

AIPMT 2005 Prelims — Biology Question Paper with Solutions

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

AIPMT 2005 Prelims · Q101

1. The main organelle involved in modification and routing of newly synthesized proteins to their destinations is :

- (A) mitochondria
- (B) endoplasmic reticulum
- (C) lysosome
- (D) chloroplast

AIPMT 2005 Prelims · Q102

2. There are two opposing views about origin of Modern man. According to one view Homo erectus in Asia were the ancestors of modern man. A study of variations of DNA however suggested African origin of Modern man. What kind of observation on DNA variation could suggest this ?

- (A) Greater variation in Africa than in Asia
- (B) Variation only in Asia and no variation in Africa
- (C) Greater variation in Asia than in Africa
- (D) Similar variation in Africa and Asia

AIPMT 2005 Prelims · Q103

3. The world's highly prized wool yielding 'Pashmina' breed is :

- (A) sheep
- (B) goat
- (C) goat-sheep cross
- (D) Kashmir sheep-Afghan sheep cross

AIPMT 2005 Prelims · Q104

4. Grey crescent is the area :

- (A) at the point of entry of sperm into ovum
- (B) just opposite to the site of entry of sperm into ovum
- (C) at the animal pole
- (D) at the vegetal pole

AIPMT 2005 Prelims · Q106

5. At what stage of the cell cycle are histone proteins synthesized in a eukaryotic cell ?

- (A) During entire prophase
- (B) During telophase
- (C) During S-phase
- (D) During G2 stage of prophase

AIPMT 2005 Prelims · Q107

6. There exists a close association between the alga and the fungus within a lichen. The fungus :

- (A) fixes the atmospheric nitrogen for the alga
- (B) provides protection, anchorage and absorption for the alga
- (C) provides food for the alga
- (D) releases oxygen for the alga

AIPMT 2005 Prelims · Q108

7. For retting of jute the fermenting microbe used is :

- (A) Helicobacter pylori
- (B) Methophilic bacteria
- (C) Streptococcus lactin
- (D) Butyric acid bacteria

AIPMT 2005 Prelims · Q109

8. A student wishes to study the cell structure under a light microscope having 10X eyepiece and 45X objective. He should illuminate the object by which one of the following colours of light so as to get the best possible resolution ?

- (A) Yellow
- (B) Green
- (C) Blue
- (D) Red

AIPMT 2005 Prelims · Q111

9. At which latitude, heat gain through insolation approximately equals heat loss through terrestrial radiation ?

- (A) 66° North and South
- (B) 22(1/2)° North and South
- (C) 40° North and South
- (D) 42(1/2)° North and South

AIPMT 2005 Prelims · Q112

10. A man and a woman, who do not show any apparent signs of a certain inherited disease, have seven children (2 daughters and 5 sons). Three of the sons suffer from the given disease but none of the daughters are affected. Which of the following mode of inheritance do you suggest for this disease ?

- (A) Autosomal dominant
- (B) Sex-linked dominant
- (C) Sex-limited recessive
- (D) Sex-linked recessive

AIPMT 2005 Prelims · Q113

11. In Ornithine cycle, which of the following wastes are removed from the blood ?

- (A) Urea and urine
- (B) Ammonia and urea
- (C) CO₂ and ammonia
- (D) CO₂ and urea

AIPMT 2005 Prelims · Q114

12. Telomerase is an enzyme which is a :

- (A) repetitive DNA
- (B) RNA
- (C) simple protein
- (D) ribonucleoprotein

AIPMT 2005 Prelims · Q115

13. During transcription holoenzyme RNA polymerase binds to a DNA sequence and the DNA assumes a saddle like structure at that point. What is that sequence called ?

- (A) CAAT box
- (B) GGTT box
- (C) AAAT box
- (D) TATA box

AIPMT 2005 Prelims · Q116

14. Centromere is required for :

- (A) transcription
- (B) crossing over
- (C) cytoplasmic cleavage
- (D) movement of chromosomes towards poles

AIPMT 2005 Prelims · Q117

15. Damage to thymus in a child may lead to :

- (A) a reduction in haemoglobin content of blood
- (B) a reduction in stem cell production
- (C) loss of antibody mediated immunity
- (D) loss of cell mediated immunity

AIPMT 2005 Prelims · Q118

16. Prolonged liberal irrigation of agricultural fields is likely to create the problem of :

- (A) acidity
- (B) aridity
- (C) metal toxicity
- (D) salinity

AIPMT 2005 Prelims · Q119

17. Chlorophyll in chloroplasts is located in :

- (A) grana
- (B) pyrenoid
- (C) stroma
- (D) both grana and stroma

AIPMT 2005 Prelims · Q120

18. Three crops that contribute maximum to global food grain production are :

- (A) wheat, rice and maize
- (B) wheat, maize and sorghum
- (C) rice, maize and sorghum
- (D) wheat, rice and barley

AIPMT 2005 Prelims · Q121

19. Genes for cytoplasmic male sterility in plants are generally located in :

- (A) mitochondrial genome
- (B) cytosol
- (C) chloroplast genome
- (D) nuclear genome

AIPMT 2005 Prelims · Q122

20. Which one of the following hydrolyses internal phosphodiester bonds in a polynucleotide chain ?

- (A) Lipase
- (B) Exonuclease
- (C) Endonuclease
- (D) Protease

AIPMT 2005 Prelims · Q123

21. Match items in column-I with those in column-II.

Column-I: (a) Peritrichous flagellation; (b) Living fossil; (c) Rhizophore; (d) Smallest flowering plant; (e) Largest perennial alga

Column-II: 1. Ginkgo; 2. Macrocystes; 3. Escherichia coli; 4. Selaginella; 5. Wolffia

Select the correct answer from the following :

Codes :

- (A) (a)-2, (b)-1, (c)-3, (d)-4, (e)-5
- (B) (a)-5, (b)-3, (c)-2, (d)-5, (e)-1
- (C) (a)-1, (b)-2, (c)-5, (d)-3, (e)-2
- (D) (a)-3, (b)-1, (c)-4, (d)-5, (e)-2

