1. Intermediate host of *Leishmania* is
   A) *Phlebotomus* (sandfly)  
   B) Tse-tse fly  
   C) Mosquito  
   D) House fly

2. Cercaria is seen in the life cycle of
   A) *Taenia soloum*  
   B) *Fasciola hepatica*  
   C) *Ascaris lumbricoides*  
   D) *Enterobius vermicularis*

3. The disease 'Kala azar' is caused by
   A) *Entamoeba histolytica*  
   B) *Trypanosoma gambiense*  
   C) *Leishmania donovani*  
   D) *Plasmodium vivax*

4. Type of coelom seen in ascaris is
   A) Schizocoel  
   B) Acoelom  
   C) Pseudocoel  
   D) Enterocoel

5. The infective stage of *Entamoeba histolytica* is
   A) Mature cyst  
   B) Trophic form  
   C) Sporozoite  
   D) Minuta form

6. In urochordatates respiration occurs through
   A) Test and gill slits  
   B) Test  
   C) Gell slits  
   D) Branchial tasket

7. Melanocytes are located in?
   A) Stratum corneum  
   B) Stratum germinativum  
   C) Stratum lucidum  
   D) Dermis

8. The rearing of single species of fish is called
   A) Monosex culture  
   B) Mono culture  
   C) Poly culture  
   D) Integrated fish culture

9. Consider the following stages
   i) zygote  
   ii) Ookinete  
   iii) Oocyst  
   iv) Sporozoite
   In the life history of malarial parasite, the correct sequence of these stages in the mosquito host is
   A) ii, i, iii, iv  
   B) i, iii, iv, ii  
   C) i, ii, iii, iv  
   D) ii, i, iv, iii

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10. The sites of first, second and third moulting of *Ascaris* larva are
   A) Soil, lungs and intestine  
   B) Soil, stomach and lungs  
   C) liver, stomach and intestine  
   D) lungs, liver and intestine

11. In which one of the following groups of animals do protonephridia function as excretory organs?
   A) Liver fluke, Amphioxus, *Taenia*  
   B) Liver fluke, *Ascaris*, Amphioxus  
   C) *Ascaris*, Nereis, Amphioxus  
   D) Amphioxus, nereis, *Pheretima*

12. Which one of the following is true for Balanoglossus? The development is
   A) direct with holoblastic cleavage  
   B) direct with meroblastic cleavage  
   C) Indirect with holoblastic cleavage  
   D) indirect with meroblastic cleavage

13. In krebs cycle, the following reaction are involved in the production of 15 ATP molecules by oxidation of food stuffs
   1. Oxidation of pyruvic acid to acetyl co-A  
   2. Oxidation of alpha-ketogulutaric acid  
   3. Oxidation of isocitrate  
   4. Oxidation of malate  
   5. Oxidation of succinate  
   6. Conversion of succinyl coenzyme-A to succinic acid
   The correct sequence of these reaction is:
   A) 1, 2, 4, 3, 5, 6  
   B) 1, 4, 3, 2, 5, 6  
   C) 1, 3, 2, 6, 5, 4  
   D) 1, 2, 4, 5, 3, 6

14. Which one of the following is a non-essential amino acid in the case of human beings?
   A) serine  
   B) histidine  
   C) Leucine  
   D) Arginine

15. Gaucher’s disease is associated with
   A) Abnormal protein metabolism  
   B) Abnormal carbohydrate metabolism  
   C) Abnormal fat metabolism  
   D) Malnutrition

16. Which enzymes bring about cleavage of specific covalent bonds and removal of groups without hydrolysis?
   A) Lyases  
   B) Ligases  
   C) Hydrolases  
   D) Transferases
17. Which of these inactivates an enzyme by changing enzyme shape?
A) Allosteric inhibitor  B) Competitive inhibitor
C) Irreversible inhibitor  D) Multienzyme complex

18. Which reference to enzymes, which one of the following statements is true?
A) Apoenzyme = Holoenzyme + Coenzyme
B) Holoenzyme = Apoenzyme + Coenzyme
C) Coenzyme = Apoenzyme + Holoenzyme
D) Holoenzyme = Coenzyme - Apoenzyme

