



NEET MOCK TEST 1- BIOLOGY

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NEET 2016 Solved Paper

AIPMT 2015 Retest Solved Paper

AIPMT 2015 Solved Paper

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PART C – BIOLOGY

DIRECTIONS : There are 90 multiple choice questions numbered 91 to 180. Each question has 4 choices (1), (2), (3) and (4), out of which ONLY ONE is correct.

91. Early and late blight of potato are caused respectively by
 (1) *Fusarium* and *Claviceps*
 (2) *Gibberella* and *Penicillium*
 (3) *Aspergillus* and *Ustilago*
 (4) None of the above
92. The green alga rich in proteins used as food supplements even by space travellers is
 (1) *Chlamydomonas* (2) *Spirogyra*
 (3) *Spirulina* (4) *Chlorella*
93. Which of the following pteridophytes is heterosporous in nature?
 (1) *Psilotum* (2) *Adiantum*
 (3) *Equisetum* (4) *Salvinia*
94. Which of the following does not have an excretory system?
 (1) *Myxine* (2) *Carcharodon*
 (3) *Balanoglossus* (4) *Asterias*
95. The flightless bird among the following is
 (1) *Columba* (2) *Neophron*
 (3) *Struthio* (4) *Corvus*
96. When tripalmitin is used as a substrate in respiration, the R.Q. is
 (1) > 1 (2) 1.0
 (3) 0.9 (4) 0.7
97. Select the activities associated with gibberellins.
 (A) Apical dominance (B) Good herbicides
 (C) Promotes bolting (D) Delay senescence
 (E) Stimulates closure of stomata
 (1) (A) and (B) only (2) (B) and (C) only
 (3) (B) and (D) only (4) (C) and (D) only
98. Much developed larynx of human male is called
 (1) Aristotle's lantern (2) Syrinx
 (3) Adam's apple (4) Muller's organ
99. The layer of cells that secrete enamel of tooth is
 (1) dentoblast (2) ameloblast
 (3) osteoblast (4) odontoblast
100. Dead space air in man is
 (1) 500 ml (2) 150 ml
 (3) 250 ml (4) 1.5 L
101. Human chorionic gonadotropin is secreted by
 (1) chorion (2) amnion
 (3) corpus luteum (4) placenta
102. What is the function of copper-T ?
 (1) Checks mutation
 (2) Stops fertilization
 (3) Stops zygote formation
 (4) Stops obliteration of blastocoel
103. The most important component of the oral contraceptive pills is
 (1) progesterone (2) growth hormone
 (3) thyroxine (4) luteinising hormone
104. A woman with two genes (one on each X-chromosome) for haemophilia and one gene for color blindness on the X-chromosome marries a normal man. How will the progeny be?
 (1) All sons and daughters are haemophilic and colorblind
 (2) Haemophilic and colorblind daughters
 (3) 50% haemophilic, colorblind sons and 50% haemophilic sons
 (4) 50% haemophilic daughters and 50% colorblind daughters
105. X linked recessive gene is
 (1) always expressed in male
 (2) always expressed in female
 (3) lethal

(4) sub-lethal

106. Read the given statements and select the incorrect ones.

- (i) Sporophyte in mosses is more elaborate than that in liverworts.
- (ii) *Salvinia* is homosporous
- (iii) Life-cycle in all spermatophytes is diplontic
- (iv) In *Cycas*, male cones and megasporophylls are borne on the same trees

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

107. Read the following statements and select the incorrect ones.

- (i) Circulatory system in arthropods is of closed type.
- (ii) Parapodia in annelids help in swimming.
- (iii) Phylum Mollusca is the second largest animal phylum.
- (iv) Aschelminthes are dioecious.

- (1) (i) and (iii) only (2) (i) only
- (3) (iii) only (4) (iii) and (iv) only

108. Which one of the following groups of animal is correctly matched with its characteristic feature without any exception?

- (1) Reptilia : possess 3-chambered heart with an incompletely divided ventricle
- (2) Chordata : possess a mouth with an upper and a lower jaw
- (3) Chondrichthyes : possess cartilaginous endoskeleton
- (4) Mammalia : give birth to young ones

109. Match Column-I with Column-II and select the correct option from the codes given below.

Column-I	Column-II
A. Vessels	I. Cells are living with thin cellulosic cell walls
B. Tracheids	II. Cells possess highly thickened walls with obliterated central lumen
C. Xylem fibres	III. Individual members are interconnected through

perforations in their common walls

- D. Xylem parenchyma IV. Elongated tube-like cells with thick, lignified walls and tapering ends

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

110. Three types of tissue system have been recognized in plants on the basis of their functions. Select the correct option regarding this.

- (1) Epidermal tissue system consists of epidermis and epidermal appendages, which provide protection to the internal tissues.
- (2) All tissues except epidermis and vascular bundles constitute the ground tissue, which forms the major part of a plant's body.
- (3) Vascular tissue system consists of complex tissues i.e., xylem and phloem.
- (4) All of these

111. AIDS is characterized by

- (1) decrease in the number of killer T-cells
- (2) decrease in the number of suppressor T-cells
- (3) decrease in the number of helper T-cells
- (4) increase in the number of helper T-cells

112. Holstein-Friesian, Brown Swiss and Jersey are all well known

- (1) exotic breeds of cow
- (2) exotic breeds of goat
- (3) exotic breeds of poultry
- (4) animal husbandry scientists