AIPMT 2005 Prelims · Q124

22. The name of Norman Borlaug is associated with :

- (A) Green revolution
- (B) Yellow revolution
- (C) White revolution
- (D) Blue revolution

AIPMT 2005 Prelims · Q125

23. G-6-P dehydrogenase deficiency is associated with haemolysis of :

- (A) lymphocytes
- (B) RBCs
- (C) platelets
- (D) leucocytes

AIPMT 2005 Prelims · Q126

24. In which one pair both the plants can be vegetatively propagated by leaf pieces ?

- (A) Bryophyllum and Kalanchoe
- (B) Chrysanthemum and Agave
- (C) Agave and Kalanchoe
- (D) Asparagus and Bryophyllum

AIPMT 2005 Prelims · Q127

25. According to IUCN red list what is the status of red Panda (*Ailurus fulgens*) ?

- (A) Vulnerable species
- (B) Critically endangered species
- (C) Extinct species
- (D) Endangered species

AIPMT 2005 Prelims · Q128

26. Which of the following substances, if introduced in the blood stream, would cause coagulation, at the site of its introduction ?

- (A) Fibrinogen
- (B) Prothrombin
- (C) Heparin
- (D) Thromboplastin

AIPMT 2005 Prelims · Q129

27. *E. coli* cells with a mutated Z gene of the lac operon cannot grow in medium containing only lactose as the source of energy because :

- (A) in the presence of glucose, *E. coli* cells do not utilize lactose
- (B) they cannot transport lactose from the medium into the cell
- (C) the lac operon is constitutively active in these cells
- (D) they cannot synthesize functional β -galactosidase

AIPMT 2005 Prelims · Q130

28. Top-shaped multiciliate male gametes and the mature seed which bears only one embryo with two cotyledons, are characteristic features of :

- (A) polypetalous angiosperms
- (B) gamopetalous angiosperms
- (C) conifers
- (D) cycads

AIPMT 2005 Prelims · Q131

29. Production of a human protein in bacteria by genetic engineering is possible because :

- (A) bacterial cell can carry out the RNA splicing reactions
- (B) the human chromosome can replicate in bacterial cell
- (C) the mechanism of gene regulation is identical in humans and bacteria
- (D) the genetic code is universal

AIPMT 2005 Prelims · Q132

30. From the following statements select the wrong one :

- (A) millepedes have two pairs of appendages in each segment of the body
- (B) prawn has two pairs of antennae
- (C) animals belonging to phylum-Porifera are exclusively marine
- (D) nematocysts are characteristic of the phylum - Cnidaria

AIPMT 2005 Prelims · Q133

31. Nucleotide are building blocks of nucleic acids, nucleotide is a composite molecule formed by :

- (A) (base-sugar-phosphate)_n
- (B) base-sugar-OH
- (C) base-sugar-phosphate
- (D) sugar-phosphate

AIPMT 2005 Prelims · Q135

32. Which one of the following pairs is mismatched ?

- (A) Biomass burning — release of CO₂
- (B) Fossil fuel burning — release of CO₂
- (C) Nuclear power — radioactive wastes
- (D) Solar energy — green house effect

AIPMT 2005 Prelims · Q136

33. Which one of the following characters is not typical of the class-mammalia ?

- (A) Seven cervical vertebrae
- (B) Thecodont dentition
- (C) Ten pairs of cranial nerves
- (D) Alveolar lungs

AIPMT 2005 Prelims · Q137

34. Which of the following is the simplest amino acid ?

- (A) Tyrosine
- (B) Asparagine
- (C) Glycine
- (D) Alanine

AIPMT 2005 Prelims · Q138

35. Barophilic prokaryotes :

- (A) grow slowly in highly alkaline frozen lakes at high altitudes
- (B) occur in water containing high concentrations of barium hydroxide
- (C) grow and multiply in very deep marine sediments
- (D) readily grown and divides in sea water enriched in any soluble salt of barium

AIPMT 2005 Prelims · Q139

36. Auxospores and hormocysts are formed, respectively, by :

- (A) several diatoms and a few cyanobacteria
- (B) several cyanobacteria and several diatoms
- (C) some diatoms and several cyanobacteria
- (D) some cyanobacteria and many diatoms

AIPMT 2005 Prelims · Q140

37. Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these :

- (A) enhance oxidative metabolism
- (B) are conjugated proteins
- (C) are exclusively synthesized in the body of a living organism as at present
- (D) help in regulating metabolism

38. Which one of the following phenomena supports Darwin's concept of natural selection in organic evolution ?

- (A) Development of transgenic animals
- (B) Production of 'Dolly' the sheep by cloning
- (C) Prevalence of pesticide resistant insects
- (D) Development of organs from 'stem cells' for organ transplantation

39. As compared to a C_3 plant, how many additional molecules of ATP are needed for net production of one molecule of hexose sugar by C_4 plants :

- (A) 2
- (B) 6
- (C) 0
- (D) 12

40. In a man, abducens nerve is injured. Which one of the following functions will be affected ?

- (A) Movement of the eye ball
- (B) Swallowing
- (C) Movement of the tongue
- (D) Movement of the neck

41. An important step in the manufacture of pulp for paper industry from the woody tissues of plants is the :

- (A) preparation of pure cellulose by removing lignin
- (B) removal of oils present in the wood by treatment with suitable chemicals
- (C) removal of water from the wood by prolonged heating at approximately 50°C
- (D) treatment of wood with chemical that breakdown cellulose

42. Protein synthesis in an animal cell occurs :

- (A) only on the ribosomes present in cytosol
- (B) on ribosomes present in cytoplasm as well as in mitochondria
- (C) only on ribosomes attached to the nuclear envelope and endoplasmic reticulum
- (D) on ribosomes present in the nucleolus as well as in cytoplasm

43. Which of the following is not true for a species ?

- (A) Members of a species can interbreed
- (B) Variations occurs among members of a species
- (C) Each species is reproductively isolated from every other species
- (D) Gene flow does not occur between the populations of a species

44. One of the most important functions of botanical gardens is that :

- (A) one can observe tropical plants there
- (B) they allow ex situ conservation of germplasm
- (C) they provide the natural habitat for wild life
- (D) they provide a beautiful area for recreation

45. The ability of the venus flytrap to capture insects is due to :

- (A) chemical stimulation by the prey
- (B) a passive process requiring no special ability on the part of the plant
- (C) specialized "muscle-like" cells
- (D) rapid turgor pressure changes

46. Animals have the innate ability to escape from predation. Examples for the same are given below. Select the incorrect example :

- (A) enlargement of body size by swallowing air in puffer fish
- (B) melanism in moths
- (C) poison fangs in snakes
- (D) colour change in chameleon

47. At a particular locus, frequency of 'A' allele is 0.6 and that of 'a' is 0.4. What would be the frequency of heterozygotes in a random mating population at equilibrium ?