19. A protein is a sequence of amino acid, in which first and last amino acids are called respectively
A) N-terminal and C-terminal amino acids
B) C-terminal and N-terminal amino acids
C) α and β-amino acids
D) β and α-amino acids

20. Which one of the following reactions is an example of oxidative decarboxylation?
A) Conversion of succinate to fumarate
B) Conversion of fumarate to malate
C) Conversion of pyruvate to acetyl CoA
D) Conversion of citrate to isocitrate

21. Which of the following is connecting link between glycolysis and kreb’s cycle?
A) Pyruvic acid  B) Isocitric acid
C) Acetyl Co-A  D) Phosphoglyceric acid

22. Redox potential is
A) Oxidation  B) Reduction
C) Both A and B  D) None of these

23. Which of the following is present in cytochromes?
A) Mo  B) Co
C) Cu  D) Mn

24. Data that possess numerical properties are known as
A) Qualitative Data  B) Statistical Data
C) Quantitative Data  D) Collection of Data
Dedicated Hard work! Sure Success!

SURYA TRB COACHING CENTRE
MADurai (a place.. You try to achieve)
(Exclusively for ZOOLOGY)

Contact: 8124602428, 9443564713, 7598302428, 8124825759

Over the years, UG, PG students from all over Tamil Nadu have chosen our coaching in Madurai (Exclusively for ZOOLOGY).

12 UG students from our Coaching Centre cleared the TRB exam in 2012 out of which 3 were Notified as 1st Rank Selected (State 1\textsuperscript{st}, 2\textsuperscript{nd}) - out of 7 Posts.
2012 had 61 students clear the TRB exam, 35 students being selected for the 1\textsuperscript{st}, 4\textsuperscript{th} and 7\textsuperscript{th} Rank.
2014 had 35 students clear the TRB exam, 39 students being selected for the 1\textsuperscript{st}, 4\textsuperscript{th} and 7\textsuperscript{th} Rank.
2015 had 39 students clear the TRB exam, 39 students being selected for the 1\textsuperscript{st}, 4\textsuperscript{th} and 7\textsuperscript{th} Rank.
2016 had 39 students clear the TRB exam, 39 students being selected for the 1\textsuperscript{st}, 4\textsuperscript{th} and 7\textsuperscript{th} Rank.

2017 PG Zoology coaching result: 180 students, 71 students selected (39.4\%)
GT = 31, BC = 17, MBC =11, SC = 10, SCA = 2

State Level Rank Achievement

State Rank II to X = 31 candidates
(State II Rank = 3, State III = 2, State IV = 1, State V = 3, State VI = 2,
State VII = 7, State VIII = 4, State IX = 4, State X = 5)

District First - 13 Candidates
Tirunelveli, Thoothukudi, Ramnad, Sivagangai, Virudhunagar, Theni,
Madurai, Dindugal, Tirupur, Erode, Namakkal, Karur, Thanjavur.

District Second - 12 Candidates
Kanyakumari, Thoothukudi, Ramnad, Sivagangai, Virudhunagar, Dindugal,
Tirupur, Salem, Karur, Nagapattinam, Thanjavur, Villupuram.

District Third - 9 Candidates
Tirunelveli, Ramnad, Virudhunagar, Madurai, Coimbatore,
Erode, Trichy, Nagapattinam, Vellore.

(Run by: Surya Educational Trust - Regd. No.: 43/2017)
Contact: 81246 02428, 94435 64713, 75983 02428.

