLl red long	Rrll red round	rrLl White long	rrll White round

F_2 phenotypic ratios-

Red long : Red round : White long: White round

1 : 1 : 1 : 1

(ii) **There are 4 human blood groups- A ; B ; AB ; O**

- In humans, there are three alleles responsible for the expression of the above blood groups.
- and they are multiple alleles
- The three alleles are I^A ; I^B ; and i
- I^A and I^B are co-dominant
- Either I^A or I^B, is dominant over i

Blood group	A	B	AB	O
Geno type	I^AI^A or I^A i	I^BI^B or I^Bi	I^AI^B	ii

- If parents are O and AB Children will be A and B
- If parents are O and A Children will be A and O
- If parents are O and B Children will be B and O
- If parents are A and A Children will be A and O
- If parents are A and AB Children will be A B and AB
- If parents are A and B Children will be A, B, AB and O
- If parents are B and AB Children will be A,B and B
- If parents are AB and AB Children will be A, B and AB
- If parents are B and B Children will be B and O
- If parents are O and O Children will be O

05.

(i) - The three methods of insect pest control are
- Biological methods
- Traditional methods
- Chemical methods

Traditional methods

- One is crop- rotation
- where crops of different families are grown one after another, in the same field pests which attacked the first crop will perish when the second crop is grown, since they will not be able to feed on the new crop
- Eg. potatoes, cabbage, carrot
- Ose of trap - crops
- involves cultivating the same crop in a small plot near the actual main field. This is a trap to attract any pests to the small plot. Pests can then be destroyed using chemicals and later the main field could be cultivated
- Eg. use of paddy as a trap crop to control bug.
- Manipulation of water is another traditional method
- Retention of water in the field, for a few days- eg. to control yellow stem borer,
- Drying the field for a few days - eg. to control brown plant hopper
- The pests could he hand-picked and removed
- eg. Lepidopteran larvae of *Sesbania*
- Maintaining general cleanliness ofthe field would get rid of pests
- eg. black beetle attacking coconut plantations.
- Pruning to remove parts of the plant attacked by the pests. eg. tea bushes
- Ploughing the field will expose some of the larvae or pupae of pests. They will then die due to drying up or may fall prey to predators.
- Eg: Army worm

Chemical methods

- Use of insecticies
- Four mojor types- Organochlorines
- Organophosphates
- pyrethroids
- Carbamates
- Dusting

Biological methods

- use of natural enemies.
- such as predator/ the animals that feed on the pest.
- Eg: lady bird beetle to control aphids.
- Parasites
- Eg: A hymenopteran/ dimmoikia javanica to control coconut leaf miner
- And pathogen
- Eg: A virus to control / coconut blank beetle / *Bacillus thuringiensis* to control Lepidoteran pest
- Use of resistant crop varieties
- Eg: paddy variety BG400- 1 is resistant to brown hopper
- use of attractants
- Eg: male hormones to attract female / Light
- use of repellants
- neem oil to repel files

(ii) **Advantages - Chemical methods**

- Chemicals are very effective since the response is quick. They are mostly either liquids or water soluble and can easily be applied ssort together / do not assort independently.
- Biological methods are generally not harmful to the environment,
- since most predators or parasites used are species specific
- Traditional methods are less expensive than others,
- and have little or no adverse impact on the surroundings

Disadvantages

- Traditional methods may not be very effective, specially hand-picking
- Pests may become resistant to some pesticides and later there may even be an increase in the number of pests.
- Chemicals may destroy other useful organisms as well
- and may be athreat to the general environment, specially during rainy seasons, when they might get drained into water-ways.
- Biological control may be relatively slow, and the entire pest population in the area may not be eradicated

06.

(i) In- situ conservation

- This involves conservation of flora and fauna (plants and animals) in their natural habitats.This is done by
- eshiblishing (i) sanctuaries (protected areas)
- (ii) man and biosphere reserves
- and by re-introduction of species which dwindle.
- For the above conservation to he successful, there should be
- adequate extent (spaye/area) of habits with suitable living condition,
- where reproduct under natural conditions is possible,
- yeasts and
- Large populations of each speicies should be present so that self-sustenance of species is possible. (due to inereased breeding)

Ex- situ conservation

- This is the conservation of flora and fauna outside their natural habitats
- Reproduction and survival of individuals is facilitated
- by ensuring that the conditions are more or less similar to those of their natural habitats. This is done by
- Establishing zoological gardens / botanical gardens,
- establishing field gene banks-/ seed banks or germ plasm centres
- Encouraging captive breeding / artificial breeding / and also by maintaining genetic resource ceriters / turtle hatcheries etc

(ii) Human placenta

- This develops from membranes chorion,
- and allantois, [This is the foetal part of placenta]
- Maternal part of placenta consists of projections from the endometrium (uterine wall)
- Placenta is disc shaped
- and the foetal part consists of finger-like projections called chorionic villi,
- containing a network of blood capillaries
- embedded in the blood spaces in the uterine wall/ haemochorionic placenta
- There is no mixing of foetal and maternal blood
- Its main function is the exchange of substances between the foetus and mother,
- by active transport and
- by diffusion .

The substances that are passed from mother to foetus are :

- oxygen
- glucose
- water
- some proteins
- amino acids - by active transport
- lipids
- minerals - by active transport
- vitamins - by active transport
- honnones- secreted by the chorion
- some antibodies
- viruses - eg: AIDS virus (IDV), Rubella & Hepatitis B
- drugs / alcohol
- toxins like tars and nicotine in tobacco smoke

Substances that pass from fetus to mother are :-

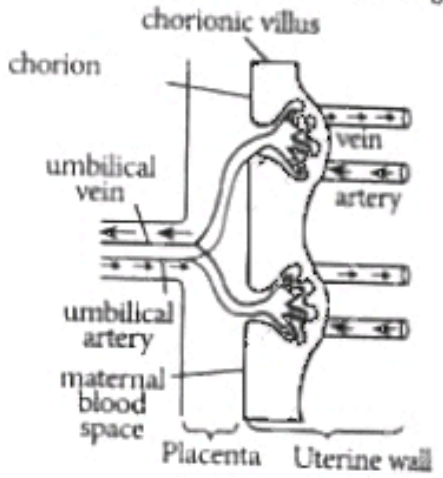
- water
- excretory products like urea
- and carbon dioxide.

other functions

- To serve as an attachment of the foetus to mother
- To function as an endocrine organ- hormone production

Hormones produced by the placenta are

- chorionic gonadotrophin (CG)
- and progesterone (during early stages of development)
- oestrogen
- and placental lactogen (during latter stages)



(iii)

- DNA probe or gene probe is a short, single-standarded piece of DNA
- With a known sequence of bases/or known sequence of nucleotides
- A large number of (identical) copies are synthesised (or cloned) using this piece of DNA.
- They are made radioactive by labeling with radioactive ^{32}P / or marked with fluorescent dyes.
- The DNA probes / gene probes so formed, are specitfic to an organism
- PNA probes are used to identify complementary nucleotide sequences / the presence of the identical DNA
- in an unknown sample (eg. of blood, semen, hair-roots, saliva or any tissue).
- This helps to establish the identity of a person (e.g. in a crime or paternity).
- Also gene probing is used to identify pathogens / diseases, in plants and animals.