SOME IMPORTANT INSTRUCTIONS TO THE CANDIDATES

1. Attempt all questions. Each question carries 4 marks. For each correct response the candidate will get 4 marks. There is no negative marking.

2. This booklet contains 2 Sections, Section A and Section B. Section A consists of 50 questions and Section B consists of 150 questions.

3. Use only BLUE / BLACK BALL POINT PEN for darkening the appropriate circle completely.
   For example: ● B C D

4. Rough work is to be done only on the Test Booklet and not on the answer sheet.

5. Make sure that you do not possess any pages (Blank or Printed) of any unauthorized material. If such material is found in your possession during the examination, you will be disqualified for admission.

6. If you are found copying/helping others, you will be disqualified for admission.

7. Candidate found in possession of Cellular Phone/Mobile Phone/Cordless Phone/Communication device/Pager/Scanner whether using or not using will be liable to be debarred for taking examination(s) either permanently or for a specified period or and dealt with as per law or and ordinance of the university according to the nature of offence, or and she/he may be proceeded against and shall be liable for prosecution under the relevant provision of the Indian Penal Code.

8. At the end of the examination hand over the text booklet and answer sheet to the invigilator.

9. Do not leave the examination hall until you are asked to do so.

10. Count the pages of the booklet on receipt. If any defect found in the booklet ask the invigilator to provide a fresh copy.

11. Use of Scientific calculators is not allowed:

12. Only numeric part of roll no. is to be entered in OMR sheet.
SECTION A

1. Snow is accumulating at $f$ feet per minute. How much snow will accumulate in $h$ hours if it continues falling at the same rate?

   (A) $60fh$  
   (B) $Fh$  
   (C) $60f/h$  
   (D) $60h/f$

2. If 9 men need 15 days to complete a task, how many days would it take to complete this task if 3 additional men were employed?

   (A) 4  
   (B) 10  
   (C) $45/4$  
   (D) 12

3. A man works 5 days in a week and binds 35 sets of books each week. If there are 7 books in a set, what is the number of books he binds each day?

   (A) 7  
   (B) 25  
   (C) 35  
   (D) 49

4. If $x + 2y = 4/3$ and $x - y = 1/3$, then $3y =$

   (A) 0  
   (B) $1/3$  
   (C) 1  
   (D) $5/3$

5. Which of the following is greater than $1/4$?

   (A) $(0.25)^3$  
   (B) $0.04$  
   (C) $(1/4)^{0.5}$  
   (D) $1/250$

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6. City X is 200 miles east of city Y and city Z is 150 miles directly north of city Y. What is the shortest distance in miles between X and Z?

   (A) 175  (B) 200
   (C) 250  (D) 300

7. The ratio of boys to girls in a class is a:b. What part of the class is made up of girls?

   (A) b/ab  (B) a/ab
   (C) b/a+b  (D) a/a+b

8. A piece of paper with an area of 60 square inches is divided into 2 pieces so that the area of one is 2/3 the area of the other. What is the area in square inches of one of the pieces?

   (A) 20  (B) 24
   (C) 30  (D) 45

9. A rectangle 1 inches long and w inches wide is made 3 inches longer. The area (in square inches) has increased by:

   (A) 3w  (B) 3l
   (C) 3lw  (D) 3(l+w)

10. If xyz = 260, which of the following cannot be a value of y?

    (A) 0  (B) 2
    (C) 5  (D) 6

11. At c cents per orange what is the price in dollars, for 1 dozen oranges:

    (A) 12c  (B) 12/100c
    (C) 12c/100  (D) c/100
Directions for Q.12–Q.19: In each of the following choose the word or phrase most nearly opposite in meaning to the word in capital letters.

