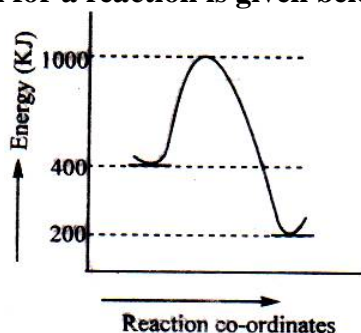


88. Energy profile diagram for a reaction is given below. The heat of reaction is



- 1) - 200 KJ                      2) 200 KJ                      3) 800 KJ                      4) 600 KJ
89. Which of the following statements are correct?  
 A) Eutrophication is mainly caused by phosphates  
 B) Ozone layer is destroyed by C.F.C  
 C) M.I.C. is a contaminant  
 D) Benzopyrene is not carcinogenic  
 1) A, B, D                      2) B, C, D                      3) A, B, C                      4) A, B, D
90. In the balancing of the reaction,  $Cr_2O_7^{2-} + NO_2^- + H^+ \rightarrow Cr^{+3} + NO_3^- + H_2O$  the stoichiometric coefficients of  $Cr_2O_7^{2-}$ ,  $NO_2^-$  and  $H^+$  respectively are  
 1) 1, 3, 8                      2) 1, 4, 8                      3) 1, 3, 12                      4) 1, 5, 12

### BIOLOGY

91. Botanical gardens:  
 1) Have collections of living plants for reference  
 2) Is an ex-situ conservation strategy  
 3) Contains labeled plants indicating its botanical/ scientific name and family  
 4) All of the above
92. Alveoli of the lungs are lined by which epithelium:-  
 1) Stratified epithelium                      2) Simple cuboidal epithelium  
 3) Stratified cuboidal epithelium                      4) Simple squamous epithelium
93. Read the following table carefully and select the correct option for W, X, Y, Z
- | Common Name | Biological Name   | Family | Order      |
|-------------|-------------------|--------|------------|
| Wheat       | Triticum aestivum | X      | Y          |
| Mango       | W                 | Z      | Sapindales |
- 1)  $W = Oryza sativa$ ,  $X = Poaceae$ ,  $Y = Poales$ ,  $Z = Anacardiaceae$   
 2)  $W = Mangifera indica$ ,  $X = Anacardiaceae$ ,  $Y = Sapindales$ ,  $Z = Poaceae$   
 3)  $W = Oryza sativa$ ,  $X = Sapindales$ ,  $Y = Poaceae$ ,  $Z = Poales$   
 4)  $W = Mangifera indica$ ,  $X = Poaceae$ ,  $Y = Poales$ ,  $Z = Anacardiaceae$
94. In the given list how many animals have complete double circulation:  
**Fish, Alligator, Frog, lung fish, Prawn, Crocodile, birds, mammals**  
 1) Five                      2) Four                      3) Three                      4) Six
95. Dinoflagellates have two flagella:  
 1) Both lying longitudinally between the wall plates  
 2) One lying longitudinally and the other transversely in a furrow between the wall plates  
 3) Both lying transversely between the wall plates  
 4) But do not help in their movement

96. Read the statements with regard to frog, Which of the statement is/are correct and incorrect?

I) The medulla oblongata passes out through foramen of Monro and continues into spinal cord

II) Vasa efferentia 10 -12 in number that arise from testes

III) Ovaries have no functional connection with kidneys.

IV) Frogs are uricotelic

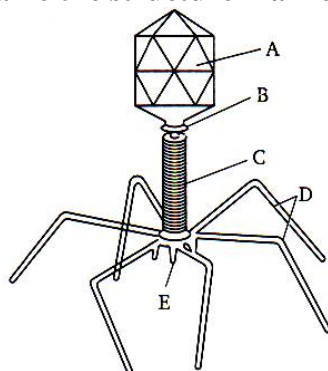
1) Statements (I), (II) and (III) are correct while statement (IV) is incorrect.

2) Statements (I) and (II) are correct while statement (III) and (IV) are incorrect

3) Statements (II) and (III) are correct while statement (I) and (IV) are incorrect

4) Statements (II), (III) and (IV) are correct while statement (I) is incorrect.

