

**SOLVED
PAPER**

**NEET (UG)
(Re-Examination)
4th September 2022**

**Code
U6**

Important Instructions :

- The test is of **3 hours 20 minutes** duration and Test Booklet contains **200** multiple choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **50** in each subject are divided into two **Section (A and B)** as per details given below:
 - Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Question Nos- 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory.
 - Section B** shall consist of **15 (Fifteen)** Questions in each subject (Question Nos- 36 to 50, 86 to 100, 136 to 150 and 80 to 200). In Section B, a candidate needs to **attempt any 10 (Ten)** questions out of **15 (Fifteen)** in each subject. **Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, the first ten questions answered by the candidate shall be evaluated.**
- Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, one mark will be deducted from the total scores. **The maximum marks are 720.**
- Use **Blue/Black Ball Point Pen only** for writing particulars on this page/markings responses on Answer Sheet.
- Use of Electronic/Manual Calculator is prohibited.
- No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
- The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
- Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of scribe or not.

BOTANY

Section A

- Q. 101.** Which stage of meiosis can last for months or years in the oocytes of some vertebrates?
(1) Leptotene (2) Pachytene
(3) Diplotene (4) Diakinesis
- Q. 102.** When one CO₂ molecule is fixed as one molecule of triose phosphate, which of the following photochemically made, high energy chemical intermediates are used in the reduction phase ?
(1) 1 ATP + 1 NADPH
(2) 1 ATP + 2 NADPH
(3) 2 ATP + 1 NADPH
(4) 2 ATP + 2 NADPH
- Q. 103.** In *lac* operon, *z* gene codes for :
(1) β -galactosidase (2) Permease
(3) Repressor (4) Transacetylase
- Q. 104.** Initiation of lateral roots and vascular cambium during secondary growth takes place in cells of :
(1) Epiblema (2) Cortex
(3) Endodermis (4) Pericycle
- Q. 105.** Match **List - I** with **List - II** :

List - I	List - II
(a) Adenine	(i) Pigment
(b) Anthocyanin	(ii) Polysaccharide
(c) Chitin	(iii) Alkaloid
(d) Codeine	(iv) Purine

Choose the **correct answer** from the options given below :

- (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)
- (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
- (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)
- (a) - (i), (b) - (iv), (c) - (iii), (d) - (ii)

- Q. 106.** Match **List - I** with **List - II** :

List - I	List - II
(a) In <i>lac</i> operon <i>i</i> gene codes for	(i) transacetylase
(b) In <i>lac</i> operon <i>z</i> gene codes for	(ii) permease
(c) In <i>lac</i> operon <i>y</i> gene codes for	(iii) β -galactosidase
(d) In <i>lac</i> operon <i>a</i> gene	(iv) Repressor codes for

Choose the **correct answer** from the options given below :

- (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)
- (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
- (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)
- (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

Q. 107. Match List - I with List - II :

List - I	List - II
(a) <i>Chlamydomonas</i>	(i) Moss
(b) <i>Cycas</i>	(ii) Pteridophyte
(c) <i>Selaginella</i>	(iii) Alga
(d) <i>Sphagnum</i>	(iv) Gymnosperm

Choose the **correct answer** from the options given below :

- (1) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)
 (2) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
 (3) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)
 (4) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

Q. 108. Given below are two statements :

Statement I :

DNA polymerases catalyse polymerisation only in one direction, that is $5' \rightarrow 3'$

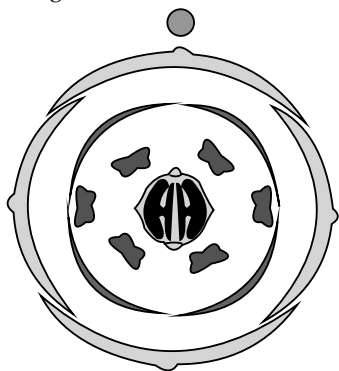
Statement II :

During replication of DNA, on one strand the replication is continuous while on other strand it is discontinuous.

In the light of the above statements, choose the **correct answer** from the options given below :

- (1) Both **Statement I** and **Statement II** are correct
 (2) Both **Statement I** and **Statement II** are incorrect
 (3) **Statement I** is correct but **Statement II** is incorrect
 (4) **Statement I** is incorrect but **Statement II** is correct

Q. 109. The Floral Diagram represents which one of the following families ?



- (1) Fabaceae (2) Brassicaceae
 (3) Solanaceae (4) Liliaceae

Q. 110. The pioneer species in a hydrarch succession are:

- (1) Free-floating angiosperms
 (2) Submerged rooted plants
 (3) Phytoplanktons
 (4) Filamentous algae

Q. 111. The number of time(s) decarboxylation of isocitrate occurs during single TCA cycle is :

- (1) One (2) Two
 (3) Three (4) Four

Q. 112. Given below are two statements :

Statement I :

Sickle cell anaemia and Haemophilia are autosomal dominant traits .

Statement II :

Sickle cell anaemia and Haemophilia are disorders of the blood.

In the light of the above statements, choose the **correct answer** from the options given below :

- (1) Both **Statement I** and **Statement II** are correct
 (2) Both **Statement I** and **Statement II** are incorrect
 (3) **Statement I** is correct but **Statement II** is incorrect
 (4) **Statement I** is incorrect but **Statement II** is correct

Q. 113. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) :

When a particular restriction enzyme cuts strand of DNA, overhanging stretches or sticky ends are formed.

Reason (R) :

Some restriction enzymes cut the strand of DNA a little away from the centre of palindromic site.

In the light of the above statements, choose the **correct answer** from the options given below :

- (1) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**
 (2) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**
 (3) **(A)** is correct but **(R)** is not correct
 (4) **(A)** is not correct but **(R)** is correct

Q. 114. Give the correct descending order of organisms with reference to their estimated number found in Amazon forest.

- (a) Plants (b) Invertebrates
 (c) Fishes (d) Mammals
 (e) Birds

Choose the **correct answer** from the options given below :

- (1) (a) > (b) > (e) > (d) > (c)
 (2) (a) > (c) > (d) > (b) > (e)
 (3) (b) > (a) > (e) > (d) > (c)
 (4) (b) > (a) > (c) > (e) > (d)

Q. 115. Match List - I with List - II :

List - I	List - II
(a) Porins nodules	(i) Pink coloured
(b) <i>leg</i> haemoglobin	(ii) Lumen of thylakoid
(c) H^+ accumulation	(iii) Amphibolic pathway
(d) Respiration	(iv) Huge pores in outer membrane of mitochondria

- Choose the correct answer from the options given below :
- (1) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)
 (2) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)
 (3) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
 (4) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)
- Q. 116.** Which of the following growth regulators is an adenine derivative ?
 (1) Auxin (2) Cytokinin
 (3) Ethylene (4) Abscisic acid
- Q. 117.** The type of tissue commonly found in the fruit wall of nuts is :
 (1) Parenchyma (2) Collenchyma
 (3) Sclerenchyma (4) Sclereid
- Q. 118.** The species that come to appear in bare area are called :
 (1) Pioneer species
 (2) Invasive species
 (3) Competitive species
 (4) Species of seral community
- Q. 119.** In general the egg apparatus of embryo sac in angiosperm consists of :
 (1) One egg cell, two synergids, three antipodal cells, two Polar nuclei
 (2) One egg cell, two synergids, two antipodal cells, three Polar nuclei
 (3) One egg cell, three synergids, two antipodal cells, two Polar nuclei
 (4) One egg cell, two synergids, two antipodal cells, two Polar nuclei
- Q. 120.** Match List - I with List - II :
- | List - I | List - II |
|---------------|-----------------------|
| (a) Imbricate | (i) <i>Calotropis</i> |
| (b) Valvate | (ii) <i>Cassia</i> |
| (c) Vexillary | (iii) Cotton |
| (d) Twisted | (iv) Bean |
- Choose the **correct answer** from the options given below :
- (1) (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)
 (2) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)
 (3) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)
 (4) (a) - (i), (b) - (iii), (c) - (iv), (d) - (ii)
- Q. 121.** All successions irrespective of the habitat proceed to which type of climax community ?
 (1) Xeric (2) Mesic
 (3) Hydrophytic (4) Edaphic
- Q. 122.** Separation of DNA, fragments is done by a technique known as :
 (1) Polymerase Chain Reaction
 (2) Recombinant technology
 (3) Southern blotting
 (4) Gel electrophoresis
- Q. 123.** The phenomenon by which the undividing parenchyma cells start to divide mitotically during plant tissue culture is called as :