12. AUSPICIOUS
   (A) Holy
   (C) Reoccurrence
   (B) Lamentation
   (D) Evil

13. ABOMINATE
   (A) Hate
   (C) Retreat
   (B) Like
   (D) Accumulate

14. DIMINUTION
   (A) Measurement
   (C) Augmentation
   (B) Proximity
   (D) Orderliness

15. ENIGMA
   (A) Riddle
   (C) Clear
   (B) Puzzle
   (D) Entreat

16. AUTONOMY
   (A) Dependence
   (C) Renown
   (B) Animation
   (D) Altruism

17. ABROGATE
   (A) Transgress
   (C) Alleviate
   (B) Ratify
   (D) Signify
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18. EXACERBATE
   (A) Aggravate  (B) Diminish
   (C) Increase   (D) Generate

19. AMELIORATION
   (A) Prevention  (B) Aggravation
   (C) Distraction (D) Indifference

Directions for Q.20–Q.22: In the following questions which of the following words is closest in meaning to the words in capital letters.

20. SATURNINE
   (A) Cheerful  (B) Gloomy
   (C) Retentive  (D) Restive

21. SCINTILLA
   (A) Least bit  (B) Large group of ships
   (C) Charred paper  (D) Sword

22. RUE
   (A) Regret  (B) Small stream
   (C) Scoundrel  (D) Ransack

Directions for Q.23–Q.26: In each of the following sentences one word or phrase indicated by the dotted line is missing. Choose the best among the four alternatives, the one which completes the meaning of the sentence.

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23. I know that he was incapable of writing anything sensible, but the boss _____ to give him the assignment.

(A) Is forcing me  (B) Had me forced
(C) Had forced me  (D) Has been forcing

24. If _____ the match was to be cancelled.

(A) It will rain  (B) It rains
(C) It is raining  (D) It rained

25. I wish, I _____ a big house where I could entertain my friends.

(A) Should have  (B) Had
(C) Have  (D) Must have

26. Will those of you who have objections to this proposal _____ put up your hands, please?

(A) Discussed  (B) Being discussed
(C) Having discussed  (D) Discussing

Directions for Q.27–Q.29: Choose the word similar in meaning to the underlined word.

27. By his silence, he seemed to Condone their behaviour.

(A) Appreciate  (B) Overlook
(C) Compliment  (D) Complement

28. After he was Cashiered from service in the military, he went into a depression.

(A) Dismissed  (B) Retired
(C) Procured  (D) Retrenched

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29. The book store was Replete with good books.
   
   (A) Filled
   (B) Devoid
   (C) Containing a Small amount
   (D) None of the above

Directions for Q.30–Q.34: From the four pairs of words following the capitalized pair, you are to select the pair, which is related in the same way as the capitalized pair.

30. BOOK : LITERATURE ::
   
   (A) Man : Beast
   (B) Song : Music
   (C) Dancer : Music
   (D) Species : Science

31. FINGER : HAND ::
   
   (A) Match : Fire
   (B) Spoke : Wheel
   (C) Nail : Scissors
   (D) State : Nations

32. PERFORATE : HOLES ::
   
   (A) Speckle : Spots
   (B) Decorate : Rooms
   (C) Filter : Water
   (D) Repent : Sins

33. INCUBATOR : INFANT ::
   
   (A) Henhouse : Chicken
   (B) Greenhouse : Plant
   (C) Archives : Document
   (D) Cooler : Wine
34. CONTINENT : ISLAND ::
   (A) Ocean : Lake            (B) Isthmus : Peninsula
   (C) Cape : Cove             (D) River : Canal

Directions for Q.35–Q.36: In each of the following sentences one word or phrase indicated by the dotted line is missing. Choose the best among the four alternatives, the one which completes the meaning of sentence.

35. The old man could not remember where he ______ his money.
   (A) Deposits            (B) Is depositing
   (C) Had deposited       (D) Will deposit

36. The food grain production this year is expected to ______ 250 million tons.
   (A) Improve to         (B) Get increased to
   (C) Exceed             (D) Get Decreased to

Directions for Q.37–Q.38: Choose the word farthest in meaning to the capitalized word.

