

**SOLUTIONS & ANSWERS FOR KERALA MEDICAL ENTRANCE  
EXAMINATION - 2014 – PAPER 2  
VERSION – B1**

**[BIOLOGY]**

1. Ans: a – 2, b – 4, c – 1, d – 3  
Sol: All the matches given in C are correct.
2. Ans: I, II and III only  
Sol: Monographs contain information on any one taxon.
3. Ans: Kingdom → Division → Class → Order → Family → Genus → Species  
Sol: The order given in D is correct
4. Ans: Mycelium is coenocytic and aseptate.  
Sol: Mycelium is septate
5. Ans: Fungi  
Sol: The features given are those that of fungi.
6. Ans: *Gracilaria*, *Gelidium*, *Porphyra*, *Polysiphonia*.  
Sol: All these algae given in 'C' are Rhodophyceae.
7. Ans: Families like Convolvulaceae, Solanaceae are included in the order Polymoniales mainly based on the floral characters.  
Sol: Biological names are written in latin.
8. Ans: Euglenoids  
Sol: Instead of cell wall euglenoids possess a pellicle layer.
9. Ans: II and IV only  
Sol: *Salvinia* and *Selaginella* are heterosporous pteridophytes.
10. Ans: a – 3, b – 1, c – 2  
Sol: All the matches given in B are correct.
11. Ans: Bryophytes can live in soil but are dependent on water for sexual reproduction.  
Sol: Water is required for the movement of gametes.
12. Ans: (a), (b) and (c) alone are correct  
Sol: In angiosperms zygote develops into embryo.
13. Ans: a – 4, b – 3, c – 2, d – 1  
Sol: All the matches given in A are correct.
14. Ans: Sweet potato and *Pistia*  
Sol: In sweet potato, adventitious roots store food.
15. Ans: Parietal and free-central.  
Sol: The placentation seen in *Argemone* is parietal.
16. Ans: (a) and (d) only  
Sol: Fabaceae shows marginal placentation.
17. Ans: (b) and (c) only  
Sol: Polyarch xylem and casparian strips are seen in dicot roots.
18. Ans: (a), (b) and (e) are correct.  
Sol: Solanaceae shows cymose inflorescence and bilocular ovary.
19. Ans: The cell wall of parenchyma is made up of pectin.  
Sol: Cell wall of parenchyma is highly cellulosic.
20. Ans: III only  
Sol: Monocots possess closed vascular bundles.
21. Ans: Spring wood and autumn wood  
Sol: Spring wood is lighter in colour and has a lower density whereas autumn wood is darker and has a greater density.
22. Ans: Endodermis  
Sol: Endodermis in dicot root contain suberin deposition.
23. Ans: (b) and (c) only  
Sol: *Vibrio* – comma shaped bacteria. Lysosome rich in hydrolytic enzyme.

