

# A

16635

120 MINUTES

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1. The synthesis of this biochemical was the first ever demonstration that biochemicals can be synthesised from inorganic precursors. The biochemical is (1). ----- and the person who synthesised it was (2). -----.
  - A) (1) Glycine (2) Urey Miller
  - B) (1) DNA (2) Erwin Chargaff
  - C) (1) Urea (2) Friedrich Wohler
  - D) (1) Urea (2) Urey Miller
  
2. Which is the correct sequence of events in the process of inducible gene expression in prokaryotes?
  - A) Signal → transcription → splicing → polyA tailing → mRNA → translation → protein.
  - B) Signal → transcription → polyA tailing → splicing → mRNA → translation → protein.
  - C) Transcription → splicing → polyA tailing → mRNA → translation → protein.
  - D) Signal → transcription → mRNA → translation → protein.
  
3. A patient attending an infertility clinic was diagnosed to be azoospermic. Further investigations revealed a history of viral infections at puberty. Considering this history and azoospermia, one of the reasons for his inability to produce viable sperms could be
  - A) Impotence.
  - B) Lack of vitamin A.
  - C) Failure to be vaccinated with MMR vaccine.
  - D) Hepatitis B infection during puberty.
  
4. In a directory of members of a residence association, the following data on blood groups were recorded. Which among them cannot be correct?
  1. Family No. 1. Father O+, Mother O-, Son O-, Daughter O-.
  2. Family No. 2. Father AB+, Mother O-, Son O-, Daughter O-.
  3. Family No. 3. Father A+, Mother O+, Son O+, Daughter O-.
  4. Family No. 4. Father A+, Mother B-, Son O+, Daughter O-.
  - A) 1 & 2 only
  - B) 2 & 3 only
  - C) 2 only
  - D) 4 only
  
5. Which among the following can be corrected by administration of ascorbic acid?
  - A) Scurvy
  - B) Phenylketonurea
  - C) Xerophthalmia
  - D) Spina bifida

6. Identify the correct matches
- |    |                   |    |                            |
|----|-------------------|----|----------------------------|
| 1. | Cysticercosis     | a. | AIDS                       |
| 2. | Sleeping sickness | b. | <i>Taenia solium</i>       |
| 3. | Kala azar         | c. | Tset tse fly               |
| 4. | gp120             | d. | <i>Phlebotomus</i>         |
|    |                   | e. | Polycystic ovarian disease |
- A) 1-e; 2-c; 3-d; 4-a      B) 1-e; 2-d; 3-c; 4-a  
 C) 1-b; 2-c; 3-d; 4-a      D) 1-b; 2-c; 3-d; 4-e
7. Consider the following statements and choose the best option  
 Statement 1: The level of Calcium ions in the extracellular fluid (ECF) is much higher than the cytosol.  
 Statement 2: Influx of Calcium ions from the ECF into the neuron is an essential component of synaptic transmission.
- A) Statement 1 is true but statement 2 is false.  
 B) Statement 1 is false but statement 2 is true.  
 C) Both statements are true, and statement 2 is an effect related to statement 1.  
 D) Both statements are true, but are independent.
8. Which among the following is true with respect to the unit of mass 'Dalton' when used in biology?
- One Dalton is equivalent to the mass of a hydrogen atom.
  - It is used to express the molecular weight of proteins.
  - It describes the molecular weights of proteins based on the weight of the simplest amino acid glycine.
  - It describes the molecular weights of proteins based on the weight of its relative mobility in electrophoretic analysis.
- A) 1 and 2 only    B) 2 and 3 only    C) 3 and 4 only    D) 1 and 4 only
9. Reduced secretion of aldosterone leads to
- |    |                    |    |                     |
|----|--------------------|----|---------------------|
| A) | Tay Sach's disease | B) | Hashimoto's disease |
| C) | Addison's disease  | D) | Down's syndrome     |
10. The counter current system
- Ensures that no solute moves across the system.
  - Enables the maintenance of a constant osmotic gradient across opposing fluid movements.
  - Requires an active energy intensive system to keep a constant osmotic gradient.
  - All of the above.