37. STABILITY
   (A) Insidious            (B) Similarly
   (C) Banal                (D) Vicissitude

38. ABSTAIN
   (A) Disparity           (B) Splurge
   (C) Deterrent           (D) Refrain

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Directions for Q.39–Q.42: Each question below consists of a word printed in capital letters, followed by four words. Choose the word that is most nearly OPPOSITE in meaning to the word in capital letters.

39. EXODUS

(A) Depart (B) Prevent
    (C) Begin (D) Entrance

40. PROTRACT

(A) Abbreviate (B) Distract
    (C) Reject (D) Stabilize

41. ABROGATE

(A) Signify (B) Alleviate
    (C) Question (D) Ratify

42. ADMONITION

(A) Premonition (B) Hallucination
    (C) Escape (D) Commendation

43. For which of the following disciplines is Nobel Prize awarded?

(A) Physics & Chemistry
(B) Physiology or Medicine
(C) Literature, Peace & Economics
(D) All of the above

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   (A) Depart                             (B) Prevent
   (C) Begin                              (D) Entrance

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   (A) Signify                           (B) Alleviate
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44. Each year World Red cross and Red Crescent day is celebrated on:
   (A) May 8       (B) May 18
   (C) June 8      (D) June 18

45. Who is the author of the book “My Experiments with Truth”? 
   (A) Mahatma Gandhi       (B) Michael Anderson
   (C) Winston Churchill    (D) James Mowis

46. The “Dronacharya Award” is given to...?
   (A) Sportsmen       (B) Coaches
   (C) Umpires        (D) Sports Editor

47. Who is the English physicist responsible for the “Big Bang Theory”? 
   (A) Albert Einstein     (B) Michael Skube
   (C) George Gamow       (D) Roger Penrose

48. Light year is the unit of:
   (A) Time       (B) Velocity
   (C) Astronomical distance (D) Intensity of light

49. The Lalit Akademi promotes and encourages study and research on:
   (A) Literature
   (B) Music and Dancing
   (C) Drama
   (D) Painting and Sculpture and Architecture
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50. The sky appears blue because of:
   (A) Scattering of light
   (B) Scattering of air
   (C) Scattering of dust particles
   (D) Scattering of water droplets

SECTION B

51. Two deletion mutants labeled P and Q of a virus were co-infected into the same host cell. On lysis wild type virus particles were recovered along with mutants. Which of the following statements are true?
   (A) P and Q have mutation in the same locus
   (B) P and Q have mutations in different loci
   (C) This is not a case of complementation.
   (D) Both (B) & (C)

52. Dosage compensation for X chromosome in Drosophila occurs by:
   (A) Activation of X chromosome in males
   (B) Inactivation of one X chromosome in females
   (C) Decrease of expression by half in females
   (D) None of the above

53. If 10 children in family were typed to have MN blood group, what would be the most probable blood group of the parents?
   (A) Both should be MN only
   (B) Father M and mother N
   (C) Both can be M or N or MN
   (D) Insufficient data to conclude
54. In a cross between two body color flies, 78 brown, 39 black and 40 white flies were obtained. This result indicates that:

(A) Body colour is controlled by two genes
(B) None of the alleles show clear dominance
(C) It is a case of multiple allelism
(D) Brown is dominant over black and white

55. A single stranded DNA molecule is synthesized randomly by incorporating the four nucleotides A, T, G, C. What is the chance that the GGGG and GATC sequence will be synthesised?

(A) $\frac{1}{256}$ & $\frac{1}{256}$
(B) $\frac{1}{4}$ & $\frac{1}{256}$
(C) $\frac{4}{256}$ & $\frac{1}{4}$
(D) None of the above

56. Which of the following statements is true regarding deletions?

1. Centromeres contain no genes, and deletion of it is of little consequence.
2. In heterozygotes, deletions result in unpaired loops during mitosis.
3. Deletion mutations cannot revert to wild-type.
4. Homozygotes and heterozygotes for deletions usually have the same phenotype.

