

NEET 2020

13th Sep 2020

Question paper Solutions - BIOLOGY

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91 Which of the following refer to correct example(s) of or,anisma which have evolved due to changes in environment brought about by anthropogenic action ?

- A Darwin's Finches of Galapagos islands.
- B Herbicide resistant weeds
- C Drug resistant eukaryotes
- D Man created breeds of domesticated animals like dogs

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

Solutions:

Anthropogenic actions are due to direct or indirect effects of human actions on the environment. Resistance due to antibiotics, use of herbicide and artificial breeding of domesticated animals are the examples of anthropogenic actions.

92- Match the following column and select the correct option

(a) Column-1	(i) Column-2
(b) Organ of Corti	(ii) Connect middle ear and pharynx
(c) Cochlea	(iii)Coiled part of the labyrinth
(d) Eustachian tube	(iii)Attached to the oval window
(e) Stapes	(iv)Located on the basilar membrane

	(a)	(b)	(c)	(d)
1	(ii)	(iii)	(i)	(iv)

	(a)	(b)	(c)	(d)
2	(iii)	(i)	(iv)	(ii)

	(a)	(b)	(c)	(d)
3	(iv)	(ii)	(i)	(iii)

	(a)	(b)	(c)	(d)
4	(i)	(ii)	(iv)	(iii)

Solutions:

The correct match is:

The organ of Corti - Located on the basilar membrane

Cochlea - Coiled part of the labyrinth

Eustachian tube - Connects middle ear and pharynx

Stapes - Attached to the oval window

93-Identify the wrong statement which reference to immunity

1 When exposed to antigen (living or dead) antibodies are produced in the host's body. It is called "Active immunity"

2 When ready made antibodies are directly given it is called "Passive immunity"

3 Active immunity is quick and gives full response

4 Foetus receives some antibodies from mother, it is an example for passive immunity

Solution:

Active immunity is slow and takes time to give its full effective response.

94 Select the correct events that occur during inspiration

- A Contraction of the diaphragm
- B Contraction of external intercostal muscles
- C Pulmonary volume decreases
- D Intrapulmonary pressure increases

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

Solution:

During inspiration, the diaphragm and external intercostal muscles contract, pulmonary volume increases and the intrapulmonary pressure decreases.

95-The oxygenation activity of RuBisCo enzyme in photorespiration leads to the formation of :

- 2 molecules of 3- C compound
- 1 molecule of a 3-C compound
- 1 molecule of a 6-C compound
- 1 molecule of a 4-C compound and 1 molecule of a 2-C compound

Solution:

The RuBisCo by oxygenation activity forms 1 molecule of 3PGA which is a 3-carbon compound.

96 The infectious stage of Plasmodium that enter the human body is :

- 1 Trophozoites
- 2 Sporozoites
- 3 Female gametocytes
- 4 Male gametocytes

Solution:

Sporozoite is the infection stage of Plasmodium that enters the human body.

97 Which of the following statements about inclusion bodies is incorrect?

- 1 They are not bound by any membrane
- 2 These are involved in the ingestion of food particles
- 3 They lie free in the cytoplasm
- 4 These represent reserve material in the cytoplasm

Solutions:

Inclusion bodies are not involved in the ingestion of food particles.

98 Dissolution of the synaptonemal complex occurs during

- 1 Pachytene
- 2 Zygotene
- 3 Diplotene
- 4 Leptotene

Solutions:

The dissolution of the synaptonemal complex occurs during the diplotene stage.

99-Ray florets have

- 1 Inferior ovary
- 2 Superior ovary
- 3 Hypogynous ovary
- 4 Half inferior ovary

Solutions:

Ray florets of sunflowers have inferior ovaries.

Q 100 In separated DNA fragments can be visualized with the help of:

- 1 Acetocarmine in bright blue light
- 2 Ethidium bromide in UV radiation
- 3 Acetocarmine in UV radiation
- 4 Ethidium bromide in infrared radiation

Solution:

During electrophoresis, separated DNA is visualized by adding Ethidium bromide and observed under UV radiation.

101- In which of the following techniques the embryos are transferred to assist those females who cannot conceive?

- 1 ZIFT and IUT
- 2 GIFT and ZIFT
- 3 ICSI and ZIFT
- 4 GIFT and ICSI

Solution: ZIFT - Zygote Intra-Fallopian tube Transfer is a form of assisted reproductive technology (ART). In this technique, we are going to put the zygote which has started developing into the embryo in the fallopian tube rather than in the uterus and we will wait for it to travel the whole length of the fallopian tube and reach the uterus on its own. On the other hand, IUT (Intrauterine transfer) is a technique in which embryos are placed into the uterus of a female with the intent to establish a pregnancy.