97. Identify the virus and name the structure marked A, B, C, D and E:



1) Bacteriophage, A = Head, B = Sheath, C= Collar, D= Tail fibre, E= Base plate

2) Bacteriophage, A = Head, B= Collar, C= Base plate, D= Sheath, E= Tail fibre

3) Bacteriophage, A = Head, B= Sheath, C= Tail fibre, D= Collar, E= Base plate

4) Bacteriophage, A= Head, B= Collar, C= Sheath, D= Tail fibre, E= Base plate

98. Contribution of India in global species diversity is:

1) 1.8 %

2) 2.4 %

3) 8.1 %

4) 4.2 %

99. In gymnosperms:

1) Ovules are not enclosed by ovary

2) Ovules remain exposed both before and after fertilization

3) Seeds are naked and not covered by fruit

4) All are correct

100. In man, 'taeniae coli' are

1) External bulged out pouches of colon

2) Longitudinal muscular folds of rectum

3) External bulged out pouches of rectum

4) Longitudinal muscular folds of colon

101. Match the column :

Column – I

A) Psilopsida

B) Lycopsida

C) Sphenopsida

D) Pteropsida

1) A – I, B – IV, C – III, D – II

3) A – I, B – II, C – III, D – IV

Column – II

I) *Dryopteris, Pteris and Adiantum*

II) *Equisetum*

III) *Selaginella and Lycopodium*

IV) *Psilotum*

2) A – II, B – IV, C – III, D – I

4) A – IV, B – III, C – II, D – I

102. Triglycerides in the chylomicrons are digested by

1) Gastric lipase

2) Lingual lipase

3) Intestinal lipase

4) Lipoprotein lipase

103. Select the correct statements:

A) From the region of elongation, some epidermal cells form root hairs

B) Pneumatophores are seen in *Rhizophora*

C) Adventitious roots are seen in the banyan trees

D) Maize and sugarcane have prop- roots

1) A and D

2) A, C and D

3) C and D

B and C

104. Note the following.

- A) Active process      B) Passive process      C) Decrease in pulmonary volume  
 D) Increase in pulmonary volume      E) Relaxation of diaphragm  
 F) Contraction of diaphragm

From the above aspects which are suitable to normal expiration in human being?

- 1) A, D, F      2) B, C, F      3) B, C, E      4) A, D, E

105. Match the column w.r.t placentation:

Column – I

- A) Axile  
 B) Parietal  
 C) Free – central  
 D) Basal

Column – II

- I) Dianthus, Primrose  
 II) Sunflower, marigold  
 III) China rose, tomato, lemon  
 IV) Mustard, Argemone

1) A – III, B – IV, C – II, D – I

2) A – IV, B – III, C – I, D – II

3) A – III, B – IV, C – I, D – II

4) A – II, B – III, C – IV, D – I

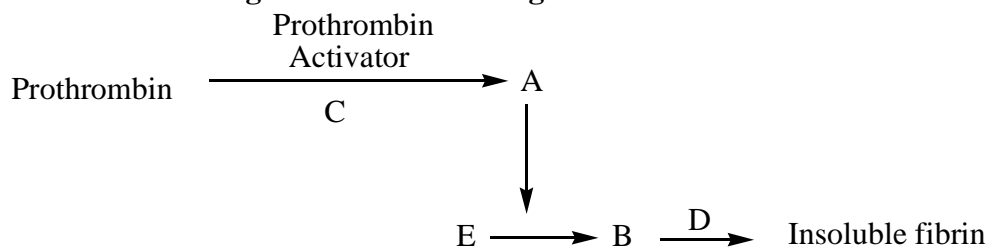
106. Which of the following would have the same O<sub>2</sub> content?

- 1) Blood entering the lungs – blood leaving the lungs  
 2) Blood entering the right side of the heart blood leaving the right side of the heart  
 3) Blood entering the right side of the heart blood leaving the left side of the heart  
 4) Blood entering the tissue capillaries – blood leaving the tissue capillaries

107. *Parkinsonia* and Australian Acacia are popular examples of:

- 1) Phylloclade      2) Phyllode      3) Cladode      4) Cladophyll

108. Read the following about blood clotting



In the above process A, B, C, D and E are respectively

- 1) Thrombin, Soluble fibrin, Factor IV, Factor XIII and Soluble fibrinogen  
 2) Thrombin, Soluble fibrin, Factor IV, Factor XIII and insoluble fibrinogen  
 3) Thrombin, Soluble fibrin, Factor III, Factor XIII and Soluble fibrinogen  
 4) Thrombin, Soluble fibrin, Factor II, Factor XIII and Soluble fibrinogen

109. If recombinant DNA is inserted within the coding sequence of enzyme galactosidase. Which of the following will occur in case of non-recombinants ?