11. Identify the true statement from the following with respect to the mammalian kidney.
- A) In the kidneys, the Malpighian capsule is located in the cortex, the loop of Henle in the medulla and the duct of Bellini opens into the pelvis.
  - B) In the kidneys, the Malpighian capsule is located in the medulla, the loop of Henle in the cortex and the duct of Bellini opens into the pelvis.
  - C) In the kidneys, the Malpighian capsule is located in the pelvis, the loop of Henle in the medulla and the duct of Bellini opens into the cortex.
  - D) In the kidneys, the Malpighian capsule is located in the renal pyramid, the loop of Henle in the medulla and the duct of Bellini opens into the pelvis.
12. Identify the correct statement.
- A) In the life cycle of the malaria parasite, the cycle of Ross describes the erythrocytic cycle, the cycle of Golgi describes the exoerythrocytic cycle and the cycle of Hull describes the sporogonic cycle.
  - B) In the life cycle of the malaria parasite, the cycle of Ross describes the sporogonic cycle, the cycle of Golgi describes the erythrocytic cycle and the cycle of Hull describes the exoerythrocytic cycle.
  - C) In the life cycle of the malaria parasite, the cycle of Ross describes the sporogonic cycle the cycle of Golgi describes the exoerythrocytic cycle and the cycle of Hull describes the erythrocytic cycle.
  - D) The entire life cycle of the malaria parasite was described by Sir. Ronald Ross.
13. The respiratory pigment seen in crustacea is
- A) Haemoglobin
  - B) Vanadium
  - C) Haemocyanin
  - D) Chlorocruorin
14. What is the genetic material in influenza virus?
- A) Double helical DNA
  - B) RNA
  - C) Single helix DNA
  - D) SnRNA
15. Which among the following is not a genetic disease?
- A) Sickle cell anaemia
  - B) Haemophilia
  - C) Down's syndrome
  - D) Rubella
16. An example for a monoestrus animal is
- A) Bears
  - B) Kangaroo
  - C) Cattle
  - D) Primates
17. Consider the following statements:  
 Statement 1. Allantoin is a nitrogenous waste product.  
 Statement 2. Allantoin is a metabolite that is transported across the placental barrier.
- A) Statement 1 is true while statement 2 is false.
  - B) Statement 1 is false while statement 2 is true.
  - C) Both statements are true.
  - D) Both statements are false.

18. The function of collateral glands of Cockroach is  
 A) Secretion of Ootheca                      B) Help in fertilization  
 C) Secretion of cuticle                      D) Spermatophore formation
19. During the process of researching the taxonomy of a specimen, a taxonomist observed the characteristic features such as a dorsal tubular central nervous system, notochord confined to the tail region, spicules, reversal of vascular circulation and retrogressive metamorphosis. The specimen may be that of  
 A) Ascidians                                      B) Sporozoans  
 C) Hydrozoans                                  D) Branchiostoma
20. In frog,  
 1. The 8th vertebra is amphicoelus while the 9th vertebra is biconvex  
 2. The 8th vertebra is biconvex while the 9th vertebra is amphicoelus  
 3. Both 8th and 9th are amphicoelus  
 4. The typical vertebra is procoelus  
 A) 1 is true                                      B) 2 is true  
 C) 1 and 4 are true                          D) 3 and 4 are true
21. Read the following statements about the circulatory system of Frog and select the correct answer.  
 (i) Erythrocytes of Frog is nucleated    (ii) Truncus atreriosus has no valves  
 (iii) Hepatic portal system is absent in Frog (iv) Venacavae opens into Sinus venous  
 A) i and ii are correct                      B) ii and iv are correct  
 C) i and iii are correct                      D) i and iv are correct
22. Choose the best option from those given below to explain the condition in which erythroblasotsis foetalis occurs.  
 A) Incompatible blood groups of the parents.  
 B) Rh positive mother and Rh negative father.  
 C) Rh negative mother and Rh positive father.  
 D) Rh negative mother and Rh positive foetus.
23. Cold sterilisation refers to  
 A) Sterilisation by Radioactive irradiation.  
 B) Ultra freezing of food materials to kill bacteria in food for human use.  
 C) Cryopreservation of food materials.  
 D) Freeze drying of food materials.
24. Feathers without interlocking hooks is a characteristic feature of  
 A) Odontognathae                              B) Neognathae  
 C) Ratites    D) Impennae