25. Match the following

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) mean</td>
<td>-1) ( \sqrt{\frac{\sum (X-x)^2}{n-1}} )</td>
<td>a) 1 3 4 2</td>
</tr>
<tr>
<td>b) median</td>
<td>- 2) ( \frac{\sum X}{N} )</td>
<td>b) 3 4 1 2</td>
</tr>
<tr>
<td>c) standard Deviation</td>
<td>- 3) ( \frac{SD}{\sqrt{N}} )</td>
<td>c) 2 4 1 3</td>
</tr>
<tr>
<td>d) standard error</td>
<td>- ( \frac{N+1}{2} )th value</td>
<td>d) 4 2 1 3</td>
</tr>
</tbody>
</table>

26. The regression equation of \( x \) on \( y \) is
   A) \( X_C = a + by \)  
   B) \( Y_C = a + bx \)  
   C) \( \sum x = Na + b \sum y \)  
   D) \( \sum xy = \sum y + \sum y^2 \)

27. The mean and mode for the following data (8,9,16,25,4,6,25,3,19,18)
   A) Mean=133, Mode=8.0  
   B) Mean=13.3, Mode=25.0  
   C) Mean=135, Mode=25.0  
   D) Mean=13.5, Mode=25.0

28. The coefficient of correlation-------------
   A) Has no limits  
   B) Is less than 1  
   C) Is more than 1  
   D) Varies from -1 to +1

29. The value can be obtained by the point of intersection of less than and greater than ogive is
   A) mean  
   B) median  
   C) mode  
   D) All of these

30. The formula of standard deviation is
   A) \( \sqrt{\frac{\sum (x-x)^2}{n-1}} \)  
   B) \( \sqrt{\frac{\sum (x-x)^2}{n-1}} \)  
   C) \( \sqrt{\frac{\sum (x-x)^2}{n-1}} \)  
   D) \( \sqrt{\frac{\sum (x-x)^2}{n-1}} \)

31. Contributed to the theory of small samples
   A) William Gosset  
   B) Virchow  
   C) Karl Pearson  
   D) Fisher

32. If the data are classified on the basis of measurement like weight, height, age etc., the type of classification is called as ........ classification
   A) Qualitative  
   B) Quantitative  
   C) Geographical  
   D) Chronological

33. Which one of the following is better suited for positional interval series?
   A) mean  
   B) median  
   C) G.M.  
   D) SD

34. Bar diagrams are one dimensional, because
   A) Width of the bar is important  
   B) Length of the bar is important  
   C) Similar to the histogram  
   D) None of the above
35. In which cell organelle nucleic acid is absent?
   A) Chloroplast  B) Mitochondria  C) Golgi apparatus  D) Ribosome

36. The ribosomes are
   A) Negatively charged  B) Positively charged  C) Amphoteric  D) None of the above

37. Which types of lysosomes contribute to the ageing process?
   A) Primary lysosomes  B) Secondary lysosomes  C) Autophagic vacuoles  D) Residual bodies

38. Carbohydrate mainly found in cell membrane is
   A) Mucopolysaccharide  B) Fucose  C) Sialic acid  D) Both (B) and (C)

39. For structure of nucleic acid, which of the following statements is wrong?
   A) DNA can be single-stranded in some viruses  B) RNA can be double-stranded occasionally
   C) There are as many as 12 bases per turn in Z-DNA  D) The length of one helix is 45Å in B-DNA

40. Purines possess nitrogen at
   A) 1,2,4 and 6 positions  B) 1,3,5 and 7 positions  C) 1,3,7 and 9 positions  D) 1,2,6 and 8 positions

41. In prokaryotes, the process of replication is catalysed by the following enzymes.
   Identify which the enzyme is best coordinate with the role
   A) Helicase  B) DNA polymerase I  C) DNA polymerase II  D) Primase
   - Joins the end of DNA segment  - Synthesises DNA  - Erases primer and fills gaps  - Synthesis RNA primers

42. Meselson and Stahl experiment on semiconservative replication demonstrates that
   A) 50% radioactive, 50% non-radioactive  B) 50% non-radioactive
   C) 50% radioactive  D) None of the above

43. The binding sites of tRNA with mRNA and amino acids are respectively
   A) DHU loop and CCA end  B) CCA end and anticodon loop  C) Anticodon loop and DHU loop  D) anticodon loop and CCA end
44. The precursor of eukaryotic mRNA is
   A) tRNA     B) rRNA
   C) snRNA    D) hnRNA