- 1) Insertional inactivation      2) Colonies do not produce any colour  
 3) Chromogenic Substrate gives blue colour  
 4) Inactivation of enzyme galactosidase

110. Consider the following four statements(i) – (iv) and select the correct option

- I) Fish heart contains only oxygenated blood  
 II) Closure of A – V valves produces the second heart sound  
 III) Columnae carneae occur in the atria  
 IV) Purkinje fibres are nerve fibres present in the heart wall

- |    | I | II | III | IV |    | I | II | III | IV |
|----|---|----|-----|----|----|---|----|-----|----|
| 1) | F | F  | T   | F  | 2) | F | F  | F   | T  |
| 3) | T | T  | F   | T  | 4) | T | F  | T   | F  |

111. In “QB” Bacteriophage genetic material is :

- 1) DNA      2) RNA      3) Protein      4) None

112. Angiotensinogenase is secreted by

- 1) Juxtaglomerular cells      2) Juxta medullary cells  
 3) Liver      4) Lungs

113. Which of the following statements are correct for sap wood?

- I) It does not help in water conduction
  - II) It is light coloured
  - III) It is also called alburnum
  - IV) Its tracheary elements are filled with tannins, resins, oils, gums aromatic compounds and essential oils
  - V) It is hard and durable
- 1) II, III                      2) I, II, III                      3) IV, V                      4) III, IV, V

114. Choose the correct one regarding urinary excretion

- 1) Urinary excretion = Tubular reabsorption + Glomerular filtration – Tubular secretion
- 2) Urinary excretion = Glomerular filtration – Tubular reabsorption – Tubular secretion
- 3) Urinary excretion = Tubular secretion + Tubular reabsorption – Glomerular filtration
- 4) Urinary excretion = Glomerular filtration – Tubular reabsorption + Tubular secretion

115. Match the column:

**Column- I**

- A) Bean shaped guard cell
- B) Dumb-bell shaped guard cell
- C) Trichome
- D) Exarch xylem

- 1) A – II, B – III, C – I, D – IV
- 3) A – IV, B – III, C – I, D – II

**Column – II**

- I) Dicot stem
- II) Monocot leaf
- III) Dicot leaf
- IV) Dicot and monocot root

- 2) A – III, B – II, C – I, D – IV
- 4) A – III, B – IV, C – II, D – I

116. The change that takes place in “cori cori” cycle

- 1) Glycogen is formed from lactic acid in muscles
- 2) Urea is formed from ammonia in liver
- 3) Glycogen is formed from lactic acid in liver
- 4) Phosphocreatine is formed from creatine in liver

117. Stele excludes:

- 1) Pericycle                      2) Vascular bundles                      3) Pith                      4) Endodermis

118. The shoulder blade is made of

- 1) Clavicle                      2) Humerus                      3) Ilium                      4) Scapula

119. Select the wrong match:

- 1) Aleuroplast – Protein storage                      2) Elaioplast – Fat / oil storage
- 3) Amyloplast – Starch storage                      4) Etioplast – Chlorophyll storage

120. Study the following statements

- I) Summation of postsynaptic potentials occurs at axon hillock
- II) Action potentials are developed when the EPSPs are greater than the IPSPs
- III) Efflux of  $K^+$  causes repolarization

Which of the above are correct?

- 1) Only II                      2) Only I                      3) Only I and II                      4) I, II, III

121. Study the names of different cell organelles/ structure given below:

**Lysosome, Mitochondria, Golgi, ER, Ribosome, Chromosome, Thylakoid, Flagella, Peroxisome**

How many of the above are bound by single membrane?