102- Select the option including all sexually transmitted diseases

- 1 Gonorrhoea, Syphilis, Genital herpes
- 2 Gonorrhoea, Malaria, Genital herpes
- 3 AIDS, Malaria, Filaria
- 4 Cancer, AIDS, Syphilis

Solution: Gonorrhoea and Syphilis are sexually transmitted diseases caused by bacteria. Gonorrhoea is caused by the pathogen Neisseria gonorrhoeae and Syphilis is caused by the Treponema pallidum. On the other hand, Genital Herpes is a sexually transmitted disease caused by the virus called Herpes simplex virus.

103 Identify the wrong statement with reference to the transport of oxygen

- 1 Binding of oxygen with hemoglobin is mainly related to the partial pressure of O_2
- 2 The partial pressure of CO_2 can interfere with O_2 binding with hemoglobin
- 3 Higher H^+ conc. in alveoli favors the formation of oxyhemoglobin
- 4 Low pCO_2 in alveoli favors the formation of oxyhemoglobin

Solution: In alveoli, all the factors favorable for the formation of oxyhemoglobin are high pO_2 , low pCO_2 , less H^+ concentration and low temperature.

104 Identify the incorrect statement

- 1 Heartwood does not conduct water but gives mechanical support
- 2 Sapwood is involved in the conduction of water and minerals from the root to the leaf
3. Sapwood is the innermost secondary xylem and is lighter in color
- 4 Due to the deposition of tannine resins, oil, etc heartwood is dark in color.

Solution: Sapwood is the outermost secondary Xylem. The sapwood may become dark and discolored such as when decaying.

105 Identify the wrong statement with regards to Restriction Enzymes

- 1 Each restriction enzyme functions by inspecting the length of a DNA sequence
- 2 They cut the strand of DNA at palindromic sites
- 3 They are useful in genetic engineering
- 4 Sticky ends can be joined by using DNA ligases.

Solution: They recognize and bind to specific sequences of DNA, called restriction sites. Each restriction enzyme recognizes just one or a few restriction sites. When it finds its target sequence, a restriction enzyme will make a double-stranded cut in the DNA molecule.

106 Floridian starch has a structure similar to

- 1 Starch and cellulose
- 2 Amylopectin and glycogen
- 3 Mannitol and algin
- 4 Laminarin and cellulose

Solution: In Rhodophyta, the reserve food is Floridean Starch which is similar to amylopectin and glycogen.

Q 107 Choose the correct option from the following

- (1)- Ligases Join the two DNA molecules
- (2)- Polymerases Break the DNA into a fragment
- (3)- Nucleases Separate the two strands of DNA
- (4)- Exonucleases Make cut at a specific position within DNA

Solution: Ligases are used to join the DNA molecules by establishing a new chemical bond.

108 Embryological support for evolution was disapproved by

- 1 Karl Ernst von Baer
- 2 Alfred Wallace
- 3 Charles Darwin
- 4 Oparin

Solution: Karl Ernst von Baer has proposed four laws of animal development, which later referred to as von Baer's laws of embryology.

109 The first phase of translation is

- 1 Binding of mRNA to the ribosome
- 2 Recognition of DNA molecule
- 3 Aminoacylation of tRNA
- 4 Recognition of an anti-codon

Solution: The first phase of translation is initiation in which there are the two ribosomal subunits (small and large), The mRNA to be translated, the first (formyl) aminoacyl tRNA (the tRNA charged with the first amino acid),

110 The plant parts which consist of two generations on within the other

- A Pollen grains inside the anther
- B Germinated pollen grains with two male gametes
- C Seed inside the fruit
- D Embryo sac inside the ovule

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

Solution: The plants which consist of two generations on within the other is pollen grains inside the anther and embryo sac inside the ovule.

111 The number of substrate-level phosphorylations in one turn of the citric acid cycle is

- 1 Zero
- 2 One
- 3 Two
- 4 Three

Solution: The number of substrate-level phosphorylations in one turn of the citric acid cycle is 2.