- (1) Differentiation (2) Dedifferentiation
 (3) Redifferentiation (4) Secondary growth
- Q. 124.** In meiosis, crossing over and exchange of genetic material between homologous chromosomes are catalyzed by the enzyme.
 (1) Phosphorylase (2) Recombinase
 (3) Transferase (4) Polymerase
- Q. 125.** The 5-C compound formed during TCA cycle is :
 (1) α -ketoglutaric acid
 (2) Oxalo succinic acid
 (3) Succinic acid
 (4) Fumaric acid
- Q. 126.** When a carrier protein facilitates the movement of two molecules across the membrane in same direction, it is called :
 (1) Uniport (2) Transport
 (3) Antiport (4) Symport
- Q. 127.** The World Summit on sustainable development held in 2002 in Johannesburg, South Africa pledged for:
 (1) A significant reduction in the current rate of biodiversity loss.
 (2) Declaration of more biodiversity hotspots.
 (3) Increase in agricultural production
 (4) Collection and preservation of seeds of different genetic strains of commercially important plants.
- Q. 128.** Interfascicular cambium is present between :
 (1) Primary xylem and primary phloem
 (2) Pericycle and endodermis
 (3) Two vascular bundles
 (4) Secondary xylem and secondary phloem
- Q. 129.** The ascent of xylem sap in plants is mainly accomplished by the :
 (1) size of the stomatal aperture
 (2) distribution of stomata on the upper and lower epidermis
 (3) cohesion and adhesion between water molecules
 (4) root pressure
- Q. 130.** Which of the following statement is not correct?
 (1) Rhizome is a condensed form of stem
 (2) The apical bud in rhizome always remains above the ground
 (3) The rhizome is aerial with no distinct nodes and internodes
 (4) The rhizome is thick, prostrate and branched
- Q. 131.** To ensure that only the desired pollens fall on the stigma in artificial hybridization process :
 (a) the female flower buds of plant producing unisexual flower need not be bagged.
 (b) there is no need to emasculate unisexual flowers of selected female parent
 (c) emasculated flowers are to be bagged immediately after cross pollination
 (d) emasculated flowers are to be bagged after removal of anthers

(e) bisexual flowers, showing protogyny are never selected for cross

Choose the **correct answer** from the options given below :

- (1) (a), (b) and (c) only
- (2) (b), (c) and (d) only
- (3) (b), (c) and (e) only
- (4) (a), (d) and (e) only

Q. 132. The residual persistent part which forms the perisperm in the seeds of beet is :

- (1) Calyx
- (2) Endosperm
- (3) Nucellus
- (4) Integument

Q. 133. The chromosomal theory of inheritance was proposed by :

- (1) Thomas Morgan
- (2) Sutton and Boveri
- (3) Gregor Mendel
- (4) Robert Brown

Q. 134. Which of the following protects nitrogenase inside the root nodule of a leguminous plant?

- (1) Catalase
- (2) leg haemoglobin
- (3) Transaminase
- (4) Glutamate dehydrogenase

Q. 135. The ability of plants to follow different pathways in response to environment leading to formation of different kinds of structures is called :

- (1) Redifferentiation
- (2) Development
- (3) Plasticity
- (4) Differentiation

Section B

Q. 136. Which of the following pair represents free living nitrogen fixing aerobic bacteria?

- (1) *Rhizobium* and *Frankia*
- (2) *Azotobacter* and *Beijerinckia*
- (3) *Anabaena* and *Rhodospirillum*
- (4) *Pseudomonas* and *Thiobacillus*

Q. 137. Match List-I with List-II :

List - I	List - II
(a) Sacred groves	(i) Alien species
(b) Zoological park	(ii) Release of large quantity of oxygen
(c) Nile perch	(iii) <i>Ex-situ</i> conservation
(d) Amazon forest	(iv) Khasi Hills in Meghalaya

Choose the **correct answer** from the options given below :

- (1) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)
- (2) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)
- (3) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)
- (4) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

Q. 138. Primary proteins are also called as polypeptides because :

- (1) They are linear chains
- (2) They are polymers of peptide monomers
- (3) Successive amino acids are joined by peptide bonds
- (4) They can assume many conformations

Q. 139. Match List-I with List-II :

List - I	List - II
(a) Gene gun	(i) Replacement of a faulty gene by a normal healthy gene
(b) Gene therapy	(ii) Used for transfer of gene
(c) Gene cloning	(iii) Total DNA in the cells of an organism
(d) Genome	(iv) To obtain identical copies of a particular DNA molecule

Choose the **correct answer** from the options given below :

- (1) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)
- (2) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)
- (3) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)
- (4) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

Q. 140. Match List-I with List-II :

List - I	List - II
(a) Bacteriophage $\phi \times 174$	(i) 48502 base pairs
(b) Bacteriophage lambda	(ii) 5386 nucleotides
(c) <i>Escherichia coli</i>	(iii) 3.3×10^9 base pairs
(d) Haploid content of human DNA	(iv) 4.6×10^6 base pairs

Choose the **correct answer** from the options given below:

- (1) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)
- (2) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)
- (3) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)
- (4) (a) - (i), (b) - (ii), (c) - (iv), (d) - (iii)

Q. 141. Which of the following can be expected if scientists succeed in introducing apomictic gene into hybrid varieties of crops ?

- (1) Polyembryony will be seen and each seed will produce many plantlets
- (2) Seeds of hybrid plants will show longer dormancy
- (3) Farmers can keep on using the seeds produced by the hybrids to raise new crop year after year
- (4) There will be segregation of the desired characters only in the progeny

Q. 142. Read the following statements and identify the characters related to the alga shown in the diagram:

- (a) It is a member of Chlorophyceae
- (b) Food is stored in the form of starch
- (c) It is a monoecious plant showing oogonium and antheridium
- (d) Food is stored in the form of laminarin or mannitol
- (e) It shows dominance of pigments chlorophyll a, c and Fucoxanthin.

Choose the **correct answer** from the options given below :



- (1) (a) and (b) only
 (2) (a), (b) and (c) only
 (3) (a), (c) and (d) only
 (4) (c), (d) and (e) only
- Q. 143.** Frugivorous birds are found in large numbers in tropical forests mainly because of :
- (1) lack of niche specialisation
 (2) higher annual rainfall
 (3) availability of fruits throughout the year
 (4) temperature conducive for their breeding
- Q. 144.** Which type of substance would face difficulty to pass through the cell membrane?
- (1) Substance with hydrophobic moiety
 (2) Substance with hydrophilic moiety
 (3) All substance irrespective of hydrophobic and hydrophilic moiety
 (4) Substance soluble in lipids
- Q. 145.** Identify the correct statements regarding chemiosmotic hypothesis :
- (a) Splitting of the water molecule takes place on the inner side of the membrane.
 (b) Protons accumulate within the lumen of the thylakoids.
 (c) Primary acceptor of electron transfers the electrons to an electron carrier.
 (d) NADP reductase enzyme is located on the stroma side of the membrane.
 (e) Protons increase in number in stroma.
- Choose the **correct answer** from the options given below :
- (a) (a), (b) and (e) (2) (a), (b) and (d)
 (3) (b), (c) and (d) (4) (b), (c) and (e)
- Q. 146.** If a female individual is with small round head, furrowed tongue, partially open mouth and broad palm with characteristic palm crease. Also the physical, psychomotor and mental development is retarded. The karyotype analysis of such an individual will show :

- (1) 47 chromosomes with XXY sex chromosomes
 (2) 45 chromosomes with XO sex chromosomes
 (3) 47 chromosomes with XYY sex chromosomes
 (4) Trisomy of chromosome 21
- Q. 147.** Identify the **correct** sequence of events during Prophase I of meiosis :
- (a) Synapsis of homologous chromosomes
 (b) Chromosomes become gradually visible under microscope
 (c) Crossing over between non-sister chromatids of homologous chromosomes
 (d) Terminalisation of chiasmata
 (e) Dissolution of synaptonemal complex
- Choose the **correct answer** from the options given below :
- (1) (a), (b), (c), (d), (e) (2) (b), (c), (d), (e), (a)
 (3) (b), (a), (c), (e), (d) (4) (a), (c), (d), (e), (b)
- Q. 148.** The enzyme (a) is needed for isolating genetic material from plant cells and enzyme (b) for isolating genetic material from fungus. Choose the correct pair of options from the following :
- (1) (a) Cellulase (b) Protease
 (2) (a) Cellulase (b) Chitinase
 (3) (a) Chitinase (b) Lipase
 (4) (a) Cellulase (b) Lipase
- Q. 149.** Match the **List-I** with **List-II** :