- 1) Six                      2) Two                      3) Four                      4) Three

122. Visual impulses from the retina of eye reach this part of human brain

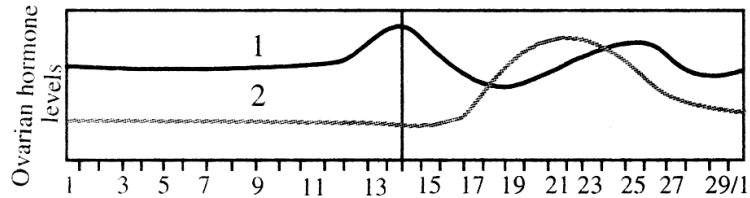
- 1) Superior colliculi                      2) Occipital lobe of cerebrum
- 3) Parietal lobe of cerebrum                      4) Pons Varolii

123. \_\_\_\_\_ is the most abundant protein in animal world and \_\_\_\_\_ is the most abundant protein in the whole biosphere.

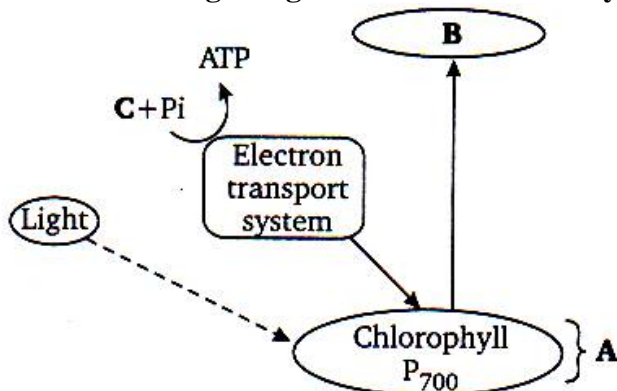
- 1) Insulin, PEP-case                      2) Insulin, RuBisCO                      3) Collagen, PEP-case                      4) Collagen, RuBisCO



132. Study the following statements and choose the correct option  
 I) In periodic abstinence, couples avoid coitus from 17<sup>th</sup> to 27<sup>th</sup> day of the menstrual cycle  
 II) Saheli, once a week pill, developed by CDRI, Lucknow is a steroidal oral contraceptive  
 III) Diaphragms are the reusable female contraceptive barriers  
 IV) LNG – 20 is a hormone releasing IUD.  
 1) I and II only      2) II, III and IV only      3) III and IV only      4) All
133. Solution A has  $\psi_s = -30$  bars and  $\psi_p = 5$  bars. Solution B have  $\psi_s = -10$  bars and  $\psi_p = 0$  bars. The two are separated by a semipermeable membrane. Flow of water will be  
 1)  $A \rightarrow B$       2)  $B \rightarrow A$       3) Equal in both directions      4) No flow of water
134. The following graph shows the levels of ovarian hormones during a menstrual cycle. What do 1 and 2 represent?



- 1      2  
 1) Progesterone      Estrogen  
 2) FSH      LH  
 3) LH      FSH  
 4) Estrogen      Progesterone
135. AUG initiation codon occurs over  
 1) 3<sup>l</sup> end of m-RNA      2) 5<sup>l</sup> end of m-RNA      3) Short arm of t RNA      4) Long arm of t-RNA
136. Read the given statements and select the correct option.  
 Statement (1): MTP is considered relatively safe during the first trimester of pregnancy  
 Statement(2) : Foetus becomes intimately associated with the maternal tissues after the first trimester  
 1) Both statement 1 and 2 are correct  
 2) Statement 1 incorrect and 2 is correct  
 3) Statement 1 is correct and statement 2 is incorrect  
 4) Both statement 1 and 2 are incorrect.
137. Leghaemoglobin function as:  
 1) Oxygen scavenger      2) Nitrogen scavenger      3) CO<sub>2</sub> scavenger      4) Hydrogen carrier
138. If the blood group of a man is 'O' and that of his wife is 'AB<sup>+</sup>', how many of their children have the phenotype for the blood group of father and mother respectively?  
 1) 100 % & 0 %      2) 0 % & 100 %      3) 50 % & 50 %      4) 0 % & 0 %
139. To remove one molecule of glucose from Calvin cycle, \_\_\_\_\_ turns of the cycle are required:  
 1) 6      2) 4      3) 2      4) 5
140. Find out the mismatch from the following related to skin colour of man  
 1) aabbcc – very fair      2) AABbCC – very dark  
 3) AaBbCc – intermediate shade      4) AABbcc – very light
141. Observe the diagram given below and identify A, B and C.





