

NEET 2016 Phase 1 — Biology Question Paper with Solutions

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

NEET 2016 Phase 1 · Q91

1. Gause's principle of competitive exclusion states that:

- (A) More abundant species will exclude the less abundant species through competition.
- (B) Competition for the same resources excludes species having different food preferences.
- (C) No two species can occupy the same niche indefinitely for the same limiting resources.
- (D) Larger organisms exclude smaller ones through competition.

NEET 2016 Phase 1 · Q93

2. The coconut water from tender coconut represents:

- (A) Endocarp
- (B) Fleshy mesocarp
- (C) Free nuclear proembryo
- (D) Free nuclear endosperm

NEET 2016 Phase 1 · Q94

3. Which of the following statements is wrong for viroids?

- (A) They lack a protein coat
- (B) They are smaller than viruses
- (C) They cause infections
- (D) Their RNA is of high molecular weight

NEET 2016 Phase 1 · Q95

4. Which of the following features is not present in the Phylum - Arthropoda?

- (A) Chitinous exoskeleton
- (B) Metameric segmentation
- (C) Parapodia
- (D) Jointed appendages

NEET 2016 Phase 1 · Q96

5. Which of the following most appropriately describes haemophilia?

- (A) Recessive gene disorder
- (B) X - linked recessive gene disorder
- (C) Chromosomal disorder
- (D) Dominant gene disorder

NEET 2016 Phase 1 · Q97

6. Emerson's enhancement effect and Red drop have been instrumental in the discovery of:

- (A) Photophosphorylation and non-cyclic electron transport
- (B) Two photosystems operating simultaneously
- (C) Photophosphorylation and cyclic electron transport
- (D) Oxidative phosphorylation

NEET 2016 Phase 1 · Q99

7. Name the chronic respiratory disorder caused mainly by cigarette smoking:

- (A) Emphysema
- (B) Asthma
- (C) Respiratory acidosis
- (D) Respiratory alkalosis

NEET 2016 Phase 1 · Q100

8. A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called:

- (A) Ley farming
- (B) Contour farming
- (C) Strip farming
- (D) Shifting agriculture

NEET 2016 Phase 1 · Q101

9. Mitochondria and chloroplast are:

(a) semi-autonomous organelles.

(b) formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery.

Which one of the following options is correct?

- (A) Both (a) and (b) are correct.
- (B) (b) is true but (a) is false.
- (C) (a) is true but (b) is false.
- (D) Both (a) and (b) are false.

NEET 2016 Phase 1 · Q103

10. In a chloroplast the highest number of protons are found in:

- (A) Stroma
- (B) Lumen of thylakoids
- (C) Inter membrane space
- (D) Antennae complex

NEET 2016 Phase 1 · Q104

11. Photosensitive compound in human eye is made up of:

- (A) Guanosine and Retinol
- (B) Opsin and Retinal
- (C) Opsin and Retinol
- (D) Transducin and Retinene

NEET 2016 Phase 1 · Q105

12. Spindle fibres attach on to:

- (A) Telomere of the chromosome
- (B) Kinetochore of the chromosome
- (C) Centromere of the chromosome
- (D) Kinetosome of the chromosome

NEET 2016 Phase 1 · Q106

13. Which is the National Aquatic Animal of India?

- (A) Gangetic shark
- (B) River dolphin
- (C) Blue whale
- (D) Sea - horse

NEET 2016 Phase 1 · Q107

14. Which of the following is required as inducer(s) for the expression of Lac operon?

- (A) glucose
- (B) galactose
- (C) lactose
- (D) lactose and galactose

NEET 2016 Phase 1 · Q108

15. Which of the following pairs of hormones are not antagonistic (having opposite effects) to each other?

- (A) Parathormone - Calcitonin
- (B) Insulin - Glucagon
- (C) Aldosterone - Atrial Natriuretic Factor
- (D) Relaxin - Inhibin

NEET 2016 Phase 1 · Q109

16. Microtubules are the constituents of:

- (A) Cilia, Flagella and Peroxisomes
- (B) Spindle fibres, Centrioles and Cilia
- (C) Centrioles, Spindle fibres and Chromatin
- (D) Centrosome, Nucleosome and Centrioles

NEET 2016 Phase 1 · Q110

17. A complex of ribosomes attached to a single strand of RNA is known as:

- (A) Polysome
- (B) Polymer
- (C) Polypeptide
- (D) Okazaki fragment

NEET 2016 Phase 1 · Q111

18. Fertilization in humans is practically feasible only if:

- (A) the sperms are transported into vagina just after the release of ovum in fallopian tube.
- (B) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the fallopian tube.
- (C) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the cervix.
- (D) the sperms are transported into cervix within 48 hrs of release of ovum in uterus.