(A) Statement 1
(B) Statement 3
(C) Statement 4
(D) Statement 2
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57. A male and a female fly with long wing and black body were crossed with each other. The following ratio of the phenotype was obtained: 100 (Long wing & Black body), 55 (Long wing & White body), 90 (Short wing & White body), 62 (Short wing & Black body). This indicates that:

(A) Gene for wing length and body colour are on different chromosomes.
(B) Segregation of the two genes is independent of each other.
(C) Segregation of the two genes is not independent of each other.
(D) Segregation of the two genes follows all laws Mendelian inheritance.

58. The inheritance of a dominant disease only through the mother to sons and daughters, suggests:

(A) X Linked inheritance       (B) Complete dominance
(C) Maternal inheritance       (D) Maternal imprinting

59. Which of the following is not aromatic?

(A) Cyclopentadiene       (B) Pyrrole
(C) Thiphene              (D) Furan

60. In which of the following compounds does the methyl group act as a nucleophile?

(A) CH₃Cl             (B) CH₃OH
(C) CH₃NH₂            (D) CH₃MgCl

61. Which of the following statements is not correct?

(A) Mirror image of D-glucose is L-glucose
(B) (+)-glucose and (-) glucose are enantiomers
(C) Mirror image of alpha -D- glucose is beta -D- glucose
(D) Mirror image of alpha -D- glucose is alpha -L- glucose

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62. The decreasing order of acidity of the protons marked x, y, z in
\[ \text{CH}_2\text{COCH}_2\text{COCH}_2\text{CH}_3 \] is:
\[ \begin{align*}
&\text{(A) } y > x > z \\
&\text{(B) } z > x > y \\
&\text{(C) } x > z > y \\
&\text{(D) } y > z > x 
\end{align*} \]

63. The NMR spectrum of an aldehyde shows a quartet at 9.80 ppm. The aldehyde is:
\[ \begin{align*}
&\text{(A) } \text{HCHO} \\
&\text{(B) } (\text{CH}_3)_2\text{CHCHO} \\
&\text{(C) } \text{CH}_2\text{CHO} \\
&\text{(D) } \text{C}_6\text{H}_5\text{CHO} 
\end{align*} \]

64. Which of the following is a non-reducing sugar?
\[ \begin{align*}
&\text{(A) } \text{Alpha D}(+) \text{ glucose} \\
&\text{(B) } \text{Fructose} \\
&\text{(C) } \text{Glyceraldehyde} \\
&\text{(D) } \text{Sucrose} 
\end{align*} \]

65. The enzyme that converts starch into maltose is:
\[ \begin{align*}
&\text{(A) } \text{Zymase} \\
&\text{(B) } \text{Maltase} \\
&\text{(C) } \text{Invertase} \\
&\text{(D) } \text{Amylase} 
\end{align*} \]

66. An example of a water soluble vitamin is:
\[ \begin{align*}
&\text{(A) } \text{Vitamin A} \\
&\text{(B) } \text{Ascorbic acid} \\
&\text{(C) } \text{Vitamin D} \\
&\text{(D) } \text{Vitamin E} 
\end{align*} \]

67. Ibuprofen is a:
\[ \begin{align*}
&\text{(A) } \text{Propionic acid derivative} \\
&\text{(B) } \text{Naphthoic acid derivative} \\
&\text{(C) } \text{Benzoic acid derivative} \\
&\text{(D) } \text{Sulphanilic acid derivative} 
\end{align*} \]
68. Which of the following medicines acts as a local anaesthetic?
   (A) Lignocaine        (B) Nicotinic acid hydrazine
   (C) Paracetamol       (D) None of these

69. The bark of the Cinchona tree is used to treat:
   (A) Cancer           (B) Bacterial infections
   (C) Malaria          (D) Pharyngitis

70. Which of the following is a basic amino acid?
   (A) Lysine            (B) Asparagine
   (C) Serine            (D) All of the above

71. The octane number of any fuel increases with:
   (A) Increase in n-heptane content
   (B) Decrease in 2,2,4-trimethyl pentane content
   (C) Increase in 2,2,4-trimethyl pentane content
   (D) Increase in n-hexane content