45. There are seven groups of autosomal chromosomes according to Denver (Colorado) convention, 1960. It is according to size of chromosomes and position of centromere, which group has acrocentric chromosome?
   A) Group B     B) Group D
   C) Group C    D) Group F

46. How many types of gametes are formed from a plant genotypes \( R, Y_y \)?
   A) One     B) Two
   C) Three    D) Four

47. Skin colour in man is an example of
   A) Sex-linked inheritance     B) Multible allelism
   C) Pleiotropy    D) Polygenic inheritance

48. The movement of a gene from one linkage group to another is called
   A) Inversion     B) Duplication
   C) Translocation    D) Crossing over

49. Which one of the following information is essential to determine the genetic map distance between two genes located on the same chromosome?
   A) Length of the chromosome     B) Number of genes present in the particular chromosomes
   C) Number of nucleotides in the particular chromosomes    D) Percentage of crossing over or recombinant frequency between the two genes

50. Post-transcriptional modification in eukaryotes referred to as
   A) Translation     B) Splicing
   C) Sequencing    D) Restriction

51. Rous sarcoma virus contains
   A) DNA     B) RNA
   C) DNA/RNA    D) None of these

52. Retroviruses and reverse transcriptase were discovered by
   A) Sinsheimer     B) Stanley
   C) Termin and Baltimore    D) Enders
53. **Ti-plasmid** are present in
   A) Cymbidium
   C) Agrobacterium
   B) Dendrobium
   D) All of these

54. It shows complete linkage
   A) male culex
   C) Female Drosophila
   B) male drosophila
   D) Neurospora

55. Match the following

   **List - I**
   (Human hereditary condition)
   a) Alkaptonuria
   b) Huntington's chorea
   c) cretinism
   d) Tay-sachs disease

   **List - II**
   (enzyme last or deficient)
   1) β-D-N cetyl hexosaminidase
   2) Gultamine acid decarboxylase
   3) Homogenetic acid oxidase
   4) Iodotyrosine deiodinase

   **Codes**
   a) b) c) d)
   A) 3 4 2 1
   B) 3 2 4 1
   C) 1 4 2 3
   D) 1 2 4 3

56. During transportation of Co2 when bicarbonate ions diffuses from RBC into plasma, the increased hydrogen ion concentration RBC is balanced by the entry of which substance from plasma into
   A) water
   C) Hydroxyl ions
   B) oxygen
   D) Chloride ions

57. The stage of Ornithine cycle at which arginase enzyme is used
   A) Arginine - Ornithine
   B) Ornithine - Urea
   C) Ornithine - Citrulline
   D) Citrulline - Argino succinic acid

58. The cells involved in inflammatory reactions are
   A) Basophils
   C) Eosinophils
   B) Neutrophils
   D) Lymphocytes

59. The process of transmission of nerve impulse in invertebrates is
   A) Chemical
   C) Physico - electrical
   B) Physico - chemical
   D) Physical

60. Gastric digestion is most important for
   A) lipids
   C) carbohydrates
   B) proteins
   D) minerals

61. Which one of the following hormone regulate Na+ concentration in extracellular fluid?
   A) Aldosterone
   C) Epinephrine
   B) Cortisol
   D) Nor-epinephrine
62. Although the cardiac muscle has a myogenic origin, yet its formation and condition by muscle fibres is changed by the action of
   A) nerve       B) SA node
   C) Vagus nerve  D) Neurons

63. CO₂ is transported via blood of lungs mostly.
   A) In the form of carbonic acid only.
   B) As carbamino haemoglobin and as carbonic acid
   C) Dissolved in blood plasma
   D) In combination with haemoglobin only.