113. Which of the following statement is/are not correct for single cell protein (SCP)?

- (i) The biomass is obtained from unicellular microorganisms only

- (ii) It provides a protein rich supplement
 (iii) SCP can be produced by using bacteria and algae but not fungi
 (iv) It helps to minimise environmental pollution
 (v) SCP has to be processed before use
 (1) (i), (iii) and (iv) (2) (iii) only
 (3) (iv) only (4) (i) and (iii)
- 114.** Which one of the following combinations of organisms are responsible for the formation and flavour of yoghurt?
 (1) *Lactobacillus bulgaricus* and *Streptococcus thermophilus*
 (2) *Rhizobium meliloti* and *Azotobacter*
 (3) *Bacillus subtilis* and *Escherichia coli*
 (4) *Bacillus megathermus* and *Xanthomonas* species
- 115.** India relishes a history of religious and cultural traditions which emphasized the protection of nature. In many cultures, tracts of forest were set aside, all the trees and wildlife within were venerated and given total protection. Such areas are referred to as
 (1) hot spots (2) ethical groves
 (3) sacred groves (4) protected areas
- 116.** Amrita Devi Bishnoi Wildlife Protection Award is for the individuals or communities from rural areas that have shown extraordinary courage in
 (1) reducing environmental pollution
 (2) reducing global warming
 (3) protecting wildlife
 (4) reforestation in deforested area
- 117.** How many of the given features are associated with keys? Couplet, Quick referral system, Ex-situ Conservation, Analytics, Preservation of specimen, Lead
 (1) Four (2) Three
 (3) Five (4) Six
- 118.** Structural and functional feature of fungi in endomycorrhiza is
 (1) Hartig net (2) Mantle
 (3) Extracellular sheath (4) Arbuscule
- 119.** Which of the following group of animal have a partially open, fluid filled body cavity which develop from the first formed embryonic cavity blastocoel?
 (1) Flatworms (2) Earthworms
 (3) Roundworms (4) Shipworms
- 120.** Ephyra is the stage in the life cycle of
 (1) *Physalia* (2) *Obelia*
 (3) *Aurelia* (4) sea anemone
- 121.** Aril is the edible part of
 (1) apple (2) litchi
 (3) banana (4) mango.
- 122.** Which of the following is the characteristic feature of androecium of *Pisum sativum*?
 (1) Ten stamens, diadelphous and ditheous anther.
 (2) Five stamens, diadelphous and monotheous anther.
 (3) Five stamens, epipetalous and ditheous anther.
 (4) Six stamens, epipetalous and ditheous anther.
- 123.** Alburnum is otherwise known as
 (1) periderm (2) sapwood
 (3) heart wood (4) bark
- 124.** Which of the following is not a part of epidermal tissue system?
 (1) Companion cells (2) Trichomes
 (3) Root hair (4) Guard cells
- 125.** In earthworms setae are present in all segments except
 (1) first and the last segments
 (2) first segment and the clitellum
 (3) first segment
 (4) clitellum and last segments
- 126.** Which of the following enzymes has heme as a prosthetic group?
 (i) Catalase
 (ii) Carboxypeptidase

- (iii) Succinic dehydrogenase
(iv) Peroxidase
(1) (i) only (2) (i) & (ii)
(3) (iii) & (iv) (4) (i) & (iv)
- 127.** Colchicine prevents the mitosis of cells at which of the following stage ?
(1) Anaphase (2) Metaphase
(3) Prophase (4) Interphase
- 128.** Select the correct events leading to the opening of the stomata
(A) decline in guard cell solutes
(B) lowering of osmotic potential of guard cells
(C) rise in potassium levels in guard cells
(D) movement of water from neighbouring cells into guard cells
(E) guard cells becoming flaccid
(1) A and E only (2) B, C and D only
(3) A, C and D only (4) B, D and E only
- 129.** DCMU
(1) inhibits PS-I
(2) inhibits PS-II
(3) destroys chloroplast
(4) inhibits oxidative phosphorylation
- 130.** A bird excretes nitrogenous waste materials in the form of
(1) uric acid (2) ammonia
(3) urea (4) amino acids
- 131.** The joint between atlas and axis is called
(1) pivot joint (2) hinge joint
(3) saddle joint (4) angular joint
- 132.** Fenestra ovalis is the opening of –
(1) Cranium (2) Tympanum
(3) Tympanic cavity (4) Brain
- 133.** Autonomic nervous system affects
(1) reflex actions (2) sensory organs
(3) internal organ (4) None of these
- 134.** The order of the three layers of cells in the retina of human eye from inside to outside is
(1) bipolar cells, photoreceptor cells, ganglion cells
(2) ganglion cells, rods, cones
(3) ganglion cells, bipolar cells, photoreceptor cells
(4) photoreceptor cells, ganglion cells, bipolar cells
- 135.** The contraction of gall bladder is due to
(1) gastrin (2) secretin
(3) cholecystokinin (4) enterogastrone
- 136.** The hormone which regulates sleep-wake cycle in man is
(1) oxytocin (2) vasopressin
(3) thyroxine (4) thyrocalcitonin
- 137.** What is common between vegetative reproduction and apomixis?
(1) Both are applicable to only dicot plants
(2) Both bypass the flowering phase
(3) Both occur round the year
(4) Both produces progeny identical to the parent
- 138.** Double fertilization occurs in
(1) *Riccia* (2) *Pteridium*
(3) *Cycas* (4) *Capsella*
- 139.** Which of these is a condition that makes flowers invariably autogamous?
(1) Dioecy (2) Self-incompatibility
(3) Cleistogamy (4) Xenogamy
- 140.** Accessory sexual character in female is promoted by
(1) androgen (2) progesterone
(3) estrogen (4) testosterone
- 141.** In Morgan's experiments on linkage, the percentage of white eyed, miniature winged recombinants in F₂ generation is
(1) 1.3 (2) 37.2
(3) 62.8 (4) 73.2