Q-112 Match the following column and select the correct option

	Column-1		Column -2
(a)	Floating Ribs	(i)	Located between Second and seventh Ribs
(b)	Acromion	(ii)	Head of the humerus
(c)	Scapula	(iii)	Clavicle
(d)	Glenoid cavity	(iv)	Do not connect with the sternum

	(a)	(b)	(c)	(d)
1	(ii)	(iv)	(i)	(iii)

	(a)	(b)	(c)	(d)
2	(i)	(iii)	(ii)	(iv)

	(a)	(b)	(c)	(d)
3	(iii)	(ii)	(iv)	(i)

	(a)	(b)	(c)	(d)
4	(iv)	(iii)	(i)	(ii)

Solution: Option number 4 contains the correct match.

113 Match the following diseases with the causative organism and select the correct option.

	Column-1		Column -2
(a)	Typhoid	(i)	Wuchereria
(b)	Pneumonia	(ii)	Plasmodium
(c)	Filaria	(iii)	Salmonella

(d)	Malaria	(iv)	Haemophilus
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	(a)	(b)	(c)	(d)
1	(i)	(iii)	(i1)	(iv)

	(a)	(b)	(c)	(d)
2	(iii)	(iv)	(i)	(ii)

	(a)	(b)	(c)	(d)
3	(ii)	(i)	(iii)	(iv)

	(a)	(b)	(c)	(d)
4	(iv)	(i)	(ii)	(iii)

Solution: Option number 2 contains the diseases with their causative organism.

114 Montreal protocol was signed in 1987 for control of

- 1 Transport of Genetically modified organisms from one country to another
- 2 Emission of ozone-depleting substances
- 3 Release of Green House Gases
- 4 Disposal of e-waste

Solution: Montreal protocol was signed in 1987 for control of emission of ozone-depleting substances.

115. The QRS complex in a standard ECG represents

- 1 Repolarisation of auricles
- 2 Depolarisation of auricles
- 3 Depolarisation of ventricles
- 4 Repolarisation of ventricles

Solution: The QRS complex in a standard ECG represents Depolarisation of ventricles.

116. Name the plant growth regulator which upon spraying on sugarcane crop, increases the length of the stem, thus increasing the yield of sugarcane crop

- 1 Cytokinin
- 2 Gibberellin
- 3 Ethylene
- 4 Abscisic acid

Solution: Gibberellin is that plant growth regulator which upon spraying on sugarcane crop, increases the length of the stem, thus increasing the yield of sugarcane crop.

117. How many true-breeding pea plant varieties did Mendel select as pairs, which were similar except in one character with contrasting traits

- 1 4
- 2 2
- 3 14
- 4 8

Solution: Total 14 true-breeding pea plant varieties did Mendel select as pairs, which were similar except in one character with contrasting traits.

118. Bilaterally symmetrical and acoelomate animals are exemplified by

- 1 Ctenophora
- 2 Platyhelminthes
- 3 Aschelminthes
- 4 Annelida

Solution: Bilaterally symmetrical and acoelomate animals are exemplified by platyhelminthes.

119. Cuboidal epithelium with brush border of microvilli is found in

- 1 Lining of intestine
- 2 ducts of salivary glands
- 3 proximal convoluted tubule of the nephron
- 4 eustachian tube

Solution: Cuboidal epithelium with brush border of microvilli is found in the proximal convoluted tubule of the nephron.

120. Which is the important site of information of glycoproteins and glycolipids in eukaryotic cells?

- 1) Endoplasmic reticulum
- 2) Peroxisomes
- 3) Golgi bodies
- 4) Polysomes

Solutions: Golgi bodies are the important sites of information of glycoproteins and glycolipids in eukaryotic cells.

121. In light reaction plastoquinone facilitates the transfer of electrons from:

- 1) *PSII to Cytb₆f complex*
- 2) *Cytb₆f complex PS -I to*
- 3 *PS – Ito NADP⁻*
- 4) *PS – Ito ATP synthase*

Solutions: In light reaction, plastoquinone facilitates the transfer of electrons from *PSII to Cytb₆f complex*

122- Match the following concerning essential elements and their function in plants:

a	Iron	(i)	Photolysis of water
b	Zinc	(ii)	Pollen germination
c	Boron	(iii)	Required for chlorophyll biosynthesis
d	Manganese	(iv)	IAA biosynthesis

	(a)	(b)	(c)	(d)

1	(ii)	(i)	(iv)	(iii)
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	(a)	(b)	(c)	(d)
2	(iv)	(iii)	(ii)	(i)

	(a)	(b)	(c)	(d)
3	(iii)	(iv)	(ii)	(i)

	(a)	(b)	(c)	(d)
4	(iv)	(i)	(ii)	(iii)

Solutions: In option (b) the essential elements are matched with their correct function in plants.