149. Match the following:

Column – I

- A) IAA  
B) ABA  
C) Ethylene  
D) GA  
E) Cytokinins

Column – II

- I) Herring sperm DNA  
II) Bolting  
III) Stomatal closure  
IV) Weed-free lawns  
V) Ripening of fruits

- 1) A – IV, B – III, C – V, D – II, E – I  
2) A – V, B – III, C – IV, D – II, E – I  
3) A – IV, B – I, C – IV, D – III, E – II  
4) A – V, B – III, C – II, D – I, E – IV

150. “The early embryos of various vertebrates exhibit the fundamental similarity”. This is stated by

- 1) Von Baer                      2) Ernst Haeckel                      3) Lamarck                      4) Nuttall

151. Match the column :

Column – I

- A) Zoospore  
B) Conidia  
C) Gemmule  
D) Buds

Column – II

- I) Penicillium  
II) Sponges  
III) Hydra  
IV) Chlamydomonas

- 1) A – I, B – IV, C – II, D – III  
2) A – III, B – II, C – I, D – IV  
3) A – IV, B – III, C – II, D – I  
4) A – IV, B – I, C – II, D – III

152. Match the following:

List – I

- A) T.R.Malthus  
B) Charles Darwin  
C) Weismann  
D) Lamarck  
E) Alfred Russel Wallace

List- II

- I) On the tendency of varieties to depart from original types  
II) Philosophie zoologique  
III) On the principles of populations  
IV) Natural selection  
V) Decaudalisation experiments

- |    | A   | B  | C  | D  | E |    | A   | B   | C | D  | E  |
|----|-----|----|----|----|---|----|-----|-----|---|----|----|
| 1) | III | V  | IV | II | I | 2) | III | II  | V | I  | IV |
| 3) | III | IV | V  | II | I | 4) | IV  | III | V | II | I  |

153. What is the chromosome number in the meiocytes of human beings, fruit fly, *Ophioglossum* and *Zea mays* respectively?

- 1) 46, 20, 1260, 8                      2) 46, 1260, 20, 8                      3) 46, 8, 1260, 20                      4) 46, 8, 20, 1260

154. Read the following

- A) *Homo erectus*                      B) *Homo sapiens*                      C) *Homo neanderthalensis*  
D) *Homo habilis*                      E) *Ramapithecus*                      F) *Australopithecus*

Arrange the above based on probable evolutionary sequence

- 1) E, F, A, D, C, B                      2) F, E, D, A, C, B                      3) F, E, A, D, C, B                      4) E, F, D, A, C, B

155. Find out correct order of vegetative propagules of plants like Potato, Ginger, Agave, *Bryophyllum* and Water Hyacinth:

- 1) Offset, bulbil, leaf bud, rhizome and eyes                      2) Leaf bud, bulbil, offset, rhizome and eyes  
3) Eyes, rhizome, bulbil, leaf buds and offset                      4) Rhizome, bulbil, leaf bud, eyes and offset

156. Match the following:

Disease

- A) Typhoid fever  
B) Pneumonia  
C) Common cold  
D) Ringworm

Causative Agent

- I) *Microsporium*  
II) *Salmonella*  
III) *Streptococcus*  
IV) Rhino virus

Sympton

- a) Fluid – filled alveoli  
b) Nasal congestion  
c) Dry and scaly lesions  
d) Intestinal perforation

The correct match is:

- 1) A (II) d B (IV) a C (III) b D (I) c                      2) A(II) d B (III) a C (IV) b D (I) c  
3) A (II) d B (III) a C (IV) b D (I) c                      4) A(II) c B (III) a C (IV) b D (I) d



157. Read the following statements:

- I) The pollen grains are light and non-sticky
- II) Stamens are well exposed from the flowers
- III) Very often feathery stigmas are present
- IV) Single ovule in each ovary is present
- V) Flowers are packed into inflorescence

Which of the following statements are correct w.r.t anemophilous plants?