- 24. Ans:** III only  
**Sol:** Ribosome is absent in golgi apparatus.
- 25. Ans:** a – 4, b – 3, c – 2, d – 1  
**Sol:** The matches given in option C is correct.
- 26. Ans:** G. N. Ramachandran  
**Sol:** G.N. Ramachandran discovered the helical structure of collagen.
- 27. Ans:** Metacentric and telocentric  
**Sol:** Based on the position of centromere there are different types of chromosomes.
- 28. Ans:** a – 4, b – 3, c – 2, d – 1  
**Sol:** All matches given in C are correct.
- 29. Ans:** Glycerol is a trihydroxy propane.  
**Sol:** Arachidonic acid has 20 carbon including carboxyl carbon.
- 30. Ans:** Niacin  
**Sol:** The coenzymes NAD and NADP contain the vitamin niacin.
- 31. Ans:** 2 and 4 only  
**Sol:** Morphine is alkaloid, curcumin is drug.
- 32. Ans:** Cells swell in hypertonic solutions and shrink in hypotonic solutions.  
**Sol:** Cells shrink in hypertonic solutions and swell in hypotonic solutions.
- 33. Ans:** Potassium and Magnesium  
**Sol:** Potassium helps in closing of stomata and magnesium helps in maintain the structure of ribosome.
- 34. Ans:** Iron, Manganese, Copper, Molybdenum and Zinc.  
**Sol:** Micronutrients required in very small amounts.
- 35. Ans:** a – 2, b – 3, c – 1  
**Sol:** All are corectly matched in the option A.
- 36. Ans:** NADPH + H<sup>+</sup> is synthesized.  
**Sol:** NADPH + H<sup>+</sup> never formed in cyclic reaction.
- 37. Ans:** I and IV only  
**Sol:** Two decarboxylation reactions take place in citric acid cycle.
- 38. Ans:** C<sub>3</sub> plants – Maize  
**Sol:** Maize is C<sub>4</sub> plants
- 39. Ans:** (c) and (d) only  
**Sol:** Facilitated transport never requires ATP and never follow uphill transport.
- 40. Ans:** I, II and IV only  
**Sol:** Oxidative decarboxylation of pyrauvic acid results during Kreb's cycle of aerobic reaction.
- 41. Ans:** (d), (a), (c), (b)  
**Sol:** Fructose 1, 6–phosphate splits into glycerate 3 - phosphate then into 1, 3 bisphosphate, 3 – phosphoglyceric acid and 2 – phosphoglycerate.
- 42. Ans:** *Beijernickia*  
**Sol:** *Rhizobium* is symbiotic bacterium. *Rhodospirillum* is anaerobic.
- 43. Ans:** Gibberellic acid  
**Sol:** GA increases internode growth in sugar cane.
- 44. Ans:** III and IV only  
**Sol:** Non–showy and no nectar are the characters of both wind and water pollinated flowers.
- 45. Ans:** Gibberellin, auxin and ABA  
**Sol:** ABA is known as plant stress hormone.
- 46. Ans:** Helps to overcome apical dominance  
**Sol:** Cytokinins help to overcome the apical dominance.
- 47. Ans:** (b) and (d) only  
**Sol:** Water hyacinth, *Yucca* and *Amorphophalus* are pollinated by insects.
- 48. Ans:** Fragmentation  
**Sol:** Leaching, humification, catabolism, mineralisation and fragmentation are the steps seen in decomposition.
- 49. Ans:** Very small animals are commonly found in polar regions as they have to spend less energy to generate body heat.

- Sol: Very small animals have to spend greater energy.
- 50. Ans:** Commensalism
- Sol: In commensalism one species benefits and the other neither harmed nor benefited.
- 51. Ans:** Late August and early October
- Sol: The ozone hole over Antarctica develops each year between late August and early October.
- 52. Ans:** Intrinsic rate of natural increase.
- Sol:  $r$  represents intrinsic rate of natural increases.
- 53. Ans:** Primary productivity depends on the plant species inhabiting a particular area.
- Sol: Secondary productivity is the rate of formation of new organic matter by consumers.
- 54. Ans:** Lichens and phytoplanktons
- Sol: Pioneer species in xerarch and hydrarch are lichens and phytoplanktons respectively.
- 55. Ans:** The nutrients such as sulphur and phosphorus encourage the growth of aquatic organisms in the lake.
- Sol: Nutrients such as  $N_2$  and P encourage the growth of aquatic organisms in the lake.
- 56. Ans:** Soil formation.
- Sol: According to Robert Constanza 50% of total cost for ecosystem services goes to soil formation.
- 57. Ans:** II and III only
- Sol: In terrestrial ecosystem a larger fraction of energy flows through detritus food chain.
- 58. Ans:** *Salmonella typhimurium*
- Sol: Antibiotic resistance gene was linked to the native plasmid of *Salmonella typhimurium*.
- 59. Ans:** In vitro replication of specific DNA sequence using thermostable DNA polymerase.
- Sol: *Taq* polymerase is the thermostable DNA polymerase enzyme used in PCR
- 60. Ans:** Processing of large volumes of culture.
- Sol: Bioreactors are useful in processing of large volumes of culture.
- 61. Ans:** Flippers of penguins and dolphins are examples for homology
- Sol: Flipper of penguins and dolphins are examples for analogy.
- 62. Ans:** 1 - b, 2 - d, 3 - a, 4 - c
- Sol: The matches given in option B are correct.
- 63. Ans:** *Homo erectus*
- Sol: *Homo erectus* had a brain capacity of 900 CC.
- 64. Ans:** Coelenterates
- Sol: Coelenterates have tissue level organisation.
- 65. Ans:** i - d, ii - a, iii - b, iv - e, v - c
- Sol: The matches given in option C are correct.
- 66. Ans:** II, III and V only
- Sol: Polyps produce medusae asexually and medusae from polyps sexually
- 67. Ans:** Teeth in Chondrichthyes are modified ctenoid scales
- Sol: Teeth in chondrichthyes are modified placoid scales.
- 68. Ans:** Proventriculus
- Sol: Proventriculus or gizzard is a part of digestive system in cockroach.
- 69. Ans:** Male genital pore - 9<sup>th</sup> segment
- Sol: The male genital pore is present on the 18<sup>th</sup> segment
- 70. Ans:** joins the sclerites
- Sol: In cockroach the arthroidal membrane joins the tergites and sternites (sclerites)
- 71. Ans:** Special venous connection between liver and intestine called renal portal system is present
- Sol: The venous connection between liver and intestine is known as hepatic portal system.