25. The instantaneous effect of cyanide poison is due to its effect on
- The nervous system
  - The cardiac vascular system
  - The electron transport chain
  - The muscular system
26. Identify the correct sequence of metabolites as seen in the Krebs's cycle.
- Acetyl co-A, citrate, isocitrate,  $\alpha$  ketoglutarate, fumarate, malate, succinate, oxaloacetate.
  - Acetyl co-A, citrate, isocitrate,  $\alpha$  ketoglutarate, succinate, fumarate, malate, oxaloacetate.
  - Acetyl co-A, isocitrate, citrate,  $\alpha$  ketoglutarate, succinate, malate, fumarate, oxaloacetate.
  - Acetyl co-A, citrate, isocitrate, succinate,  $\alpha$  ketoglutarate, fumarate, malate, oxaloacetate, NADH.
27. The  $2n$  chromosome number of *Drosophila* is
- 16
  - 4
  - 12
  - 8
28. A researcher working on a signal transduction system observed that the activation of the receptor complex required one ligand molecule and two surface receptor molecules. The type of signal transduction could be:
- G protein coupled receptor pathway.
  - Tyrosine kinase receptor pathway.
  - Ras signalling pathway.
  - cAmp cascade.
29. The scientific community has categorized the Western Ghats in Kerala as a 'Hot Spot' due to
- The presence of a large number of endangered species.
  - Very high biological diversity of organisms.
  - Its location in a warm tropical climate and de-forestation which causes Green House Effects.
  - Origin and occurrence of a large number of hot and spicy plants and plant products such as pepper, ginger, chillies etc.
30. In an insilico bioinformatics experiment, the binding of a ligand to its target enzyme was predicted to inhibit its activity. In the actual empirical experiment, the activity of the enzyme was observed to be inversely proportional to the relative concentrations of the ligand and the substrate in the reaction mix. Which among the following could be the most probable reason(s)?
- The ligand is an allosteric inhibitor.
  - The ligand is a competitive inhibitor.
  - The ligand is an uncompetitive inhibitor.
  - The ligand is a mimetic of the actual substrate and is not destroyed by the target.
- 1 only
  - 2 only
  - 1 and 3 only
  - 2 and 4 only

31. Select the group of organisms belonging to the same phylum
- Sea pen, Sea fan, Sea anemone
  - Jelly fish, Gold fish, Silver fish
  - Sea mouse, Sea urchin, Sea lemon
  - Devil fish, Cray fish, Star fish
32. Which among the following is/are true with respect to Jacob and Monod's experiment?
- Statement 1: The hypothesis that was tested was 'The control of expression of enzyme in cells is a result of regulation of transcription of DNA sequences'.
- Statement 2: They worked on the lac operon system.
- Statement 3: It was Monod who later predicted the existence of mRNA molecules as a link between DNA and proteins.
- Statement 1 is true while statement 2 and 3 are false.
  - Statement 1 is false while statement 2 and 3 are true.
  - All three statements are true.
  - All three statements are false.
33. Sea anemone is
- Diploblastic and radially symmetrical
  - Triploblastic and radially symmetrical
  - Diploblastic and bilaterally symmetrical
  - Triploblastic and bilaterally symmetrical
34. The following are diseases caused by autoimmune reactions. Identify the option in which all the matches are correct.
- (1). Myasthenia gravis – Myelin sheath; (2). Grave's disease – TSH receptor; (3). SLE – dsDNA; (4). Multiple sclerosis - Acetylcholine receptors;
  - (1). Addison's disease – Adrenal cells; (2). Goodpasture syndrome – TSH receptor; (3). Grave's disease – Basement membrane; (4). Rheumatic fever – Cardiac valves.
  - (1). Hashimoto's disease – Thyroid; (2). Rheumatoid arthritis – Collagen; (3). Myasthenia gravis – Myelin sheath; (4). SLE – RBCs.
  - (1). Myasthenia gravis – Acetylcholine receptors; (2). Grave's disease – TSH receptor; (3). SLE – dsDNA; (4). Addison's disease – Adrenal cells.
35. With respect to the human eye,
- Myopia is a condition in which the rays focused by the lens of the eye fall short of the retina.
  - Myopia is a condition in which the rays focused by the lens of the eye fall beyond the retina.
  - Nictalopia is a condition in which regeneration of rhodopsin is impaired.
- Statements 2 and 3 are correct while statement 1 is wrong.
  - Statement 1 alone is correct while statements 2 and 3 are wrong.
  - Statements 1 and 3 are correct while statement 2 is wrong.
  - Statement 2 alone is correct while statements 1 and 3 are wrong.

36. Platyhelminthes are best described as  
 A) Flat worms, triploblastic and acoelomate animals  
 B) Round worms, diploblastic and acoelomate animals  
 C) Round worms, triploblastic and coelomate animals  
 D) Flatworms, diploblastic and acoelomate animals

37. Schwann cells are  
 A) Myeloid cells  
 B) Glial cells  
 C) Neuronal cells  
 D) Astroglia

38. Match the following

1. Limbless reptile	a. Lamprey
2. Jawless vertebrate	b. Salamander
3. Limbless amphibian	c. Anguis
4. Tailed amphibian	d. Ichthyophis
5. Egg laying mammal	e. Ornithorhynchus