NEET 2016 Phase 1 · Q112

19. Asthma may be attributed to:

- (A) bacterial infection of the lungs
- (B) allergic reaction of the mast cells in the lungs
- (C) inflammation of the trachea
- (D) accumulation of fluid in the lungs

NEET 2016 Phase 1 · Q113

20. The Avena curvature is used for bioassay of:

- (A) ABA
- (B) GA₃
- (C) IAA
- (D) Ethylene

NEET 2016 Phase 1 · Q114

21. The standard petal of a papilionaceous corolla is also called:

- (A) Carina
- (B) Pappus
- (C) Vexillum
- (D) Corona

NEET 2016 Phase 1 · Q115

22. Tricarpellary, syncarpous gynoecium is found in flowers of:

- (A) Liliaceae
- (B) Solanaceae
- (C) Fabaceae
- (D) Poaceae

NEET 2016 Phase 1 · Q116

23. One of the major components of cell wall of most fungi is:

- (A) Chitin
- (B) Peptidoglycan
- (C) Cellulose
- (D) Hemicellulose

NEET 2016 Phase 1 · Q117

24. Select the incorrect statement:

- (A) FSH stimulates the sertoli cells which help in spermiogenesis.
- (B) LH triggers ovulation in ovary.
- (C) LH and FSH decrease gradually during the follicular phase.
- (D) LH triggers secretion of androgens from the Leydig cells.

NEET 2016 Phase 1 · Q119

25. A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F₁ plants were selfed the resulting genotypes were in the ratio of:

- (A) 1 : 2 : 1 :: Tall homozygous : Tall heterozygous : Dwarf
- (B) 1 : 2 : 1 :: Tall heterozygous : Tall homozygous : Dwarf
- (C) 3 : 1 :: Tall : Dwarf
- (D) 3 : 1 :: Dwarf : Tall

NEET 2016 Phase 1 · Q120

26. Which of the following is the most important cause of animals and plants being driven to extinction?

- (A) Over - exploitation
- (B) Alien species invasion
- (C) Habitat loss and fragmentation
- (D) Co - extinctions

NEET 2016 Phase 1 · Q121

27. Which one of the following is a characteristic feature of cropland ecosystem?

- (A) Absence of soil organisms
- (B) Least genetic diversity
- (C) Absence of weeds
- (D) Ecological succession

NEET 2016 Phase 1 · Q122

28. Changes in GnRH pulse frequency in females is controlled by circulating levels of:

- (A) estrogen and progesterone
- (B) estrogen and inhibin
- (C) progesterone only
- (D) progesterone and inhibin

NEET 2016 Phase 1 · Q123

29. Which of the following is not a feature of the plasmids?

- (A) Independent replication
- (B) Circular structure
- (C) Transferable
- (D) Single - stranded

NEET 2016 Phase 1 · Q124

30. Which of the following features is not present in *Periplaneta americana*?

- (A) Schizocoelom as body cavity
- (B) Indeterminate and radial cleavage during embryonic development
- (C) Exoskeleton composed of N-acetylglucosamine
- (D) Metamerically segmented body

NEET 2016 Phase 1 · Q125

31. In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self-cells, then it leads to:

- (A) Allergic response
- (B) Graft rejection
- (C) Auto-immune disease
- (D) Active immunity

NEET 2016 Phase 1 · Q126

32. Match the terms in Column I with their description in Column II and choose the correct option:

Column I: (a) Dominance (b) Codominance (c) Pleiotropy (d) Polygenic inheritance

Column II: (i) Many genes govern a single character (ii) In a heterozygous organism only one allele expresses itself (iii) In a heterozygous organism both alleles express themselves fully (iv) A single gene influences many characters

- (A) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
- (B) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
- (C) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
- (D) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

NEET 2016 Phase 1 · Q127

33. Joint Forest Management Concept was introduced in India during:

- (A) 1960s
- (B) 1970s
- (C) 1980s
- (D) 1990s

NEET 2016 Phase 1 · Q128

34. Pick out the correct statements:

(a) Haemophilia is a sex-linked recessive disease.

(b) Down's syndrome is due to aneuploidy.

(c) Phenylketonuria is an autosomal recessive gene disorder.

(d) Sickle cell anaemia is an X - linked recessive gene disorder.

- (A) (a) and (d) are correct.
- (B) (b) and (d) are correct.
- (C) (a), (c) and (d) are correct.
- (D) (a), (b) and (c) are correct.

NEET 2016 Phase 1 · Q130

35. Proximal end of the filament of stamen is attached to the:

- (A) Anther
- (B) Connective
- (C) Placenta
- (D) Thalamus or petal

NEET 2016 Phase 1 · Q131

36. Which of the following approaches does not give the defined action of contraceptive?

- (A) Barrier methods - prevent fertilization
- (B) Intra uterine devices - increase phagocytosis of sperms, suppress sperm motility and fertilizing capacity of sperms
- (C) Hormonal contraceptives - Prevent/retard entry of sperms, prevent ovulation and fertilization
- (D) Vasectomy - prevents spermatogenesis

NEET 2016 Phase 1 · Q132

37. The taq polymerase enzyme is obtained from:

- (A) *Thermus aquaticus*
- (B) *Thiobacillus ferrooxidans*
- (C) *Bacillus subtilis*
- (D) *Pseudomonas putida*

NEET 2016 Phase 1 · Q133

38. Identify the correct statement on 'inhibin':

- (A) Inhibits the secretion of LH, FSH and Prolactin.
- (B) Is produced by granulosa cells in ovary and inhibits the secretion of FSH.
- (C) Is produced by granulosa cells in ovary and inhibits the secretion of LH.
- (D) Is produced by nurse cells in testes and inhibits the secretion of LH.