123-The root that originated from the base of the stem are :

Fibrous root

Primary root

Prop root

Lateral root

Solutions: Fibrous root originates from the base of the stem.

124- From the experiments, S.I. Miller produced amino acids by mixing the following in a closed flask:

CH_4 , H_2 , NH_3 and water vapor at 800 C°

CH_3 , H_2 , NH_4 and water vapor at 800 C°

CH_4 , H_2 , NH_3 and water vapor at 600 C°

CH_3 , H_2 , NH_3 and water vapor at 600 C°

Solutions: S.I. Miller produced CH_4 , H_2 , NH_3 and water vapour at 800 C°.

125- Identify the basic amino acid from the following.

- 1) Tyrosine
- 2) Glutamic Acid
- 3) Lysine
- 4) Valine

Solutions: Lysine is the basic amino acid from the following.

126-The process of growth is maximum during

- 1) Log phase
- 2) Lag Phase
- 3) Senescence
- 4) Dormancy

Solutions: Growth rate becomes more rapid in log phase.

127- Presence of which of the following conditions in urine are indicative of Diabetes Mellitus?

- 1) Uremia and ketonuria
- 2) Uremia and Renal Calculi
- 3) Ketonuria and Glycosuria
- 4) Renal calculi and Hyperglycemia

Solutions: Presence of Ketonuria and Glycosuria conditions in urine are indicative of Diabetes Mellitus.

128- Select the correct match

- (1) Haemophilia - Ylinked
- (2) Phenylketonuria - Autosomal dominant trait

(3) Sickle cell anaemia -Autosomal recessive trait chromosome 11

(4) Thalassemia - X linked

Solutions: Sickle cell anaemia - Autosomal recessive trait chromosome 11 is the correct one.

129 Strobili or cones are found in :

- 1) Salvinia
- 2) Pteris
- 3) Marchantia
- 4) Equisetum

Solutions: Strobili or cones are found in Equisetum.

130 Identify the wrong statement with reference to the gene 'I' that controls ABO blood groups

- 1) The gene (I) has three alleles.
- 2) A person will have only two of the three alleles.
- 3) When IA and IB are present together, they express some type of sugar.
- 4) Allele "i" does not produce any sugar.

Solutions:

131 Identify the correct statement with reference to the human digestive system.

- 1) The ileum opens into the small intestine.
- 2) Serosn is the innermost layer of the alimentary canal.
- 3) The ileum is a highly coiled part.
- 4) The vermiform appendix arises from the duodenum.

Solutions: The ileum is a highly coiled part, so this is the correct statement.

132) Which of the following would help in the prevention of diuresis?

- (1) More water reabsorption due to underreaction of ADH

(2) Reabsorption of Na and water from renal tubules to aldosterone

(3) Atrial natriuretic factor causes vasoconstriction

(4) Decreases in secretion renin by JG cells

Solutions: More water reabsorption due to underreaction of ADH would help in the prevention of diuresis.

133) Match the following with respect to meiosis:

(a) Zygotene (i) Terminalization

(b) Pachytene (ii) Chiasmata

(c) Diplotene (iii) Crossing over

(d) Diakinesis (iv) Synapsis

Select the correct option from the following :

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

Solutions: (a) (iv) (b) (iii) (c) (ii) (d) (i)

134) Which of the following is not an inhibitory substance governing seed dormancy?

(1) Gibberellic acid

(2) Abscisic acid

(3) Phenolic acid

(4) Para-ascorbic acid

Solutions: Gibberellic acid is not an inhibitory substance governing seed dormancy.

135) Match the following columns and select the correct option.

Column -I

Column -II

- | | |
|------------------------------------|----------------------------------|
| (a) Bt-cotton | (i) Gene therapy |
| (b) Adenosine deaminase deficiency | (ii) Cellular defence |
| (c) RNAi | (iii) Detection of HIV infection |
| (d) PCR | (iv) Bacillus thuringiensis |

(a) (b) (c) (d)

- | | | | |
|-----------|-------|-------|-------|
| (1) (iv) | (i) | (ii) | (iii) |
| (2) (iii) | (ii) | (i) | (iv) |
| (3) (ii) | (iii) | (iv) | (i) |
| (4) (i) | (ii) | (iii) | (iv) |

Solution: (a) (iv) (b) (i) (c) (ii) (d) (iii)

136) Match the following :