- A) 1-b, 2-a, 3-d, 4-e, 5-c  
 B) 1-d, 2-a, 3-b, 4-e, 5-c  
 C) 1-a, 2-d, 3-c, 4-b, 5-e  
 D) 1-c, 2-a, 3-d, 4-b, 5-e
39. An example for an inherited disease involving defective nucleotide excision repair mechanism is  
 A) Huntington's chorea  
 B) Breast cancer  
 C) Abelson's leukaemia  
 D) Xeroderma pigmentosum
40. Founder Effect is an example of  
 A) Genetic drift seen in an isolated population.  
 B) Occurrence of new genes in the general population.  
 C) Occurrence of mutations in the general population.  
 D) Introduction of new genes by migration between populations.
41. Which of the following combination of chemicals was used in Miller's experiment?  
 A) Methane, Oxygen, Ammonia and Water vapour  
 B) Nitrogen, Hydrogen, Ammonia and Water vapour  
 C) Hydrogen, CO<sub>2</sub>, Ammonia and Oxygen  
 D) Methane, Hydrogen, Ammonia and Water vapour
42. The frequency of expression of an allele in a population is called  
 A) Allelomorph  
 B) Phenotypic ratio  
 C) Genotypic ratio  
 D) Penetrance
43. The limit to which the number of times a normal cell can be induced to divide in vitro is  
 A) Ame's limit  
 B) Limit of totipotency  
 C) Hayflick limit  
 D) LD 100

44. The phenomenon in which a single gene influences multiple traits is termed  
 A) Multigene effect                      B) Polyploidy  
 C) Pleotropy                                D) Polycistronic
45. Which among the following is a characteristic feature of the zika virus?  
 1. Antibodies from an infected mother cross the placenta and cause microcephaly  
 2. It crosses the placenta and causes microcephaly in the foetus.  
 3. It is a single stranded flavivirus transmitted by the Aedes mosquito.  
 4. It is a retrovirus transmitted by Aedes mosquitoes.
- A) 1 and 4 only                              B) 2 and 3 only  
 C) 1 and 3 only                              D) 2 and 4 only
46. Energy flow in an ecosystem is  
 A) Unidirectional                          B) Bidirectional  
 C) Multidirectional                        D) Semidirectional
47. The concept of ecological pyramid was coined by  
 A) AG Tansely                                B) EP Odum  
 C) Charles Eaton                          D) Balinsky
48. The type of population change with a sudden exponential increase followed by a sudden decline is known as  
 A) Ecesis                                        B) Eruptive  
 C) Irruptive                                    D) Disruptive
49. Organisms having the potential for interbreeding and producing fertile offspring belong to a:  
 A) Population    B) Genus            C) Species        D) Family
50. Minamata disease is caused by  
 A) Mercury        B) Lead            C) Titanium        D) Arsenic
51. In biotechnology the process of transforming a bacterial cell, the rupture and re-sealing of the plasma membrane is facilitated by  
 A) Manipulating the concentration of NaCl in the transforming medium.  
 B) Manipulating the concentration of ZnCl<sub>2</sub> in the transforming medium.  
 C) Manipulating the concentration of CaCl<sub>2</sub> in the transforming medium.  
 D) By providing lactose in the medium to induce the lac operon.
52. World Environment Day is celebrated on  
 A) 5<sup>th</sup> June        B) 15<sup>th</sup> June        C) 5<sup>th</sup> January    D) 5<sup>th</sup> July



53. Which among the following is true for (1) super antigens and (2) bystander effect?
- A) Super antigens bind irreversibly to specific T cells and cause anergy, while bystander effect is caused by non-specific attachment of antigens to any cell making it susceptible to auto-immune responses.
  - B) Presence of super antigens causes depletion of T cells in the bone marrow, while bystander effect is caused by non-specific attachment of antigens to any cell making it susceptible to auto-immune responses.
  - C) Antigens that cause bystander effect bind irreversibly to T and B cells and cause anergy, while super antigens bind to any cell making it susceptible to auto-immune responses.
  - D) Super antigens are those which are capable of provoking a high level of immune response while bystander effect is a consequence of viruses infecting non-target cells.
54. The fish that is asphyxiated if prevented from gulping air is
- A) *Harpadon nehereus*                      B) *Scoliodon*
  - C) *Anabas testudineus*                      D) *Glyphis gangeticus*
55. Which animal is the symbol of WWF?
- A) Zebra                      B) Giant Panda      C) Red Panda      D) Opossum
56. In Pavlov's experiment,
- A) The bell is the conditioned stimulus, salivation is the conditioned reflex, the meat is an unconditional stimulus and the salivation to meat is an unconditional reflex.
  - B) The bell is the unconditioned stimulus, salivation is the unconditioned reflex, the meat is a conditional stimulus and the salivation to meat is a conditional reflex.
  - C) The meat is the conditioned stimulus, salivation is the conditioned reflex, the bell is an unconditional stimulus and the salivation to meat is an unconditional reflex.
  - D) The bell and the meat are the conditioned stimuli and salivation is the conditioned reflex.
57. Which among the following is correct?
- A) The Lineweaver-Burke plot deals with enzyme kinetics, the Ramachandran plot deals with protein- ligand affinity and the Scatchard plot deals with protein structure.
  - B) The Lineweaver-Burke plot deals with enzyme kinetics, the Ramachandran plot deals with protein structure and the Scatchard plot deals with affinity of a ligand to its receptor.
  - C) The Lineweaver-Burke plot deals with affinity of a ligand to its receptor, the Ramachandran plot deals with protein structure and the Scatchard plot deals with enzyme kinetics.
  - D) The Lineweaver-Burke plot deals with enzyme kinetics, the Ramachandran plot deals with linear equations and the Scatchard plot deals with affinity of a ligand with its receptor.