NEET 2016 Phase 1 · Q134

39. Which part of the tobacco plant is infected by *Meloidogyne incognita*?

- (A) Flower
- (B) Leaf
- (C) Stem
- (D) Root

NEET 2016 Phase 1 · Q135

40. Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain:

- (A) Activated pathogens
- (B) Harvested antibodies
- (C) Gamma globulin
- (D) Attenuated pathogens

NEET 2016 Phase 1 · Q136

41. Which one of the following cell organelles is enclosed by a single membrane?

- (A) Mitochondria
- (B) Chloroplasts
- (C) Lysosomes
- (D) Nuclei

NEET 2016 Phase 1 · Q137

42. Lack of relaxation between successive stimuli in sustained muscle contraction is known as:

- (A) Spasm
- (B) Fatigue
- (C) Tetanus
- (D) Tonus

NEET 2016 Phase 1 · Q138

43. Which of the following is not a stem modification?

- (A) Pitcher of *Nepenthes*
- (B) Thorns of citrus
- (C) Tendrils of cucumber
- (D) Flattened structures of *Opuntia*

NEET 2016 Phase 1 · Q139

44. Water soluble pigments found in plant cell vacuoles are:

- (A) Xanthophylls
- (B) Chlorophylls
- (C) Carotenoids
- (D) Anthocyanins

NEET 2016 Phase 1 · Q140

45. Select the correct statement:

- (A) Gymnosperms are both homosporous and heterosporous
- (B) Salvinia, Ginkgo and Pinus all are gymnosperms
- (C) Sequoia is one of the tallest trees
- (D) The leaves of gymnosperms are not well adapted to extremes of climate

NEET 2016 Phase 1 · Q141

46. Which of the following is not required for any of the techniques of DNA fingerprinting available at present?

- (A) Polymerase chain reaction
- (B) Zinc finger analysis
- (C) Restriction enzymes
- (D) DNA - DNA hybridization

NEET 2016 Phase 1 · Q142

47. Which type of tissue correctly matches with its location?

- (A) Smooth muscle - Wall of intestine
- (B) Areolar tissue - Tendons
- (C) Transitional epithelium - Tip of nose
- (D) Cuboidal epithelium - Lining of stomach

NEET 2016 Phase 1 · Q143

48. A plant in your garden avoids photorespiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilisation. In which of the following physiological groups would you assign this plant?

- (A) C₃
- (B) C₄
- (C) CAM
- (D) Nitrogen fixer

NEET 2016 Phase 1 · Q144

49. Which of the following structures is homologous to the wing of a bird?

- (A) Dorsal fin of a Shark
- (B) Wing of a Moth
- (C) Hind limb of Rabbit
- (D) Flipper of Whale

NEET 2016 Phase 1 · Q145

50. Which of the following characteristic features always holds true for the corresponding group of animals?

- (A) Cartilaginous endoskeleton - Chondrichthyes
- (B) Viviparous - Mammalia
- (C) Possess a mouth with an upper and a lower jaw - Chordata
- (D) 3 - chambered heart with one incompletely divided ventricle - Reptilia

NEET 2016 Phase 1 · Q146

51. Which of the following statements is not true for cancer cells in relation to mutations?

- (A) Mutations in proto-oncogenes accelerate the cell cycle.
- (B) Mutations destroy telomerase inhibitor.
- (C) Mutations inactivate the cell control.
- (D) Mutations inhibit production of telomerase.

NEET 2016 Phase 1 · Q147

52. The amino acid Tryptophan is the precursor for the synthesis of:

- (A) Melatonin and Serotonin
- (B) Thyroxine and Triiodothyronine
- (C) Estrogen and Progesterone
- (D) Cortisol and Cortisone

NEET 2016 Phase 1 · Q148

53. Following are the two statements regarding the origin of life:

(a) The earliest organisms that appeared on the earth were non-green and presumably anaerobes.

(b) The first autotrophic organisms were the chemoautotrophs that never released oxygen.

Of the above statements which one of the following options is correct?

- (A) (a) is correct but (b) is false.
- (B) (b) is correct but (a) is false.
- (C) Both (a) and (b) are correct.
- (D) Both (a) and (b) are false.

NEET 2016 Phase 1 · Q149

54. Reduction in pH of blood will:

- (A) reduce the rate of heart beat.
- (B) reduce the blood supply to the brain.
- (C) decrease the affinity of hemoglobin with oxygen.
- (D) release bicarbonate ions by the liver.

NEET 2016 Phase 1 · Q150

55. Analogous structures are a result of:

- (A) Divergent evolution
- (B) Convergent evolution
- (C) Shared ancestry
- (D) Stabilizing selection

NEET 2016 Phase 1 · Q151

56. Which of the following is a restriction endonuclease?

- (A) Hind II
- (B) Protease
- (C) DNase I
- (D) RNase

NEET 2016 Phase 1 · Q152

57. The term ecosystem was coined by:

- (A) E.P. Odum
- (B) A.G. Tansley
- (C) E. Haeckel
- (D) E. Warming

NEET 2016 Phase 1 · Q153

58. Which one of the following statements is wrong?

- (A) Sucrose is a disaccharide.
- (B) Cellulose is a polysaccharide.
- (C) Uracil is a pyrimidine.
- (D) Glycine is a sulphur containing amino acid.