- | | |
|-------------------------------------|----------------|
| (a) Inhibitor of catalytic activity | (i) Rieia |
| (b) Posses peptide bonds | (ii) Malorinta |
| (c) Cell wall material in fungi | (iii) Chitin |
| (d) Secondary metabolite | (iv) Collagen |

Choose the correct option from the following:

(a) (b) (c) (d)

- | | | | |
|-----------|------|-------|------|
| (1) (ii) | (iv) | (iii) | (i) |
| (2) (iii) | (i) | (iv) | (ii) |
| (3) (iii) | (iv) | (i) | (ii) |

- (4) (ii) (iii) (i) (iv)

Solution: (a) (ii) (b) (iv) (c) (iii) (d) (i)

137) The sequence that controls the copy number of the linked DNA in the vector, is termed:

- (1) Selectable marker
- (2) Ori-site
- (3) Palindromic sequence
- (4) Reognitions site

Solution: Ori-site is the site where DNA replication begins and controls the copy number of the linked DNA.

138) Snow- blindness in Antarctic region

- (1) Freezing of fluids in the temperature
- (2) Inflammation of cornea due UV-B radiation
- (3) High reflection of light from
- (4) Damage to retina caused by infra

Solution: Snow- blindness is caused because of direct exposure of UV-B radiations in the Antarctic region as it causes inflammation in the cornea.

139) According to Robert May, the global species diversity is about :

- (1) 1.5 million
- (2) 20 million
- (3) 50 million
- (4) 7 million

Solution: The global species diversity is about 7 million according to Robert May.

140) By which method was a new breed 'Hisardale' of sheep formed by using Bikaneri ewes and Marino rams?

- (1) Out crossing
- (2) Mutational breeding
- (3) Cross breeding
- (4) Inbreeding

Solution: Crossbreeding is the technique used in developing 'Hisardale' breed of sheep.

141) Which of the following regions of the globe exhibits highest species diversity?

- (1) Western Ghats of India
- (2) Madagascar
- (3) Himalayas
- (4) Amazon Forests

Solutions: Amazon forests have the highest diversity on the earth.

142) Match the following columns and select the correct option.

Column I

Column II

- | | |
|-------------------------------|---------------------|
| (a) G- 15 pairs of gill slits | (i) Trygon |
| (b) Heterocercal caudal fin | (ii) Cyclostomes |
| (c) Air Bladder | (iii) Chordichthyes |
| (d) Poison sting | (iv) Osteichthyes |

(a) (b) (c) (d)

(1) (ii) (iii) (iv) (iv)

(2) (iii) (iv) (i) (ii)

(3) (iv) (ii) (iii) (i)

(4) (i) (iv) (iii) (ii)

Solutions: 6-15 gill slits are found in cyclostomata which is given only in option 1.

143) Which of the following statements is not correct ?

(1) In man insulin is synthesised as a proinsulin

(2) The proinsulin has an extra peptide called C-peptide

(3) The functional insulin has A and B chains linked together by hydrogen bonds

(4) Genetically engineered insulin is produced in E-coli.

Solutions: The functional insulin has A and B chain bonded by the disulphide bridge

144) Match the organisms with its use in biotechnology

(a) *Bacillus thuringiensis* (i) Cloning vector

(b) *Thermus aquaticus* (ii) Construction of first r DNA

(c) *Agrobacterium tumefaciens* (iii) DNA polymerase

(d) *Salmonella typhimurium* (iv) Cry proteins

Select the correct option from the following :

(a) (b) (c) (d)

(1) (ii) (iv) (iii) (i)

(2) (iv) (iii) (i) (ii)

(3) (iii) (ii) (iv) (i)

(4) (iii) (iv) (i) (ii)

Solutions: *Bacillus thuringiensis* produces cry protein and that is given only in option 2.

145) Which of the following pairs is of unicellular algae ?

- (1) Laminaria and Sargassum
- (2) Gelidium and Gracilaria
- (3) Anabaena and Volvox
- (4) Chlorella and spirulina

Solution: Chlorella and spirulina are examples of unicellular algae.

146) Meiotic division of the secondary oocyte is completed :

- (1) Prior to ovulation
- (2) At the time of copulation
- (3) After zygote formation
- (4) At the time of fusion of a sperm with an ovum

Solution: Meiosis is completed when the secondary oocyte fuses with sperm.

147) Secondary metabolites such as nicotine, strychnine and caffeine are produced by plants for their :

- (1) Nutritive value
- (2) Growth response
- (3) Defence action
- (4) Effect on reproduction

Solutions:

Secondary metabolites in plants help in defence action

148) Which of the following statements are true for the phylum -Chordata ?

