

AIPMT 2006 Prelims — Biology Question Paper with Solutions

95 Biology questions as set in the paper · answers checked by RankUp

AIPMT 2006 Prelims · Q101

1. What would be the number of chromosomes in the cells of the aleurone layer in a plant species with 8 chromosomes in its synergids ?

- (A) 16
- (B) 24
- (C) 32
- (D) 8

AIPMT 2006 Prelims · Q102

2. Pineapple (annanas) fruit develops from :

- (A) a unilocular polycarpillary flower
- (B) a multipistillate syncarpous flower
- (C) a cluster of compactly borne flowers on a common axis
- (D) a multilocular monocarpillary flower

AIPMT 2006 Prelims · Q103

3. Golden rice is a promising transgenic crop. When released for cultivation, it will help in :

- (A) alleviation of vitamin-A deficiency
- (B) pest resistance
- (C) herbicide tolerance
- (D) producing a petrol-like fuel from rice

AIPMT 2006 Prelims · Q104

4. Parthenocarpic tomato fruits can be produced by :

- (A) removing androecium of flowers before pollen grains are released
- (B) treating the plants with low concentrations of gibberellic acid and auxins
- (C) raising the plants from vernalized seeds
- (D) treating the plants with phenylmercuric acetate

AIPMT 2006 Prelims · Q105

5. How does pruning help in making the hedge dense ?

- (A) It induces the differentiation of new shoots from the rootstock
- (B) It frees axillary buds from apical dominance
- (C) The apical shoot grows faster after pruning
- (D) It releases wound hormones

AIPMT 2006 Prelims · Q106

6. The 'blue baby' syndrome results from :

- (A) excess of chloride
- (B) methaemoglobin
- (C) excess of dissolved oxygen
- (D) excess of TDS (Total Dissolved Solids)

AIPMT 2006 Prelims · Q107

7. Praying mantis is a good example of :

- (A) mullerian mimicry
- (B) warning colouration
- (C) social insects
- (D) camouflage

8. Which one of the following statements is correct ?

- (A) Neurons regulate endocrine activity, but not vice versa
- (B) Endocrine glands regulate neural activity and nervous system regulates endocrine glands
- (C) Neither hormones control neural activity nor the neurons control endocrine activity
- (D) Endocrine glands regulate neural activity, but not vice versa

9. Examination of blood of a person suspected of having anaemia, shows large, immature, nucleated erythrocytes without haemoglobin. Supplementing his diet with which of the following, is likely to alleviate his symptoms ?

- (A) Thiamine
- (B) Folic acid and cobalamine
- (C) Riboflavin
- (D) Iron compounds

10. Farmers in a particular region were concerned that pre-mature yellowing of leaves of a pulse crop might cause decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield ?

- (A) Frequent irrigation of the crop
- (B) Treatment of the plants with cytokinins along with a small dose of nitrogenous fertilizer
- (C) Removal of all yellow leaves and spraying the remaining green leaves with 2, 4, 5-trichlorophenoxy acetic acid
- (D) Application of iron and magnesium to promote synthesis of chlorophyll

11. In which of the following fruits is the edible part the aril ?

- (A) Custard apple
- (B) Pomegranate
- (C) Orange
- (D) Litchi

12. Which one of the following aminoacids was not found to be synthesized in Miller's experiment ?

- (A) Glycine
- (B) Aspartic acid
- (C) Glutamic acid
- (D) Alanine

13. Crop plants grown in monoculture are :

- (A) low in yield
- (B) free from intraspecific competition
- (C) characterised by poor root system
- (D) highly prone to pests

14. Montreal protocol which calls for appropriate action to protect the ozone layer from human activities was passed in the year :

- (A) 1986
- (B) 1987
- (C) 1988
- (D) 1985

AIPMT 2006 Prelims · Q115

15. The formula for exponential population growth is :

- (A) $dt/dN = rN$
- (B) $dN/rN = dt$
- (C) $rN/dN = dt$
- (D) $dN/dt = rN$

AIPMT 2006 Prelims · Q116

16. Which one of the following is not used for construction of ecological pyramids ?

- (A) Dry weight
- (B) Number of individuals
- (C) Rate of energy flow
- (D) Fresh weight

AIPMT 2006 Prelims · Q117

17. Niche overlap indicates :

- (A) active co-operation between two species
- (B) two different parasites on the same host
- (C) sharing of one or more resources between the two species
- (D) mutualism between two species

AIPMT 2006 Prelims · Q118

18. In photosystem-I, the first electron acceptor is :

- (A) ferredoxin
- (B) cytochrome
- (C) plastocyanin
- (D) an iron-sulphur protein

AIPMT 2006 Prelims · Q119

19. Treatment of seed at low temperature under moist conditions to break its dormancy is called :

- (A) scarification
- (B) vernalization
- (C) chelation
- (D) stratification

AIPMT 2006 Prelims · Q120

20. Which one of the following is the most suitable, medium for culture of *Drosophila melanogaster* ?

- (A) Moist bread
- (B) Agar agar
- (C) Ripe banana
- (D) Cow dung

AIPMT 2006 Prelims · Q121

21. Which one of the following is not included under in situ conservation ?

- (A) Sanctuary
- (B) Botanical garden
- (C) Biosphere reserve
- (D) National park

AIPMT 2006 Prelims · Q122

22. Which antibiotic inhibits interaction between t-RNA and m-RNA during bacterial protein synthesis ?

- (A) Erythromycin
- (B) Neomycin
- (C) Streptomycin
- (D) Tetracycline

AIPMT 2006 Prelims · Q123

23. Phenotype of an organism is the result of :

- (A) mutations and linkages
- (B) cytoplasmic effects and nutrition
- (C) environmental changes and sexual dimorphism
- (D) genotype and environment interactions