List - I	List - II
(a) Carbon dissolved in oceans	(i) 55 billion tons
(b) Annual fixation of carbon through photosynthesis	(ii) 71%
(c) PAR captured by plants	(iii) 4×10^3 kg
(d) Productivity of oceans	(iv) 2 to 10%

Choose the **correct answer** from the options given below :

- (1) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)
 (2) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
 (3) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
 (4) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)
- Q. 150.** What is the expected percentage of F_2 progeny with yellow and inflated pod in dihybrid cross experiment involving pea plants with green coloured, inflated pod and yellow coloured constricted pod ?
- (1) 100% (2) 56.25%
 (3) 18.75 % (4) 9%

ZOOLOGY

Section A

- Q. 151.** Pathogenic bacteria gain resistance to antibiotics due to changes in their :
- (1) Cosmids (2) Plasmids
 (3) Nucleus (4) Nucleoid

- Q. 152.** Milk of transgenic 'Cow Rosie' was nutritionally more balanced product for human babies than natural cow milk because it contained:
- (1) Human protein α -1-antitrypsin
 (2) Human alpha-lactalbumin

- (3) Human insulin-like growth factor
 (4) Human enzyme Adenosine Deaminase (ADA)
- Q. 153. If the pH in lysosomes is increased to alkaline, what will be the outcome?
- (1) Hydrolytic enzymes will function more efficiently
 - (2) Hydrolytic enzymes will become inactive
 - (3) Lysosomal enzymes will be released into the cytoplasm
 - (4) Lysosomal enzymes will be more active
- Q. 154. Choose the incorrect enzymatic reaction :
- (1) Maltose $\xrightarrow{\text{Maltase}}$ Glucose + Galactose
 - (2) Sucrose $\xrightarrow{\text{Sucrase}}$ Glucose + Fructose
 - (3) Lactose $\xrightarrow{\text{Lactase}}$ Glucose + Galactose
 - (4) Dipeptides $\xrightarrow{\text{Dipeptidases}}$ Amino acids
- Q. 155. Which of the following reasons is mainly responsible for graft rejection in transplantation of organs ?
- (1) Inability of recipient to differentiate between 'self' and 'non-self' tissues/cells
 - (2) Humoral immune response only
 - (3) Auto-immune response
 - (4) Cell-mediated response
- Q. 156. If DNA contained sulphur instead of phosphorus and proteins contained phosphorus instead of sulfur, what would have been the outcome of Hershey and Chase experiment?
- (1) No radioactive sulfur in bacterial cells
 - (2) Both radioactive sulfur and phosphorus in bacterial cells
 - (3) Radioactive sulfur in bacterial cells
 - (4) Radioactive phosphorus in bacterial cells
- Q. 157. Two butterfly species are competing for the same nectar of a flower in a garden. To survive and coexist together, they may avoid competition in the same garden by:
- (1) feeding at the same time
 - (2) choosing different foraging patterns
 - (3) increasing time spent on attacking each other
 - (4) predated on each other
- Q. 158. Mad cow disease in cattle and Cr Jacob disease in humans are due to infection by _____ .
- (1) Bacterium
 - (2) Virus
 - (3) Viroid
 - (4) Prion
- Q. 159. Which of the following is not an Intra Uterine device?
- (1) Progestogens
 - (2) Multiload 375
 - (3) Lippes loop
 - (4) Progestasert
- Q. 160. Match List-I with List-II :

List - I	List - II
(a) <i>Chlamydomonas</i>	(i) Conidia
(b) <i>Penicillium</i>	(ii) Zoospores
(c) <i>Hydra</i>	(iii) Gemmules
(d) <i>Sponge</i>	(iv) Buds

- Choose the **correct answer** from the options given below:
- (1) (a) – (i), (b) – (iv), (c) – (iii), (d) – (ii)
 - (2) (a) – (ii), (b) – (i), (c) – (iv), (d) – (iii)
 - (3) (a) – (iii), (b) – (ii), (c) – (i), (d) – (iv)
 - (4) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)
- Q. 161. According to the sliding filament theory:
- (1) Actin and myosin filaments slide over each other to increase the length of the sarcomere.
 - (2) Length of A-band does not change.
 - (3) I-band increases in length
 - (4) The actin filaments slide away from A-band resulting in shortening of sarcomere.
- Q. 162. The amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis is called:
- (1) Secondary production
 - (2) Primary production
 - (3) Gross primary production
 - (4) Net primary production
- Q. 163. Given below are two statements:
- Statement I :**
 Amino acids have a property of ionizable nature of $-\text{NH}_2$ and $-\text{COOH}$ groups, hence have different structures at different pH.
- Statement II :**
 Amino acids can exist as Zwitterionic form at acidic and basic pH.
- In the light of the above statements, choose the **most appropriate answer** from the options given below:
- (1) Both **Statement I** and **Statement II** are correct
 - (2) Both **Statement I** and **Statement II** are Incorrect
 - (3) **Statement I** is correct but **Statement II** is incorrect
 - (4) **Statement I** is incorrect but **Statement II** is correct
- Q. 164. Which of the following types of epithelium is present in the bronchioles and Fallopian tubes?
- (1) Simple squamous epithelium
 - (2) Simple columnar epithelium
 - (3) Ciliated epithelium
 - (4) Stratified squamous epithelium
- Q. 165. Western Ghats have a large number of plants and animal species that are not found anywhere else. Which of the following term is used to notify such species?
- (1) Threatened species
 - (2) Keystone species
 - (3) Endemic species
 - (4) Vulnerable species
- Q. 166. Gout is a type of disorder which leads to:
- (1) Inflammation of joints due to accumulation of uric acid crystals
 - (2) Weakening of bones due to decreased bone mass

- (3) Inflammation of joints due to cartilage degeneration
- (4) Weakening of bones due to low calcium level

Q. 167. Which of the following statements are correct with respect to vital capacity?

- (a) It includes ERV, TV and IRV
- (b) Total volume of air a person can inspire after a normal expiration
- (c) The maximum volume of air a person can breathe in after forced expiration
- (d) It includes ERV, RV and IRV.
- (e) The maximum volume of air a person can breath out after a forced inspiration.

Choose the **most appropriate answer** from the options given below:

- (1) (b), (d) and (e) (2) (a), (c) and (d)
- (3) (a), (c) and (e) (4) (a) and (e)

Q. 168. A unique vascular connection between the digestive tract and liver is called _____.

- (1) Hepato-pancreatic system
- (2) Hepatic portal system
- (3) Renal portal system
- (4) Hepato-cystic system

Q. 169. Match **List-I** with **List-II** regarding the organs of Cockroach:

List - I	List - II
(a) Crop	(i) grinding the food particles
(b) Proventriculus	(ii) secretion of digestive juice
(c) Hepatic caecae	(iii) removal of nitrogenous waste
(d) Malpighian tubules	(iv) storage of food

Choose the **correct answer** from the options given below:

- (1) (a) – (iv), (b) – (i), (c) – (ii), (d) – (iii)
- (2) (a) – (iii), (b) – (ii), (c) – (i), (d) – (iv)
- (3) (a) – (ii), (b) – (iv), (c) – (i), (d) – (iii)
- (4) (a) – (i), (b) – (iv), (c) – (iii), (d) – (ii)

Q. 170. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)** :

Assertion (A) :

Spirulina is a microbe that can be used for reducing environmental pollution.

Reason (R) :

Spirulina is a rich source of protein, carbohydrates, fats, minerals and vitamins.

In the light of the above statements, choose the **most appropriate answer** from the options given below:

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (3) (A) is correct but (R) is not correct
- (4) (A) is not correct but (R) is correct

Q. 171. Panspermia, an idea that is still a favourite for some astronomers, means :

- (1) Creation of life from dead and decaying matter
- (2) Creation of life from chemicals
- (3) Origin of sperm in human testes
- (4) Transfer of spores as unit of life from other planets of Earth





Q. 172. Arrange the components of mammary gland. (from proximal to distal)

- (a) Mammary duct
- (b) Lactiferous duct
- (c) Alveoll
- (d) Mammary ampulla
- (e) Mammary tubules

Choose the most appropriate answer from the options given below :

- (1) (c) → (a) → (d) → (e) → (b)
- (2) (b) → (c) → (e) → (d) → (a)
- (3) (c) → (e) → (a) → (d) → (b)
- (4) (e) → (c) → (d) → (b) → (a)

Q. 173. Select the **incorrect** match regarding the symbols used in Pedigree analysis:

- (1)  - Sex unspecified
- (2)  - Affected individual
- (3)  - Consanguineous mating
- (4)  - Parent with male child affected with disease

Q. 174. Why CNG is considered better fuel than diesel?

- (a) It can not be adulterated
- (b) It takes less time to fill the fuel tank
- (c) It burns more efficiently
- (d) It is cheaper
- (e) It is less inflammable.