- (A) 0.16
- (B) 0.48
- (C) 0.36
- (D) 0.24

48. Which one of the following experiments suggests that simplest living organisms could not have originated spontaneously from non-living matter ?

- (A) Microbes did not appear in stored meat
- (B) Larvae could appear in decaying organic matter
- (C) Microbes appeared from unsterilized organic matter
- (D) Meat was not spoiled, when heated and kept sealed in a vessel

49. Biodiversity act of India was passed by the Parliament in the year :

- (A) 1996
- (B) 1992
- (C) 2002
- (D) 2000

50. During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP ?

- (A) Conversion of pyruvic acid to acetyl Co-A
- (B) Electron transport chain
- (C) Glycolysis
- (D) Krebs cycle

51. A woman with normal vision, but whose father was colour blind, marries a colourblind man. Suppose that the fourth child of this couple was a boy. This boy :

- (A) must have normal colour vision
- (B) will be partially colourblind since he is heterozygous for the colourblind mutant allele
- (C) must be colourblind
- (D) may be colourblind or may be of normal vision

52. Ectophloic siphonostele is found in :

- (A) Adiantum and Cucurbitaceae
- (B) Osmunda and Equisetum
- (C) Marsilea and Botrychium
- (D) Dicksonia and maiden hair fern

AIPMT 2005 Prelims · Q156

53. Which of the following represents the edible part of the fruit of litchi ?

- (A) Pericarp
- (B) Mesocarp
- (C) Juicy aril
- (D) Endocarp

AIPMT 2005 Prelims · Q157

54. Carbohydrates, the most abundant biomolecules on earth, are produced by :

- (A) all bacteria, fungi and algae
- (B) fungi, algae and green plant cells
- (C) some bacteria, algae and green plant cells
- (D) viruses, fungi and bacteria

AIPMT 2005 Prelims · Q158

55. Identify the correctly matched pair :

- (A) Montreal protocol - Global warming
- (B) Kyoto protocol - Climatic change
- (C) Ramsar convention - Ground water pollution
- (D) Basal convention - Biodiversity conservation

AIPMT 2005 Prelims · Q159

56. Which of the following is not a hereditary disease ?

- (A) Cretinism
- (B) Cystic fibrosis
- (C) Thalassaemia
- (D) Haemophilia

AIPMT 2005 Prelims · Q160

57. The deficiencies of micro-nutrients, not only affects growth of plants but also vital functions such as photosynthetic and mitochondrial electron flow. Among the list given below, which group of three elements shall affect most, both photosynthetic and mitochondrial electron transport ?

- (A) Cu, Mn, Fe
- (B) Co, Ni, Mo
- (C) Mn, Co, Ca
- (D) Ca, X, Na

AIPMT 2005 Prelims · Q161

58. de Vries gave his mutation theory on organic evolution while working on :

- (A) *Althea rosea*
- (B) *Drosophila melanogaster*
- (C) *Oenothera lamarckiana*
- (D) *Pisum sativum*

AIPMT 2005 Prelims · Q163

59. Which of the following is not used for disinfection of drinking water ?

- (A) Phenyl
- (B) Chloramine
- (C) Chlorine
- (D) Ozone

AIPMT 2005 Prelims · Q164

60. Chemiosmotic theory of ATP synthesis in the chloroplasts and mitochondria is based on :

- (A) proton gradient
- (B) accumulation of K ions
- (C) accumulation of Na ions
- (D) membrane potential

AIPMT 2005 Prelims · Q165

61. Parkinson's disease (characterized by tremors and progressive rigidity of limbs) is caused by degeneration of brain neurons that are involved in movement control and make use of neurotransmitter :

- (A) acetylcholine
- (B) norepinephrine
- (C) dopamine
- (D) GABA

AIPMT 2005 Prelims · Q167

62. An acromian process is characteristically found in the :

- (A) pelvic girdle of mammals
- (B) skull of frog
- (C) pectoral girdle of mammals
- (D) sperm of mammals

AIPMT 2005 Prelims · Q168

63. In a type of apomixis known as adventive embryony, embryos develop directly from the :

- (A) nucellus or integuments
- (B) synergids or antipodals in an embryo sac
- (C) accessory embryo sacs in the ovule
- (D) zygote

AIPMT 2005 Prelims · Q169

64. Through which cell of the embryo sac, does the pollen tube enter the embryo sac ?

- (A) Egg cell
- (B) Central cell
- (C) Persistent synergid
- (D) Degenerated synergid

AIPMT 2005 Prelims · Q170

65. Epithelial cells of the intestine involved in food absorption have on their surface :

- (A) pinocytic vesicles
- (B) phagocytic vesicles
- (C) zymogen granules
- (D) micro-villi

AIPMT 2005 Prelims · Q171

66. A patient is generally advised to specially, consume more meat, lentils, milk and eggs in diet only when he suffers from :

- (A) kwashiorkor
- (B) rickets
- (C) anaemia
- (D) scurvy

AIPMT 2005 Prelims · Q172

67. Which one of the following pairs is mismatched ?

- (A) Savanna — Acacia trees
- (B) Prairie — epiphytes
- (C) Tundra — permafrost
- (D) Coniferous forest — evergreen trees

AIPMT 2005 Prelims · Q174

68. Which one of the following represents an ovule, where the embryo sac becomes horse-shoe shaped and the funiculus and micropyle are close to each other ?