NEET 2016 Phase 1 · Q154

59. In bryophytes and pteridophytes, transport of male gametes requires:

- (A) Wind
- (B) Insects
- (C) Birds
- (D) Water

NEET 2016 Phase 1 · Q156

60. Which one of the following statements is not true?

- (A) Tapetum helps in the dehiscence of anther
- (B) Exine of pollen grains is made up of sporopollenin
- (C) Pollen grains of many species cause severe allergies
- (D) Stored pollen in liquid nitrogen can be used in the crop breeding programmes

NEET 2016 Phase 1 · Q157

61. Which of the following would appear as the pioneer organisms on bare rocks?

- (A) Lichens
- (B) Liverworts
- (C) Mosses
- (D) Green algae

NEET 2016 Phase 1 · Q158

62. Which one of the following is the starter codon?

- (A) AUG
- (B) UGA
- (C) UAA
- (D) UAG

NEET 2016 Phase 1 · Q159

63. Which one of the following characteristics is not shared by birds and mammals?

- (A) Ossified endoskeleton
- (B) Breathing using lungs
- (C) Viviparity
- (D) Warm blooded nature

NEET 2016 Phase 1 · Q160

64. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature?

- (A) Biological names can be written in any language
- (B) The first word in a biological name represents the genus name, and the second is a specific epithet
- (C) The names are written in Latin and are italicised
- (D) When written by hand, the names are to be underlined

NEET 2016 Phase 1 · Q161

65. Blood pressure in the pulmonary artery is:

- (A) same as that in the aorta.
- (B) more than that in the carotid.
- (C) more than that in the pulmonary vein.
- (D) less than that in the venae cavae.

NEET 2016 Phase 1 · Q162

66. Cotyledon of maize grain is called:

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

NEET 2016 Phase 1 · Q163

67. In the stomach, gastric acid is secreted by the:

- (A) gastrin secreting cells
- (B) parietal cells
- (C) peptic cells
- (D) acidic cells

NEET 2016 Phase 1 · Q164

68. Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancers:

- (A) Nitrous oxide
- (B) Ozone
- (C) Ammonia
- (D) Methane

NEET 2016 Phase 1 · Q165

69. Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom:

- (A) Monera
- (B) Protista
- (C) Fungi
- (D) Animalia

NEET 2016 Phase 1 · Q167

70. In mammals, which blood vessel would normally carry largest amount of urea?

- (A) Renal Vein
- (B) Dorsal Aorta
- (C) Hepatic Vein
- (D) Hepatic Portal Vein

NEET 2016 Phase 1 · Q168

71. Seed formation without fertilization in flowering plants involves the process of:

- (A) Sporulation
- (B) Budding
- (C) Somatic hybridization
- (D) Apomixis

NEET 2016 Phase 1 · Q169

72. Which of the following is wrongly matched in the given table?

- (A) Trichoderma polysporum - Cyclosporin A - immunosuppressive drug
- (B) Monascus purpureus - Statins - lowering of blood cholesterol
- (C) Streptococcus - Streptokinase - removal of clot from blood vessel
- (D) Clostridium butylicum - Lipase - removal of oil stains

NEET 2016 Phase 1 · Q170

73. In a testcross involving F_1 dihybrid flies, more parental-type offspring were produced than the recombinant-type offspring. This indicates:

- (A) The two genes are located on two different chromosomes.
- (B) Chromosomes failed to separate during meiosis.
- (C) The two genes are linked and present on the same chromosome.
- (D) Both of the characters are controlled by more than one gene.

NEET 2016 Phase 1 · Q172

74. Which of the following is not a characteristic feature during mitosis in somatic cells?

- (A) Spindle fibres
- (B) Disappearance of nucleolus
- (C) Chromosome movement
- (D) Synapsis

NEET 2016 Phase 1 · Q173

75. Which of the following statements is not correct?

- (A) Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.
- (B) Insects that consume pollen or nectar without bringing about pollination are called pollen/nectar robbers.
- (C) Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil.
- (D) Some reptiles have also been reported as pollinators in some plant species.

NEET 2016 Phase 1 · Q174

76. Specialised epidermal cells surrounding the guard cells are called:

- (A) Complementary cells
- (B) Subsidiary cells
- (C) Bulliform cells
- (D) Lenticels

NEET 2016 Phase 1 · Q175

77. Which of the following guards the opening of hepatopancreatic duct into the duodenum?

- (A) Semilunar valve
- (B) Ileocaecal valve
- (C) Pyloric sphincter
- (D) Sphincter of Oddi

NEET 2016 Phase 1 · Q177

78. The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the:

- (A) Halophiles
- (B) Thermoacidophiles
- (C) Methanogens
- (D) Eubacteria

NEET 2016 Phase 1 · Q178

79. A river with an inflow of domestic sewage rich in organic waste may result in:

- (A) Drying of the river very soon due to algal bloom.
- (B) Increased population of aquatic food web organisms.
- (C) An increased production of fish due to biodegradable nutrients.
- (D) Death of fish due to lack of oxygen.

NEET 2016 Phase 1 · Q179

80. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in:

- (A) Aneuploidy
- (B) Polyploidy
- (C) Somaclonal variation
- (D) Polyteny

NEET 2016 Phase 1 · Q180

81. A typical fat molecule is made up of:

- (A) Three glycerol molecules and one fatty acid molecule
- (B) One glycerol and three fatty acid molecules
- (C) One glycerol and one fatty acid molecule
- (D) Three glycerol and three fatty acid molecules

Answer key and explanations

1. Answer: (C) No two species can occupy the same niche indefinitely for the same limiting resources.

Gause's principle says two closely related species competing for the same limiting resource cannot coexist indefinitely in the same niche; the competitively inferior one is eventually eliminated. It is not about abundance or body size, and species with different food preferences do not compete for the same resource at all.