Choose the **most appropriate answer** from the options given below

- (1) (a), (b), (c), (e) only (2) (a), (c), (d) only
- (3) (a), (b), (d), (e) only (4) (c), (d), (e) only

Q. 175. Which of the following methods is not commonly used for introducing foreign DNA into the plant cell?

- (1) *Agrobacterium* mediated transformation
- (2) Gene gun
- (3) 'Disarmed pathogen' vectors
- (4) Bacteriophages

Q. 176. Identify the region of human brain which has pneumotaxic centre that alters respiratory rate by reducing the duration of inspiration.

- (1) Medulla (2) Pons
- (3) Thalamus (4) Cerebrum

- Q. 177.** How many secondary spermatocytes are required to form 400 million spermatozoa ?
 (1) 50 million (2) 100 million
 (3) 200 million (4) 400 million
- Q. 178.** Choose the **correct** statement about a muscular tissue :
 (1) Skeletal muscle fibres are uninucleated and found in parallel bundles.
 (2) Intercalated discs allow the cardiac muscle cells to contract as a unit.
 (3) The walls of blood vessels are made up of columnar epithelium.
 (4) Smooth muscles are multinucleated and involuntary.
- Q. 179.** Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) :
 FSH which interacts with membrane bound receptors does not enter the target cell.
Reason (R) :
 Binding of FSH to its receptors generates second messenger (cyclic AMP) for its biochemical and physiological responses.
 In the light of the above statements, choose **the most appropriate answer** from the options given below ;
 (1) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
 (3) (A) is correct but (R) is not correct
 (4) (A) is not correct but (R) is correct
- Q. 180.** Which of the following animals has three chambered heart ?
 (1) *Scoliodon* (2) *Hippocampus*
 (3) *Chelone* (4) *Pteropus*
- Q. 181.** Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) :
 During pregnancy the level of thyroxine is increased in the maternal blood.
Reason (R) :
 Pregnancy is characterised by metabolic changes in the mother.
 In the light of the above statements, choose **the most appropriate answer** from the options given below :
 (1) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
 (3) (A) is correct but (R) is not correct
 (4) (A) is not correct but (R) is correct
- Q. 182.** Select the **Incorrect** statements with respect to Cyclostomes :
 (a) They lack scales and paired fins.
 (b) They have circular mouth with Jaws.
 (c) They bear 6-15 pairs of gills.
 (d) They migrate to deep sea for spawning.
 Choose **the most appropriate answer** from the options given below :
 (1) (a) and (b) only
 (2) (b) and (c) only
 (3) (b) and (d) only
 (4) (a) and (d) only
- Q. 183.** Role of enamel is to :
 (1) Connect crown of tooth with its root.
 (2) Masticate the food.
 (3) Form bolus.
 (4) Give basic shape to the teeth.
- Q. 184.** Choose the **correct** statements :
 (a) Bones support and protect softer tissues and organs
 (b) Weight bearing function is served by limb bones
 (c) Ligament is the site of production of blood cells.
 (d) Adipose tissue is specialised to store fats.
 (e) Tendons attach one bone to another.
 Choose **the most appropriate answer** from the options given below :
 (1) (a), (b) and (d) only
 (2) (b), (c) and (e) only
 (3) (a), (c) and (d) only
 (4) (a), (b) and (e) only
- Q. 185.** Bivalent or Tetrad formation is a characteristic feature observed during :
 (1) Synaptonemal complex in zygotene stage
 (2) Chiasmata in Diplotene stage
 (3) Synaptonemal complex in Pachytene stage
 (4) Chiasmata in zygotene stage

Section B

- Q. 186.** Which of the following are true about the taxonomical aid 'key' ?
 (a) Keys are based on the similarities and dissimilarities.
 (b) Key is analytical in nature.
 (c) Keys are based on the contrasting characters in pair called couplet.
 (d) Same key can be used for all taxonomic categories.
 (e) Each statement in the key is called Lead.
 Choose **the most appropriate answer** from the options given below :
 (1) (a), (b) and (c) only
 (2) (b), (c) and (d) only
 (3) (a), (b), (c) and (e) only
 (4) (a), (c), (d) and (e) only

Q. 187. A normal girl, whose mother is haemophilic marries a male with no ancestral history of haemophilia.

What will be the possible phenotypes of the offsprings ?

- (a) Haemophilic son and haemophilic daughter.
- (b) Haemophilic son and carrier daughter.
- (c) Normal daughter and normal son.
- (d) Normal son and haemophilic daughter.

Choose **the most appropriate answer** from the options given below :

- (1) (a) and (b) only
- (2) (b) and (c) only
- (3) (a) and (d) only
- (4) (b) and (d) only

Q. 188. IUDs are small objects made up of plastic or copper that are inserted in the uterine cavity. Which of the following statements are correct about IUDs ?

- (a) IUDs decrease phagocytosis of sperm within the uterus.
- (b) The released copper ions suppress the sperm motility.
- (c) IUDs do not make the cervix hostile to the sperm.
- (d) IUDs suppress the fertilization capacity of sperm.
- (e) The IUDs require surgical intervention for their insertion in the uterine cavity.

Choose **the most appropriate answer** from the options given below :

- (1) (a), (d) and (e) only
- (2) (b) and (c) only
- (3) (b) and (d) only
- (4) (d) only

Q. 189. Refer to the following statements for agarose-gel electrophoresis :

- (a) Agarose is a natural polymer obtained from sea-weed.
- (b) The separation of DNA molecules in agarose-gel electrophoresis depends on the size of DNA.
- (c) The DNA migrates from negatively-charged electrode to the positively-charged electrode
- (d) The DNA migrates from positively-charged electrode to the negatively-charged electrode.

Choose **the most appropriate answer** from the options given below :

- (1) (a) and (b) only
- (2) (a), (b) and (c) only
- (3) (a), (b) and (d) only
- (4) (b), (c) and (d) only

Q. 190. Match **List - I** with **List - II**

List - I	List - II
(a) Multipolar neuron	(i) Somatic neural system
(b) Bipolar neuron	(ii) Cerebral cortex
(c) Myelinated nerve fibre	(iii) Retina of Eye
(d) Unmyelinated nerve fibre	(iv) Spinal nerves

Choose the **correct answer** from the options given below :

- (1) (a) – (iii), (b) – (i), (c) – (iv), (d) – (ii)
- (2) (a) – (ii), (b) – (iv), (c) – (iii), (d) – (i)
- (3) (a) – (ii), (b) – (iii), (c) – (i), (d) – (iv)
- (4) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)

Q. 191. Excretion in cockroach is performed by all, EXCEPT :

- (1) Urecoase glands
- (2) Malpighian tubules
- (3) Fat body
- (4) Hepatic caeca

Q. 192. Select the **correct** statement regarding mutation theory of evolution.

- (1) This theory was proposed by Alfred Wallace
- (2) Variations are small directional changes
- (3) Single step large mutation is a cause of speciation
- (4) Large differences due to mutations arise gradually in a population

Q. 193. Arrange the following formed elements in the decreasing order of their abundance in blood in humans :

- (a) Platelets
- (b) Neutrophils
- (c) Erythrocytes
- (d) Eosinophils
- (e) Monocytes

Choose **the most appropriate answer** from the options given below :

- (1) (c), (a), (b), (e), (d)
- (2) (c), (b), (a), (e), (d)
- (3) (d), (e), (b), (a), (c)
- (4) (a), (c), (b), (d), (e)

Q. 194. In the enzyme which catalyses the breakdown of: $\text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{O}_2$ the prosthetic group is :

- (1) Nicotinamide adenine dinucleotide
- (2) Haem
- (3) Zinc
- (4) Niacin

Q. 195. Against the codon 5' UAC 3', what would be the sequence of anticodon on tRNA ?

- (1) 5' AUG 3'
- (2) 5' ATG 3'
- (3) 5' GTA 3'
- (4) 5' GUA 3'

Q. 196. Select the **correct** statements.

- (a) Angiotensin II activates the cortex of adrenal gland to release aldosterone.
- (b) Aldosterone leads to increase in blood pressure.

- (c) ANF acts as a check on renin-angiotensin mechanism.
 (d) ADH causes vasodilation.
 (e) Vasopressin is released from adenohypophysis.