- (a) In a Chordata notochord extends from head to tail and it is present throughout their life.

- (b) In Vertebrata notochord is present during the embryonic period only
- (c) Central nervous system is dorsal and hollow
- (d) Chordata is divided into 3 subphyla : Hermichordata, Tunicata and Cephalochordata

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

Solutions:

In the phylum chordata:

In Vertebrata, notochord is present during the embryonic stage only

The nerve cord is dorsal and hollow

149) Bt cotton variety that was developed by the introduction of toxin gene of *Bacillus thuringiensis* (Bt) is resistant to :

- (1) Insect pests
- (2) Fungal diseases
- (3) Plant nematodes
- (4) Insect predators

Solutions: toxins from *Bacillus thuringiensis* kills Bollworm that eats cotton plant

150) The product (s) of reaction catalyzed by nitrogenase in root nodules of leguminous plants is /are :

- (1) Ammonia alone
- (2) Nitrate alone
- (3) Ammonia and oxygen
- (4) Ammonia and hydrogen

Solutions: Nitrogenase converts nitrogen into ammonia

151) Match the following columns and select the correct option,

Column -I

Column -II

(a) Pituitary gland

(i) Grave's disease

(b) Thyroid gland

(ii) Diabetes mellitus

(c) Adrenal gland

(iii) Diabetes insipidus

(d) Pancreases

(iv) Addison's disease

(a) (b) (c) (d)

(1) (iv) (iii) (i) (ii)

(2) (iii) (ii) (i) (iv)

(3) (iii) (i) (iv) (ii)

(4) (ii) (i) (iv) (iii)

Solutions:

The correct match is:

Pituitary gland - Diabetes insipidus

Thyroid gland - Graves disease

Adrenal gland - Addison's disease

Pancreas - Diabetes mellitus

152) Which one of the following is the most abundant protein in the animals?

(1) Haemoglobin

(2) Collagen

(3) Lactin

(4) Insulin

Solution:

Collagen is the most abundant proteins in animals

153) Identify the correct statement with regard to G_1 phase (Gsp1) of interphase.

- (1) DNA synthesis or replication takes place
- (2) Reorganisation of all cell components takes place
- (3) Cell is metabolically active, grows but does not replicate its DNA
- (4) Nuclear Division takes place.

Solutions: In the G_1 phase, the cell is metabolically active, grows but do not replicate its DNA.

154) Match the trophic levels with their correct species examples in grassland ecosystem.

- (a) Fourth trophic level (i) Crow
- (b) Second trophic level (ii) Vulture
- (c) First trophic level (iii) Rabbit
- (d) Third trophic level (iv) Grass

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

Solution: First trophic level is grass and only option 1 shows it.

155) The ovary is half inferior in :

- (1) Brinjal
- (2) Mustard
- (3) Sunflower
- (4) Plum

Solution:

The ovary of plum is half inferior.

156) The body of the ovule is fused within the funicle at :

- (1) Hilum
- (2) Micropyle
- (3) Nucellus
- (4) Chalaza

Solutions:

Ovule is fused with the funicle at the hilum.

157) The specific palindromic sequence which is recognized by EcoRI is :

- (1) $5' - GAATTC - 3'$
 $3' - CTTAAG - 5'$
- (2) $5' - GGAACC - 3'$
 $3' - CCTTGG - 5'$
- (3) $5' - CTTAAG - 3'$
 $3' - GAATTC - 5'$
- (4) $5' - GGATCC - 3'$
 $3' - CCTAGG - 5'$

Solutions:

The palindrome identified by EcoRI is 5'-GAATTC-3' / 3'-CTTAAG-5'

158) Which of the following is correct about viroids ?

- (1) They have RNA with protein coat
- (2) They have free RNA without protein coat
- (3) They have DNA with protein coat
- (4) They have free DNA without protein coat

Solutions:

Viroids have single-stranded RNA with no protein coat.

159) In water hyacinth and waterlily, pollination takes place by :

- (1) insects or wind
- (2) water currents only
- (3) wind and water
- (4) Insects and water

Solutions:

Due to attractive conspicuous flowers, water hyacinth and water lily are pollinated by insects and some by the wind.