142. When yellow round heterozygous pea plants are self-fertilized, the frequency of occurrence of RrYY genotype among the offsprings is
 (1) 9/26 (2) 3/16
 (3) 2/16 (4) 1/16
143. If percentage of cytosine is 18%, then percentage of adenine will be
 (1) 32% (2) 64%
 (3) 36% (4) 23%
144. Which of the following codons has no tRNA?
 (1) UAA (2) UAU
 (3) UGU (4) UGC
145. During Meselson and Stahl's experiments, heavy DNA was distinguished from normal DNA by centrifugation in
 (1) CsOH gradient (2) $^{14}\text{NH}_4\text{Cl}$
 (3) $^{35}\text{SO}_2$ (4) CsCl gradient
146. In *lac* operon, the genes *a, i, y* and *z* code respectively for
 (1) repressor protein, permease, β -galactosidase, transacetylase
 (2) transacetylase, permease, β -galactosidase, repressor protein
 (3) permease, transacetylase, repressor protein, β -galactosidase
 (4) transacetylase, repressor protein, permease, β -galactosidase
147. Presence of tail in a child is an example of
 (1) atavism (2) divergent evolution
 (3) convergent evolution (4) mutation
148. *Yersinia pestis* is responsible for
 (1) syphilis (2) whooping cough
 (3) plague (4) leprosy
149. Morphine, which is used as an analgesic is obtained from
 (1) *Chinchona*
 (2) *Papaver somniferum officinalis*
 (3) *Taxus brevifolia*
 (4) *Berberis nilghiriensis*
150. Which of the following is the pair of biofertilizers?
 (1) *Azolla* and Blue green algae
 (2) *Nostoc* and legume
 (3) *Rhizobium* and grasses
 (4) *Salmonella* & *E. coli*
151. ELISA is used to detect viruses where the key reagent is
 (1) DNA probe (2) RNAse
 (3) alkaline phosphatase (4) catalase
152. Restriction endonuclease - Hind II always cuts DNA molecules at a particular point by recognizing a specific sequence of
 (1) Six base pairs. (2) Five base pairs.
 (3) Four base pairs. (4) Seven base pairs.
153. The formula for exponential population growth is
 (1) $dN/rN = dt$ (2) $rN / dN = dt$
 (3) $dN / dt = rN$ (4) $dt / dN = rNV$
154. Animals from colder climates generally have smaller limbs. This is called
 (1) Niche rule (2) Allen's rule
 (3) Ehrlich rule (4) None of these.
155. In an ecosystem, keystone are those which
 (1) are most frequent
 (2) are present in maximum number
 (3) attain a large biomass
 (4) contribute to ecosystem properties
156. Which of the following statements is incorrect regarding enzymatic activity?
 (1) It increases with increase in substrate concentration upto the saturation point.
 (2) It is highest at optimum pH value.
 (3) It initially decreases with increase in pH value.
 (4) It initially increases with increase in temperature and then decreases.
157. Effective filtration pressure in glomerulus is caused due to
 (1) powerful pumping action of the heart
 (2) secretion of adrenaline

- (3) afferent arteriole is slightly larger than efferent arteriole
- (4) vacuum develops in proximal convoluted tubule and sucks the blood

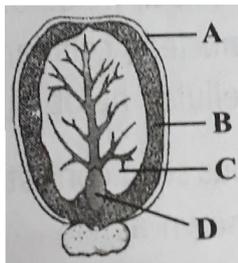
158. Refer the given statements.

- (i) Outer exine is made up of sporopollenin.
- (ii) Inner intine is pecto-cellulosic in nature.
- (iii) Generative cell is bigger and contains abundant food reserve.
- (iv) Vegetative cell is small and floats in the cytoplasm of the generative cell.

Which of the given statements are not true regarding structure of pollen grain?

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

159. Identify the parts labelled as A, B, C and D in the given figure and select the correct option from the codes given below.



- | A | B | C | D |
|---------------|-----------|-----------|-----------|
| (1) Seed coat | Scutellum | Epicotyl | Hypocotyl |
| (2) Seed coat | Scutellum | Hypocotyl | Epicotyl |
| (3) Seed coat | Cotyledon | Endosperm | Hypocotyl |
| (4) Seed coat | Endosperm | Cotyledon | Hypocotyl |

160. The third stage of parturition is called "after-birth". In this stage

- (1) excessive bleeding occurs
- (2) foetus is born and cervix and vagina contraction to

normal condition happens

- (3) foetus is born and contraction of uterine wall prevents excessive bleeding
- (4) placenta is expelled out

161. If map distance between genes P and Q is 4 units, between P and R is 11 units, and between Q and R is 7 units, the order of genes on the linkage map can be traced as follows.

- (1) $\overleftarrow{Q} \quad \overleftarrow{P} \quad \overleftarrow{R}$
- (2) $\overleftarrow{P} \quad \overleftarrow{Q} \quad \overleftarrow{R}$
- (3) $\overleftarrow{P} \quad \overleftarrow{Q} \quad \overleftarrow{R}$
- (4) $\overleftarrow{P} \quad \overleftarrow{Q} \quad \overleftarrow{P} \quad \overleftarrow{R} \quad \overleftarrow{Q} \quad \overleftarrow{R}$

162. Which of the following statements regarding 'human genome' is incorrect?

- (1) Human genome consists of 3×10^9 bp and about 20,500 genes.
- (2) The average gene size is 3000 bp and dystrophin is the largest known human gene.
- (3) Chromosome 1 contains maximum (2968) number of genes and the Y-chromosome has the least (231) number of genes.
- (4) Repeated (or repetitive) sequences are not present in human genome.