2. Answer: (D) Free nuclear endosperm

In coconut the primary endosperm nucleus divides repeatedly without wall formation, so the watery liquid of a tender coconut is free-nuclear endosperm; the surrounding white kernel is the later cellular endosperm. The endocarp is the hard shell and the mesocarp is the fibrous husk.

3. Answer: (D) Their RNA is of high molecular weight

Viroids are naked, infectious RNA molecules without a protein coat and are smaller than viruses (e.g. potato spindle tuber viroid). Their RNA is of low molecular weight, so the statement about high molecular weight RNA is the wrong one.

4. Answer: (C) Parapodia

Parapodia are lateral locomotory appendages of aquatic annelids such as Nereis, not of arthropods. Arthropods have a chitinous exoskeleton, segmented bodies and jointed appendages.

5. Answer: (B) X - linked recessive gene disorder

Haemophilia is caused by a recessive allele on the X chromosome, so it is a sex-linked (X-linked) recessive disorder, seen mostly in males. 'Recessive gene disorder' is true but less precise; it is not a chromosomal or dominant disorder.

6. Answer: (B) Two photosystems operating simultaneously

Emerson found that the rate of photosynthesis falls in light beyond 680 nm (red drop) but rises above the sum of separate rates when shorter-wavelength light is given together with it (enhancement effect). This showed that two photosystems (PS I and PS II) work together.

7. Answer: (A) Emphysema

Emphysema is a chronic disorder in which alveolar walls are damaged and the respiratory surface is reduced; cigarette smoking is its major cause. Asthma is an allergic inflammation of bronchi, and acidosis/alkalosis are acid-base disturbances, not respiratory diseases caused by smoking.

8. Answer: (A) Ley farming

Ley farming alternates cropping with periods of grass or legume pasture (ley), which adds organic matter and nitrogen and improves soil structure. Contour and strip farming are soil-conservation layouts on slopes, and shifting agriculture is slash-and-burn cultivation.

9. Answer: (C) (a) is true but (b) is false.

Mitochondria and chloroplasts are semi-autonomous: they arise by division of pre-existing organelles and have their own circular DNA. They also have their own 70S ribosomes, so they do possess protein-synthesising machinery, which makes the second statement false.

10. Answer: (B) Lumen of thylakoids

During the light reaction, water splitting on the inner side of the thylakoid membrane and proton pumping by the cytochrome b₆f complex accumulate H⁺ in the thylakoid lumen. This gradient drives ATP synthase; the stroma becomes relatively proton-poor (alkaline).

11. Answer: (B) Opsin and Retinal

Rhodopsin, the photopigment of rods (and the cone pigments), consists of the protein opsin bound to retinal, an aldehyde of vitamin A. Retinol is vitamin A alcohol, not the bound chromophore, and transducin is a G-protein in the signalling cascade.

12. Answer: (B) Kinetochore of the chromosome

Spindle fibres attach to kinetochores, the disc-shaped protein structures that form on the centromere of each chromatid. The centromere is the constriction carrying the kinetochore; a kinetosome is a basal body of cilia, and telomeres are chromosome ends.

13. Answer: (B) River dolphin

The Gangetic river dolphin (*Platanista gangetica*) was declared India's National Aquatic Animal in 2009 to promote its conservation. The other animals have no such status.

14. Answer: (C) lactose

Lactose (strictly its isomer allolactose) binds the lac repressor and inactivates it, so the structural genes are transcribed. Glucose actually represses the operon and galactose is not the inducer.

15. Answer: (D) Relaxin - Inhibin

Parathormone raises and calcitonin lowers blood calcium; insulin lowers and glucagon raises blood glucose; aldosterone retains Na^+ and water while ANF promotes their loss. Relaxin (softens pelvic ligaments at parturition) and inhibin (suppresses FSH) act on unrelated targets, so they are not antagonistic.

16. Answer: (B) Spindle fibres, Centrioles and Cilia

Microtubules (tubulin polymers) form the spindle fibres, the triplet fibrils of centrioles and the 9+2 axoneme of cilia. Peroxisomes are membrane-bound vesicles, and chromatin and nucleosomes are made of DNA and histones, not microtubules.

17. Answer: (A) Polysome

Several ribosomes translating the same mRNA at the same time form a polysome (polyribosome). A polypeptide is the product of translation, and Okazaki fragments are short DNA pieces of the lagging strand.

18. Answer: (B) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the fallopian tube.

Fertilisation occurs in the ampullary region near the ampullary-isthmic junction of the fallopian tube, so the ovum and sperms must reach that site at the same time. The cervix has no ampullary-isthmic junction, and the ovum is not released into the uterus.

19. Answer: (B) allergic reaction of the mast cells in the lungs

Asthma is an allergic response: allergens trigger mast cells to release histamine and other mediators, causing inflammation and spasm of bronchi and bronchioles and wheezing. It is not a bacterial infection (as in pneumonia) or fluid accumulation.

20. Answer: (C) IAA

In the Avena curvature test, an agar block containing auxin placed on one side of a decapitated oat coleoptile causes bending proportional to auxin concentration, so it is the bioassay for IAA. Gibberellins are assayed by dwarf pea/maize or barley endosperm tests instead.