72. Rhombic sulfur and monoclinic sulfur are:
   (A) Isotopes         (B) Allotropes
   (C) Isomers          (D) Isozymes

73. The medicine “Tincture of Iodine” is:
   (A) Iodine in benzene (B) Iodine in alcohol
   (C) KI₃               (D) CHI₃
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79. Williamson’s synthesis is a method for synthesizing:
(A) Alkyl halides  (B) Ethers
(C) Grignard reagents  (D) Aldehydes

80. Triphenylphosphine is a reagent commonly used in:
(A) Claisen condensation  (B) Claisen Schmidt reaction
(C) Wittig reaction  (D) Cannizzarro reaction

81. Reverse transcription is the synthesis of:
(A) RNA from DNA  (B) DNA from RNA
(C) Proteins from RNA  (D) RNA from protein

82. Deliquescent substances are:
(A) Highly soluble in water  (B) Slightly soluble in water
(C) Insoluble in water  (D) Soluble in chloroform

83. The common name for the compound with formula NaOH is:
(A) Quick lime  (B) Caustic potash
(C) Caustic soda  (D) Slaked lime

84. A beta-particle carries:
(A) Unit negative charge  (B) No charge
(C) Unit positive charge  (D) Two units positive charge

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85. Which of the following compounds would be most difficult to nitrate?
   (A) m-Dinitrobenzene    (B) Nitrobenzene
   (C) Benzene             (D) Aniline

86. Which of the following will undergo oxidation with periodic acid?
   (A) n-Propanol          (B) 2,3-Propanediol
   (C) 2-Propanol          (D) 1,3-Propanediol

87. Which of the following compounds can act as a nucleophile?
   (A) BF₃                     (B) NH₃
   (C) FeBr₃                  (D) AlCl₃

88. Only one singlet is obtained in the PMR spectrum of a compound C₃H₆Cl₂. The structure of the compound is:
   (A) CH₃CCl₂CH₃         (B) CH₃CH₂CHCl₂
   (C) CH₂ClCH₂CH₂Cl       (D) CH₃CHClCH₂Cl

89. Aldol condensation cannot occur between:
   (A) Two different aldehydes    (B) Two different ketones
   (C) An aldehyde and a ketone   (D) An aldehyde and an ester

90. Among the following the solvent with the highest dielectric constant is:
   (A) Chloroform           (B) Methanol
   (C) Ethanol              (D) Water
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91. Eukaryotes developed around:
   (A) 1600 Million years ago   (B) 3619 Million years ago
   (C) 4800 Million years ago   (D) 5200 Million years ago

92. What kind of life was predominantly present on earth 2-3 billion years ago?
   (A) Archebacteria   (B) Blue green algae
   (C) Bryophytes      (D) None of the above

93. The neurotransmitter found to be deficient in patients suffering from Alzheimer’s disease is:
   (A) Acetylcholine   (B) GABA
   (C) Aspartate       (D) Noradrenaline

94. Carbidopa is a drug used in the treatment of:
   (A) Parkinson’s disease   (B) Alzheimer’s disease
   (C) Type II Diabetes      (D) Atherosclerosis

95. Acetoacetate 3-hydroxybutyrate and acetone are known as:
   (A) Lipid bodies   (B) Lipid droplets
   (C) Fatty bodies   (D) Ketone bodies

96. A widely used drug for the treatment of HIV-AIDS is:
   (A) Azidothymidine   (B) Chloroquine
   (C) Salbutamol       (D) Nitroglycerin

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97. Match the items in Group I with Group II:

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. Circular Dichroism</td>
<td>1. Concentration</td>
</tr>
<tr>
<td>Q. X-ray Crystallography</td>
<td>2. Sedimentation Coefficient</td>
</tr>
<tr>
<td>R. Freeze-drying</td>
<td>3. Secondary structure determination</td>
</tr>
<tr>
<td>S. Ultracentrifugation</td>
<td>4. Tertiary structure determination</td>
</tr>
</tbody>
</table>