65. Which among the following is correct?
- 'NCBI' stands for National Centre for Bio Informatics, situated at New Delhi
  - 'NCBI' stands for National Centre for Biotechnology Information, situated at New Delhi.
  - 'NCBI' stands for National Centre for Bio Informatics, situated in the USA.
  - 'NCBI' stands for National Centre for Biotechnology Information, in the USA.
66. Lipinski's rule of five deals with
- Criteria for the insilico selection of potential drug candidates.
  - Criteria for the computational prediction of structure of proteins.
  - Rules for the submission of nucleotide sequence to the GEN bank.
  - Law of limitations.
67. The evolution of the genetic code has been described as a 'frozen accident' by
- Hargobind Khorana.
  - James Watson.
  - Francis Crick.
  - James Watson, Francis Crick and Maurice Wilkins
68. Antisense RNA is an example of
- Regulation of gene expression by viruses.
  - Post translational gene regulation.
  - Post transcriptional gene regulation.
  - All of the above.
69. Which among the following is/are characteristic feature(s) of apoptosis?
- Disintegration of mitochondria.
  - Disruption of plasma membrane.
  - Expression of p53 genes.
  - Expression of constitutively active Ras protein.
- 3 only
  - 1, 2, 3 and 4
  - 1, 2, and 3 only
  - 3 and 4 only
70. The role of NaCl in oral rehydration solution is to
- Maintain isotonic conditions in the intestine as well as in the blood.
  - Enable the absorption of glucose across the intestinal membrane.
  - Suppress the Na<sup>+</sup>/K<sup>+</sup> ATPase enzyme so that the entry of glucose into the intestinal cells is facilitated.
  - Form the sodium salt of glucose so that the entry of glucose into the intestinal cells is enhanced.
71. Which among the following is applicable to cessation of mitotic cell division?
- Activation of cyclin dependent kinases
  - Deactivation of cyclin dependent kinases.
  - Mutations in p53.
- 1 only
  - 2 and 3 only
  - 2 only
  - 3 only

72. The poriferan that harbours a pair of crustaceans throughout its lifetime in its spongocoel is  
 A) Clathrina B) Euplectella  
 C) Cliona D) Spongilla
73. Which among the following is true?  
 A) In Obelia, the sedentary colonial asexual polypoid and the mobile sexual polypoid are diploid.  
 B) In Obelia, the sedentary asexual colonial polypoid is diploid while the mobile sexual polypoid is haploid.  
 C) In Obelia, the sedentary asexual colonial polypoid is haploid while the mobile sexual polypoid is diploid.  
 D) In Obelia, the sedentary colonial sexual polypoid and the mobile asexual polypoid are diploid.
74. Which of the following compounds are classified as lipids?  
 (1) Polysaccharides (2) Triglycerides (3) Steroids (4) Enzymes (5) Eicosanoids  
 A) 1, 2, 3 & 4 only B) 2, 3, 4 & 5 only  
 C) 2, 3 & 5 only D) 1, 4 & 5 only
75. The segmentation of the body of Taenia is  
 A) Incomplete B) Complete  
 C) Metameric D) Pseudometameric
76. In synaptic transmission, neurotransmitters are removed from the synaptic cleft by  
 (1) Axonal transport (2) Diffusion away from the cleft  
 (3) Neurosecretory cells (4) Enzymatic breakdown (5) Cellular uptake  
*Choose the correct answer*  
 A) 2, 4 & 5 only B) 1, 2 & 3 only  
 C) 1, 3 & 5 only D) 2, 3 & 4 only
77. Identify the correct matches.  
 1. Alima r. Penaeus  
 2. Mysis s. Pentacrinoid  
 3. Doliolaria t. Squilla  
 4. Osphradium u. Molluscan eye  
 v. Chemoreceptor  
 A) 1 – t; 2 – r; 3 – s; 4 – u B) 1 – t; 2 – r; 3 – s; 4 – v  
 C) 1 – s; 2 – r; 3 – t; 4 – v D) 1 – u; 2 – t; 3 – r; 4 – v
78. The correct sequence of arrangement (proximal to distal) of the ambulatory leg in insect is  
 A) Coxa, femur, trochanter, tibia, pre-tarsus, tarsus, and arolium.  
 B) Arolium, pre-tarsus, tarsus, tibia, femur, trochanter, and coxa.  
 C) Coxa, trochanter, femur, tibia, pre-tarsus, tarsus, and arolium.  
 D) Coxa, trochanter, femur, tibia, tarsus, pre-tarsus and arolium.