- (A) Circinotropous
- (B) Anatropous
- (C) Amphitropous
- (D) Atropous

AIPMT 2005 Prelims · Q175

69. Potometer works on the principle of :

- (A) amount of water absorbed equals the amount transpired
- (B) osmotic pressure
- (C) root pressure
- (D) potential difference between the tip of the tube and that of the plant

AIPMT 2005 Prelims · Q177

70. Which one of the following makes use of RNA as a template to synthesize DNA ?

- (A) Reverse transcriptase
- (B) DNA dependant RNA polymerase
- (C) DNA polymerase
- (D) RNA polymerase

AIPMT 2005 Prelims · Q178

71. In contrast to annelids the platyhelminths show :

- (A) radial symmetry
- (B) presence of pseudocoel
- (C) bilateral symmetry
- (D) absence of body cavity

AIPMT 2005 Prelims · Q179

72. Which of the following statements regarding enzyme inhibition is correct ?

- (A) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate
- (B) Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein
- (C) Competitive inhibition is seen when the substrate and the inhibitor compete
- (D) Non-competitive inhibitors often bind to the enzyme irreversibly

AIPMT 2005 Prelims · Q180

73. Which of the following pairs is correctly matched ?

- (A) Cartilaginous joint — skull bones
- (B) Hinge joint — between vertebrae
- (C) Fibrous joint — between phalanges
- (D) Gliding joint — between zygapophyses of the successive vertebrae

AIPMT 2005 Prelims · Q181

74. The catalytic efficiency of two different enzymes can be compared by the :

- (A) the K_m value
- (B) the pH optimum value
- (C) formation of the product
- (D) molecular size of the enzyme

AIPMT 2005 Prelims · Q183

75. Which of the following is generally used for induced mutagenesis in crop plants ?

- (A) Alpha particles
- (B) X-rays
- (C) UV (260 nm)
- (D) Gamma rays (from cobalt 60)

76. Haemophilia is more commonly seen in human males than in human females because :

- (A) this disease is due to an X-linked dominant mutation
- (B) a greater proportion of girls die in infancy
- (C) this disease is due to an X-linked recessive mutation
- (D) this disease is due to a Y-linked recessive mutation

77. A woman with 47 chromosomes due to three copies of chromosome 21 is characterized by :

- (A) Down syndrome
- (B) triploidy
- (C) Turner syndrome
- (D) super femaleness

78. In order to find out the different types of gametes produced by a pea plant having the genotype AaBb, it should be crossed to a plant with the genotype

- (A) aaBB
- (B) AaBB
- (C) AABB
- (D) aabb

79. Four healthy people in their twenties got involved in injuries resulting in damage and death of a few cells of the following. Which of the cells are least likely to be replaced by new cells ?

- (A) Osteocytes
- (B) Malpighian layer of the skin
- (C) Liver cells
- (D) Neurons

80. Secretin and cholecystokinin are digestive hormones. They are secreted in :

- (A) oesophagus
- (B) ileum
- (C) duodenum
- (D) pyloric stomach

81. Which of the following unicellular organism has a macro-nucleus for trophic function and one or more micro-nuclei for reproduction ?

- (A) Euglena
- (B) Amoeba
- (C) Paramecium
- (D) Trypanosoma

82. AIDS is caused by HIV that principally infects :

- (A) all lymphocytes
- (B) activator B cells
- (C) T 4 lymphocytes
- (D) cytotoxic T cells

83. According to widely accepted "fluid mosaic model" cell membranes are semi-fluid, where lipids and integral proteins can diffuse randomly. In recent years, this model has been modified in several respects. In this regard, which of the following statements is incorrect?

- (A) Proteins in cell membranes can travel within the lipid bilayer
- (B) Proteins can remain confined within certain domains of the membrane
- (C) Proteins can also undergo flip-flop movements in the lipid bilayer
- (D) Many proteins remain completely embedded within the lipid bilayer

84. A person is undergoing prolonged fasting. His urine will be found to contain abnormal quantities of :

- (A) fats
- (B) ketones
- (C) amino acids
- (D) glucose

85. Why is vivipary an undesirable character for annual crop plants ?

- (A) It reduces the vigour of plant
- (B) The seeds cannot be stored under normal conditions for the next season
- (C) The seeds exhibit long dormancy
- (D) It adversely affects the fertility of the plant

86. *Bacillus thuringiensis* (Bt) strains have been used for designing novel :

- (A) bio-metallurgical technique
- (B) bio-mineralization processes
- (C) bio-insecticidal plants
- (D) bio-fertilizers

87. The salivary gland chromosomes in the dipteran larvae, are useful in gene mapping because :

- (A) these are much longer in size
- (B) these are easy to stain
- (C) these are fused
- (D) they have endoreduplicated chromosomes

88. Which group of three of the following five statements (1-5) contain all three correct statements regarding beri-beri ?

- A. A crippling disease prevalent among the native population of sub-Sahara Africa.**
- B. A deficiency disease caused by lack of thiamine (vitamin B1).**
- C. A nutritional disorder in infants and young children when the diet is persistently deficient in essential protein.**
- D. Occurs in those countries where the staple diet is polished rice.**
- E. The symptoms are pain from neuritis, paralysis, muscle wasting, progressive oedema, mental deterioration and finally heart failure.**

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

89. Photosynthetic Active Radiation (PAR) has the following range of wavelengths :

- (A) 400 - 700 nm
- (B) 450 - 950 nm
- (C) 340 - 450 nm
- (D) 500 - 600 nm

90. Golden rice is a transgenic crop of the future with the following improved trait :

- (A) high lysine (essential amino acid) content
- (B) insect resistance
- (C) high protein content
- (D) high vitamin A content

91. Which one of the following depresses brain activity and produces feelings of calmness, relaxation and drowsiness.

- (A) Valium
- (B) Morphine
- (C) Hashish
- (D) Amphetamines

Answer key and explanations

1. Answer: (B) endoplasmic reticulum

Proteins made on ribosomes attached to the rough endoplasmic reticulum enter its lumen, where they are folded, glycosylated and packed into vesicles for transport onward (via the Golgi) to their destinations. Mitochondria and chloroplasts make ATP and food, and lysosomes digest material; none of them sort and route new proteins.