AIPMT 2006 Prelims · Q124

24. Photochemical smog pollution does not contain :

- (A) ozone
- (B) nitrogen dioxide
- (C) carbon dioxide
- (D) PAN (Peroxy Acyl Nitrate)

AIPMT 2006 Prelims · Q125

25. Moss peat is used as a packing material for sending flowers and live plants to distant places because :

- (A) it is easily available
- (B) it is hygroscopic
- (C) it reduces transpiration
- (D) it serves as a disinfectant

AIPMT 2006 Prelims · Q127

26. The thalloid body of a slime mould (Myxomycetes) is known as :

- (A) protonema
- (B) Plasmodium
- (C) fruiting body
- (D) mycelium

AIPMT 2006 Prelims · Q128

27. In which mode of inheritance do you expect more maternal influence among the off spring ?

- (A) Autosomal
- (B) Cytoplasmic
- (C) Y-linked
- (D) X-linked

AIPMT 2006 Prelims · Q129

28. What type of placentation is seen in sweet pea ?

- (A) Basal
- (B) Axile
- (C) Free central
- (D) Marginal

AIPMT 2006 Prelims · Q130

29. Long filamentous threads protruding at the end of a young cob of maize are :

- (A) anthers
- (B) styles
- (C) ovaries
- (D) hairs

AIPMT 2006 Prelims · Q131

30. Conifers differ from grasses in the :

- (A) production of seeds from ovules
- (B) lack of xylem tracheids
- (C) absence of pollen tubes
- (D) formation of endosperm before fertilization

AIPMT 2006 Prelims · Q132

31. How many different kinds of gametes will be produced by a plant having the genotype AABbCC ?

- (A) Three
- (B) Four
- (C) Nine
- (D) Two

AIPMT 2006 Prelims · Q133

32. In maize, hybrid vigour is exploited by :

- (A) bombarding the protoplast with DNA
- (B) crossing of two inbred parental lines
- (C) harvesting seeds from the most productive plants
- (D) inducing mutations

AIPMT 2006 Prelims · Q134

33. Which of the following statements regarding mitochondrial membrane is not correct ?

- (A) The outer membrane is permeable to all kinds of molecules
- (B) The enzymes of the electron transfer chain are embedded in the outer membrane
- (C) The inner membrane is highly convoluted forming a series of infoldings
- (D) The outer membrane resembles a sieve

AIPMT 2006 Prelims · Q135

34. Amino acid sequence, in protein synthesis is decided by the sequence of :

- (A) t-RNA
- (B) m-RNA
- (C) c-DNA
- (D) r-RNA

AIPMT 2006 Prelims · Q136

35. How many ATP molecules could maximally be generated from one molecule of glucose, if the complete oxidation of one mole of glucose to CO_2 and H_2O yields 686 kcal and the useful chemical energy available in the high energy phosphate bond of one mole of ATP is 12 kcal ?

- (A) Two
- (B) Thirty
- (C) Fifty seven
- (D) One

AIPMT 2006 Prelims · Q137

36. An organic substance bound to an enzyme and essential for its activity is called :

- (A) coenzyme
- (B) holoenzyme
- (C) apoenzyme
- (D) isoenzyme

AIPMT 2006 Prelims · Q138

37. Bowman's glands are found in :

- (A) olfactory epithelium
- (B) external auditory canal
- (C) cortical nephrons only
- (D) juxtamedullary nephrons

AIPMT 2006 Prelims · Q139

38. The bacterium (*Clostridium botulinum*) that causes botulism is :

- (A) a facultative anaerobe
- (B) an obligate anaerobe
- (C) a facultative aerobe
- (D) an obligate aerobe

AIPMT 2006 Prelims · Q140

39. Which one of the following is the correctly matched pair of an endangered animal and a National Park ?

- (A) Lion — Corbett National Park
- (B) Rhinoceros — Kaziranga National Park
- (C) Wild ass — Dudhwa National Park
- (D) Great Indian bustard — Keoladeo National Park

AIPMT 2006 Prelims · Q141

40. A person showing unpredictable moods, outbursts of emotion, quarrelsome behaviour and conflicts with others is suffering from :

- (A) schizophrenia
- (B) borderline personality disorder (BPD)
- (C) mood disorders
- (D) addictive disorders

AIPMT 2006 Prelims · Q143

41. Pentamerous, actinomorphic flowers, bicarpillary ovary with oblique septa, and fruit a capsule or berry, are characteristic features of :

- (A) Asteraceae
- (B) Brassicaceae
- (C) Solanaceae
- (D) Liliaceae

AIPMT 2006 Prelims · Q144

42. In a moss the sporophyte :

- (A) is partially parasitic on the gametophyte
- (B) produces gametes that give rise to the gametophyte
- (C) arises from a spore produced from the gametophyte
- (D) manufactures food for itself, as well as for the gametophyte

AIPMT 2006 Prelims · Q145

43. Curing of tea leaves is brought about by the activity of :

- (A) bacteria
- (B) mycorrhiza
- (C) viruses
- (D) fungi

AIPMT 2006 Prelims · Q146

44. People living at sea level have around 5 million RBC per cubic millimeter of their blood whereas those living at an altitude of 5400 metres have around 8 million. This is because at high altitude :

- (A) people get pollution-free air to breathe and more oxygen is available
- (B) atmospheric O₂ level is less and hence more RBCs are needed to absorb the required amount of O₂ to survive
- (C) there is more UV radiation which enhances RBC production
- (D) people eat more nutritive food, therefore more RBCs are formed

AIPMT 2006 Prelims · Q147

45. An important evidence in favour of organic evolution is the occurrence of :

- (A) homologous and vestigial organs
- (B) analogous and vestigial organs
- (C) homologous organs only
- (D) homologous and analogous organs