163. In a mRNA molecule, untranslated regions (UTRs) are present at

- (1) 5' - end (before start codon)
- (2) 3' - end (after stop codon)
- (3) both (1) and (2)
- (4) no UTRs present in mRNA

164. Statins used for lowering blood-cholesterol level are extracted from

- (1) algae (2) bacteria

- (3) viruses (4) yeast
- 165.** One of the key factors, which makes the plasmid the vector in genetic engineering is
- (1) its resistance to antibiotics
 - (2) its resistance to restriction enzymes
 - (3) its ability to carry a foreign gene
 - (4) its ability to cause infection in the host
- 166.** Primers are
- (1) chemically synthesized oligonucleotides that are complementary to the regions of DNA
 - (2) chemically synthesized oligonucleotides that are not complementary to the regions of DNA
 - (3) chemically synthesized, autonomously replicating circular DNA molecules
 - (4) specific sequences present on recombinant DNA
- 167.** Which of the following statements regarding the structure of proinsulin and mature insulin are not correct?
- (i) Proinsulin is made up of three polypeptide chains – A, B and C.
 - (ii) C - polypeptide chain with 33 amino acids is removed prior to insulin formation.
 - (iii) Mature insulin is made up of 51 amino acids arranged in two polypeptide chains – A and B.
 - (iv) Polypeptide chain A has 30 amino acids and polypeptide chain B has 21 amino acids.
 - (v) Polypeptide chains A and B are interconnected by only one S – S linkage.
- 168.** Kangaroo and desert rat that live in conditions of water scarcity are capable of meeting all their water requirements by
- (1) having a thick coat to minimise evaporative desiccation
 - (2) oxidizing stored fat to produce water as by product
 - (3) producing very concentrated urine and solid faeces
 - (4) all of these
- 169.** The exotic species, which when introduced in India became notorious weed(s), is/are
- (1) *Lantana camara*
 - (2) *Eicchornia crassipes*
 - (3) *Parthenium hysterophorus*
 - (4) all of these
- 170.** The diversity of organisms sharing the same habitat or community is termed as
- (1) alpha diversity (2) beta diversity
 - (3) gamma diversity (4) delta diversity
- 171.** Select correct statements for non-vascular archegoniate.
- A. Independent sporophyte & gametophyte
 - B. Dependent sporophyte
 - C. Multicellular independent gametophyte
 - D. Many neck canal cells in female sex organ
 - E. Homosporous and mitospores are formed
- (1) B, C, D (2) A, C, D
 - (3) B, C, E (4) A, D, E
- 172.** Which of the following statements is wrong regarding model of plasma membrane given by S.J. Singer and G.L. Nicolson?
- (1) The quasi-fluid nature of protein enables lateral movement of lipids
 - (2) The integral proteins are partially or totally buried in the membrane
 - (3) Protein icebergs in sea of lipids
 - (4) Phosphoglycerides are present in lipid component
- 173.** Which of the following events listed below, is not observed during mitosis?
- (1) Movements of centrioles to opposite poles
 - (2) Chromatin condensation
 - (3) Appearance of recombination nodule
 - (4) Appearance of chromosomes with two chromatids joined together at the centromere

174. During fat absorption, a very small protein coated fat globules called chylomicron is formed in
- (1) Lumen of intestine
 - (2) Intestinal cell
 - (3) Lymph vessel
 - (4) Blood stream
175. Which of the following will be the cardiac output (in L/min) of the heart that has stroke volume 0.07 L and is beating at the rate of 75/min?
- (1) 52.5
 - (2) 5.25
 - (3) 0.52
 - (4) 0.052
176. Milk formative hormone is
- (1) Prolactin
 - (2) Melatonin
 - (3) Oxytocin
 - (4) Pitressin
177. All of the following changes occur during contraction of a muscle fibre except one
- (1) Width of A-band and I-band remain same
 - (2) Actin filament slides over the myosin filaments
 - (3) Length of actin and myosin filaments remain same
 - (4) Width of H-zone decreases
178. In phloem
- A. Transport of sugar is essentially unidirectional
 - B. Sap mainly consists of water and sucrose
 - C. Loading and unloading of sugar is passive process
 - D. Translocation from source to sink occurs by mass flow
- (1) A and C are incorrect
 - (2) Only D is correct
 - (3) A and B are correct
 - (4) B and C are incorrect
179. Which of the following elements can become toxic at higher concentration?
- (1) S
 - (2) Mn
 - (3) N
 - (4) K
180. How many ATP are produced by substrate level phosphorylation from one molecule of PGAL if it is oxidised completely during aerobic respiration?
- (1) 2
 - (2) 3
 - (3) 6
 - (4) 4