21. Answer: (C) Vexillum

In papilionaceous (vexillary) aestivation the large posterior standard petal is the vexillum, the two lateral ones are wings (alae) and the two anterior fused ones form the keel (carina). Pappus is a modified calyx of Asteraceae.

22. Answer: (A) Liliaceae

Liliaceae have a tricarpeal, syncarpous, superior ovary with axile placentation. Solanaceae is bicarpeal syncarpous, Fabaceae is monocarpeal, and Poaceae has a monocarpeal-appearing ovary.

23. Answer: (A) Chitin

Most fungal cell walls are made of chitin and polysaccharides. Peptidoglycan is the bacterial wall component and cellulose/hemicellulose are typical of plant walls.

24. Answer: (C) LH and FSH decrease gradually during the follicular phase.

During the follicular phase LH and FSH levels rise gradually, and LH reaches a peak (LH surge) in mid-cycle that triggers ovulation. So saying they decrease in this phase is incorrect; the other statements describe normal gonadotropin actions.

25. Answer: (A) 1 : 2 : 1 :: Tall homozygous : Tall heterozygous : Dwarf

$TT \times tt$ gives Tt in F_1 ; selfing Tt gives $TT : Tt : tt$ in a 1 : 2 : 1 ratio, i.e. tall homozygous : tall heterozygous : dwarf. 3 : 1 tall : dwarf is the phenotypic ratio, not the genotypic one asked for.

26. Answer: (C) Habitat loss and fragmentation

Of the 'evil quartet', habitat loss and fragmentation is the most important cause of species extinction, as seen with tropical rainforest clearing. Over-exploitation, alien species and co-extinctions also contribute but to a lesser extent.

27. Answer: (B) Least genetic diversity

A cropland is a man-made ecosystem usually dominated by a single crop variety (monoculture), so its genetic diversity is very low. Soil organisms and weeds are present, and succession is prevented by repeated cultivation.

28. Answer: (A) estrogen and progesterone

The ovarian steroids estrogen and progesterone feed back on the hypothalamus and modulate GnRH pulse frequency (estrogen increases it, progesterone slows it). Inhibin acts mainly on the pituitary to suppress FSH, not on GnRH pulse frequency.

29. Answer: (D) Single - stranded

Plasmids are extrachromosomal, circular, double-stranded DNA molecules that replicate independently of the chromosome and can be transferred between cells. They are not single-stranded.

30. Answer: (B) Indeterminate and radial cleavage during embryonic development

Cockroach is a protostome arthropod: its embryos show determinate cleavage, and its coelom is schizocoelic in origin. Indeterminate radial cleavage is a deuterostome feature (echinoderms, chordates). Its exoskeleton is chitin, a polymer of N-acetylglucosamine, and the body is segmented.

31. Answer: (C) Auto-immune disease

When the immune system fails to recognise self and destroys the body's own cells, the result is an autoimmune disease such as rheumatoid arthritis. Allergy is an exaggerated response to harmless foreign antigens, and graft rejection is a response to non-self tissue.

32. Answer: (B) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

Dominance means only one allele is expressed in the heterozygote; codominance means both alleles are fully expressed (e.g. ABO blood group); pleiotropy is one gene affecting several traits (e.g. phenylketonuria); polygenic inheritance is many genes controlling one trait (e.g. skin colour).

33. Answer: (C) 1980s

The Government of India introduced Joint Forest Management in the late 1980s (1988 forest policy, guidelines in 1990) to involve local communities in protecting and managing forests. It did not exist in the 1960s or 1970s.

34. Answer: (D) (a), (b) and (c) are correct.

Haemophilia is X-linked recessive, Down's syndrome results from trisomy 21 (aneuploidy) and phenylketonuria is autosomal recessive. Sickle-cell anaemia is autosomal recessive (HbS gene on chromosome 11), not X-linked, so every combination containing it is wrong.

35. Answer: (D) Thalamus or petal

The filament's proximal (basal) end is attached to the thalamus, or to the petal in epipetalous flowers, while its distal end bears the anther. The connective joins the two anther lobes and the placenta bears ovules.

36. Answer: (D) Vasectomy - prevents spermatogenesis

Vasectomy cuts and ties the vasa deferentia, blocking sperm transport; spermatogenesis in the testes continues normally. The other pairs correctly state how barriers, IUDs and hormonal pills work.

37. Answer: (A) *Thermus aquaticus*

Taq polymerase is a heat-stable DNA polymerase isolated from the thermophilic bacterium *Thermus aquaticus*, which lets it survive the high denaturation temperature in PCR. The other bacteria are not its source.

38. Answer: (B) Is produced by granulosa cells in ovary and inhibits the secretion of FSH.

Inhibin is a glycoprotein secreted by granulosa cells of ovarian follicles (and Sertoli cells in testes) that selectively inhibits FSH secretion from the anterior pituitary. It does not suppress LH or prolactin.

39. Answer: (D) Root

Meloidogyne incognita is a root-knot nematode that infects tobacco roots and reduces yield; RNA interference was used to make nematode-resistant tobacco. It does not attack flowers, leaves or stems.

40. Answer: (D) Attenuated pathogens

Oral polio vaccine contains live attenuated (weakened) poliovirus that induces active immunity. Antivenom and gamma globulin provide passive immunity through ready-made antibodies.