- 72. Ans:** i, iii and iv only are wrong  
**Sol:** Gap junctions facilitate the cells to communicate with each other.
- 73. Ans:** Dense regular connective tissue  
**Sol:** Tendons and ligaments are dense regular connective tissue.
- 74. Ans:** ABO blood types  
**Sol:** ABO blood types is an example for multiple allelism.
- 75. Ans:** Reginald C. Punnett  
**Sol:** The representation is known as Punnett square.
- 76. Ans:** Closely located genes in a chromosome always assort independently resulting in recombinants  
**Sol:** Closely linked genes are not always subjected to independent assortment.
- 77. Ans:** Tyrosine  
**Sol:** The affected person do not produces an enzyme called phenylalanine hydroxylase.
- 78. Ans:** In a nucleotide, the nitrogenous base is linked to a phosphate group  
**Sol:** The nitrogenous base is linked to the first carbon of pentose sugar.
- 79. Ans:** In insects with XO type of sex determination, all sperms bear X-chromosome besides autosomes  
**Sol:** In insects 50% sperms contain X-chromosome while the remaining 50% sperms lack sex chromosome.
- 80. Ans:** Destroy itself after every cell cycle  
**Sol:** The genetic material will be passed on to the newly produced daughter cells.
- 81. Ans:** 1-b, 2-d, 3-c, 4-a  
**Sol:** The matches given in option C are correct.
- 82. Ans:** Val, His, Leu, Thr, Pro, Val, Glu  
**Sol:** In sickle cell anaemia, glutamic acid at the 6<sup>th</sup> position is replaced by valine.
- 83. Ans:** UAA  
**Sol:** UAA, UAG, and UGA are stop codons.
- 84. Ans:** 2 and 5 only are correct  
**Sol:** RNA polymerase I transcribes rRNA.
- 85. Ans:** X-ray diffraction data of Maurice Wilkins and Rosalind Franklin was the basis of Watson and Crick's DNA model  
**Sol:** Haploid content of human DNA is  $3.3 \times 10^9$  bp
- 86. Ans:** Formation of peptide bond  
**Sol:** Aminocylation of tRNA is also known as charging of tRNA.
- 87. Ans:** Exons  
**Sol:** The non coding sequences are called introns.
- 88. Ans:** Anticodon  
**Sol:** tRNA reads the triplet codes on mRNA using anticodon loop.
- 89. Ans:** Meselson and Stahl – regulation of gene expression  
**Sol:** Meselson and Stahl proved semiconservative mode of DNA replication.
- 90. Ans:** DNA polymorphism  
**Sol:** Inheritable mutation observed in a population at high frequency is called DNA polymorphism.
- 91. Ans:** hnRNA  
**Sol:** RNA polymerase II transcribes the precursor of mRNA i.e. hnRNA
- 92. Ans:** 1-c-i, 2-a-iii, 3-d-ii, 4-b-iv  
**Sol:** All the matchings given in option 'c' are correct.
- 93. Ans:** The optimum pH for salivary amylase activity is 8.9  
**Sol:** The optimum pH for salivary amylase activity is 6.8
- 94. Ans:** Diaphragm  
**Sol:** Diaphragm and external and internal intercostal muscles help in breathing.
- 95. Ans:** The total volume of air accommodated in the lungs at the end of a forced inspiration is called the vital capacity.  
**Sol:** The total volume of air accommodated in the lungs at the end of a forced inspiration is called total lung capacity.
- 96. Ans:** i-d, ii-e, iii-a, iv-b, v-c  
**Sol:** All the matchings given in option D correct.