79. All the following are secreted as proenzymes except
- |            |                 |
|------------|-----------------|
| A) Trypsin | B) Pepsin       |
| C) Amylase | D) Chymotrypsin |
80. According to Konrad Lorenz, which among the following is/are allied to ethological imprinting?
1. Imprinting has to occur in the brief sensitive period after birth.
  2. The major stimulus is visual, followed by auditory signals.
  3. Failure of hand reared or captive animals to adapt to the wild is partly due to aberrant imprinting.
  4. Imprinting is a part of habituation process.
- |                    |               |
|--------------------|---------------|
| A) 1, 2, 3 & 4     | B) 1 & 2 only |
| C) 1, 2 and 3 only | D) 4 only     |
81. The first genetically modified organism to be granted a patent was the ‘Super bug’. It was modified from
- |                              |                                   |
|------------------------------|-----------------------------------|
| A) <i>Escherichia coli</i>   | B) <i>Acetobacter xylinium</i>    |
| C) <i>Pseudomonas putida</i> | D) <i>Rhizobium leguminosarum</i> |
82. In the development of the teeth,
- A) The enamel is derived from the ectoderm while the rest of the tooth from the mesenchyme.
  - B) The enamel is derived from the underlying bone while the pulp and associated structures are formed from the marrow.
  - C) The enamel is derived from the mesenchyme while the rest of the tooth from the ectoderm.
  - D) The dentine is derived from the underlying bone while the enamel and associated structures are formed from the mesoderm.
83. In human kidney, podocytes are present in
- A) Proximal convoluted tubule
  - B) Distal convoluted tubule
  - C) Collecting tubule
  - D) Bowman’s capsule
84. Classification based on quantitative analysis of physical traits and evolutionary relationships is
- |                             |                             |
|-----------------------------|-----------------------------|
| A) Numerical classification | B) Molecular classification |
| C) Cladistics               | D) Phylogenetics            |

85. Pick out the most correct statement with regard to the control of the level of glucose in the blood
- A) Insulin is produced by the alpha cells of the islets of Langerhans, while glucagon is suppressed by the alpha cells.
  - B) Insulin boosts the absorption and catabolism of glucose in RBCs while it elevates the absorption and conversion of glucose to glycogen in hepatocytes.
  - C) Insulin is produced by the crypts of Lieburkin present in the pancreas in response to abnormal levels of glucose in the blood.
  - D) Glucagon secreted from the crypts of Lieburkin and insulin produced by the islets of Langerhans work antagonistically to regulate glucose levels.
86. For glycogenesis, glucose should be converted to
- A) Glucuronic acid
  - B) Pyruvic acid
  - C) UDP glucose
  - D) Sorbitol
87. The human placenta is recognized as:
- A) Haemochorial ; monodiscoidal; deciduous and with interstitial implantation
  - B) Epitheliochorial; non-deciduous; monodiscoidal; cotylydonary, with superficial implantation.
  - C) Haemochorial; contradeciduous; Monodiscoidal; zonary; with eccentric implantation.
  - D) Endotheliochorial; non-deciduous; diffuse; with superficial implantation.
88. Dietary fats after absorption appear in the circulation as
- A) HDL
  - B) VLDL
  - C) LDL
  - D) Chylomicron
89. A high-powered microscope that produces an image from scattered secondary electrons
- A) Immunofluorescence microscope.
  - B) Bright-field light microscope.
  - C) Transmission electron microscope.
  - D) Scanning electron microscope.
90. The synsacrum as seen in birds and is formed by the fusion of
- A) All lumbar vertebrae, all sacral vertebrae and a few caudal vertebrae.
  - B) All sacral vertebrae and a few caudal vertebrae.
  - C) Sacral vertebrae.
  - D) The last thoracic vertebra, all lumbar vertebrae, all sacral vertebrae and a few caudal vertebrae.
91. The limitations of the Beer-Lambert's law tends to make the OD vs concentration graph
- A) Sigmoidal
  - B) Straight line
  - C) Curvilinear
  - D) Bimodal