AIPMT 2006 Prelims · Q148

46. Which one of the following is not a living fossil ?

- (A) King crab
- (B) Sphenodon
- (C) Archaeopteryx
- (D) Peripatus

AIPMT 2006 Prelims · Q149

47. Annual migration does not occur in the case of :

- (A) salmon
- (B) Siberian crane
- (C) salamander
- (D) arctic tern

AIPMT 2006 Prelims · Q150

48. A major breakthrough in the studies of cells came with the development of electron microscope. This is because :

- (A) the resolution power of the electron microscope is much higher than that of the light microscope
- (B) the resolving power of the electron microscope is 200 – 350 nm as compared to 0.1 – 0.2 nm for the light microscope
- (C) electron beam can pass through thick materials, whereas light microscopy requires thin sections
- (D) the electron microscope is more powerful than the light microscope as it uses a beam of electrons which has wavelength much longer than that of photons

AIPMT 2006 Prelims · Q151

49. Which one of the following is a matching set of a phylum and its three examples ?

- (A) Cnidaria — Bonellia, Physalia, Aurelia
- (B) Platyhelminthes — Planaria, Schistosoma, Enterobius
- (C) Mollusca — Loligo, Teredo, Octopus
- (D) Porifera — Spongilla, Euplectella, Pennatula

AIPMT 2006 Prelims · Q152

50. Metameric segmentation is the characteristic of :

- (A) Platyhelminthes and Arthropoda
- (B) Echinodermata and Annelida
- (C) Annelida and Arthropoda
- (D) Mollusca and Chordata

AIPMT 2006 Prelims · Q153

51. Which of the following pairs of an animal and a plant represents endangered organisms in India ?

- (A) Bentinckia nicobarica and red panda
- (B) Tamarind and rhesus monkey
- (C) Cinchona and leopard
- (D) Banyan and black buck

AIPMT 2006 Prelims · Q154

52. Jurassic period of the Mesozoic era is characterised by :

- (A) gymnosperms are dominant plants and first birds appear
- (B) radiation of reptiles and origin of mammal like reptiles
- (C) dinosaurs become extinct and angiosperms appear
- (D) flowering plants and first dinosaurs appear

AIPMT 2006 Prelims · Q155

53. What is common about Trypanosoma, Noctiluca, Monocystis and Giardia ?

- (A) These are all unicellular protists
- (B) They have flagella
- (C) They produce spores
- (D) These are all parasites

AIPMT 2006 Prelims · Q157

54. Microbes found to be very useful in genetic engineering are :

- (A) Escherichia coli and Agrobacterium tumefaciens
- (B) Vibrio cholerae and a tailed bacteriophage
- (C) Diplococcus sp. and Pseudomonas sp.
- (D) Crown gall bacterium and Caenorhabditis elegans

AIPMT 2006 Prelims · Q158

55. Which of the following environmental conditions are essential for optimum growth of Mucor on a piece of bread ? A. Temperature of about 25°C B. Temperature of about 5°C C. Relative humidity of about 5% D. Relative humidity of about 95% E. A shady place F. A brightly illuminated place Choose the answer from the following options :

- (A) A, C and E only
- (B) A, D and E only
- (C) B, D and E only
- (D) B, C and F only

AIPMT 2006 Prelims · Q159

56. Evolutionary history of an organism is known as :

- (A) Phylogeny
- (B) Ancestry
- (C) Paleontology
- (D) Ontogeny

AIPMT 2006 Prelims · Q160

57. Which of the following is considered a hot-spot of biodiversity in India ?

- (A) Western ghats
- (B) Indo-Gangetic plain
- (C) Eastern ghats
- (D) Aravalli hills

AIPMT 2006 Prelims · Q161

58. During photorespiration, the oxygen consuming reaction(s) occur in :

- (A) stroma of chloroplasts and mitochondria
- (B) stroma of chloroplasts and peroxisomes
- (C) grana of chloroplasts and peroxisomes
- (D) stroma of chloroplasts

AIPMT 2006 Prelims · Q162

59. Which one of the following is an example of polygenic inheritance ?

- (A) Flower colour in Mirabilis jalapa
- (B) Production of male honey bee
- (C) Pod shape in garden pea
- (D) Skin colour in humans

AIPMT 2006 Prelims · Q163

60. Which one of the following not act as a neurotransmitter ?

- (A) Acetylcholine
- (B) Epinephrine
- (C) Nor epinephrine
- (D) Cortisone

AIPMT 2006 Prelims · Q164

61. Sertoli cells are regulated by the pituitary hormone known as :

- (A) FSH
- (B) GH
- (C) Prolactin
- (D) LH

AIPMT 2006 Prelims · Q165

62. A steroid hormone which regulates glucose metabolism is :

- (A) cortisol
- (B) corticosterone
- (C) 11-deoxycorticosterone
- (D) cortisone

AIPMT 2006 Prelims · Q166

63. The contractile protein of skeletal muscle involving ATPase activity is :

- (A) tropomyosin
- (B) myosin
- (C) α -actinin
- (D) troponin

AIPMT 2006 Prelims · Q167

64. Which one of the following is not a second messenger in hormone action ?

- (A) cGMP
- (B) Calcium
- (C) Sodium
- (D) cAMP

AIPMT 2006 Prelims · Q169

65. One gene - one enzyme hypothesis was postulated by :

- (A) R. Franklin
- (B) Hershey and Chase
- (C) A. Garrod
- (D) Beadle and Tatum

AIPMT 2006 Prelims · Q170

66. One turn of the helix in a B-form DNA is approximately :

- (A) 20 nm
- (B) 0.34 nm
- (C) 3.4 nm
- (D) 2 nm

AIPMT 2006 Prelims · Q171

67. Test cross involves :

- (A) crossing between two genotypes with recessive trait
- (B) crossing between two F_1 hybrids
- (C) crossing the F_1 hybrid with a double recessive genotype
- (D) crossing between two genotypes with dominant trait