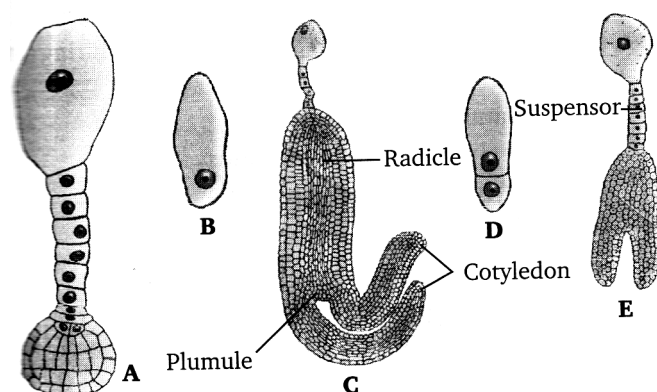
- 1) I, II, III                      2) III, IV and V                      3) I, II                      4) I, II, III, IV and V

158. Which of the following provide the sites for interaction of lymphocytes with the antigen?

- A) Bone marrow
- B) Spleen
- C) Thymus gland
- D) Lymph nodes
- E) Appendix
- F) Peyer's patches of small intestine

- 1) B and C only                      2) B, D, E and F                      3) B and D only                      4) B, D and F only

159. Arrange A, B, C, D and E in the sequence of dicot embryo development from zygote stage.



- 1) A → C → D → B → E                      2) C → B → D → E → A  
 3) A → B → C → E → D                      4) B → D → A → E → C

160. The exaggerated immune response of the immune system to certain antigens is called

- 1) Auto-immune disorder
- 2) Hypersensitivity
- 3) Graft rejection
- 4) All the three

161. A hexaploid (6n) female plant gets pollinated by an octaploid (8n) male plant. As a result of double fertilization, what will be the ploidy of embryo and endosperm respectively?

- 1) 10n, 7n                      2) 6n, 8n                      3) 7n, 10n                      4) 8n, 6n

162. GEAC means

- 1) General engineering approval committee
- 2) Genetic Engineering approval committee
- 3) Generator energy approval committee
- 4) Green environment approval committee

163. How many different types of gametes would be formed in an individual who is heterozygous for four different loci?

- 1) 16                      2) 12                      3) 8                      4) 4

164. Match the following

List- I

- A) Allen's rule
- B) Bergmann's rule
- C) Coral animals
- D) Van't hof's rule

List- II

- I) Eurythermal
- II) Temperature effect on length of extremities
- III) Body volume temperature
- IV) Temperature metabolic rate
- V) Stenothermal

- 1) A – II, B – III, C – V, D – IV                      2) A – II, B – III, C – I, D – IV  
 3) A – V, B – IV, C – III, D – I                      4) A – II, B – V, C – IV, D – I

165. Study the following lists:

List- I

- A) T. H. Morgan
- B) G.J. Mendel
- C) Bateson
- D) Reginal C. Punnett

List- II

- I) Coined the term genetics
- II) Linkage
- III) Checker board
- IV) Laws of heredity
- V) Mutations

The correct match is:

- |    | A   | B  | C | D  |    | A  | B   | C  | D   |
|----|-----|----|---|----|----|----|-----|----|-----|
| 1) | III | IV | I | II | 2) | II | IV  | I  | III |
| 3) | I   | II | V | IV | 4) | IV | III | II | I   |

166. Obligatory relationship between two organisms in which both are benefitted is called:-

- 1) Proto- cooperation
- 2) Amensalism
- 3) Commensalism
- 4) Mutualism

167. Heterozygotic tall plant (Tt) is crossed with homozygous dwarf(tt) plant. Then what will be the percentage of dwarf plants in the next generation?