2. Answer: (A) Greater variation in Africa than in Asia

Mutations pile up over time, so the oldest human population carries the most genetic diversity. Greater DNA (mitochondrial) variation in African populations than in Asian ones shows that humans lived longest in Africa, which points to an African origin. Greater variation in Asia would instead support an Asian origin.

3. Answer: (B) goat

Pashmina is the fine under-fleece of the Changthangi goat of the cold Ladakh/Kashmir plateau. It is not sheep wool, and it does not come from a cross-breed.

4. Answer: (B) just opposite to the site of entry of sperm into ovum

In a frog egg, sperm entry makes the pigmented cortex rotate, which exposes a lighter grey band on the side opposite the entry point. This grey crescent later marks the dorsal side of the embryo (dorsal lip of the blastopore). It is not at the entry site itself or at either pole.

5. Answer: (C) During S-phase

Histones are made in the S phase, at the same time as DNA replication, so the newly copied DNA can be packed into nucleosomes straight away. Prophase and telophase are stages of mitosis, and G2 is not part of prophase.

6. Answer: (B) provides protection, anchorage and absorption for the alga

In a lichen, the algal partner (phycobiont) photosynthesises and makes food. The fungal partner (mycobiont) gives shelter, anchorage, and absorbs water and minerals for it. Food and oxygen come from the alga, not the fungus.

7. Answer: (D) Butyric acid bacteria

During retting, jute stems are soaked in water and anaerobic butyric acid bacteria (such as Clostridium) break down the pectin that holds the fibres together, which frees the fibres. Helicobacter pylori causes stomach ulcers and lactic streptococci sour milk; neither one rets fibres.

8. Answer: (C) Blue

Resolving power improves as the wavelength gets shorter (the resolution limit is about $0.61\lambda/NA$). Blue has the shortest wavelength of the colours listed, so it gives the finest resolution. Red has the longest wavelength and gives the poorest.

9. Answer: (C) 40° North and South

Between the equator and about 40° latitude, incoming solar energy is more than outgoing radiation (a surplus). Poleward of about 40°, outgoing radiation is greater (a deficit). The two balance near 40° N and S. 66° marks the polar circles and 22½° is near the tropics; neither is the balance line.

10. Answer: (D) Sex-linked recessive

Unaffected parents with affected sons only fits an X-linked recessive trait: the mother is a carrier and passes the mutant X to some sons, while daughters receive the father's normal X and are not affected. A dominant trait would show up in at least one of the parents.

11. Answer: (C) CO₂ and ammonia

In the liver's ornithine (urea) cycle, toxic ammonia and carbon dioxide taken from the blood are combined into urea. So the wastes removed from the blood are CO₂ and ammonia, and urea is the product that is formed, not removed.

12. Answer: (D) ribonucleoprotein

Telomerase has a protein reverse-transcriptase part plus its own RNA, which serves as the template for adding telomere repeats. That makes it a ribonucleoprotein, not a simple protein and not RNA alone.

13. Answer: (D) TATA box

The promoter's TATA box (Pribnow box in prokaryotes) is the AT-rich site where RNA polymerase binds. The DNA bends and opens easily there to start transcription. The CAAT box lies further upstream and mainly regulates how often transcription starts.

14. Answer: (D) movement of chromosomes towards poles

The centromere carries the kinetochores, where spindle fibres attach. This lets chromatids or chromosomes be pulled towards the poles during anaphase. It has no role in transcription or cytokinesis.

15. Answer: (D) loss of cell mediated immunity

T lymphocytes mature in the thymus, and T cells drive cell-mediated immunity. Damage to the thymus in childhood therefore causes loss of cell-mediated immunity. Antibody-mediated immunity relies mainly on B cells, which mature in the bone marrow.

16. Answer: (D) salinity

Heavy irrigation, especially with poor drainage, raises the water table. Evaporation then leaves dissolved salts on the surface, which makes the soil saline. Irrigation does not cause aridity, and it does not usually cause acidity.

17. Answer: (A) grana

Chlorophyll sits in the thylakoid membranes, which are stacked into grana. The stroma is the fluid matrix where the dark reactions happen and holds no pigment, and the pyrenoid is a starch-forming body in algae.

18. Answer: (A) wheat, rice and maize

Wheat, rice and maize are the world's three main cereals and together supply most of the global food grain. Sorghum and barley are much smaller contributors.

19. Answer: (A) mitochondrial genome

Cytoplasmic male sterility is inherited through the mother and is caused by rearranged genes in the mitochondrial genome, which disrupt pollen development. Nuclear restorer genes can override it, but the sterility genes themselves are mitochondrial, not chloroplast or nuclear.

20. Answer: (C) Endonuclease

Endonucleases cut phosphodiester bonds within a DNA or RNA chain; restriction enzymes are an example. Exonucleases remove nucleotides only from the ends. Lipases and proteases act on fats and proteins.

21. Answer: (D) (a)-3, (b)-1, (c)-4, (d)-5, (e)-2

E. coli has flagella all over its surface (peritrichous). Ginkgo is a living fossil. Selaginella has leafless rhizophores that bear roots. Wolffia is the smallest flowering plant, and the kelp Macrocystis is the largest perennial alga. That gives (a)-3, (b)-1, (c)-4, (d)-5, (e)-2.

22. Answer: (A) Green revolution

Norman Borlaug bred high-yielding, semi-dwarf, disease-resistant wheat varieties that drove the Green Revolution and won him the 1970 Nobel Peace Prize. The White Revolution (milk) is linked to Verghese Kurien.