AIPMT 2006 Prelims · Q172

68. Antiparallel strands of a DNA molecule means that :

- (A) one strand turns anti-clockwise
- (B) the phosphate groups of two DNA strands, at their ends, share the same position
- (C) the phosphate groups at the start of two DNA strands are in opposite position (pole)
- (D) one strand turns clockwise

AIPMT 2006 Prelims · Q173

69. Areolar connective tissue joins :

- (A) fat body with muscles
- (B) integument with muscles
- (C) bones with muscles
- (D) bones with bones

AIPMT 2006 Prelims · Q174

70. Mast cells secrete :

- (A) hippurin
- (B) myoglobin
- (C) histamine
- (D) haemoglobin

AIPMT 2006 Prelims · Q175

71. If a colourblind woman marries a normal visioned man, their sons will be :

- (A) all normal visioned
- (B) one-half colourblind and one-half normal
- (C) three-fourths colourblind and one-fourth normal
- (D) all colourblind

AIPMT 2006 Prelims · Q176

72. Cri-du-chat syndrome in humans is caused by the :

- (A) fertilization of an XX egg by a normal Y-bearing sperm
- (B) loss of half of the short arm of chromosome 5
- (C) loss of half of the long arm of chromosome 5
- (D) trisomy of 21st chromosome

AIPMT 2006 Prelims · Q177

73. Restriction endonuclease :

- (A) cuts the DNA molecule randomly
- (B) cuts the DNA molecule at specific sites
- (C) restricts the synthesis of DNA inside the nucleus
- (D) synthesizes DNA

AIPMT 2006 Prelims · Q178

74. Antibodies in our body are complex :

- (A) lipoproteins
- (B) steroids
- (C) prostaglandins
- (D) glycoproteins

AIPMT 2006 Prelims · Q180

75. Earthworms are :

- (A) ureotelic when plenty of water is available
- (B) uricotelic when plenty of water is available
- (C) uricotelic under conditions of water scarcity
- (D) ammonotelic when plenty of water is available

AIPMT 2006 Prelims · Q181

76. Which of the following is an accumulation and release centre of neurohormones ?

- (A) Posterior pituitary lobe
- (B) Intermediate lobe of the pituitary
- (C) Hypothalamus
- (D) Anterior pituitary lobe

AIPMT 2006 Prelims · Q182

77. Withdrawal of which of the following hormones is the immediate cause of menstruation ?

- (A) Estrogens
- (B) FSH
- (C) FSH-RH
- (D) Progesterone

AIPMT 2006 Prelims · Q183

78. Which one of the following statements is incorrect ?

- (A) The residual air in lungs slightly decreases the efficiency of respiration in mammals
- (B) The presence of non-respiratory air sacs, increases the efficiency of respiration in birds
- (C) In insects, circulating body fluids serve to distribute oxygen to tissues
- (D) The principle of countercurrent flow facilitates efficient respiration in gills of fishes

AIPMT 2006 Prelims · Q184

79. Which one of the following has an open circulatory system ?

- (A) Pheretima
- (B) Periplaneta
- (C) Hirudinaria
- (D) Octopus

AIPMT 2006 Prelims · Q185

80. Which hormone causes dilation of blood vessels, increased oxygen consumption and glycogenolysis ?

- (A) ACTH
- (B) Insulin
- (C) Adrenalin
- (D) Glucagon

AIPMT 2006 Prelims · Q186

81. The causative agent of mad-cow disease is a :

- (A) bacterium
- (B) prion
- (C) worm
- (D) virus

AIPMT 2006 Prelims · Q187

82. The translocation of organic solutes in sieve tube members is supported by :

- (A) root pressure and transpiration pull
- (B) P-proteins
- (C) mass flow involving a carrier and ATP
- (D) cytoplasmic streaming

AIPMT 2006 Prelims · Q188

83. Biradial symmetry and lack of cnidoblasts are the characteristics of :

- (A) Starfish and sea anemone
- (B) Ctenoplana and Beroe
- (C) Aurelia and Paramecium
- (D) Hydra and starfish

AIPMT 2006 Prelims · Q189

84. The arrangement of the nuclei in a normal embryo sac in the dicot plants is :

- (A) 2 + 4 + 2
- (B) 3 + 2 + 3
- (C) 2 + 3 + 3
- (D) 3 + 3 + 2

AIPMT 2006 Prelims · Q190

85. An enzyme that can stimulate germination of barley seeds is :

- (A) α -amylase
- (B) lipase
- (C) protease
- (D) invertase

AIPMT 2006 Prelims · Q191

86. In a cereal grain the single cotyledon of embryo is represented by :

- (A) coleorhiza
- (B) scutellum
- (C) prophyll
- (D) coleoptile

AIPMT 2006 Prelims · Q192

87. The majority of carbon dioxide produced by our body cells is transported to the lungs :

- (A) dissolved in the blood
- (B) as bicarbonates
- (C) as carbonates
- (D) attached to haemoglobin

AIPMT 2006 Prelims · Q193

88. Triticale, the first man-made cereal crop, has been obtained by crossing wheat with :

- (A) rye
- (B) pearl millet
- (C) sugarcane
- (D) barley

AIPMT 2006 Prelims · Q194

89. In order to obtain virus-free plants through tissue culture the best method is :

- (A) protoplast culture
- (B) embryo rescue
- (C) anther culture
- (D) meristem culture

AIPMT 2006 Prelims · Q195

90. HIV that causes AIDS, first starts destroying :

- (A) B-lymphocytes
- (B) leucocytes
- (C) thrombocytes
- (D) helper T-lymphocytes

AIPMT 2006 Prelims · Q196

91. In which one of the following sets of animals do all the four give birth to young ones ?

- (A) Lion, bat, whale, ostrich
- (B) Platypus, penguin, bat, hippopotamus
- (C) Shrew, bat, cat, kiwi
- (D) Kangaroo, hedgehog, dolphin, loris