64. Muscle of the Urinary bladder is
   A) Smooth muscle  B) Striped muscle
   C) Skeletal muscle D) Cardiac muscle

65. Marine Birds excrete the excess salt through
   A) Salt absorbing cells
   B) Salt secretary cells of gills
   C) Nasal gland
   D) Kidney

66. Glial cells are an example of
   A) Epithelial cells
   B) Muscle cells
   C) Nervous tissue
   D) Connective tissue

67. Mammary glands are modified
   A) Sweat glands
   B) Ceruminous glands
   C) Glands of zeis
   D) Inguinal gland

68. Schwann cell is found around
   A) Axon
   B) Cyton
   C) Dendrite
   D) Dendron

69. Duodenum has characteristic Brunner’s glands which secrete two hormones called
   A) Kinase, estrogen
   B) Secretin, Cholecystokinin
   C) Prolactin, Parathormone
   D) Estradiol, Progesterone

70. The auditory ossicles transmit the sound induced vibrations of the ear drum to the
   A) Perilymph
   B) Endolymph
   C) Aqueous humour
   D) Vitreous humour

71. Blastopore is
   A) The opening of neural tube
   B) Found in blastula
   C) Present at future anterior end of embryo
   D) The external opening of archenteron
72. A tissue of the embryo transmits stimulus to influence another tissue of the embryo to produce a structure. The former is known as

A) producer  B) inductor or organizer
C) promoter  D) none of these

73. Match the following

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>(Type of placenta)</td>
<td>(Example)</td>
<td>a</td>
</tr>
<tr>
<td>a) Epitheliochorial</td>
<td>1) Dog</td>
<td>A)</td>
</tr>
<tr>
<td>b) syndesmochorial</td>
<td>2) platypus</td>
<td>B)</td>
</tr>
<tr>
<td>c) Endotheliochorial</td>
<td>3) Monkey</td>
<td>C)</td>
</tr>
<tr>
<td>d) Homochorial</td>
<td>4) Pig</td>
<td>D)</td>
</tr>
<tr>
<td></td>
<td>5) Deer</td>
<td></td>
</tr>
</tbody>
</table>

74. The major protein involved in ageing is

A) Kenatin  B) elastin  C) collagen  D) actin and myosin

75. Graafian follicles are seen in this part of the ovary

A) Cortex  B) Medulla  C) Hilus  D) Mesovarium

76. When the first maturation division of the primary oocyte is incomplete, it is called

A) Thelytoky  B) Arrhenotoky  C) Restitution  D) Cytokinesis

77. **Henson’s node** in part of the developing embryo of

A) Hen  B) Insect  C) Rabbit  D) Branchiostoma

78. Which of the following cells during gametogenesis is normally diploid?

A) Primary polar body  B) Spermatid  C) Spermatogonia  D) Secondary polar body

79. Natural killer lymphocytes are an example for

A) physical barrier  B) cytokine barrier  C) cellular barrier  D) physiological barrier

80. Glycoprotein 120 of HIV, have affinity with

A) CD4  B) CD8  C) CD45  D) CD24

81. The functional status of an animal is called

A) Sere  B) Community  C) Niche  D) Ecotone

82. Passive immunity is defined as immunity

A) inherited from the parents  B) achieved through vaccination  
C) acquired through first exposure to the disease  D) achieved through the sera of other animals enriched in antibodies

83. Lymphocytes that activate B-cells and T-cells are

A) Helper - T-cells  B) Macrophages  C) cytotoxic T-cells  D) Activator B-cells
84. In warm-humid climate many mammals, birds and insects are darkly coloured than their counter parts living in cool-dry climate. This is an example of
   A) Jordan's rule          B) Bergmann's rule
   C) Allen's rule          D) Gloger's rule

85. A sucker fish attached to the belly of shark gets a free ride and feeds on the left-overs from shark. What is this type of inter-specific animal relationship called?
   A) commensalism          B) Parasitism
   C) protooco operation    D) mutualism

86. Consider the following statements
   1) The ecological pyramid of number is always upright
   2) The ecological pyramid of biomass can be upright or inverted
   Which of the statements given above is / are correct
   A) 1 only              B) 2 only
   C) Both 1 and 2        D) Neither 1 or 2

87. A Primary lymphoid organ responsible for humoral immunity
   A) Thymus              B) Spleen
   C) Lymph node          D) Bursa

88. PALS is found in
   A) Thymus              B) Spleen
   C) Lymph node          D) Bone marrow

89. Di George syndrome is due to
   A) Defective bursa      B) Defective bone morrow
   C) Defective thymus     D) Defective spleen