Choose the **most appropriate** answer from the options given below :

- (1) (a), (b) and (e) only
 (2) (c), (d) and (e) only
 (3) (b), (c) and (d) only
 (4) (a), (b) and (c) only

Q. 197. With respect to metaphase, which of the following statements is incorrect ?

- (1) Complete disintegration of nuclear envelope takes place
 (2) Chromosomes are highly condensed
 (3) Metaphase chromosomes are made up of four sister chromatids held together by centromere
 (4) Chromosomes lie at the equator of the cell

Q. 198. Select the **incorrect** statement with respect to inbreeding of animals.

- (1) It is used for evolving pure lines in cattle.
 (2) It helps in accumulation of superior genes and elimination of less desirable genes.

- (3) It decreases homozygosity.
 (4) It exposes harmful recessive genes that are eliminated by selection.

Q. 199. Match **List - I** with **List - II** :

List - I	List - II
(a) Cellular barrier	(i) Interferons
(b) Cytokine barrier	(ii) Mucus
(c) Physical barrier	(iii) Neutrophils
(d) Physiological juice	(iv) HCl in gastric barrier

Choose the **correct** answer from the options given below :

- (1) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
 (2) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)
 (3) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
 (4) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)

Q. 200. If A and C make 30% and 20% of DNA, respectively, what will be the percentage composition of T and G ?

- (1) T : 20%, G : 30%
 (2) T : 30%, G : 20%
 (3) T : 30%, G : 30%
 (4) T : 20%, G : 20%



Q.no	Answer Key	Topic name	Chapter name
101	3	Cell cycle and cell division	Cell cycle and cell division
102	1	Photosynthesis in higher plants	Photosynthesis in higher plants
103	1	Lac operon	Molecular basis of inheritance
104	4	Secondary growth	Anatomy of flowering plants
105	1	Secondary metabolites	Biomolecules
106	2	<i>Lac</i> operon	Molecular basis of inheritance
107	2	(i) Moss (ii) Pteridophyte (iii) Alga (iv) Gymnosperm	Plant kingdom
108	1	DNA Replication	Molecular basis of inheritance
109	2	DESCRIPTION OF SOME IMPORTANT FAMILIES	Morphology of flowering plants
110	3	Successions	Ecosystem
111	2	Metabolic pathways	Respiration in plants
112	4	Genetic disorders	Principles of inheritance and variation
113	1	Restriction enzymes	Biotechnology: Principles and processes
114	4	Biodiversity	Biodiversity and its conservation
115	2	Mineral nutrition & respiration in plants	Mineral nutrition
116	2	Phytohormones	Plant growth and development
117	4	Plant tissues	Anatomy of flowering plants
118	1	Succession of plants	Ecosystem
119	1	Double fertilisation	Sexual reproduction in flowering plants
120	2	DESCRIPTION OF SOME IMPORTANT FAMILIES	Morphology of flowering plants
121	2	Successions	Ecosystem
122	4	Gel electrophoresis	Biotechnology: Principles and processes
123	2	Plant tissues	Anatomy of flowering plants
124	2	Cell cycle and cell division	Cell cycle and cell division
125	1	Metabolic pathways	Respiration in plants
126	4	Active and passive transport	Transport in plants
127	1	<i>Ex-situ</i> and <i>in-situ</i> conservation	Biodiversity and its conservation
128	3	Plant tissues	Anatomy of flowering plants
129	3	Transpiration	Transport in plants
130	3	Characteristics of flowering plants	Morphology of flowering plants
131	2	artificial hybridisation process	Sexual reproduction in flowering plants
132	3	Parts of a flowering plant	Sexual reproduction in flowering plants
133	2	Chromosomal theory of inheritance	Principles of inheritance and variation
134	2	Leguminous plants	Mineral nutrition
135	3	Growth and development	Plant growth and development
136	2	Nitrogen fixing bacteria	Mineral nutrition
137	1	<i>Ex-situ</i> and <i>in-situ</i> conservation	Biodiversity and its conservation
138	3	Structure of protein	Biomolecules
139	1	Recombinant DNA technology	Biotechnology and its applications
140	3	The DNA	Molecular basis of inheritance
141	3	Apomictic gene	Sexual reproduction in flowering plants

Q.no	Answer Key	Topic name	Chapter name
142	2	Phaeophyceae	Plant kingdom
143	3	Species area relationship	Biodiversity and its conservation
144	2	Biomolecules	Biomolecules
145	2	Chemiosmotic hypothesis	Photosynthesis in higher plants
146	4	Down's syndrome	Principles of inheritance and variation
147	3	Cell cycle and cell division	Cell cycle and cell division
148	2	DNA isolation	Biotechnology: Principles and processes
149	3	Fixation in plants	Photosynthesis in higher plants
150	3	Mendel's breeding experiment	Principles of inheritance and variation
151	2	Antibiotic resistance	Biotechnology: Principles and processes
152	2	Gene cloning	Biotechnology and its applications
153	2	Cell organelles	Cell -The unit of life
154	1	Enzymatic reactions	Biomolecules
155	4	Immune system	Human Health and Disease
156	3	Hershey and Chase experiment	Molecular basis of inheritance
157	2	Species interactions	Organisms and population
158	4	VIRUSES, VIROIDS, PRIONS AND LICHENS	Biological classification
159	1	Birth control methods	Reproductive health
160	2	Asexual reproduction	Reproduction in organisms
161	2	sliding filament theory	Locomotion and movement
162	2	Productivity	Ecosystem
163	1	Amino acids	Biomolecules
164	3	Types of epithelium	Structural organisation in animals
165	3	Endemic species	Biodiversity and its conservation
166	1	Disorders of muscular and skeletal system	Locomotion and movement
167	3	Vital capacity	Breathing and exchange of gases
168	2	Double circulation	Body fluids and circulation
169	1	Digestive system	Structural organisation in animals
170	2	Single cell protein	Strategies for enhancement in food production
171	4	Theory of spontaneous generation	Evolution
172	3	Components of mammary gland	Human reproduction
173	3	Pedigree analysis	Principles of inheritance and variation
174	2	Environmental issues	Environmental issues
175	4	Gene transfer methods	Biotechnology: Principles and processes
176	2	Respiratory rate	Breathing and exchange of gases
177	3	Spermatogenesis	Human reproduction
178	2	Muscular tissues	Structural organisation in animals
179	2	Hormones	Human reproduction
180	3	Structure of heart	Animal kingdom
181	1	Metabolic changes during pregnancy	Human reproduction
182	3	Cyclostomes	Animal kingdom
183	2	Role of enamel	Digestion and absorption
184	1	Tissues	Structural organisation in animals
185	1	Cell cycle and cell division	Cell cycle and cell division

Q.no	Answer Key	Topic name	Chapter name
186	3	Taxonomical aid 'key'	The living world
187	2	Genetic disorders	Principles of inheritance and variation
188	3	Birth control methods	Reproductive health
189	2	Agarose-gel electrophoresis :	Biotechnology and its applications
190	4	Types of neurons	Neural control and co-ordination
191	4	Excretion in cockroach	Excretory products and their elimination
192	3	Mutation theory of evolution.	Evolution
193	1	Types of cells	Cell- The unit of life
194	2	Role of enzymes	Biomolecules
195	4	tRNA sequence	Molecular basis of inheritance
196	4	Renin-angiotensin mechanism.	Excretory products and their elimination
197	3	Cell cycle and cell division	Cell cycle and cell division
198	3	Inbreeding of animals	Strategies for enhancement in food production
199	4	Physical and physiological barriers	Human Health and Disease
200	2	Nitrogenous bases	Molecular basis of inheritance

NEET (UG) Re-Examination 4th September 2022

ANSWERS WITH EXPLANATION

BOTANY

Section A

101. **Option (3) is correct.**

Explanation: Diplotene (a stage of Prophase-I of Meiosis) which can delay for months or years in oocyte of some vertebrates such as humans. In human female, cycle the cell arrest during embryonic stage and continue after puberty. It is completed at the time of ovulation during menstruation.

102. **Option (1) is correct.**

Explanation: During C_3 cycle (calvin cycle) 3 phases continue, namely **carboxylation, Reduction & regeneration**. During reduction or fixation phase, each CO_2 molecule require one mole of ATP and one mole of NADPH.

103. **Option (1) is correct.**

lac operon is an example of polycistronic operon in which 3 gene are present namely Z, Y and A.

Z — β -galactosidase

Y — Permease

A — Transacetylase

104. **Option (4) is correct.**

Explanation: In Dicot root, the vascular bundles are **radial**, in which vascular cambium is purely secondary and arise from **pericycle** with **lateral roots** as well. Lateral roots thus have **endogenous** origin.