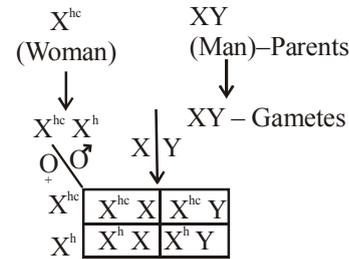
Hints and Solutions

PART C – BIOLOGY

91. (4) Early blight of potato is caused by a fungus called *Alternaria solani*. Late blight of potato (which claimed more than one million lives in 1845 in Ireland) is caused by another fungus called *Phytophthora infestans*.
92. (4) *Chlorella* is a unicellular green alga, rich in proteins and is used as food supplement even by space travellers.
93. (4) Within the sporangia spore mother cell undergoes meiosis to form spores. If all the spores are of the same size the plant is said to be homosporous (*Lycopodium Psilotum, Adiantum, Equisetum* and *Dryopteris*), and if they are of two different sizes, the plant is called heterosporous (*Selaginella, Isoetes, Marsilea, Azolla* and *Salvinia*).
94. (4) *Asterias* (Star fish) belongs to phylum Echinodermata in which an excretory system is absent.
95. (3) *Struthio* (Ostrich) is the largest living flightless bird.
96. (4) R.Q. value for fatty acid is less than one. When tripalmitin (a fatty acid) is used as respiratory substrate, the R.Q. is 0.7 as shown below.
- $$2(C_{51}H_{98}O_6) + 145 O_2 \rightarrow 102 CO_2 + 98 H_2O \text{ (fat tripalmitin)}$$
- $$R.Q. = \frac{102 CO_2}{145 O_2} = 0.7$$
97. (4) Apical dominance is regulated by auxins. Auxin like 2, 4-D are widely used as herbicides. ABA stimulates the closure of stomata in the epidermis and increases the tolerance of plants to various kinds of stresses.
98. (3) Larynx is a cartilaginous box which helps in sound production and hence called the sound box. Much developed larynx of human male is called Adam's apple.
99. (4) A single layer of **odontoblast cells** line the pulp cavity. These cells secrete enamel, which is a bluishwhite shiny translucent and the hardest substance of the body and helps in the mastication of food.
100. (2) Dead space is the air that is inhaled by the body in breathing but does not take part in gas exchange. In man, it is 150 ml. E.g.; the amount of air present in trachea, bronchi and bronchioles, which is not used in respiration.
101. (4) Placenta functions as a gland, secreting human chorionic gonadotrophin, progesterone, and oestrogens, which regulate the maintenance of pregnancy. Its primary function is to provide the embryo with nourishment, eliminate its wastes, and exchange respiratory gases.
102. (2) Copper-T is copper releasing intra uterine devices (IUD). It increases phagocytosis of sperms within the uterus and suppress sperm motility and fertilising capacity of sperms.
103. (1) Use of contraceptive pills is a widespread form of birth control. Contraceptive pills contain oestrogen and progesterone. The production of the pituitary

hormones FSH and LH in the normal sexual cycle of a female is shut down by these hormones. In the absence of FSH, the ovarian follicles do not ripen and ovulation does not occur in the absence of LH.

104. (3) Haemophilia and colour blindness both are recessive X-linked traits. They express in males when present in single copy (heterozygous) but in females, they express only when present in homozygous condition.



Results

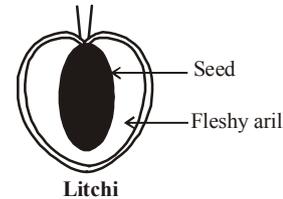
- (1) 50% sons are colorblind and haemophilic.
- (2) 50% sons are haemophilic only.
- (3) 50% daughters are carrier for colour blindness and haemophilia.
- (4) 50% daughters are carrier for haemophilia only.
105. (1) X-linked recessive trait shows transmission from carrier female to male progeny. It is also called criss-cross inheritance in which sex-linked characters are inherited from male parent to male grandchildren through females.
106. (3) Few pteridophytes are heterosporous i.e., with two types of spores, microspores and megaspores, e.g., *Selaginella*, *Salvinia*, *Marsilea*. Plants of *Cycas* are also heterosporous and invariably dioecious, i.e. male and female reproductive organs occur on separate individuals.
107. (2) Circulatory system in arthropods is of open type. i.e. blood flows in irregular spaces called lacunae. It does not flow in definite blood vessels.
108. (3) Reptiles usually possess 3-chambered heart but crocodiles are an exception with 4-chambered heart. Not all chordates have a mouth with upper and lower jaw. Egg laying mammals include duck-billed platypus. Chondrichthyes (cartilaginous fishes) are the fishes that have cartilaginous endoskeleton. There is no exception to this.
109. (2) Xylem is a complex permanent tissue, which consists of tracheids, vessels, xylem parenchyma and xylem fibres. It functions as a conducting tissue for water and minerals from roots to the stem and leaves. Tracheids are elongated or tube like cells with thick and lignified walls and tapering ends. These are dead and are without protoplasm. Vessel is a long cylindrical tube-like structure made up of many cells called vessel members, each with lignified walls and a large central cavity. Vessel members are interconnected through perforations in their common walls. Xylem fibres have

highly thickened walls and obliterated central lumens. These may either be septate or aseptate. Xylem parenchyma cells are living and thin-walled, and their cell walls are made up of cellulose.

110. (4) Epidermal tissue system forms outer covering of plant, which is in direct contact with external environment. The tissue system consists of the epidermis derived from protoderm and its associated structures; epidermal outgrowths. The cells perform different functions like protection, absorption, excretion, gaseous exchange, secretion and control of transpiration, etc. The tissue present between epidermis and vascular tissue system constitutes ground tissue system. It forms the major part of a plant's body. Vascular tissue system is composed of a number of vascular bundles, present in the central cylinder or column of the axis of root and stem which is known as stele. The vascular bundle is composed of primary xylem, primary phloem and cambium.
111. (3) AIDS is caused by HIV. When HIV enters into helper T-cells, it replicates and produces other viruses that kill the helper T-cells. Thus, the number of helper T-cells decreases in the body of the infected person and the person starts suffering from various infections.
112. (1) Holstein-Friesian from Holland, Brown Swiss from Switzerland and Jersey from Island of Jersey in English channel are exotic breeds of cattle.
113. (4) The cell from micro-organisms such as bacteria, fungi, filamentous algae, treated in various ways and used as food, are called single cell protein (SCP). The biomass is not only obtained from unicellular microorganisms but also from multicellular microorganisms.
114. (1) Yoghurt (yogurt) is produced by curdling milk with the help of *Streptococcus thermophilus* and *Lactobacillus bulgaricus*. The temperature is maintained at about 45°C (40° – 46°C) for four hours. It has a flavour of lactic acid and acetaldehyde.
115. (3) Sacred forests (= sacred groves) are forest patches around places of worship which are held in high esteem by tribal communities. They are the most undisturbed forest patches (island of pristine forests) which are often surrounded by highly degraded landscapes. They are found in several parts of India, e.g., Karnataka, Maharashtra, Rajasthan, etc. Many endemic species which are rare or have become extinct elsewhere can be seen to flourish here.
116. (3) The Government of India has instituted Amrita Devi Bishnoi Wildlife Protection Award for individuals or communities from rural areas that have shown extraordinary courage and dedication in protecting wildlife.
117. (2) Couplet, Lead, Analytical are the features associated with keys
118. (4) Hartig net, mantle and extracellular sheath are ectomycorrhizal while arbuscule is endomycorrhizal
119. (3) Roundworms are pseudocoelomate animals. The coelom is not completely lined by mesoderm, there are scattered patches or pouches of mesoderm in between ectoderm and endoderm.
120. (3) Ephyra is the second larval stage in the life cycle of

Aurelia or Jelly fish. Planula larva forms Scyphistoma. Budding in Scyphistoma forms Ephyra. The process of Ephyra formation is called strobilation. One scyphistoma forms several Ephyra larva.