23. Answer: (B) RBCs

Red blood cells rely on glucose-6-phosphate dehydrogenase to make NADPH, which protects them from oxidative damage. In the X-linked deficiency, oxidant drugs or fava beans cause RBCs to break down (haemolytic anaemia). White cells and platelets are not the cells that lyse.

24. Answer: (A) Bryophyllum and Kalanchoe

Bryophyllum and Kalanchoe (closely related succulents) grow adventitious buds from notches on the leaf margin, so a leaf piece can give rise to new plants. Agave reproduces by bulbils, Chrysanthemum by suckers and Asparagus by its root system, not by leaves.

25. Answer: (D) Endangered species

The red panda of the eastern Himalayas is listed as Endangered by the IUCN because of habitat loss and poaching. It is not extinct and has not been placed in the critically endangered category.

26. Answer: (D) Thromboplastin

Thromboplastin (tissue factor) starts the clotting cascade, which leads to thrombin formation and turns fibrinogen into fibrin, so a clot forms where it is introduced. Fibrinogen and prothrombin already circulate in plasma without clotting, and heparin is an anticoagulant.

27. Answer: (D) they cannot synthesize functional β -galactosidase

The z gene codes for β -galactosidase, which splits lactose into glucose and galactose. Without a working enzyme, lactose cannot be used for energy. Lactose transport depends on permease, the y gene product, so the transport option describes a y mutation instead.

28. Answer: (D) cycads

Cycads have large, top-shaped male gametes with many cilia, which is a primitive trait. Their seed carries one embryo with two cotyledons. Angiosperms and conifers have non-motile male gametes delivered by a pollen tube.

29. Answer: (D) the genetic code is universal

Because the genetic code is universal, bacterial ribosomes read a human gene's codons as the same amino acids and so make the human protein. Bacteria cannot splice introns (cDNA is used for that reason), and gene regulation differs between bacteria and humans.

30. Answer: (C) animals belonging to phylum-Porifera are exclusively marine

NCERT describes sponges as 'generally marine', and freshwater sponges such as Spongilla exist, so 'exclusively marine' is the wrong statement. Millipedes have two pairs of legs on each (diplo)segment, prawns carry antennules plus antennae (two pairs), and nematocysts are unique to cnidarians.

31. Answer: (C) base-sugar-phosphate

A nucleotide is a nitrogenous base joined to a pentose sugar (a nucleoside) plus a phosphate group. '(base-sugar-phosphate)_n' describes a polynucleotide chain, and 'base-sugar' alone is a nucleoside.

32. Answer: (D) Solar energy — green house effect

Solar energy is a clean source that releases no greenhouse gases, so linking it to the greenhouse effect is a mismatch. Burning biomass or fossil fuel releases CO₂, and nuclear power produces radioactive waste.

33. Answer: (C) Ten pairs of cranial nerves

Mammals have twelve pairs of cranial nerves; ten pairs is the condition in fishes and amphibians. Seven neck vertebrae, teeth set in sockets (thecodont) and alveolar lungs are all typical mammalian traits.

34. Answer: (C) Glycine

Glycine is the simplest amino acid because its R group is just a hydrogen atom. Alanine has a methyl group, and tyrosine and asparagine have larger side chains.

35. Answer: (C) grow and multiply in very deep marine sediments

'Baro' means pressure. Barophilic (piezophilic) prokaryotes thrive under the very high hydrostatic pressure of deep-sea sediments. The term has nothing to do with barium salts.

36. Answer: (A) several diatoms and a few cyanobacteria

Auxospores are formed by many diatoms to restore full cell size after repeated divisions shrink the silica frustule. Hormocysts are thick-walled, multicellular perennating filaments made by only a few filamentous cyanobacteria (such as Westiella). So the order is diatoms first, then cyanobacteria, and hormocysts are restricted to a few.

37. Answer: (D) help in regulating metabolism

What enzymes, vitamins (often as coenzymes) and hormones have in common is that they control the rate and direction of metabolism. They are not all proteins (many vitamins and steroid hormones are not), and vitamins are mostly obtained from food rather than made in the body.

38. Answer: (C) Prevalence of pesticide resistant insects

When a pesticide is used, the rare resistant insects survive and reproduce, so resistance spreads through the population. This is natural selection working on existing variation. Transgenics, cloning and stem-cell organs are human technologies, not natural selection.

39. Answer: (D) 12

A C_3 plant needs 18 ATP per hexose. A C_4 plant also spends 2 ATP per CO_2 to regenerate PEP (pyruvate to PEP), which is 12 more for six CO_2 , giving 30 ATP in total. So it needs 12 extra ATP.

40. Answer: (A) Movement of the eye ball

The abducens (VI cranial) nerve supplies the lateral rectus muscle, which turns the eyeball outward, so eye movement is affected. The tongue is moved by the hypoglossal nerve, swallowing involves the glossopharyngeal and vagus nerves, and the neck by the accessory nerve.

41. Answer: (A) preparation of pure cellulose by removing lignin

Paper is made from cellulose fibres, so pulping removes lignin chemically (for example by the sulphate or sulphite process) and leaves relatively pure cellulose. Breaking down the cellulose would destroy the very fibres that make up paper.

42. Answer: (B) on ribosomes present in cytoplasm as well as in mitochondria

Animal cells translate proteins on cytoplasmic 80S ribosomes (both free and ER-bound) and also on the 70S ribosomes inside mitochondria, which have their own DNA. The nucleolus assembles ribosomal subunits but does not make proteins.

43. Answer: (D) Gene flow does not occur between the populations of a species

Populations of one species can interbreed, so gene flow does take place between them, and the statement that it does not is false. Interbreeding, variation within the species and reproductive isolation from other species are all true of a biological species.

44. Answer: (B) they allow ex situ conservation of germplasm

Botanical gardens keep living plant collections away from their natural habitats, which makes them a key means of ex situ conservation of germplasm. Providing natural habitat for wildlife is in situ conservation (national parks, sanctuaries).

45. Answer: (D) rapid turgor pressure changes

When an insect touches the trigger hairs, the cells of the leaf lobes rapidly lose or gain turgor (and expand quickly), so the trap snaps shut. Plants have no muscle cells, and the closure is an active response to touch, not to a chemical.