105. **Option (1) is correct.**

Explanation:

Adenine	— A nitrogenous purine base — Purple coloured pigment in vacuole
Anthocyanin	— Polymer of aminated sugar i.e., N-acetyl-D-glucosamine, present in the exoskeleton of insects, molluscs, nematodes, cell wall of fungi etc.
Chitin	— Alkaloid (acts on CNS to relieve mild to moderate pain)
Codeine	

106. **Option (2) is correct.**

Explanation: i-gene in *lac operon* code for repressor while z codes for β -galactosidase, y for permease and a is for Transacetylase. All these genes are a part of single structure called *lac operon*.

107. **Option (2) is correct.**

Explanation:

<i>Chlamydomonas</i>	— A green algae
<i>Cycas</i>	— Fossil gymnosperm
<i>Selaginella</i>	— Pteridophyte, Microphyllous
<i>Sphagnum</i>	— Moss, Peat Mass/cotton mass.

108. **Option (1) is correct.**

Explanation: DNA polymerase can read template DNA in only one direction i.e., $3' \rightarrow 5'$ thus DNA replication can continue only in $5' \rightarrow 3'$ direction, thus it can continue only on one strand of DNA. The DNA stand on which replication is continuous is called **leading strand** whereas the strand on which replication is discontinuous is said to be **lagging strand**.

109. **Option (2) is correct.**

Explanation: Above mentioned floral diagram is of the family **Brassicaceae**. It is indicated by two unique characters—(1) Tetrameric flower i.e., (four petalled cross-shaped) and (2) Tetradyamous condition of stamens (two long and two short).

110. **Option (3) is correct.**

Explanation: Hydrarch succession is a series of communities in aquatic habitat. It is started with **phytoplankton** as pioneer species. Both Hydrarch and Xerarch are ended in nearly same type of condition called **Mesarch**.

111. **Option (2) is correct.**

Explanation: Isocitrate (Isocitric acid) undergoes two times decarboxylation during TCA cycle. During first decarboxylation, it forms α -Ketoglutaric acid and in the second time, it forms succinyl Co-A

112. **Option (4) is correct.**

Explanation: Sickle cell anemia is autosomal recessive trait while haemophilia is X-linked recessive trait.

Sickle cell anaemia is blood disorder while haemophilia is the disorder of blood clotting.

113. **Option (1) is correct.**

Explanation: With the help of most restriction enzymes sticky ends in DNA can be created. The flanking region in DNA can be formed due to cutting of DNA strand little away from restriction site.

114. **Option (4) is correct.**

Explanation: Amazon rain forest contains following number of species in respective group.

Invertebrates	125000
Plants	40000
Fishes	3000
Birds	1300
Mammals	427

115. **Option (2) is correct.**

Explanation:

Porins	Huge pores in outer membrane of Mitochondria, Chloroplast & some bacteria.
Leg Haemoglobin	pink coloured pigment, O ₂ scavenger
H ⁺ accumulation	Lumen of thylakoid (Inside chloroplast)
Respiration	Amphibolic (catabolic + Anabolic) pathway.

116. **Option (2) is correct.**

Explanation: Cytokinin is a cell division inducing hormone derived from **Adenine**, a purine type nitrogenous base.

→ Cytokinin was first obtained from autoclaved Herring sperm DNA.

117. **Option (4) is correct.**

Explanation: In fruit wall of several nuts, various types of sclereid tissues are present. These are called **stone cells**. These are dead cells with obliterated lumen.

118. **Option (1) is correct.**

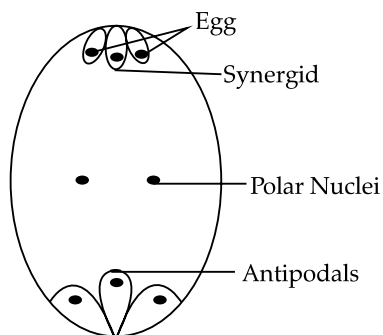
Explanation: During process of succession, the species which occupy bare are first time is called **Pioneer** species. It is the species with least adaptation and highest environmental resistance.

119. **Option (1) is correct.**

Explanation: A typical embryo sac is 8 nucleate, 7 celled structure formed in most angiosperms.

It has a 3 celled egg apparatus in which one egg cell and two synergids are present.

Note: The answer has been provided with respect to the embryo sac, not egg apparatus.



120. **Option (2) is correct.**

Explanation:

Imbricate	Gulmohar, <i>Cassia</i> etc (Fabaceae) <i>Calotropis</i> (Asclepiadaceae)
Valvate	Beans (Fabaceae or leguminosae)
Vexillary	
Twisted	Cotton (Malvaceae)

121. **Option (2) is correct.**

Explanation: All succession, either started from water body or sand, leads to the Mesic condition.

122. **Option (4) is correct.**

Explanation: With the help of Gel electrophoresis technique, separation of DNA fragments, based on their size (mol. wt) can take place. DNA fragments can be separated on Agarose gel with the help of electrode and can be visualised with the help of ethidium bromide under UV-light.

123. **Option (2) is correct.**

Explanation: The process of conversion of a **Non-dividing** (permanent cell) to a dividing cell is called **de-differentiation**. This is an important process for secondary growth which taken place in plants.

124. **Option (2) is correct.**

Explanation: During Meiosis-I, the stage **Prophase I** occurs in which various substages are present. Of these substages, the most important is **Pachytene stage** in which exchange of chromosomal segments take place between non-sister chromatids of homologous chromosome, with the help of enzyme recombinase.

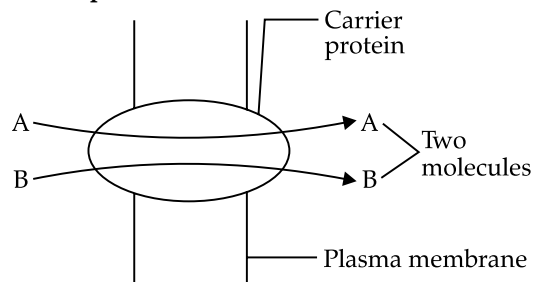
125. **Option (1) is correct.**

Explanation: During TCA cycle, after first decarboxylation of oxalosuccinic acid, α -Ketoglutaric acid 5-C compound (α -KGA) is formed.

α -KGA undergoes further decarboxylation to form a 4 carbon compound i.e., succinyl-CO-A.

126. **Option (4) is correct.**

Explanation:



Above condition is called **Symport** in which the two molecules are moving in the same direction. This is a type of **Facilitated diffusion** of non-Polar substance from plasma membrane.

127. **Option (1) is correct.**

Explanation: World summit on sustainable development takes place to ensure significant reduction in the current rate of Biodiversity loss. This summit was held in 2002 in Johannesburg, South Africa.

128. **Option (3) is correct.**

Explanation: Inter fascicular cambium is present between two vascular bundles and formed from the differentiation of permanent tissues in medullary rays. Interfascicular cambium is present in between primary xylem and primary phloem.

129. **Option (3) is correct.**

Explanation: Ascent of sap in xylem is mainly due to transpiration pull which is supported by physical properties of water such as cohesion and adhesion between water molecules. Cohesion is also called **Tensile strength of water molecule**.

130. **Option (3) is correct.**

Explanation: The Rhizome is underground stem modification in which nodes and internodes are distinct. The nodes contain several buds from which new plants arise. It is prostrate and branched. e.g. **Sugarcane, Banana**, etc.

131. **Option (2) is correct.**

Explanation: During the process of artificial pollination in pea plant, emasculation is only needed in Bisexual plant, selected as female parent. After removing stamens from such flower and transferring selected pollens, it needs to be bagged to prevent non-desired pollen to come in contact with this flower.

132. **Option (3) is correct.**

Explanation: Persistent nucellus in beet and pepper is called **Perisperm**. Nucellus is diploid sporogenous tissue which is generally degraded, but present in above mentioned seeds.

133. **Option (2) is correct.**

Explanation: Chromosomal theory of inheritance was proposed by **Sutton** and **Boveri** in 1902. They both connect the idea of Mendelian factor to the new concept of chromosome and find very close similarity between these two.

134. **Option (2) is correct.**

Explanation: **Leg-Haemoglobin** is a pink O_2 -scavenger-pigment present in root nodules of leguminous plants. It helps in protection of **Nitrogenase** from the O_2 , as it is O_2 -sensitive enzyme.

135. **Option (3) is correct.**

Explanation: Phenotypic plasticity is the process through which plants follow different pathways in response to different environmental conditions. For example Heterophylly in **Cotton, Coriander** and **Larkspur**.