121. (2) Aril is the edible



part of litchi fruit (*Litchi sinensis*). It's a simple fruit (nut). The fruit has one seed and its covering is hard and woody. The fleshy and juicy aril is edible.

122. (1) *Pisum sativum* (Sweet Pea) belongs to the family Fabaceae which possess ten stamens, diadelphous and ditheous anther.
123. (2) The wood of the older stems gets differentiated into two zones, the outer light coloured and functional sapwood or alburnum which is involved in the conduction of water and minerals from root to leaf and the inner darker and nonfunctional heartwood or duramen. The heartwood is stronger and more durable than the sapwood and provide resistant to the attacks of micro-organisms and insects.
124. (1) Companion cells are part of phloem which in turn are a part of vascular tissue system and not epidermal tissue system.
125. (4) Except the first, the last and clitellar segment in each segment bears a ring of tiny curved, chitinous structure known as setae. Setae helps in locomotion and copulation.
126. (4) In peroxidase and catalase which catalyse the break down of hydrogen peroxide to water and oxygen, heme is a prosthetic group.
127. (2) Colchicine is an alkaloid obtained from the plant *Colchicum autumnale*. During mitosis it does not interfere with the replication of chromosome but prevents the formation of spindle fibres. During metaphase it inhibits the assemblage of microtubules hence spindle formation does not occur. Colchicine is used to induce polyploidy in plant breeding.
128. (2) pH of the guard cells rises due to active H⁺ concentration. A rise pH causes hydrolysis of starch to form malic acid. Malic acid dissociates into H⁺ and malate. H⁺ ions pass out of the guard cells in exchange for K⁺ ions. This lowers the osmotic potential of guard cells. As a result movement of water begins from neighbouring cells into guard cells which leads to opening of stomata.
129. (2) A herbicide DCMU (also known as diuron) blocks electron flow at the quinone acceptors of photosystem II, by competing for the binding site of plastoquinone.
130. (1) Birds are uricotelic animals which excrete nitrogenous waste materials in the form of uric acid.
131. (1) Axis vertebra possesses a peg-like structure called the

odontoid process which projects forward from the centrum. It fits into the cavity of the atlas below the ligament so that it is separated from the neural canal. Such an arrangement gives a pivot joint which allows head to shake (rotate from one side to the other).

132. (3) Fenestra ovalis is membrane covered opening leading from tympanic cavity into the vestibule of the internal ear.
133. (3) Autonomic nervous system (ANS) automatically regulates the activities of smooth muscles, cardiac muscles and glands. This coordination is involuntary.
134. (3) The inner layer of eye is the retina and it contains three layer of cells—from inside to outside—ganglion cells, bipolar cells and photoreceptor cells.
135. (3) *Cholecystokinin* is a peptide hormone of mucosa of small intestine. It causes pancreas to release pancreatic enzymes and gall bladder to eject bile juice.
136. (4)
137. (4) Vegetative reproduction and apomixis both are asexual methods of reproduction, which gives the progeny genetically similar to parent.
138. (4) Double fertilization is the characteristic feature of angiosperms, e.g., *Capsella*. It includes fusion of one male gamete with egg cell. This result in the formation of a diploid cell, the zygote. The other male gamete moves towards the two polar nuclei and fuses with them to produce a triploid **primary endosperm nucleus** (PEN). As this involves the fusion of three haploid nuclei it is termed **triple fusion**. Since two types of fusions, syngamy and triple fusion take place in an embryo sac the phenomenon is termed double fertilisation.
139. (3) Cleistogamous flowers do not open or bloom at all. Thus, they cannot receive foreign pollens and invariably show autogamy, *i.e.*, self pollination. *E.g.*, *Commellina*, *Viola* and *Oxalis*. These plants possess both cleistogamous and chasmogamous (flowers which bloom) flowers.
140. (3) Estrogen produced by ovary have wide range of actions such as stimulation of growth and activities of female secondary sex organs, development of growing ovarian follicles, appearance of female secondary sex characters. It also regulates female sexual behavior.
141. (2) Morgan identified linkage in fruitfly hence the percentage of white eyed and miniature winged recombinants are fewer than the expected ratio.
142. (3) Yellow round heterozygous pea plant may be represented by genotype RrYy. On selfing such plants following results will be obtained.