46. Answer: (C) poison fangs in snakes

Poison fangs are mainly used by snakes to kill prey (offence), not to escape predators. Puffing up (puffer fish), dark camouflage (melanic moths) and colour change (chameleon) all help avoid predation.

47. Answer: (B) 0.48

By the Hardy-Weinberg principle, the heterozygote frequency is $2pq = 2 \times 0.6 \times 0.4 = 0.48$. 0.36 (p^2) and 0.16 (q^2) are the frequencies of the two homozygotes.

48. Answer: (D) Meat was not spoiled, when heated and kept sealed in a vessel

When the material was heated (sterilised) and sealed off from outside microbes, it did not spoil. This shows that life comes from pre-existing life (Spallanzani/Pasteur-type experiments). Microbes appearing in unsterilised material is exactly what spontaneous generation was wrongly claimed to explain.

49. Answer: (C) 2002

India's Biological Diversity Act was passed in 2002, after the 1992 Convention on Biological Diversity (Rio Earth Summit). 1992 is the year of the convention, not of the Indian Act.

50. Answer: (B) Electron transport chain

Most of the ATP from aerobic respiration (about 34 of 38 in the older count) is made by oxidative phosphorylation as NADH and $FADH_2$ pass electrons down the electron transport chain. Glycolysis and the Krebs cycle make only a few ATP directly, by substrate-level phosphorylation.

51. Answer: (D) may be colourblind or may be of normal vision

The woman got her colour-blind father's X, so she is a carrier (X^cX). A son always gets his X from his mother, so each son has a 50% chance of colour blindness, whatever the birth order. Males carry only one X, so a son cannot be heterozygous.

52. Answer: (B) Osmunda and Equisetum

An ectophloic siphonostele has a pith with phloem only outside the xylem ring; it is found in *Osmunda* and *Equisetum*. *Adiantum* (maidenhair fern), *Marsilea* and *Dicksonia* have amphiphloic stelar types, with phloem on both sides of the xylem.

53. Answer: (C) Juicy aril

The juicy white flesh of litchi is an aril, a fleshy outgrowth of the seed, not part of the fruit wall. The pericarp is the inedible rough outer rind.

54. Answer: (C) some bacteria, algae and green plant cells

Carbohydrates are made by photosynthetic (and chemosynthetic) autotrophs: some bacteria, algae and green plants. Fungi and viruses cannot make carbohydrate from CO₂, and not all bacteria are autotrophic.

55. Answer: (B) Kyoto protocol - Climatic change

The Kyoto Protocol (1997) set limits on greenhouse gas emissions to tackle climate change. The Montreal Protocol is about ozone-depleting substances, Ramsar about wetlands, and Basel about cross-border movement of hazardous waste.

56. Answer: (A) Cretinism

Cretinism is caused by thyroid hormone deficiency in childhood (often iodine deficiency), a hormonal disorder rather than an inherited gene defect. Cystic fibrosis, thalassaemia and haemophilia are all Mendelian genetic disorders.

57. Answer: (A) Cu, Mn, Fe

Iron (in cytochromes and Fe-S proteins), copper (in plastocyanin and cytochrome oxidase) and manganese (in water splitting at PSII) are directly involved in electron carriers. Co, Ni and Mo are needed in nitrogen-related enzymes, and Ca and Na are not electron carriers.

58. Answer: (C) Oenothera lamarckiana

Hugo de Vries based his mutation theory on sudden large variations he saw in the evening primrose, *Oenothera lamarckiana*. *Drosophila* was Morgan's organism and *Pisum sativum* was Mendel's.

59. Answer: (A) Phenyl

Phenyl (a phenolic disinfectant) is toxic and is used only on floors and drains, never in drinking water. Chlorine, chloramine and ozone are standard disinfectants for drinking water.

60. Answer: (A) proton gradient

Mitchell's chemiosmotic theory says that electron transport pumps protons across a membrane, and the protons flowing back through ATP synthase (CF₀-CF₁ or F₀-F₁) drive ATP formation. The driving force is the proton gradient, not K⁺ or Na⁺ build-up.

61. Answer: (C) dopamine

Parkinson's disease results from the loss of dopamine-producing neurons in the substantia nigra, which regulate movement through the basal ganglia. Treatment therefore replaces dopamine (L-DOPA). Loss of acetylcholine neurons is linked mainly to Alzheimer's disease.

62. Answer: (C) pectoral girdle of mammals

The acromion is the flat projection at the end of the scapular spine, so it belongs to the pectoral girdle of mammals. Do not confuse it with the acrosome of a sperm.

63. Answer: (A) nucellus or integuments

In adventive embryony (seen in Citrus and mango), diploid nucellar or integument cells outside the embryo sac grow directly into embryos, with no gametophyte step. Embryos formed from synergids or antipodals are a different kind of apomixis, and an embryo from a zygote is normal sexual reproduction.

64. Answer: (D) Degenerated synergid

The pollen tube, guided by the filiform apparatus, enters one of the synergids, which degenerates and releases the male gametes. The other, persistent synergid is not entered, and the tube does not go directly into the egg or the central cell.

65. Answer: (D) micro-villi

Absorptive intestinal cells have a brush border of microvilli that greatly increases the surface area for absorption. Zymogen granules store enzymes in secretory cells and are not surface structures.

66. Answer: (A) kwashiorkor

Meat, lentils, milk and eggs are rich in protein, and kwashiorkor is caused by protein deficiency. Rickets needs vitamin D and calcium, scurvy needs vitamin C, and anaemia is treated mainly with iron.

67. Answer: (B) Prairie — epiphytes

Prairies are temperate grasslands with few trees, so epiphytes (plants growing on other plants, typical of tropical rain forests) do not fit there. Acacia in savanna, permafrost in tundra and evergreen conifers in coniferous forest are all correct pairs.

68. Answer: (C) Amphitropous

In an amphitropous ovule, both the body of the ovule and the embryo sac are curved into a horseshoe shape, which brings the micropyle close to the funiculus. An anatropous ovule is inverted but its embryo sac stays straight, and an atropous ovule is upright.