Section B

136. **Option (2) is correct.**

Explanation: **Azotobacter** and **Beijerinckia** are free living, N_2 fixing, Aerobic bacteria. **Rhizobium**

and **Frankia** are associated bacteria. **Pseudomonas** and **Thiobacillus** are denitrifying bacteria while **Rhodospirillum** is **anaerobic non- N_2 Fixing** bacteria.

137. **Option (1) is correct.**

Explanation:

Sacred grooves	Khasi Hill in Meghalaya
Zoological park	<i>Ex-situ</i> (off site) conservation
Nile perch	Alien species—causes loss of 200 species of unique Assemblage of Chichlid Fishes
Amazon forest	Lungs of planet Earth, release about 20% of total oxygen.

138. **Option (3) is correct.**

Explanation: Primary structure in proteins are continuous, in which successive amino acids are added with the help of peptide bond formation. It is simplest yet generally non-Functional structure of proteins.

139. **Option (1) is correct.**

Explanation:

Gene gun	Particle gun, used for transfer of gene.
Gene therapy	Replacement of non-working gene by a working gene.
Gene cloning	To obtain identical copies of a particular DNA molecule.
Genome	Total DNA in the cells of an organism in Haploid state (n)

140. **Option (3) is correct.**

Explanation:

Organism	Genome size
Bacteriophage $\phi \times 174$	5386 Nucleotides (SS)
Bacteriophage lambda	48502 bp
<i>E. Coli</i>	4.6×10^6 bp
Haploid content of Human DNA	3.3×10^9 bp

141. **Option (3) is correct.**

Explanation: It Apomictic gene are introduced into hybrid crop. Varieties, the seed formed in them without fertilisation, leads to continuation of desired combination of characters. For unlimited generations, thus Farmers can keep their seeds for next year.

142. **Option (2) is correct.**

Explanation: The given figure is of *Chara*, a green algae of family **chlorophyceae**, pigments are **chl a, b** and **carotene**. Stored food material is in the form of starch. It is monoecious and contain **Oogonium** (female sex organ) and **Antheridium** (male sex organ).

143. **Option (3) is correct.**

Explanation: Fruit eating birds (Frugivorous) are present in tropical forest as food is available in throughout the year. For example, fig plant

support such birds in their survival. Thus, Fig is also called **Keystone** species in TRF.

144. **Option (2) is correct.**

Explanation: As plasma membrane is made up to phospholipid, it only allow free transfer of **Fat soluble substances** (Hydrophobic) it does not allow Hydrophilic substance to pass from it.

145. **Option (2) is correct.**

Explanation: Chemi-osmotic hypothesis of ATP formation was given by **P. A. Mitcheli**. According to which proton flow causes ATP formation. Primary acceptor of electrons, i.e., Phaeophytin transfers its electron to **proton carrier** that is Plastoquinone, non an e^- carrier.

146. **Option (4) is correct.**

Explanation: The symptoms mentioned in the question are of down's syndrome which is caused by trisomy of chromosome 21. Total chromosome number turn to be 47. It is also called **Mongoloid Idiocy**.

147. **Option (3) is correct.**

Explanation: The order of events during prophase I of Meiosis-I is as follows:

Leptotene → Thickening of chromosome

Zygotene → Synapsis of chromosome

Pachytene → Crossing over

Diplotene → Dissolution of synaptonemal complex

Diakinesis → Terminalisation of chiasmata.

148. **Option (2) is correct.**

Explanation: Cellulase can degrade cellulosic cell wall of plant cell while chitinase is used for

degrading **Chitin** (Fungal cellulase) for obtaining DNA from cell.

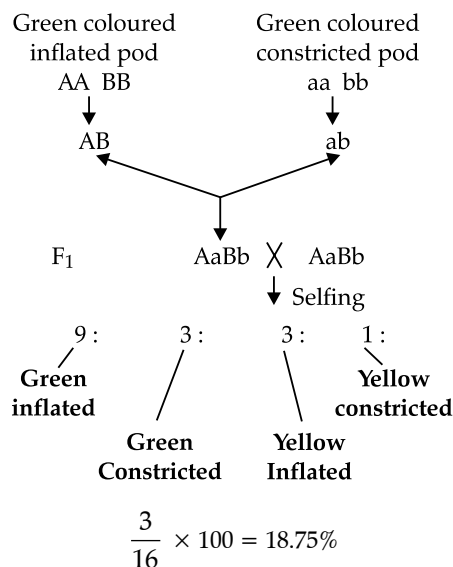
149. **Option (3) is correct.**

Explanation:

- Carbon dissolved in oceans = About 71%
- Annual fixation of CO_2 through photosynthesis is = 4×10^{13} kg
- PAR captured by plants = 2 – 10%
- Productivity of oceans = 55 billion tonnes

150. **Option (3) is correct.**

Explanation:



ZOOLOGY

Section A

151. **Option (2) is correct.**

Explanation: Plasmids are extra chromosomal DNA in bacterial cytoplasm which provide additional feature to the bacteria such as antibiotic resistance, N_2 -Fixation, fertility, etc.

Plasmid may contain resistance genes for several antibiotics.

152. **Option (2) is correct.**

Explanation: Transgenic cow **Rosie** produced milk rich in Human protein **α -Lactalbumin** which is easily digestible to babies with lactose intolerance.

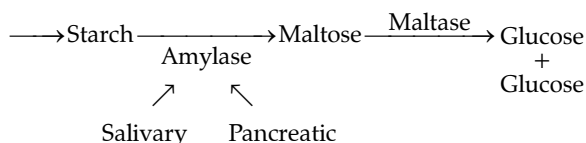
→ Such proteins which are produced in other organisms through DNA recombinant technology are called **recombinant proteins**.

153. **Option (2) is correct.**

Explanation: Lysosomal enzymes are generally **Hydrolytic** enzymes which are functional in Acidic pH only. When pH is turned to basic, medium these enzymes will become inactive.

154. **Option (1) is correct.**

Explanation: **Maltase** leads to breakdown of disaccharide maltose into two glucose subunits.



155. **Option (4) is correct.**

Explanation: During organ transplantation, the graft rejection takes place due to cell mediated response, in which T-cell controls the identification of **Self** from **Non-self**.

This rejection can be prevented by **Immuno-suppressive agent** i.e., **Cyclosporin-A**.

156. **Option (3) is correct.**

Explanation: If **Sulphur** and **Phosphorus** change their presence in DNA and protein respectively the result of **Hershey and Chase** experiment will be reversed. Bacteria with radioactive sulphur formed at the base of Test Tube.

157. **Option (2) is correct.**

Explanation: Two competing species can co-exist for the same type of resource by changing their foraging pattern. These butterflies can obtain nectar at different times and chase different floral parts to avoid competition.

158. **Option (4) is correct.**

Explanation: Mad cow disease (Bovine spongiform encephalopathy) and Cr. Jacob disease in humans are caused by misfolded, Infectious protein particle called **Prion**. These are proteins which attack neural tissues, generally.

159. **Option (1) is correct.**

Explanation: Progestogens are pills containing progesterone. These are **NOT IUDs** as they can be taken in the form of daily/weekly or monthly pills.

160. **Option (2) is correct.**

Explanation:

<i>Chlamydomonas</i>	Zoospore
<i>Penicillium</i>	Conidia
<i>Hydra</i>	Budding (External budding)
Sponges	Gemmule (internal budding)

These all are methods of Asexual reproduction.

161. **Option (2) is correct.**

Explanation: According to **Sliding filament theory**, thin. Filament slide over **Thick filament** (mainly myosin). That is why the length of A band does not change as A band is made up of thick filament.

162. **Option (2) is correct.**

Explanation: Productivity is the total amount of biomass or organic matter produced per unit area. Over a period of time by plants. This is also called **Primary production**.

→ Productivity of consumer is called Secondary production.

163. **Option (1) is correct.**

Explanation: Amino acids can exist in zwitterionic form which contains both positive and negative charges together, thus called **Amphoteric molecule**. These forms of amino acids, are having both moieties.

164. **Option (3) is correct.**

Explanation: Epithelium of Bronchiole and Fallopian tube is lined by the cilia for the movement of attached substances in specific direction.

→ Egg movement towards uterus is due to these surface outgrowths.

165. **Option (3) is correct.**

Explanation: Western ghats have large number of endemic species which are absent in all other parts of the world. These consist of amphibians and large number of flowering plants. Western ghats is one of biodiversity hotspots in India.

166. **Option (1) is correct.**

Explanation: Accumulation of uric acid crystals leads to inflammation of joints which is commonly called as **Gout**. It is a metabolic disorder in which

Uric acid degrading enzyme remains inactive or absent.