92. Sickle cell anaemia has not been eliminated from the African population because :

- (A) it is controlled by recessive genes
- (B) it is not a fatal disease
- (C) it provides immunity against malaria
- (D) it is controlled by dominant genes

93. Two common characters found in centipede, cockroach and crab are :

- (A) compound eyes and anal cerci
- (B) jointed legs and chitinous exoskeleton
- (C) green gland and tracheae
- (D) book lungs and antennae

94. Both sickle cell anaemia and Huntington's chorea are :

- (A) bacteria-related diseases
- (B) congenital disorders
- (C) pollutant-induced disorders
- (D) virus-related diseases

95. Angiotensinogen is a protein produced and secreted by :

- (A) macula densa cells
- (B) endothelial cells (cells lining the blood vessels)
- (C) liver cells
- (D) juxtaglomerular (JG) cells

Answer key and explanations

1. Answer: (B) 24

Synergids are cells of the embryo sac and are haploid, so $n = 8$ here. The aleurone layer is the outermost layer of the endosperm, which is triploid ($3n$), giving 24 chromosomes. 16 would be the diploid ($2n$) count of somatic cells, not endosperm.

2. Answer: (C) a cluster of compactly borne flowers on a common axis

Pineapple is a composite (multiple) fruit called sorosis, formed from a whole inflorescence of many flowers borne compactly on a common axis. A multipistillate syncarpous flower is not correct because the fruit comes from many flowers, not one flower.

3. Answer: (A) alleviation of vitamin-A deficiency

Golden rice is genetically engineered to make beta-carotene (provitamin A) in the grain, so it is meant to reduce vitamin A deficiency. Pest resistance is the trait of Bt crops, not golden rice.

4. Answer: (B) treating the plants with low concentrations of gibberellic acid and auxins

Auxins and gibberellins can make the ovary grow into a fruit without fertilisation, giving seedless (parthenocarpic) tomatoes. Removing the androecium alone only stops pollination; without a hormone stimulus the flower would simply drop.

5. Answer: (B) It frees axillary buds from apical dominance

The shoot apex makes auxin that suppresses the lateral buds (apical dominance). Pruning removes the apex, so axillary buds grow into branches and the hedge becomes bushy. The apical shoot does not grow faster; it is the part that is removed.

6. Answer: (B) methaemoglobin

Excess nitrate in drinking water is converted to nitrite, which oxidises haemoglobin to methaemoglobin that cannot carry oxygen, turning infants bluish ('blue baby' syndrome). Excess chloride or dissolved solids do not cause this condition.

7. Answer: (D) camouflage

The praying mantis is green or brown like the leaves and twigs it sits on, so it is hidden from both prey and predators; this is camouflage (cryptic colouration). It is a solitary insect, so 'social insects' is wrong, and it shows no warning colours.

8. Answer: (B) Endocrine glands regulate neural activity and nervous system regulates endocrine glands

The neural and endocrine systems control each other: the hypothalamus (nervous tissue) controls the pituitary, while hormones such as thyroxine and adrenaline change the activity of the nervous system. So the statement that neurons regulate endocrine glands but not the other way round is wrong.

9. Answer: (B) Folic acid and cobalamine

Large, immature, nucleated red cells (megaloblasts) are typical of megaloblastic anaemia, which comes from a shortage of folic acid or vitamin B12 (cobalamin) needed for DNA synthesis in dividing marrow cells. Iron deficiency instead gives small, pale (microcytic) red cells.

10. Answer: (B) Treatment of the plants with cytokinins along with a small dose of nitrogenous fertilizer

Cytokinins delay leaf senescence by keeping chlorophyll and protein from breaking down, and a small dose of nitrogen supports this, so leaves stay green and photosynthesise longer for seed filling. Iron and magnesium help chlorophyll synthesis but do not stop natural senescence-type yellowing.

11. Answer: (D) Litchi

In litchi the juicy white edible part is a fleshy aril, an outgrowth around the seed. In pomegranate the edible part is the juicy outer seed coat (testa), and in orange it is juicy hairs on the inner fruit wall.

12. Answer: (C) Glutamic acid

Miller's spark-discharge experiment produced simple amino acids such as glycine, alanine and aspartic acid. Glutamic acid was not among those reported, so it is the odd one.

13. Answer: (D) highly prone to pests

Large areas of one genetically uniform crop give a pest or pathogen that attacks it an unlimited food supply, so monocultures are highly prone to pest outbreaks. They are not free from intraspecific competition, since all plants are the same species competing for the same resources.

14. Answer: (B) 1987

The Montreal Protocol to control ozone-depleting substances was signed in 1987 in Montreal, Canada. The 1985 date is the Vienna Convention, which set the framework but did not set the controls.

15. Answer: (D) $dN/dt = rN$

In exponential growth the rate of change of population size with time is proportional to its size: $dN/dt = rN$, where r is the intrinsic rate of natural increase. The other options put the variables in the wrong positions.

16. Answer: (D) Fresh weight

Pyramids are built from numbers, biomass measured as dry weight, or energy flow. Fresh weight is not used because water content varies a lot between organisms and would distort the biomass comparison.

17. Answer: (C) sharing of one or more resources between the two species

A niche overlap means two species use one or more of the same resources (food, space, etc.), which can lead to competition. Two parasites on the same host is just one possible case and is not what the term means.

18. Answer: (D) an iron-sulphur protein

Electrons from excited P700 pass through bound iron-sulphur proteins of PS I before reaching ferredoxin, so the early acceptor is an iron-sulphur protein. Plastocyanin is the donor to PS I, not its acceptor, and ferredoxin comes later.

19. Answer: (D) stratification

Stratification is keeping seeds moist at low temperature to break dormancy. Vernalisation is a cold treatment that promotes flowering, not seed germination, and scarification is breaking a hard seed coat.