♂	X	♀																														
RrYy	(Round Yellow)	RrYy																														
(Round Yellow)		(Round Yellow)																														
Parents:																																
Gametes:	RY Ry rY ry	RY Ry rY ry																														
Offsprings:	<table border="1" style="border-collapse: collapse; text-align: center; width: 100%;"> <tr> <td style="width: 10%; height: 20px;">♂</td> <td style="width: 10%;">RY</td> <td style="width: 10%;">Ry</td> <td style="width: 10%;">rY</td> <td style="width: 10%;">ry</td> </tr> <tr> <td style="height: 20px;">♀</td> <td>RRYY</td> <td>RRYy</td> <td>RrYY</td> <td>RrYy</td> </tr> <tr> <td>RY</td> <td>RrYy</td> <td>Rryy</td> <td>rrYy</td> <td>rryy</td> </tr> </table>		♂	RY	Ry	rY	ry	♀	RRYY	RRYy	RrYY	RrYy	RY	RRYY	RRYy	RrYY	RrYy	Ry	RRYy	RRyy	RrYy	Rryy	rY	RrYY	RrYy	rrYY	rrYy	ry	RrYy	Rryy	rrYy	rryy
♂	RY	Ry	rY	ry																												
♀	RRYY	RRYy	RrYY	RrYy																												
RY	RRYY	RRYy	RrYY	RrYy																												
Ry	RRYy	RRyy	RrYy	Rryy																												
rY	RrYY	RrYy	rrYY	rrYy																												
ry	RrYy	Rryy	rrYy	rryy																												

Hence, total 26 genotypes will be obtained in the next generation, out of which the frequency of occurrence of RrYY genotype is 2, as illustrated in the table above.

143. (1) In a DNA molecule the amount of purine is equal to the amount of pyrimidine. Purine are adenine and guanine, Pyrimidine are cytosine and thymine. The number of adenine is equal to the number of thymine always. The number of cytosine is always equal to that of guanine.
- $$A = T$$
- $$C = G$$
- If C = 18%, then G = 18%
- $$C + G = 36\%$$
- So, A + T = 100 - 36 = 64%
- $$A = 32\%, T = 32\%$$
- So, adenine is 32%.
144. (1) There are three nonsense codons – UAA, UAG and UGA. These codons are not recognised by any of the tRNAs. Therefore, no more aminoacyl tRNA is formed and reaches A-site on ribosome.
145. (4) During Meselson and Stahl's experiments, heavy DNA was distinguished from normal DNA by centrifugation in CsCl gradient. When DNA is mixed with caesium chloride it will settle down at a particular height in centrifugation, heavier one higher up.
146. (4) The *lac* operon consists of one regulatory gene (the *i* gene) and three structural genes (*z*, *y*, and *a*). The *i* gene codes for the repressor of the *lac* operon. The *z* gene codes for beta-galactosidase (β -gal), which is primarily responsible for the hydrolysis of the disaccharide, lactose into its monomeric units, galactose and glucose. The *y* gene codes for permease, which increases permeability of the cell to β -galactosides. The *a* gene encodes a transacetylase. Hence, all the three gene products in *lac* operon are required for metabolism of lactose.
147. (1) Atavism is the phenomenon of sudden appearance of ancestral characters, not parental, in young ones, e.g., tail in newly born babies, dense and long hairs on body.

148. (3) Plague is a disease of the rats caused by a rod-shaped, non-motile bacillus, *Yersinia pestis*. The rat fleas leave the rats that die of plague, and bite human beings, thus infecting them with the disease.
149. (2) Morphine is the principle opium alkaloid. It is a strong analgesic. Opium is dried latex of unripe capsular fruits of poppy plant, *Papaver somniferum*. It is eaten or smoked. Morphine depresses respiratory centre, contributes to the fall in BP and cause bradycardia. It causes addiction.
150. (1) *Azolla* and BGA are biofertilizer which increases the fertility of soil.
151. (3) Alkaline phosphatase has become a useful tool in molecular biology laboratories, since DNA normally possesses phosphate groups on the 5' end. Removing these phosphates prevents the DNA from ligating thereby keeping DNA molecules linear until the next step of the process for which they are being prepared; also, removal of the phosphate groups allows radiolabeling in order to measure the presence of the labeled DNA through further steps in the process or experiment. For these purposes, the alkaline phosphatase from shrimp is the most useful, as it is the easiest to inactivate once it has done its job. Another important use of alkaline phosphatase is as a label for enzyme immunoassays.
152. (1) Restriction endonuclease-Hind II, always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs. This specific base sequence is known as the recognition sequence for Hind II.
153. (3) The formula of exponential growth is $\frac{dN}{dt} = rN$ where $\frac{dN}{dt}$ is the rate of change in population size, r is the biotic potential and N is the population size.
154. (2) The body parts like ears, tail, limbs of animals living in colder climates become small to reduce the loss of heat from the body and thereby conserving energy. Such animals have to conserve body heat which is necessary to survive in colder climatic conditions. This is called Allen's Rule. Its an important law related with evolution.
155. (4) An ecosystem comprises of various biotic and abiotic components. In biotic components living beings (plants, animals and microbes) are included. These living beings may be various species. Those species which have important impact on ecosystem or which the characteristics of the ecosystem are called keystone species.
156. (3) Every enzyme possesses an optimum pH value, where it is most effective. Most enzymes show maximum activity in a pH range of about 6.0 to 7.5, i.e., near neutral pH. Some digestive enzymes have their optimum pH in the acidic or activity alkaline range. e.g., pepsin of gastric juice has its optimum at pH 2 (acidic), and trypsin of pancreatic juice shows maximum

activity at pH 8.8 (alkaline). A rise and fall in pH reduces enzyme activity by changing the degree of ionisation of its side chain.