160) The transverse section of a plant shows following anatomical features:

- (a) Large number of scattered vascular bundles surrounded by bundle sheath
- (b) Large conspicuous parenchyma tissue
- (c) Vascular bundles conjoint and
- (d) Phloem parenchyma absent

Identify the category of plant and its

- (1) Monocotyledonous stem
- (2) Monocotyledonous root
- (3) Dicotyledonous stem
- (4) Dicotyledonous root

Solutions:

Monocotyledonous stems have all the characters mentioned in the options.

161) Which of the following statements is correct?

- (1) Adenine pairs with thymine through two H-bonds
- (2) Adenine pairs with thymine through one H-bond
- (3) Adenine pairs with thymine through three H-bonds.
- (4) Adenine does not pair with thymine

Solutions: In double-stranded DNA, Adenine pairs with Thymine with two Hydrogen bonds that is (A=T) and Guanine pairs with Cytosine with three hydrogen bonds.

162) Select the correct statement.

- (1) Glucocorticoids stimulate gluconeogenesis
- (2) Glucagon is associated with hypoglycemia
- (3) Insulin acts on pancreatic cells and adipocytes
- (4) Insulin is associated with hyperglycemia

Solutions: Glucocorticoids are steroid hormones that promote gluconeogenesis in the liver.

163. Match the following columns and select the correct option.

Column I	Column II
(a) gregarious polyphagous pest	(i) Asterias

(b) Adult with the radial symmetry and larva with bilateral symmetry	(ii) Scorpion
(c) Book lungs	(iii) Ctenoplanes
(d) Bioluminesces	(iv) Locusta

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

Solutions:

a. gregarious polyphagous pest - Locust

b. Adult with the radial symmetry and larva with bilateral symmetry - Asterias

c. Book lungs - Scorpion

d. Bioluminesces - Ctenoplanes

164. match the following columns and select the correct option

Column -I	Column -II
(a) Eosinophils	(i) Immune response
(b) basophils	(ii) Phagocytes
(c) Neutrophils	(iii) Release histaminse, destructive enzymes
(d) Lymphocytes	(iv) Release granules containing histamine

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

Solutions:

a. Eosinophils - release histamine, destructive enzymes

b. Basophils - release granules containing histamine

c. Neutrophils - Phagocytes

d. Lymphocytes - Immune response

165. If the head of a cockroach is removed, it may live for few days because:

(1) The supra-oesophageal ganglia of the cockroach are situated in ventral part of the abdomen.

(2) the cockroach does not have a nervous system

(3) the head holds a small proportion of a nervous system while the rest is situated along the ventral part of its body.

(4) the head holds 1/3rd of a nervous system while the rest is situated along the dorsal part of the body

Solutions: The head holds a bit of a nervous system while the rest is situated along the ventral part of its body .The brain is represented by supra-oesophageal ganglion which supplies nerves to antennae and compound eyes.

166. Name the enzymes that facilitate the opening of DNA helix during transcription.

(1) DNA ligase

(2) DNA helicase

(3) DNA polymerase

(4) RNA polymerase

Solutions: During initiation in the process of transcription, the RNA polymerase holoenzyme binds to the promoter region of the transcription unit. The RNA polymerase-sigma complex binds to the promoter and initiates transcription of a specific strand of DNA. The DNA strand unwinds by the action of this complex.

167. Flippers of Penguins and Dolphins are examples of:

(1) Adaptive radiation

(2) Convergent evolution

(3) Industrial melain

(4) Natural selection

Solutions: Flippers of penguin and dolphins have different structures but similar functions and thus are categorized under analogous organs. Also, Penguin and dolphins are not closely related to each other but have evolved the similar traits (as per this question - flippers) therefore, show convergent type of evolution.

168. Which of the following hormone levels will cause the release of the ovum (ovulation) from the graffian follicle?

(1) the high concentration of estrogen

(2) the high concentration of progesterone

(3) low concentration of LH

(4) low concentration of FSH

Solutions: The high concentration of Estrogen will suppress the release of FSH through which the ovary won't be able to grow to become a fully mature Graafian follicle

169. If the distance between two consecutive base pairs is 0.34nm and the total number of base pairs of a DNA helix in a typical mammalian cell is 6.6×10^5 bp, then the length of the DNA is approximate:

(1) 2.0 meters

(2) 2.5 meters

(3) 2.2 meters

(4) 2.7 meters

Solutions: Length of the DNA = Distance between two base pairs x Total no. of base pairs.