20. Answer: (C) Ripe banana

Drosophila feeds on yeasts in fermenting fruit, so ripe (overripe) banana is the classic simple culture medium. Agar alone has no food value for the flies.

21. Answer: (B) Botanical garden

In situ conservation protects species in their natural habitat, such as national parks, sanctuaries and biosphere reserves. A botanical garden holds plants away from their natural habitat, so it is ex situ conservation.

22. Answer: (D) Tetracycline

Tetracycline binds the 30S ribosomal subunit and blocks aminoacyl-tRNA from pairing with the mRNA codon at the A site. Erythromycin acts on the 50S subunit and blocks peptide movement, not tRNA-mRNA binding.

23. Answer: (D) genotype and environment interactions

The observable phenotype is produced by the genotype acting within a given environment. Mutations, nutrition or sexual dimorphism each affect only a part of it.

24. Answer: (C) carbon dioxide

Photochemical smog forms when nitrogen oxides and hydrocarbons react in sunlight, producing ozone, PAN and nitrogen dioxide. Carbon dioxide is not a component of this smog.

25. Answer: (B) it is hygroscopic

Peat from Sphagnum moss holds a lot of water (it is hygroscopic), so it keeps packed living plants moist during transport. Its use is not because it reduces transpiration or kills germs.

26. Answer: (B) Plasmodium

Slime moulds form a mass of multinucleate protoplasm without walls called a plasmodium, which can spread over long distances. Mycelium is the network of hyphae of true fungi, and protonema is the juvenile stage of mosses.

27. Answer: (B) Cytoplasmic

Genes in mitochondria and plastids are passed on mostly through the egg cytoplasm, so cytoplasmic inheritance shows strong maternal influence. X-linked traits are inherited from both parents, and Y-linked traits come only from the father.

28. Answer: (D) Marginal

Sweet pea (Fabaceae) has a monocarpellary ovary with ovules along one ventral suture, which is marginal placentation. Axile placentation needs a multilocular syncarpous ovary, as in tomato.

29. Answer: (B) styles

The silky threads (silk) of a maize cob are the long styles and stigmas of the female flowers, which catch wind-borne pollen. They are not hairs, and anthers are borne in the male tassel.

30. Answer: (D) formation of endosperm before fertilization

In gymnosperms such as conifers the endosperm is the female gametophyte, formed before fertilisation and haploid. In grasses (angiosperms) the endosperm forms after double fertilisation and is triploid. Both groups make seeds from ovules and both have pollen tubes.

31. Answer: (D) Two

Only the B gene is heterozygous, so the plant makes $2^1 = 2$ kinds of gametes: ABC and AbC. AA and CC each give only one kind of allele.

32. Answer: (B) crossing of two inbred parental lines

Hybrid vigour is obtained by crossing two different inbred lines; the F1 hybrid outperforms both parents. Simply picking seed from the best plants is mass selection and does not exploit heterosis.

33. Answer: (B) The enzymes of the electron transfer chain are embedded in the outer membrane

The electron transport chain enzymes lie in the inner mitochondrial membrane, which is folded into cristae; so the statement putting them in the outer membrane is incorrect. The outer membrane is porous and sieve-like.

34. Answer: (B) m-RNA

The order of codons in mRNA decides the order of amino acids in the polypeptide. tRNA only brings amino acids by reading those codons; it does not decide the order.

35. Answer: (C) Fifty seven

If all 686 kcal could be stored in ATP at 12 kcal per ATP, the maximum would be $686 / 12 \approx 57$ ATP. Thirty is close to the real yield from respiration, but the question asks for the theoretical maximum from the numbers given.

36. Answer: (A) coenzyme

An organic non-protein molecule that binds an enzyme and is needed for its activity is a coenzyme (a tightly bound one is called a prosthetic group). An apoenzyme is the protein part alone, and a holoenzyme is the complete active enzyme.

37. Answer: (A) olfactory epithelium

Bowman's glands lie in the olfactory epithelium of the nose and secrete mucus that dissolves odour molecules. They should not be confused with Bowman's capsule of the nephron.

38. Answer: (B) an obligate anaerobe

Clostridium botulinum cannot grow in the presence of oxygen; it is an obligate anaerobe, which is why it grows in badly canned, airless foods. A facultative anaerobe can grow with or without oxygen.

39. Answer: (B) Rhinoceros — Kaziranga National Park

Kaziranga National Park in Assam is famous for the endangered one-horned rhinoceros. Lions live only in Gir, not Corbett (known for tigers), and the wild ass is in the Rann of Kutch, not Dudhwa.

40. Answer: (B) borderline personality disorder (BPD)

Unstable moods, emotional outbursts, quarrelsome behaviour and repeated conflict with others are the defining features of borderline personality disorder. Schizophrenia is marked by hallucinations, delusions and disordered thinking, which are not described here.

41. Answer: (C) Solanaceae

Solanaceae has pentamerous, actinomorphic flowers and a bicarpellary syncarpous ovary placed obliquely, with a capsule or berry fruit. Brassicaceae is tetramerous, and Liliaceae is trimerous with a tricarpellary ovary.

42. Answer: (A) is partially parasitic on the gametophyte

The moss sporophyte (foot, seta, capsule) stays attached to the gametophyte and gets water and some nutrients from it, though its young capsule can photosynthesise; so it is partially dependent. It produces spores, not gametes, and it grows from the zygote, not from a spore.

43. Answer: (A) bacteria

Curing (fermentation) of tea leaves is done by the activity of bacteria, which develop flavour and colour. Fungi are used in other processes such as cheese ripening.

44. Answer: (B) atmospheric O₂ level is less and hence more RBCs are needed to absorb the required amount of O₂ to survive

At high altitude the partial pressure of oxygen is low, so the body makes more RBCs to carry enough oxygen to the tissues. The air there actually has less available oxygen, not more.