(A) P-4, Q-1, R-2, S-3  (B) P-1, Q-4, R-3, S-2
(C) P-2, Q-3, R-4, S-1  (D) P-3, Q-4, R-1, S-2

98. A sample of human DNA in solution is subjected to increasing temperature until the major fraction exhibits optical density changes due to disruption of its helix (melting or denaturation). A smaller fraction is atypical in that it requires a much higher temperature for melting. This smaller, atypical fraction of DNA must contain a higher content of:

(A) Adenine plus cytosine  (B) Cytosine plus guanine
(C) Adenine plus thymine  (D) Cytosine plus thymine

99. The presence of which of the following structural arrangements in a protein strongly suggests that it is a DNA-binding, regulatory protein?

(A) β Sheet  (B) Triple helix
(C) α Helix  (D) Zinc finger

100. During blood coagulation, thromboplastin is released by:

(A) RBC
(B) Blood plasma
(C) Leukocytes
(D) Clumped platelets & damaged tissues.
101. Which gymnospermic plant is used as a fish poison?
   (A) Ephedra foliata  (B) Gnetum contractum
   (C) Pinus roxburghii  (D) Podocarpus

102. The removal of a ring of bark from trunk of tree eventually kills it because:
   (A) Minerals and salts cannot go up
   (B) Of immediate stoppage of photosynthesis
   (C) Sugar does not travel down and root becomes starved and dies
   (D) Water cannot go up

103. Which of the following set of conditions is essential for a good cotton crop?
   (A) Low temperature and heavy rainfall with drier season during flowering
   (B) Moderate temperature and heavy rainfall with moist season during flowering
   (C) High temperature and moderate rainfall with drier during flowering
   (D) High temperature and heavy rainfall with drier season during flowering

104. Lucerne is a:
   (A) Foliage crop  (B) Root crop
   (C) Stem crop  (D) Fungus

105. Which of the following amino acids is most compatible with an α-helical structure?
   (A) Tryptophan  (B) Alanine
   (C) Lysine  (D) Proline
106. Which of the following force is responsible for raising water upto 100 m tall plant?
   (A) Root pressure  (B) Capillary action
   (C) Transpiration pull  (D) Air pressure

107. The C_4 plant are photosynthetically more efficient than C_3 plant because:
   (A) They have more chloroplasts
   (B) The CO_2 compensation point is more
   (C) CO_2 generated during photorespiration is trapped and recycled through PEP carboxylase
   (D) The CO_2 efflux is not prevented

108. Where does bulk fixation of carbon through photosynthesis takes place?
   (A) Crop plant  (B) Oceans
   (C) Tropical rain forests  (D) Both (A) and (C)

109. Seed dormancy is due to the:
   (A) Ethylene  (B) Abscissic acid
   (C) IAA  (D) Starch

110. Differentiation of shoot is controlled by:
   (A) High auxin: cytokinin ratio
   (B) High cytokinin: auxin ratio
   (C) High gibberellin: auxin ratio
   (D) High gibberellins: cytokinin ratio
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111. Amphimixis in plants means development:
   (A) From fusion of 2 gametes
   (B) Without fusion of gametes
   (C) From stem cuttings
   (D) From root cuttings

112. In flowering plant meiosis occurs at the time of:
   (A) Germination of seed
   (B) Formation of buds
   (C) Formation of root primordia
   (D) Formation of pollen grain

113. Which of the following statements are incorrect regarding light reaction?
   (A) Light reaction is called as Hill reaction
   (B) Light reaction takes place on the grana of chloroplast
   (C) CO₂ fixation to carbohydrate is the major event in light reaction
   (D) ATP and NADPH are produced in light reaction

114. Which of the following statements are incorrect regarding photosystems?
   (A) The reaction of PSI is P700 and chlorophyll-a is predominant
   (B) The reaction centre of PSII is P680 and chlorophyll-b is predominant pigment
   (C) Both photosystem (PSI and PSII) are located on the outer membrane
   (D) PSI is located on the thylakoid membrane

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115. The “Endosymbiotic theory” of origin of mitochondria and chloroplasts is based on which of the following assumptions?