41. Answer: (C) Lysosomes

Lysosomes are single-membrane vesicles containing hydrolytic enzymes. Mitochondria, chloroplasts and the nucleus (nuclear envelope) are all bounded by a double membrane.

42. Answer: (C) Tetanus

When stimuli come so rapidly that the muscle cannot relax between them, the twitches fuse into a smooth sustained contraction called tetanus. Fatigue is reduced response after repeated contraction and tonus is the mild resting contraction of muscle.

43. Answer: (A) Pitcher of *Nepenthes*

The pitcher of *Nepenthes* is a modified leaf (lamina) used to trap insects. Thorns of Citrus, tendrils of cucumber and the flattened phylloclade of *Opuntia* are all stem modifications.

44. Answer: (D) Anthocyanins

Anthocyanins are water-soluble flavonoid pigments dissolved in the vacuolar cell sap, giving red, purple and blue colours. Chlorophylls, carotenoids and xanthophylls are fat-soluble pigments located in plastids.

45. Answer: (C) Sequoia is one of the tallest trees

Sequoia (giant redwood), a gymnosperm, is one of the tallest trees. Gymnosperms are all heterosporous, Salvinia is a pteridophyte, and gymnosperm needles with thick cuticle and sunken stomata are well adapted to extreme climates.

46. Answer: (B) Zinc finger analysis

DNA fingerprinting uses restriction digestion, PCR amplification and hybridisation with labelled VNTR probes (Southern blotting). Zinc finger analysis is not a part of any fingerprinting technique; zinc fingers are DNA-binding protein motifs.

47. Answer: (A) Smooth muscle - Wall of intestine

Smooth (visceral) muscle forms the walls of the intestine and other hollow organs. Tendons are dense regular connective tissue, the tip of the nose has cartilage, and the stomach is lined by columnar epithelium.

48. Answer: (B) C₄

C₄ plants concentrate CO₂ around RuBisCO in bundle-sheath cells, which suppresses photorespiration, gives high photosynthetic rates at high temperature and needs less water and nitrogen (less RuBisCO) per unit carbon fixed. C₃ plants suffer photorespiration; CAM plants save water but have low photosynthetic rates.

49. Answer: (D) Flipper of Whale

The bird's wing is a modified forelimb, and the whale's flipper is also a forelimb with the same basic bone plan (humerus, radius-ulna, carpals, digits), so they are homologous. The moth's wing is only analogous, a shark's dorsal fin is not a limb, and a hind limb is not the corresponding forelimb.

50. Answer: (A) Cartilaginous endoskeleton - Chondrichthyes

All Chondrichthyes (sharks, rays) have a cartilaginous endoskeleton. Not all mammals are viviparous (monotremes lay eggs), jawless chordates such as cyclostomes lack jaws, and crocodiles have a four-chambered heart.

51. Answer: (D) Mutations inhibit production of telomerase.

Cancer cells typically reactivate telomerase so their telomeres are maintained and they divide indefinitely; mutations do not inhibit telomerase production. Activated proto-oncogenes, loss of telomerase inhibition and loss of cell-cycle control all favour cancer.

52. Answer: (A) Melatonin and Serotonin

Tryptophan is converted to serotonin (5-hydroxytryptamine), which in the pineal gland is converted to melatonin. Thyroid hormones come from tyrosine, while estrogen, progesterone, cortisol and cortisone are steroids derived from cholesterol.

53. Answer: (C) Both (a) and (b) are correct.

The first life forms arose in an oxygen-free atmosphere, so they were non-green anaerobic heterotrophs. The earliest autotrophs were chemoautotrophs that obtained energy from inorganic chemical reactions and did not release oxygen; oxygen-releasing photosynthesis came later with cyanobacteria-like organisms.

54. Answer: (C) decrease the affinity of hemoglobin with oxygen.

A fall in pH (higher H⁺) shifts the oxygen-haemoglobin dissociation curve to the right (Bohr effect), lowering haemoglobin's affinity for O₂ so more oxygen is released to tissues. It does not cause the liver to release bicarbonate.

55. Answer: (B) Convergent evolution

Analogous structures, such as wings of butterflies and birds, perform similar functions but have different origins; they arise when unrelated lineages adapt to similar environments (convergent evolution). Divergent evolution from shared ancestry produces homologous structures.

56. Answer: (A) Hind II

Hind II, from Haemophilus influenzae, was the first restriction endonuclease isolated and cuts DNA at a specific recognition sequence. DNase I cuts DNA non-specifically, while proteases and RNases do not act on DNA.

57. Answer: (B) A.G. Tansley

A. G. Tansley coined the term ecosystem in 1935. Haeckel coined the term ecology, and Odum and Warming are known for other contributions to ecology.

58. Answer: (D) Glycine is a sulphur containing amino acid.

Glycine is the simplest amino acid with H as its side chain and has no sulphur; the sulphur-containing amino acids are cysteine and methionine. The other statements are correct.

59. Answer: (D) Water

Bryophytes and pteridophytes have flagellated (motile) antherozoids that must swim through a film of water to reach the archegonium, which is why they are called amphibians of the plant kingdom (bryophytes) and are restricted to moist places.