Length of the DNA = $0.34 \times 6.6 \times 10^5 = 2.244$

170. Match the following columns and select the correct option.

Column - I	Column -II
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(a) Placenta	(i) Androgens
(b) Zona pellucida	(ii) Human Chorionic Gonadotropin (hCG)
(c) Bulbo-urethral glande	(iii) Layer of the ovum
(d) Leydig cells	(iv) Lubrication of the Penis

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

Solutions:

a. Placenta - Human Chorionic Gonadotropin (hCG)

b. Zona pellucida - Layer of the ovum

c. Bulbourethral glands - Lubrication of the Penis

d. Leydig cells - Androgens

171. Match of the following columns and select the correct option.

Column I	Column II
(a) <i>Clostridium butylicum</i>	(i) Cyclosporin - A
(b) <i>Trichoderma polysporum</i>	(ii) Butyric acid
(c) <i>Monascus purpureus</i>	(iii) Citric acid
(d) <i>Aspergillus niger</i>	(iv) Blood cholesterol lowering agent

	(a)	(b)	(c)	(d)
1.	iii	iv	ii	i
2.	ii	i	iv	iii

3.	i	ii	iv	iii
4.	iv	iii	ii	i

Solutions:

a. *Clostridium butylicum* - Butyric acid

b. *Trichoderma polysprom* - Cyclosporin - A

c. *Monasucus purpureus* - Blood cholestrol lowering agent

d. *Aspergillus niger* - Citric acid

172. Goblet cells of the alimentary canal are modified from:

- (1) Squamous epithelial cells
- (2) Columnar epithelial cells
- (3) Chondrocytes
- (4) Compound epithelial cells

Solutions: Goblet cells of the alimentary canal are modified from columnar epithelial cells.

173. Experimental verification of the chromosomal theroy of the inheritance was done by:

- (1) Mendel
- (2) Sutton
- (3) Boveri

(4) Morgan

Solutions: The experimental verification of the chromosomal theory of inheritance was done by Thomas Hunt Morgan and his colleagues which led to discovering the basis for the variation that sexual reproduction produced.

174. The process responsible for facilitating loss of water in liquid form from the tip of grass blades at night and early morning is:

- (1) transpiration
- (2) Root pressure
- (3) Inhibition
- (4) Plasmolysis

Solutions: Effects of root pressure is observable at night and early morning when evaporation is low, and excess water collects in the form of droplets around special openings of veins near the tip of grass blades, and leaves of many herbaceous parts. Such water loss in its liquid phase is known as guttation.

175. Identify the substance having a glycosidic bond and peptide bond, respectively in their structure:

- (1) Chitin, cholesterol
- (2) Glycerol, trypsin
- (3) Cellulose, lecithin
- (4) Inulin, insulin

Solutions: Inulin and Insulin are the substances having a glycosidic bond and peptide bond, respectively in their structure.

176. Which of the following is not an attribute of a population?

- (1) Sex ratio
- (2) natality
- (3) mortality
- (4) species interaction

Solutions: The factors considered under the population attributes are Birth Rate or Natality, Death Rate or Mortality and Sex Ratio.

177. The enzyme enterokinase helps in conversion of:

- (1) protein into polypeptide
- (2) trypsinogen into trypsin
- (3) caeinogen into casein
- (4) pepsinogen into pepsin

Solutions: The enzyme enterokinase helps in the conversion of trypsinogen into trypsin. The enzyme trypsin further helps in the breakdown of proteins for the process of digestion.

178. Some dividing cells exit the cell cycle and enter the vegetative inactive stage. This is called the quiescent stage (G_0). This process occurs at the end of:

- (1) M phase
- (2) G_1 phase
- (3) S phase
- (4) G_2 phase

Solutions: G_1 is commonly called Pre DNA synthesis phase or first gap phase. The cell recovers from the previous division.

179. In relation to gross primary productivity and Net primary productivity of an ecosystem which one of the following statements is correct?

- (1) Gross primary productivity is always less than net primary productivity
- (2) Gross primary productivity is always more than net primary productivity
- (3) Gross primary productivity and net primary productivity are one and the same
- (4) There is no relationship between Gross primary productivity and net primary productivity.

Solutions: Gross primary productivity is always more than net primary productivity. It is because GPP is the total solar energy trapped in the food material by photosynthesis. On the other hand, Gross primary productivity minus respiration losses (R), is the net primary productivity (NPP)

180. Which of the following is put into Anaerobic digester for further sewage treatment?

(1) Primary sludge

(2) Floating debris

(3) effluents of primary treatment

(4) Activated sludge

Solutions: Activated sludge is a type of wastewater system as aerated sewage containing aerobic microorganisms which help to break it down.