69. Answer: (A) amount of water absorbed equals the amount transpired

A potometer measures how fast a cut shoot takes up water and assumes this equals the water lost by transpiration. It does not measure osmotic pressure or root pressure.

70. Answer: (A) Reverse transcriptase

Reverse transcriptase, found in retroviruses such as HIV, is an RNA-dependent DNA polymerase that copies RNA into DNA. DNA polymerase copies DNA into DNA, and RNA polymerase copies DNA into RNA.

71. Answer: (D) absence of body cavity

Flatworms are acoelomates with no body cavity, whereas annelids are true coelomates. Both groups are bilaterally symmetrical, so bilateral symmetry does not set them apart, and a pseudocoel is found in roundworms.

72. Answer: (C) Competitive inhibition is seen when the substrate and the inhibitor compete

In competitive inhibition, a substrate-like inhibitor competes with the substrate for the enzyme's active site (for example malonate against succinate). Adding more substrate overcomes competitive inhibition, not non-competitive inhibition.

73. Answer: (D) Gliding joint — between zygapophyses of the successive vertebrae

The articular processes (zygapophyses) of adjacent vertebrae meet at gliding joints. Skull bones are joined by fibrous sutures, the bodies of vertebrae by cartilaginous joints, and phalanges by hinge joints.

74. Answer: (A) the K_m value

K_m , the substrate concentration that gives half the maximum velocity, reflects an enzyme's affinity for its substrate: a lower K_m means higher affinity and efficiency. It is the standard value for comparing enzymes. pH optimum and molecular size say nothing about catalytic efficiency.

75. Answer: (D) Gamma rays (from cobalt 60)

Gamma rays from a cobalt-60 source penetrate seeds and tissues well and are the most common mutagen in plant mutation breeding. Alpha particles penetrate too little, and UV acts only on surface cells or pollen.

76. Answer: (C) this disease is due to an X-linked recessive mutation

Haemophilia is X-linked recessive. Males have one X, so one mutant allele causes the disease, while females need two copies and are usually carriers. A Y-linked trait would never appear in females at all.

77. Answer: (A) Down syndrome

Trisomy 21 (47 chromosomes) is Down syndrome. Turner syndrome is 45,XO, super female is XXX (trisomy of the X), and triploidy would mean three full sets (69 chromosomes).

78. Answer: (D) aabb

A test cross with the double recessive aabb works because that parent gives only ab gametes, so each offspring's phenotype shows exactly which gamete came from the AaBb plant. Dominant alleles in the tester would hide the recessive gametes.

79. Answer: (D) Neurons

Mature neurons are permanently out of the cell cycle (G_0) and are generally not replaced. The Malpighian layer of the skin divides all the time, liver cells can regenerate, and bone is remodelled by osteoblasts.

80. Answer: (C) duodenum

When acidic chyme and fat enter the duodenum, its mucosa releases secretin and CCK, which act on the pancreas, liver and gall bladder. The pyloric stomach releases gastrin, not these hormones.

81. Answer: (C) Paramecium

Ciliates such as Paramecium have nuclear dimorphism: a large macronucleus controls everyday metabolism, and micronuclei take part in conjugation. Euglena, Amoeba and Trypanosoma each have a single kind of nucleus.

82. Answer: (C) T 4 lymphocytes

HIV attaches to the CD4 receptor, so it mainly infects helper T (T4) lymphocytes (and macrophages). The steady fall in these cells causes immunodeficiency. Cytotoxic T cells are CD8 and are not the main target.

83. Answer: (C) Proteins can also undergo flip-flop movements in the lipid bilayer

Membrane proteins can move sideways within the bilayer but practically never flip from one face to the other. Their hydrophilic parts cannot cross the hydrophobic core, and this is why membranes stay asymmetric. Lipids can flip-flop slowly; proteins do not.

84. Answer: (B) ketones

During prolonged fasting, the body burns stored fat. Incomplete oxidation of fatty acids produces ketone bodies, which spill into the urine (ketonuria). Glucose in the urine indicates diabetes, not starvation.

85. Answer: (B) The seeds cannot be stored under normal conditions for the next season

In vivipary, seeds germinate while still on the parent plant without any dormancy, so they cannot be dried and stored for sowing next season. That makes the trait undesirable for annual crops. Vivipary means no dormancy, the opposite of long dormancy.

86. Answer: (C) bio-insecticidal plants

Bt makes Cry protein toxins that kill specific insect larvae. Transferring cry genes into crops (Bt cotton, Bt brinjal) produces insect-resistant transgenic plants. Bt is not a biofertiliser and plays no part in metal extraction.

87. Answer: (D) they have endoreduplicated chromosomes

Polytene chromosomes form by repeated DNA replication without cell division (endoreduplication), so many chromatids lie side by side. This gives clear band patterns that can be linked to particular genes. Their large size is a result of endoreduplication, and the bands are what make mapping possible.

88. Answer: (D) B, D and E

Beri-beri is caused by lack of thiamine (vitamin B1). It is common where polished rice, with its thiamine-rich husk removed, is the staple food, and it causes neuritis, paralysis, oedema and heart failure. Statement C describes kwashiorkor, a protein deficiency, not beri-beri.

89. Answer: (A) 400 - 700 nm

NCERT gives PAR as light from 400 to 700 nm, the visible band that chlorophylls and carotenoids absorb. Wavelengths beyond 700 nm (far-red, infrared) and in the ultraviolet are not used for photosynthesis.

90. Answer: (D) high vitamin A content

Golden rice is engineered to make β -carotene (provitamin A) in its grain, which gives it a golden colour and helps fight vitamin A deficiency. Insect resistance is the trait of Bt crops, and high lysine is the trait of quality-protein maize.

91. Answer: (A) Valium

Valium (diazepam), a benzodiazepine tranquilliser, depresses the central nervous system and brings calm, relaxation and drowsiness. Amphetamines are stimulants, hashish is a cannabinoid that alters perception, and morphine is an opioid painkiller.

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.