- 97. Ans:** Enzymatic reactions in coagulation of blood  
**Sol:** Thromokinase is required for the conversion of prothrombin into thrombin during coagulation of blood.
- 98. Ans:** pO<sub>2</sub> 95 mm Hg; pCO<sub>2</sub> 40 mm Hg  
**Sol:** Systemic arteries carry oxygenated blood.
- 99. Ans:** Actin and myosin  
**Sol:** Actin and myosin are two important proteins seen in the myofibril.
- 100. Ans:** a-sphenoid bone; b-occipital bone; c-zygomatic bone; d-parietal bone, e-frontal bone; f-temporal bone  
**Sol:** All the labellings in the option 'C' are correct.
- 101. Ans:** Hyoid  
**Sol:** Hyoid bone is included in the skull.
- 102. Ans:** A neuron is polarized only when the outer surface of the axonal membrane possess a negative charge and it's inner surface is positively charged.  
**Sol:** In a depolarized neuron the outer surface of the axonal membrane posses a negative charge inner surface positive charge.
- 103. Ans:** Myasthenia gravis  
**Sol:** Myasthenia gravis leading to fatigue, weakening and paralysis of skeletal muscle.
- 104. Ans:** Parathyroid hormone decreases the Ca<sup>2+</sup> levels in blood  
**Sol:** Parathyroid hormone increases the Ca<sup>2+</sup> ions in blood.
- 105. Ans:** i-c, ii-a, iii-d, iv-e, v-b  
**Sol:** All the matchings given in option 'D' are correct.
- 106. Ans:** Central part of I-band – M-line  
**Sol:** Central part of I - band – Z line.
- 107. Ans:** Small fat globules coated with protein.  
**Sol:** Chylomicrons are transported into the lacteals in the villi.
- 108. Ans:** Sigmoid  
**Sol:** Sigmoid curve is called the oxygen dissociation curve
- 109. Ans:** Adrenal medullary hormones can increase cardiac output  
**Sol:** Adrenal medullary hormones are called catecholamines
- 110. Ans:** To prevent diuresis, ADH facilitates water reabsorption from the latter parts of the tubule  
**Sol:** ADH deficiency leads to diabetes inspidus.
- 111. Ans:** Macula lutea  
**Sol:** The yellow spot is the region with greatest resolution.
- 112. Ans:** Secondary spermatocytes are diploid.  
**Sol:** Secondary spermatocytes are haploid.
- 113. Ans:** Endometrium  
**Sol:** The inner glandular layer of the uterus is endometrium.
- 114. Ans:** Spermiation  
**Sol:** The release of sperm from the seminiferous tubule is called spermiation.
- 115. Ans:** *in situ* conservation - IVF  
**Sol:** IVF is an Assisted Reproductive Technology (ART).
- 116. Ans:** Biosphere reserves  
**Sol:** Biosphere reserves are *in-situ* conservation strategy.
- 117. Ans:** Norman. E. Borlaug  
**Sol:** Norman. E. Borlaug is revered as the 'Father of Green Revolution' at International level.
- 118. Ans:** Establishing the potential of penicillin as an effective antibiotic  
**Sol:** They established the antibiotic potential of Penicillin.
- 119. Ans:** 1 - d, 2 - c, 3 - e, 4 - b, 5 - a  
**Sol:** The matches given in option (A) are correct.
- 120. Ans:** Biological control agents  
**Sol:** *Nucleopolyhedroviruses* have a narrow spectrum insecticidal property.