167. **Option (3) is correct.**

Explanation: Vital capacity does not include **RV** as this cannot be measure of by using respirometer. Vital capacity is the maximum inspiration after force full expiration.

168. **Option (2) is correct.**

Explanation: Organ to organ transportation of any substance/nutrients is called **portal system**, occurs via special veins called **Portal veins**. Transfer of material from digestive tract to liver is via **Hepato-Portal veins**.

169. **Option (1) is correct.**

Explanation:

Crop	— Storage chamber for food.
Pro. ventriculus (Gizzard)	→ Have Chitinous/Cuticular teeth for grinding the food particular.
Hepatic caecae	→ Gastric caeca — Secrete digestive juice
Malpighian Tubule	— Main excretory structure for the removal of nitrogenous waste

170. **Option (2) is correct.**

Explanation: *Spirulina* (a BGA) can be used as an agent reduce environmental pollution. It absorb heavy metals and other harmful substances from environment thus reduce pollution. It can also be used as SCP (Single cell protein) as source of protein, carbohydrate, fat, mineral & vitamins.

171. **Option (4) is correct.**

Explanation: Panspermia is a hypothesis which explains the origin of life on earth due to transfer of spores from other planet of earth. The theory faces high level of criticism as environment between two planets cannot support Life.

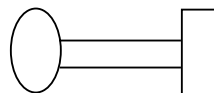
172. **Option (3) is correct.**

Explanation: Mammary glands have various structures arranged in defined order—from proximal to distal they shows—

Alveoli → Mammary tubules → Mammary duct → Mammary ampulla → Lactiferous duct

173. **Option (3) is correct.**

Explanation: In consanguine marriage/mating occurs between two close relatives and can be represented by two lateral lines between male and female as follows:



This lead to expression of numerous harmful genes.

174. **Option (2) is correct.**

Explanation: CNG (Compressed Natural Gas) is better fuel than diesel because it cannot be adulterated, It burns more efficiently and It is cheaper than diesel.

→ Its distribution is difficult.

175. **Option (4) is correct.**

Explanation: Bacteriophage can be used in introducing DNA into animal and bacterial cell, not plant cell.

Gene Gun, *Agrobacterium* mediated Transfer and Disarmed pathogen are used as vector for plant cells.

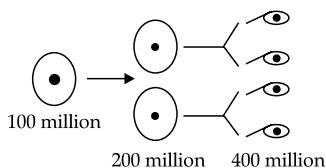
176. **Option (2) is correct.**

Explanation: Pneumotaxic centre present in the pons region of brain controls the respiratory rhythm centre. Single from this centre can control the duration of inspiration and expiration thus control and alter respiratory rate.

177. **Option (3) is correct.**

Explanation: Spermatogenesis is the formation of spermatozoa in males. Each secondary spermatocyte undergo Meiosis II and form two spermatids.

→ Thus 200 million spermatocytes are required to produce 400 million spermatozoa.



178. **Option (2) is correct.**

Explanation: Skeletal muscle fibres are multinucleated and bundled in a parallel manner. Communication junction (Gap junction) in the intercalated disc of cardiac muscles allow the cardiac muscle cells to contract as a unit.

Blood vessel lining contains simple squamous epithelium.

179. **Option (2) is correct.**

Explanation: Because FSH (Follicle Stimulating Hormone) is a fat soluble hormone, it cannot cross the plasma membrane for entering into target cell, but generate secondary messenger (cAMP) which in turn regulate cellular metabolism.

180. **Option (3) is correct.**

Explanation: 3 chambered heart is present in *Chelone* (Turtle), as Reptiles have 3 chambered heart.

Pteropus is fire fox (a mammal) with 4 chambered heart.

→ *Scoliodon* → 2 chambered Heart.

181. **Option (1) is correct.**

Explanation: During pregnancy, thyroxine level increases in maternal blood because metabolic rate in body increases during pregnancy. As thyroxine

maintain Basal Metabolic rate (BMR) to generate heat.

182. **Option (3) is correct.**

Explanation: Cyclostomes are jawless thus option with jawed behaviour is not correct.

They normally live in marine water but for spawning they move to fresh water.

→ They are scaleless and contain paired fins.

183. **Option (2) is correct.**

Explanation: Enamel is the hardest part of the body which protect the soft portion of teeth. It is a nonliving part made up of minerals and salt.

It provide surface for mastication/chewing.

184. **Option (1) is correct.**

Explanation: Bone protect inner visceral parts and limb bone helps weigh bearing.

→ Adipose tissue store fat.

→ Ligament joins bone to bone and tendons attach muscles to the bones, bone marrow is the site where blood cells are produced not ligament.

185. **Option (1) is correct.**

Explanation: Bivalent or Tetrad formation is characteristic feature of Zygotene stage of prophase I of Meiosis I, during which 4 chromatids can be observed on a single centromere.

Section B

186. **Option (3) is correct.**

Explanation: Taxonomic keys are specialised taxonomic aid which help in studying taxonomy and identifying organisms. Each category have different set of keys for its segregation. Each key count aim **couplet** and **lead**.

187. **Option (2) is correct.**

Explanation: The girl will be carrier (Heterozygous) for Hemophilia while the male have no history of **Haemophilia**. This can be explained with the help of following cross:

	♀ XX ^h	♂ XY
♀ X	XX	XY
X ^h	X ^h X	X ^h Y

188. **Option (3) is correct.**

Explanation: IUDs suppress the fertilisation capacity of sperm. If also reduces sperm motility. copper releasing IUDs also reduces sperm motility and fertilization capacity. But IUDs increase phagocytosis of sperms. They also make uterus hostile.

189. **Option (2) is correct.**

Explanation: Agarose gel electrophoresis is the process of separation of DNA fragments based on their size. As DNA is —vely charged, it moves from negative charged electrode to tve charged electrode inside the Gel Agarose gel shows **sieving effect**.

190. **Option (4) is correct.**

Explanation:

Multipolar neuron	Cerebral cortex, Brain
Bipolar neuron	Retina of eye
Myclinated nerve fibre	Peripheral Nerves e.g., Cranial Nerve
Unmyelinate nerve fibre	Nerve innervations to voluntary muscles.

191. **Option (4) is correct.**

Explanation: Excretion in cockroach should not be performed by Hepatic caeca as it is glandular in nature which secrete digestive Juice. It is least concerned with excretion.

192. **Option (3) is correct.**

Explanation: The concept of evolution through mutation was given by Hugo de vries.

→ Mutations are sudden aberration/change that arise in the population thus they are discontinuous in nature.

→ Large single step changes are called Saltation which lead to speciation.

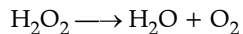
193. **Option (1) is correct.**

Explanation: Number or abundance of blood cells can be arranged in decreasing order as follows:

RBCs > Platelets > Neutrophills > Monocytes > Eosinophills > Platelets

194. **Option (2) is correct.**

Explanation: The enzyme which catalyse the breakdown of H_2O_2 as :



is called **Catalase** which have prosthetic group **Haem**. This enzyme is activated by iron. The breakdown occurs inside peroxisome during

photorespiration.

195. **Option (4) is correct.**

Explanation: 5' UAC 3' code on mRNA can be complemented by 5' GUA 3' on anticodon loop of tRNA.

Codon anticodon pairing between mRNA and rRNA is the key of translation process.

196. **Option (4) is correct.**

Explanation: ADH (Antidiuretic Hormone) called **Vasopressin**. Which is a Vasoconstrictor.

Vasopressin is released from **Posterior Pituitary** not Adenohypophysis.

197. **Option (3) is correct.**

Explanation: Chromosome with 4 sister chromatids are not present during **Metaphase**.

Metaphasic chromosome consist of 2 chromatids attached together by a centromere. This is the thickest and shortest chromosome with prominent structure.

198. **Option (3) is correct.**

Explanation: Inbreeding always increases homozygosity thus leads to loss of superior characters.

In breeding can be synonymously used as continuous selling through which purelines can be generated for stability of characters.

199. **Option (4) is correct.**

Explanation:

Skin and mucous membrane	— Physical barriers
HCl is gastric juice	— Physiological barrier
Phagocytic cells	— Cellular barrier
Interferons	— Cytokine barriers.

200. **Option (2) is correct.**

Explanation:

A → 30% = T → 30%

C → 20% = G → 20%

According to chargaff's rule, Adenine (A) pairs with Thymine (T) and Cytosine (C) pairs with Guanine (G). So, The ds DNA have equal percentage of A and T or G and C.

□□□