45. Answer: (A) homologous and vestigial organs

Homologous organs show common ancestry with divergent evolution, and vestigial organs are remnants of organs functional in ancestors; both support organic evolution. Analogous organs come from convergent evolution and do not show common descent.

46. Answer: (C) Archaeopteryx

Archaeopteryx is an extinct Jurassic fossil bird with reptile features, a connecting link. King crab, *Sphenodon* and *Peripatus* are living species that have changed little over long times, i.e. living fossils.

47. Answer: (C) salamander

Salmon, Siberian crane and arctic tern all make long annual migrations. Salamanders are amphibians that stay in a small local area and do not make annual migrations.

48. Answer: (A) the resolution power of the electron microscope is much higher than that of the light microscope

Electrons have a much shorter wavelength than light, so an electron microscope has far greater resolving power and shows fine cell structures. The option quoting 200–350 nm for the electron microscope swaps the values, and electron beams need very thin sections.

49. Answer: (C) Mollusca — Loligo, Teredo, Octopus

Loligo (squid), *Teredo* (shipworm) and *Octopus* are all molluscs. *Bonellia* is not a cnidarian, *Enterobius* is a roundworm, not a flatworm, and *Pennatulula* (sea pen) is a cnidarian, not a sponge.

50. Answer: (C) Annelida and Arthropoda

True metameric segmentation, with the body divided into repeated segments, is found in Annelida and Arthropoda. Platyhelminthes and molluscs are not metamerically segmented.

51. Answer: (A) *Bentinckia nicobarica* and red panda

Bentinckia nicobarica is an endangered palm of the Nicobar Islands and the red panda is an endangered mammal of the eastern Himalaya. Tamarind, banyan and the rhesus monkey are common and not endangered.

52. Answer: (A) gymnosperms are dominant plants and first birds appear

In the Jurassic period gymnosperms such as conifers and cycads were the dominant plants and the first birds (*Archaeopteryx*) appeared. Dinosaurs became extinct at the end of the Cretaceous, not the Jurassic.

53. Answer: (A) These are all unicellular protists

Trypanosoma, Noctiluca, Monocystis and Giardia are all single-celled eukaryotes, i.e. protists. Not all are parasites, since Noctiluca is a free-living marine dinoflagellate, and Monocystis has no flagella.

54. Answer: (A) Escherichia coli and Agrobacterium tumefaciens

E. coli is the main host for cloning vectors, and Agrobacterium tumefaciens is used to transfer genes into plants through its Ti plasmid. Caenorhabditis elegans is a nematode, not a microbe.

55. Answer: (B) A, D and E only

Bread mould (Mucor) grows best in warm (around 25°C), very humid and shady conditions. Cold (5°C), dry air or bright light slow its growth.

56. Answer: (A) Phylogeny

Phylogeny is the evolutionary history of a species or group. Ontogeny is the development of a single individual from zygote to adult.

57. Answer: (A) Western ghats

The Western Ghats (with Sri Lanka) is one of the global biodiversity hotspots in India because of its high species richness and endemism. The Indo-Gangetic plain and Aravalli hills are not hotspots.

58. Answer: (B) stroma of chloroplasts and peroxisomes

Oxygen is taken up when RuBisCO acts as an oxygenase on RuBP in the chloroplast stroma, and again when glycolate is oxidised by glycolate oxidase in the peroxisome. Mitochondria release CO₂ in this pathway; they do not consume O₂ in it.

59. Answer: (D) Skin colour in humans

Human skin colour is controlled by several genes with additive effects, giving continuous variation; this is polygenic inheritance. Flower colour in Mirabilis jalapa shows incomplete dominance of a single gene.

60. Answer: (D) Cortisone

Cortisone is a steroid hormone of the adrenal cortex, not a neurotransmitter. Acetylcholine, epinephrine and norepinephrine are all released at synapses.

61. Answer: (A) FSH

FSH acts on Sertoli cells and helps spermatogenesis. LH acts mainly on Leydig cells to stimulate testosterone secretion.

62. Answer: (A) cortisol

Cortisol is the main glucocorticoid; it raises blood sugar by stimulating gluconeogenesis and other effects on carbohydrate metabolism. 11-deoxycorticosterone acts mainly as a mineralocorticoid on salt balance.

63. Answer: (B) myosin

The head of myosin has ATPase activity and binds actin to make cross-bridges, driving contraction. Troponin and tropomyosin are regulatory proteins on the thin filament with no ATPase activity.

64. Answer: (C) Sodium

cAMP, cGMP and Ca²⁺ act as second messengers that relay hormone signals inside the cell. Sodium ions are not used as second messengers.

65. Answer: (D) Beadle and Tatum

Beadle and Tatum, working with Neurospora mutants, proposed that one gene controls one enzyme. Garrod earlier described inborn errors of metabolism but did not state this hypothesis.

66. Answer: (C) 3.4 nm

B-DNA has about 10 base pairs per turn with 0.34 nm between pairs, so one turn (pitch) is about 3.4 nm. 0.34 nm is the distance between adjacent base pairs, and 2 nm is the helix diameter.

67. Answer: (C) crossing the F₁ hybrid with a double recessive genotype

In a test cross the F₁ (or any dominant-phenotype) plant is crossed with the homozygous recessive parent to find its genotype. Crossing two F₁ hybrids is selfing that gives the F₂.

68. Answer: (C) the phosphate groups at the start of two DNA strands are in opposite position (pole)

The two strands of DNA run in opposite directions, one 5'→3' and the other 3'→5', so the phosphate end (5') of each strand lies at opposite ends of the molecule. Both strands turn the same way in a right-handed helix.