60. Answer: (A) Tapetum helps in the dehiscence of anther

The tapetum is the innermost anther wall layer that nourishes developing pollen grains; dehiscence is brought about by the endothecium and stomium. The exine is made of sporopollenin, pollen causes allergies, and cryopreserved pollen is used in breeding.

61. Answer: (A) Lichens

In primary succession on bare rock (xerarch), lichens are the pioneers: they secrete acids that weather rock and form a thin soil. Mosses and liverworts follow only after some soil has formed.

62. Answer: (A) AUG

AUG, coding for methionine, is the initiation (start) codon. UGA, UAA and UAG are stop codons that terminate translation.

63. Answer: (C) Viviparity

Birds are oviparous (lay eggs) while most mammals are viviparous, so viviparity is not shared. Both groups have bony skeletons, breathe with lungs and are warm-blooded (homeothermic).

64. Answer: (A) Biological names can be written in any language

Scientific names must be in Latin or Latinised form, so writing them in any language is against the rules. Binomials consist of genus followed by specific epithet, printed in italics or underlined separately when handwritten.

65. Answer: (C) more than that in the pulmonary vein.

The pulmonary artery receives blood pumped by the right ventricle, so its pressure (about 25/8 mm Hg) is higher than in the pulmonary vein returning blood to the left atrium. It is much lower than systemic arterial pressure in the aorta or carotid, and higher than in the venae cavae.

66. Answer: (D) scutellum

In monocot grains like maize the single large shield-shaped cotyledon is the scutellum. Coleoptile and coleorhiza are sheaths covering the plumule and radicle respectively.

67. Answer: (B) parietal cells

Parietal (oxyntic) cells of gastric glands secrete HCl and intrinsic factor. Peptic (chief) cells secrete pepsinogen, and gastrin-secreting G cells release a hormone that stimulates acid secretion.

68. Answer: (B) Ozone

Stratospheric ozone absorbs UV-B radiation; its depletion lets more UV-B reach the earth, damaging DNA and increasing skin cancer. Nitrous oxide and methane are greenhouse gases, not UV shields.

69. Answer: (B) Protista

In Whittaker's five-kingdom system these unicellular eukaryotic groups, along with protozoans, are placed in kingdom Protista. Monera contains prokaryotes, and slime moulds are not true fungi.

70. Answer: (C) Hepatic Vein

Urea is made in the liver by the ornithine cycle, so blood leaving the liver in the hepatic vein carries the highest urea load. The renal vein carries the least, because urea has been removed by the kidneys.

71. Answer: (D) Apomixis

Apomixis is the formation of seeds without fertilisation, a form of asexual reproduction that mimics sexual reproduction (e.g. some grasses and Asteraceae). Somatic hybridisation is fusion of protoplasts, and budding and sporulation are other asexual methods that do not produce seeds.

72. Answer: (D) Clostridium butylicum - Lipase - removal of oil stains

Clostridium butylicum is used to produce butyric acid, not lipase; lipases for removing oily stains in detergents come from other microbes. Cyclosporin A from Trichoderma, statins from Monascus and streptokinase from Streptococcus are correctly matched.

73. Answer: (C) The two genes are linked and present on the same chromosome.

Independent assortment would give equal parental and recombinant classes (1:1:1:1) in a dihybrid testcross. An excess of parental types means the genes tend to be inherited together, i.e. they are linked on the same chromosome, with recombinants coming only from crossing over.

74. Answer: (D) Synapsis

Synapsis, the pairing of homologous chromosomes, occurs only in zygotene of meiosis I. Spindle formation, disappearance of the nucleolus and chromosome movement all occur during mitosis.

75. Answer: (A) Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.

The pistil accepts only compatible pollen; pollen of other species is usually rejected, and many compatible pollen tubes of the same species can grow down the style, not just one. The other statements, about pollen/nectar robbers, pollen-pistil chemical interaction and reptile pollinators, are from NCERT and correct.

76. Answer: (B) Subsidiary cells

Specialised epidermal cells next to the guard cells are subsidiary cells, and together they form the stomatal apparatus. Bulliform cells are large cells on grass leaves that help leaf rolling, and lenticels are pores in bark.

77. Answer: (D) Sphincter of Oddi

The common hepatopancreatic duct opening into the duodenum is guarded by the sphincter of Oddi. The pyloric sphincter guards the stomach-duodenum opening, the ileocaecal valve the ileum-caecum junction, and semilunar valves are in the heart's arteries.

78. Answer: (C) Methanogens

Methanogens such as *Methanobacterium* are archaebacteria in the rumen and in cattle dung that produce methane, the main component of biogas. Halophiles and thermoacidophiles are archaebacteria of salty and hot acidic habitats.

79. Answer: (D) Death of fish due to lack of oxygen.

Microbes decomposing the organic matter in sewage consume large amounts of dissolved oxygen (high BOD), so oxygen falls sharply and fish die. The river does not dry up, and fish production falls rather than rises.

80. Answer: (B) Polyploidy

If chromosomes separate but no cell plate forms (failure of cytokinesis), both sets stay in one cell and the chromosome number doubles, i.e. polyploidy. Aneuploidy is gain or loss of single chromosomes, and polyteny is repeated DNA replication without separation of chromatids.

81. Answer: (B) One glycerol and three fatty acid molecules

A typical fat (triglyceride) is formed by esterification of one glycerol molecule with three fatty acid molecules. Monoglycerides have only one fatty acid, and fats never contain three glycerols.

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.