92. The occurrence of 'chaakara' (mud bank) in the coasts of Alleppey in Kerala is favoured by
- The phenomenon of upwelling and the layout of the continental shelf.
  - Enhanced and copious flow of water into the estuarine area due to the S.W. monsoon, attracting the marine organisms.
  - Rough seas during the monsoons causing ecological changes that bring the organisms to the sea shore.
  - Organisms moving into the continental shelf and littoral zones for breeding.
93. Tight junctions between the cells of the intestinal tissue ensures that
- Glucose enters the blood stream across the cell membrane of the intestinal cells and lipids enter through the inter-cellular spaces.
  - Lipids enter the blood stream across the cell membrane of the intestinal cells and glucose enters through the inter-cellular spaces.
  - Both glucose and lipids enter the blood stream across the cell membrane.
  - Entry of glucose into the cells even if the glut transporter system fails.
94. In what form does the product of glycolysis enter the TCA cycle?
- Pyruvate
  - Pyruvic acid
  - Acetyl Co A
  - Acetate
95. Coelomates that develop with the blastopore becoming the mouth are called
- Protostomes
  - Deuterostomes
  - Microstomes
  - Blastostomes.
96. The site from where the oldest australopithecines, paranthropoids, and early humans have been recovered is
- Shaanxi in China.
  - Olduvai Gorge in East Africa.
  - Swartkrans cave in South Africa.
  - Java in South-East Asia.
97. The expression of the agouti gene is an example of
- Epigenetic influence on gene expression.
  - Post-translational modifications of proteins.
  - Transposable genes.
  - Post transcriptional regulation of gene expression.
98. Match the following

1	Trisomy 13	a	Edward syndrome
2	Trisomy 18	b	Down's syndrome
3	Trisomy 21	c	Cat eye syndrome
4	Trisomy 22	d	Patau syndrome

- 1-d, 2-a, 3-b, 4-c
- 1-d, 2-c, 3-a, 4-b
- 1-b, 2-c, 3-d, 4-a
- 1-b, 2-d, 3-a, 4-c

99. Statement 1. Microsatellites are those extensions seen at the extreme ends of chromosomes.  
Statement 2. Microsatellites are those bands of DNA seen when chromosomal DNA is resolved by ultra centrifugation.
- A) Statement 1 is correct while statement 2 is wrong.  
B) Statement 1 is wrong while statement 2 is correct.  
C) Both statements are wrong.  
D) Both statements are correct.
100. The genetically modified fish that was patented and trademarked was engineered from
- A) *Poecilia reticulata*                      B) *Puntius denisoni*  
C) *Carassius auratus*                      D) *Danio rerio*
101. Which among the following are suited for raft culture?
- A) *Pinctada fucata*                      B) *Ostrea edulis*  
C) *Perna viridis*                      D) *Chanos chanos*
102. A cross between F<sub>1</sub> hybrid and a recessive parent gives the ratio of
- A) 3:1                      B) 2:1                      C) 1:1                      D) 4:1
103. Assertion: In bioinformatics, a curated database is one in which the submissions are evaluated by experts before making them available in the public domain.  
Condition: Submission to a curated database requires empirical authentication.
- A) Both assertion and the condition are correct and the condition supplements the assertion.  
B) The assertion is correct but the condition does not supplement the assertion.  
C) Both assertion and the condition given are incorrect.  
D) All bioinformatics databases are curated and hence the assertion and the condition are not sustainable.
104. The origin of bioinformatics as a science began with the efforts of a mathematician who consolidated the sequence data of proteins available at that time and used a computer network to make it available to interested users. The name of that person, the network and the protein resource are respectively:
- A) Richard Stallman, INTERNET and GEN bank  
B) Margaret Dayhoff, NCBI and SWISS-PROT  
C) Paul Hebert, COBOL and EMBL  
D) Margaret Dayhoff, ARPANET and Protein Information Resource
105. When a virus enters a cell but does not replicate immediately, the situation is called
- A) lysogeny                      B) fermentation  
C) symbiosis                      D) synergism