90. In the case of peppered moth (Biston betularia) the black coloured form became dominant over the light coloured form in England during industrial revolution. This is an example of
   A) Natural selection where by the darker forms were selected
   B) Appearance of the darker coloured individuals due to the very poor sun light
   C) Protective mimicry    
   D) Inheritance of darker colour character acquired due to the darker environment

91. Most species originate by a (an) route
   A) Allopatric           B) Sympatric
   C) Parapatric          D) parametric

92. A Population will not exist in Hardy-Weinberg equilibrium if
   A) Individuals mate selectively
   B) There are no mutations
   C) There is no migration
   D) The population is large

93. Variation in gene frequencies within populations can occur by chance rather then by natural selection. This is referred to
   A) genetic flow         B) genetic drift
   C) random mating        D) genetic load
94. Any body or traces of body, animal or vegetable buried and preserved by natural causes is a
A) Specimen       B) Fossil       C) Fuel       D) None of these

95. Origin of new species and genera is
A) Macro evolution       B) micro evolution
C) Mega evolution       D) co-evolution

96. Regarding the origin of metazoan, Acoela was considered as the most primitive metazoan by
A) Huxley       B) Garstrang       C) Joan Hadzi       D) Bather

97. Mark the incorrect matching
A) Homologous organs - Divergent evolution
B) Analogous organs - Convergent evolution
C) Adaptive convergence - Parallel evolution
D) Homoplastic organs - Homologous organs

98. The first organic compound on primitive earth was
A) Fatty cid and amino acids       B) Glucose and glycine
C) Proteins and nucleic acids       D) only carbohydrates

99. Hot spots occur in
A) Tamil Nadu and Andhra Pradesh       B) Western Ghats and Eastern Himalayas
C) Uttar Pradesh and Bihar       D) Madhya Pradesh and Orissa

100. Floating national park is situated in the state
A) Tamil Nadu       B) Kerala
C) Assam       D) Manipur

101. This is a phenomenon in which animals dormancy to escape from excessive cold during winter
A) Hibernation       B) Encystment
C) Aestivation       D) Diapause

Contact: 81246 02428, 94435 64713, 75983 02428.
102. "Ecotone" is best described as the
A) Transition between two or more diverse communities
B) maximum biomass an ecosystem can support
C) state of equilibrium among various trophic levels in an ecosystem
D) potentiality of an animal to adjust to new circumstances

103. Consider the following protected areas
1) Indravati  2) Melghat  3) Periyar  4) Valmiki
Which of the above are the project tiger reserves in India?
A) 1 and 2  B) 1, 3 and 4  C) 2, 3, and 4  D) 1, 2, 3 and 4

104. Match

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Tetrasomy</td>
<td>1) 2n-2</td>
<td>A) 3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>b) Trisomy</td>
<td>2) 2n + 1</td>
<td>B) 4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c) Nullisomy</td>
<td>3) 2n + 2</td>
<td>C) 4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>d) Monosomy</td>
<td>4) 2n - 1</td>
<td>D) 2</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

105. An ecosystem comprising of producers, herbivores and carnivores is an incomplete ecosystem if it does not include
A) Top Carnivores  B) decomposers  C) Secondary consumers  D) Secondary and tertiary consumers

106. A renewable resource is
A) Fossil fuel  B) Metals  C) Both A and B  D) Sunlight

107. A living connecting link which provides evidences for organic evolution is
A) Sphenodon between reptile and bird  B) Lung fishes between Pisces and reptile  C) Duck-billed platypus between reptiles and mammals  D) Archaeopteryx between reptile and bird

108. Darwin called sudden changes in organisms as
A) Sport  B) mutation  C) mutagen  D) Games

109. Among the human ancestors the brain size was more than 1000 CC in
A) Homo erectus  B) Homo habilis  C) Homo neanderthalensis  D) Ramapithecus

110. Conservation of forests can be done by
A) Social forestry programme  B) Agro forestry programme  C) Urban forestry programme  D) All of the above.