- 1) 0 %
- 2) 50 %
- 3) 25 %
- 4) 100 %

168. Identify the logistic growth equation

- 1)  $\frac{dN}{dt} = rN \left( \frac{K-N}{N} \right)$
- 2)  $\frac{dN}{dt} = rN$
- 3)  $\frac{dN}{dt} = rN \left( \frac{K-N}{K} \right)$
- 4)  $\frac{dN}{dt} = rN \left( \frac{N-K}{K} \right)$

169. Which of the following correctly represents DNA replication?

- 
- 1)
  - 2)
  - 3)
  - 4)

170. All automobiles in India have met Euro- IV norms by

- 1) April 1, 2010
- 2) April 1, 2012
- 3) May 5, 2014
- 4) May 5, 2000

171. In sea urchin DNA, which is double stranded, 17% of the bases were shown to be cytosine. The percentages of other bases expected to be present in this DNA

- 1) G = 8.5%, A = 50 %, T = 24.5 %
- 2) G = 34%, A = 24.5 %, T = 24.5 %
- 3) G = 17%, A = 16.5%, T = 32.5 %
- 4) G = 17%, A = 33%, T = 33 %

172. Ozone layer of upper atmosphere is being destroyed by:-

- 1) Sulphurdioxide
- 2) Carbondioxide
- 3) Chlorofluorocarbon
- 4) Smog

173. Which of the following cry gene codes for the protein which can control the corn borer effectively?

- 1) Cry I Ac
- 2) Cry II Ab
- 3) Cry I Ab
- 4) Cry II Ac

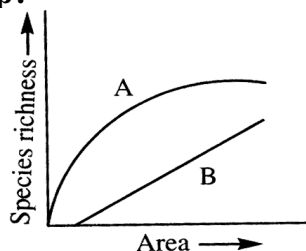
174. First biosphere reserve was established in 1986 at

- 1) Nilgiri
- 2) Nanda Devi
- 3) Rann of Kutch
- 4) Sunderbans

175. Which of the following are varieties of wheat?

- 1) Reimei and Jagannath
- 2) Kalyan sona and Sonalika
- 3) Himgiri and Parbhani Kranti
- 4) None of the above

176. Which option correctly describes the equations of curves A and B, in the given graph as species area relationship?



- | A   | B  |
|---|--|
| 1) $S = CA^Z$   | $\text{Log } S = \text{Log } C + Z \text{ Log } A$ |
| 2) $\text{Log } S = \text{Log } C + Z \text{ Log } A$ | $S = CA^Z$   |
| 3) $\text{Log } C = \text{Log } S + Z \text{ Log } A$ | $S = CA^Z$   |
| 4) $S = CA^Z$   | $\text{Log } C = \text{Log } S + Z \text{ Log } A$ |

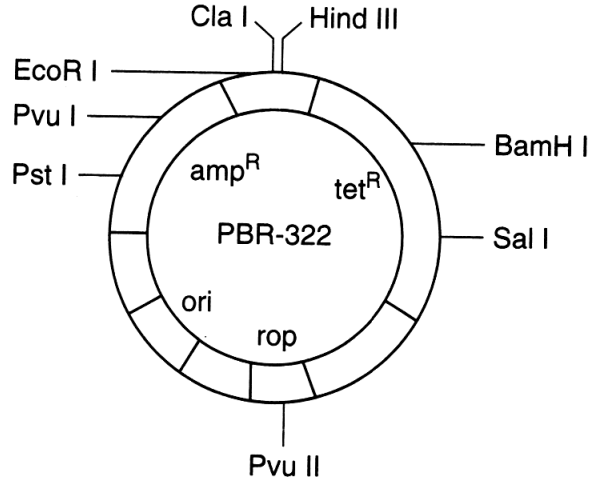
177. The BOD test measures the rate of :

- 1) O<sub>2</sub> uptake by microbes in a sample of water to oxidise organic matter
- 2) Organic matter production
- 3) Air quality
- 4) Organic matter use by herbivore fishes

178. Agglomerular kidney exist in

- 1) Marine cartilaginous fishes
- 2) Fresh water Bony Fishes
- 3) Fresh water Chondrichthyes fishes
- 4) Marine Bony Fishes

179. The figure given below is the diagrammatic representation of the E.coli vector pBR-322. Which one of the given options correctly identifies its certain component(s)?



- 1) Ori-original restriction enzyme
- 2) rop-reduced osmotic pressure
- 3) Hind III, Eco RI-selectable markers
- 4) amp<sup>R</sup>, tet<sup>R</sup>-antibiotic resistance gene

180. Association between 'cattle egret' and 'grazing cattle' is (Assume '+' sign for beneficial organism and '-' sign for detrimental and '0' for neutral interaction)

- 1) + and -
- 2) + and 0
- 3) - and 0
- 4) + and +