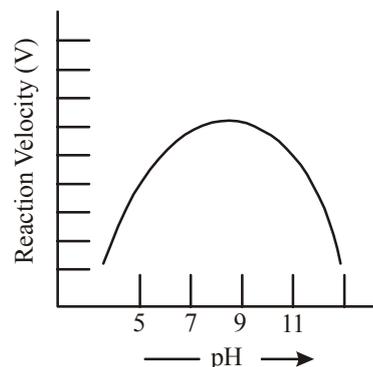
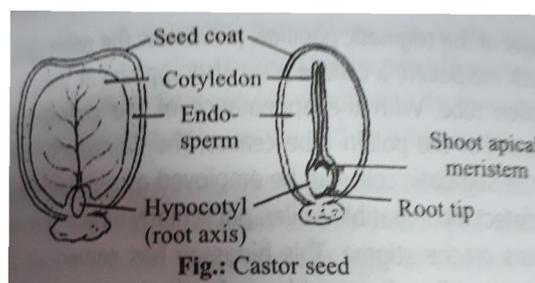
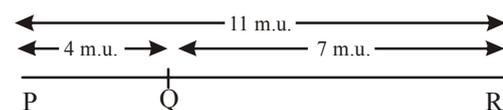


Fig. Effect of pH on the velocity of enzyme action

157. (3) The diameter of afferent arteriole is larger than the efferent arteriole. This increases the volume of blood in glomerulus and increases the filtration rate. This causes the effective filtration pressure thus, promoting filtration.
158. (3) In a mature pollen grain, the generative cell is smaller and the tube (or vegetative) cell is larger. In the later stages of development of pollen grain, callose dissolves and the naked generative cell comes to lie freely in the cytoplasm of the tube cell. The tube cell has a cytoplasm which is rich in the food reserve (starch, protein, fat with mostly unsaturated fatty acids).
159. (4) Given figure represents castor seed. It is oblong mottled brown endospermic and dicotyledonous seed. A thick hard but brittle testa covers the seed. A thin perisperm lies below it and around the kernel. A white oily endosperm lies below the perisperm. It stores food reserve as oil drops and proteins. Endosperm is source of castor oil. Embryo lies in the centre of seed. It consists of a short embryo axis bearing two thin semi-transparent oval cotyledons, a small indistinct plumule and a knob-shaped radicle.



160. (4) Third stage of parturition (placental stage) is the time after the delivery until the placenta or after birth is expelled by powerful uterine contractions. Umbilical cord is cut close to the baby's navel. It lasts for 10-15 minutes after the birth of child.
161. (3) 
162. (4) Repeated or repetitive sequences make up a large

portion of human genome. Repetitive sequences are nucleotide sequences that are repeated many times, sometimes hundred to thousand times. They have no direct coding function but provide information as to chromosome structure, dynamics and evolution. They represent junk DNA.

163. (3) mRNA has some additional sequences that are not translated and are referred as untranslated regions (UTRs). The UTRs are present at both 5'-end (before start codon) and at 3'-end (after stop codon). They are required for efficient translation process.
164. (4) Statins are products of fermentation by yeast *Monascus purpureus* which resemble mevalonate and are competitive inhibitors of β -hydroxy- β -methylglutaryl or HMG CoA reductase. This inhibits cholesterol synthesis. Statins are, therefore, used in lowering blood cholesterol, e.g., lovastatin, pravastatin, simvastatin.
165. (3) Plasmids are extra-chromosomal, self replicating, usually circular, double stranded DNA molecules found naturally in many bacteria and also in some yeast. Plasmids are usually not essential for normal cell growth and division, they often confer some traits to the host organism e.g., resistance to certain antibiotics. The plasmid that is used as carrier for transferring a fragment of foreign DNA into a suitable host is called vehicle DNA or cloning vector or gene carrier.
166. (1) Primers are small, chemically synthesized oligonucleotides that are complementary to the sequences present at 3' end of the template DNA. They hybridize to the target DNA region, one to each strand of the double helix. These primers are oriented with their ends facing each other allowing synthesis of the DNA towards one another.
167. (4) Human insulin is made up of 51 amino acids arranged in two polypeptide chains, A, having 21 amino acids and B, with 30 amino acids. The two polypeptide chains are interconnected by two disulphide bridges. The hormone develops from a storage product called proinsulin. Proinsulin has three chains, A, B and C C-chain with 33 amino acids is removed prior to insulin formation.
168. (4) Kangaroo and desert rat seldom drink water. It has a thick coat to minimise evaporative desiccation. The animal seldom comes out of its comparatively humid and cool burrow during the day time. 90% of its water requirement is met from metabolic water which is produced by respiratory breakdown of fats. 10% is obtained from food. Loss of water is minimized by producing nearly solid urine and faeces.
169. (4) *Lantana*, *Eichhornia* and *Parthenium* are all exotic species, which had been introduced in India. *Lantana camara* has replaced many species in forests of Uttar Pradesh and Madhya Pradesh. *Eichhornia* (water hyacinth) has clogged water bodies including wetlands resulting in death of several aquatic plants and animals. *Parthenium* has pushed out several herbs and shrubs from open places in the plains.
170. (1) Ecological diversity is of three types:
- (i) Alpha diversity (Within community diversity) is species diversity in a given community or habitat. It is dependent upon species richness and evenness.
 - (ii) Beta diversity (Between community diversity) is biodiversity in a range of communities due to replacement of species with the change in community/habitat because of presence of different microhabitats, niches, etc.
 - (iii) Gamma biodiversity is diversity of habitats/ecosystems over a total landscape or geographical area.
171. (1) Archegoniates are bryophytes, pteridophytes & gymnosperms.
172. (1) The quasi-fluid nature of lipid enables lateral movement of proteins within the overall bilayer.
173. (3) Recombination nodule appears during pachytene of meiosis.
174. (2) Fats are absorbed in lacteals of small intestine by coating with proteins, before absorption and then they enter in the lymphatic circulation.
175. (2) Cardiac output = Stroke volume \times Heart rate
= $0.07 \times 75 = 5.25$ L/min
176. (1) Prolactin is secreted by anterior pituitary and is responsible for beginning the production of milk by mammary glands.
177. (1) Width of I-band decreases during muscle contraction.
178. (1) Loading and unloading of sugars is an active process as well as transport of sugar is not unidirectional but bidirectional.
179. (2) Mn is a micronutrient and thus, can be come toxic at higher concentrations
180. (2) On substrate level phosphorylation, one molecule of PGAL produces only 3 ATP [2 Glycolysis + 1 TCA cycle.