106. Statement 1. Utilisation of lactose which is present in the medium by *E. coli* in the absence of glucose is an example of enzyme induction.  
Statement 2. Utilisation of tryptophan which is present in the medium by *E. coli* provides an example of enzyme suppression.
- A) Both statements are true.  
B) Statement 1 is true but statement 2 is false because utilisation of tryptophan induces the genes for tryp operon system.  
C) Both statements are false because *E. coli* cannot utilise lactose or tryptophan.  
D) Statement 1 is false because bacteria that utilise lactose are *Lactobacillus* species and not *E. coli*; but statement 2 is true.
107. The vectors that transmit 1). *Wuchereria bancroftii* is -----; 2). leishmaniasis is -----; and 3). Dengue fever is -----.
- A) 1). *Culex quinquefasciatus*. 2). *Glossina palpalis* and 3). *Armigeres subaltus*.  
B) 1). *Culex quinquefasciatus*, 2). *Tabanus eggeri*, and 3). *Anopheles stephensi*.  
C) 1). *Culex quinquefasciatus*, 2). *Phlebotomus papatasi* and 3). *Aedes aegypti*.  
D) 1). *Aedes aegypti*, 2). *Tabanus eggeri*, and 3). *Xenopsylla cheopis*.
108. A successful treatment for SCID syndrome by gene therapy involved the correction of the defects in the
- A) Adenosine de-aminase gene involving the salvage of nucleotides.  
B) Ornithine tricarboxylic acid gene involving the metabolism of nucleotides.  
C) Purine metabolism that results in the formation of uric acid crystals and gout.  
D) None of the above because SCID is a disease of the immune system and is not affected genes for nucleotide metabolism.
109. An example(s) for a sexually transmitted bacterial disease is  
1. Chlamydia      2. AIDS      3. Treponema      4. Yersinia
- A) 1, 2, 3 and 4                      B) 2 only  
C) 1, 3 and 4 only                    D) 1 and 3 only
110. Which membrane protein is *incorrectly* matched with its function?
- |   |                  |                                     |
|---|------------------|-------------------------------------|
| 1 | Receptor         | recognition of specific molecules   |
| 2 | Carrier proteins | allow cells to recognize each other |
| 3 | Ion channels     | allow passage of specific ions      |
| 4 | Enzymes          | catalyze the cellular functions     |
- A) 1                      B) 2                      C) 3                      D) 4

111. The theory of Pangenesis
- Was put forward by Darwin and suggested that a miniature homunculus resides in the sperm or eggs.
  - Was put forward by Swammerdam and Malpighi who suggested that a miniature 'homunculus' resides in the sperm or eggs.
  - Was put forward by Darwin and suggested that gemmules from all parts of the body collect in the gonads to form gametes.
  - Was put forward by Aristotle who suggested that females release an inert fluid to which life is given by the 'vitalising' fluid from the male.
112. The amphibian discovered in the Western Ghats and considered to be a biological proof showing that Sri Lanka was once part of the Indian subcontinent is
- Rana (Euphlyctis) hexadactyla*
  - Bufo* sp
  - Nasikabatrachus* sp
  - Rhacophorus malabaricus*
113. The different types of gametes produced by an organism with genotype Qq, Rr and Tt is
- 7
  - 8
  - 9
  - 16
114. In the experiments as designed by Craig Mello and Andrew Fire, crossing of red flowering petunias and white flowering petunias produced mottled flowers with red and white spots. This is a result of
- Post-transcriptional regulation of gene expression.
  - RNA interference.
  - Co-dominance.
- 1 only
  - 2 only
  - 1 and 2 only
  - 3 only
115. The scientific name of the great Indian hornbill is
- Ardeotis nigriceps*
  - Bos indicus*
  - Buceros bicornis*
  - Oryx capensis*
116. Choose the correct order of procedures in DNA profiling
- DNA isolation → PCR amplification → restriction digestion → electrophoresis → southern blotting → autoradiography → DNA pattern analysis
  - DNA isolation → restriction digestion → PCR amplification → electrophoresis → southern blotting → autoradiography → DNA pattern analysis
  - DNA isolation → restriction digestion → PCR amplification → autoradiography → southern blotting → electrophoresis → DNA pattern analysis
  - DNA isolation → restriction digestion → southern blotting → electrophoresis → PCR amplification → autoradiography → DNA pattern analysis

117. The DNA sequence of choice opted by COBOL for molecular classification of eukaryote animals is
- A) Cyclooxygenase                      B) Cytochrome oxidase  
C) 16s RNA                                D) X chromosome
118. Which among the following is/are true when prokaryotes and eukaryotes are considered?
1. Single origin of replication in prokaryotes as opposed to multiple origins in eukaryotes.
  2. In prokaryotes since there is no mitochondria, energy production is dependent solely on fermentation pathways.
  3. Fermentation pathways for energy production is seen in prokaryotes while it is absent in eukaryotes.
  4. In prokaryotes, translation starts simultaneously with transcription, while in eukaryotes translation is preceded by RNA processing.
- A) 1, 2 and 3 only                      B) 2, 3 and 4 only  
C) 1 and 4 only                         D) 1, 2, 3 and 4.
119. In an attempt to distinguish and classify two species under the same genus, a researcher carried out a PCR and obtained two identical amplified bands. Which among the following should he choose to further distinguish the two species using the two identical bands?
- A) RT-PCR                                B) RFLP  
C) ELISA                                  D) Western blot analysis
120. In a suspected case of food adulteration, forensic analysis revealed the presence of a large number of nucleated RBCs in a sample of mutton. The adulteration could have been done with meat from
- A) Dogs                      B) Buffalo                      C) Cow                      D) Camel

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