69. Answer: (B) integument with muscles

Areolar tissue lies beneath the skin and attaches the skin (integument) to the underlying muscles. Bones are joined to muscles by tendons and to other bones by ligaments.

70. Answer: (C) histamine

Mast cells of connective tissue release histamine (and heparin, serotonin) during inflammation and allergy. Haemoglobin and myoglobin are oxygen-binding proteins of RBCs and muscle, not secretions.

71. Answer: (D) all colourblind

A colourblind woman is X^cX^c , so every son gets an X carrying the colourblind allele from her and a Y from the father; all sons are colourblind. The daughters would be carriers with normal vision.

72. Answer: (B) loss of half of the short arm of chromosome 5

Cri-du-chat syndrome is due to deletion of part of the short arm (p arm) of chromosome 5, giving a cat-like cry in infants. Trisomy 21 causes Down syndrome.

73. Answer: (B) cuts the DNA molecule at specific sites

A restriction endonuclease recognises a specific palindromic base sequence and cuts DNA at or near that site. It does not cut randomly or make DNA.

74. Answer: (D) glycoproteins

Antibodies (immunoglobulins) are glycoproteins made of two heavy and two light polypeptide chains with carbohydrate attached. They are not lipoproteins, steroids or prostaglandins.

75. Answer: (D) ammonotelic when plenty of water is available

Earthworms excrete mainly ammonia when plenty of water is available and switch to urea when water is scarce. They are not uricotelic.

76. Answer: (A) Posterior pituitary lobe

Oxytocin and vasopressin are made by hypothalamic neurons, travel down their axons, and are stored in and released from the posterior pituitary. The hypothalamus produces these neurohormones but the place where they collect and are released is the neurohypophysis.

77. Answer: (D) Progesterone

When the corpus luteum degenerates without fertilisation, progesterone falls and the endometrium can no longer be kept, so menstruation starts. FSH and oestrogen falling are not the direct trigger.

78. Answer: (C) In insects, circulating body fluids serve to distribute oxygen to tissues

Insects carry oxygen directly to tissues through tracheal tubes, and their blood (haemolymph) plays little part in oxygen transport, so this statement is the incorrect one. Residual air does slightly lower efficiency because fresh air is mixed with stale air.

79. Answer: (B) Periplaneta

Periplaneta (cockroach), like other arthropods, has an open circulatory system with blood flowing through haemocoel sinuses. Pheretima, Hirudinaria and Octopus have closed systems.

80. Answer: (C) Adrenalin

Adrenaline (the fight-or-flight hormone) raises oxygen use, breaks down glycogen and widens blood vessels in muscles and heart. Glucagon also causes glycogenolysis but does not produce these vascular and metabolic stress effects.

81. Answer: (B) prion

Mad cow disease (bovine spongiform encephalopathy) is caused by prions, abnormally folded infectious proteins. It is not caused by a virus or bacterium.

82. Answer: (C) mass flow involving a carrier and ATP

Food moves in sieve tubes by mass (pressure) flow, and loading of sugars into sieve tubes uses carrier proteins and ATP. Root pressure and transpiration pull move water in xylem, not food in phloem.

83. Answer: (B) Ctenoplane and Beroe

Ctenophores such as Ctenoplane and Beroe have biradial symmetry and lack cnidoblasts, using colloblasts to catch prey instead. Hydra, sea anemone and Aurelia are cnidarians with cnidoblasts.

84. Answer: (B) 3 + 2 + 3

The mature embryo sac has 3 cells at the micropylar end (egg apparatus), 2 polar nuclei in the central cell and 3 antipodals at the chalazal end: 3 + 2 + 3. It is 7-celled and 8-nucleate.

85. Answer: (A) α -amylase

Gibberellin from the embryo makes the aleurone layer produce α -amylase, which breaks starch into sugars for the growing seedling. This is the basis of using GA in malting barley.

86. Answer: (B) scutellum

In grass (cereal) embryos the single shield-shaped cotyledon is called the scutellum. The coleoptile and coleorhiza are sheaths covering the plumule and radicle.

87. Answer: (B) as bicarbonates

About 70% of CO₂ is carried in plasma as bicarbonate ions, formed with carbonic anhydrase in RBCs. About 20–25% travels bound to haemoglobin and around 7% dissolved.

88. Answer: (A) rye

Triticale is an artificial cereal from crossing wheat (*Triticum*) with rye (*Secale*), then doubling the chromosomes. Barley and pearl millet are not its parents.

89. Answer: (D) meristem culture

The apical and axillary meristems are usually free of virus, so culturing meristems gives virus-free plants. Anther culture is used to raise haploid plants, not virus-free ones.

90. Answer: (D) helper T-lymphocytes

HIV enters and multiplies inside helper T-lymphocytes, which it gradually destroys, so their number falls. B-lymphocytes are not the first target.

91. Answer: (D) Kangaroo, hedgehog, dolphin, loris

Kangaroo, hedgehog, dolphin and loris are all viviparous mammals. Each other set has an egg-layer: ostrich, platypus and penguin, or kiwi.

92. Answer: (C) it provides immunity against malaria

Heterozygous carriers (HbA HbS) are more resistant to falciparum malaria, so the allele is kept in high frequency where malaria is common. Simply being recessive does not explain why the allele persists at such a high frequency.

93. Answer: (B) jointed legs and chitinous exoskeleton

Centipedes, cockroaches and crabs are arthropods, so they all have jointed legs and a chitinous exoskeleton. Anal cerci, tracheae, green glands and book lungs are found only in some of them.

94. Answer: (B) congenital disorders

Both sickle cell anaemia and Huntington's chorea are genetic (inherited) disorders, present from birth in the genotype. They are not caused by microbes or pollutants.

95. Answer: (C) liver cells

Angiotensinogen is a plasma protein made by liver cells; renin from JG cells converts it to angiotensin I. JG cells secrete renin, not angiotensinogen.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.