(A) Some regions of mitochondrial and chloroplast DNA are strikingly similar to the DNA of present-day bacteria.

(B) A large segment of mitochondrial DNA is found in nuclear genome.

(C) All mitochondrial DNAs and chloroplast DNAs appear to encode rRNAs, tRNAs, and some of the proteins involved in Mitochondrial or photosynthetic electron transport and ATP synthesis.

(D) None of the above

116. Which of the following statement is incorrect for Kinesins?

(A) They transport cargo vesicles and chromosomes during mitosis

(B) They transduce ATP as a source of energy for linear movement

(C) They utilize ion gradient for rotary movement

(D) They are found in cytoplasm

117. The outer proteinaceous shell of a virus is known as:

(A) Virion

(B) Capsid

(C) Envelope

(D) None of these

118. Which of the following does NOT occur in mitochondria?

(A) Kreb cycle

(B) Glycolysis

(C) Electron transport system

(D) ATP synthesis
119. Protein S will fold into its native conformation only when protein Q is present in the solution. However, protein Q can fold into its native conformation without protein S. Protein Q, therefore, may function as a ______ for protein S.

(A) Ligand  (B) Molecular chaperone
(C) Protein precursor  (D) Structural motif

120. Structural proteins are:

(A) Fibrous  (B) Globular
(C) Branched  (D) Compound

121. Defect in collagen formation is seen in:

(A) Scurvy  (B) Hunter’s syndrome
(C) Marfan’s syndrome  (D) None of these

122. Which of the following is not a function of endoplasmic reticulum?

(A) Helps in protein folding
(B) Helps in protein glycosylation
(C) Lipid biosynthesis
(D) Protein degradation

123. In a mixture of five protein listed below, which should elute second in size exclusion (gel-filtration) chromatography.

(A) Chytochrome c $M_r = 13,000$
(B) Immunoglobulin G $M_r = 1,45,000$
(C) Ribonuclease A $M_r = 13,700$
(D) RNA polymerases $M_r = 4,50,000$
124. Which of the following statement is incorrect?

(A) In affinity chromatography, lectins are used to purify glycoproteins

(B) The separation in gel filtration chromatography in based on size, shape and net charge of the protein

(C) In ion exchange chromatography, the bound protein are eluted using NaCl solution.

(D) All of these

125. Salting out process involves:

(A) Precipitation of protein using ammonium sulphate

(B) Precipitation of protein using copper sulphate

(C) Precipitation of protein using sodium chloride

(D) None of the above

126. Depletion of T regulatory cells in the body might:

(A) Cause autoimmune disorders

(B) Enhance responses to pathogens

(C) Make no difference as these T cells are not that important

(D) Both (A) and (B)

127. Human saliva is rich in:

(A) IgG

(B) IgE

(C) IgD

(D) IgA
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128. T helper 17 (Th17) cells produce the following cytokines:
   (A) IL-12 and IL-1
   (B) IL-17A and IL-17F
   (C) IL-10 and IFN-γ
   (D) There is no such T-cell subset

129. Maturation of B cells for the production of high affinity B cell receptor bearing B-lymphocytes occur in:
   (A) Pancreas
   (B) Germinal centres
   (C) Bone marrow
   (D) Thymus

130. Which is not an antigen presenting cell?
   (A) B cell
   (B) Nk-T cell
   (C) Dendritic cell
   (D) Kuffer cell

131. Allergic responses result in increased levels of:
   (A) IgA
   (B) IgE
   (C) IgD
   (D) IgM

132. Cancerous cells are:
   (A) Immortal
   (B) Senescent
   (C) Mutated
   (D) Both (A) and (C)

133. During fasting, in what sequence are the following organic compounds used up by the body?
   (A) First fats, next carbohydrates & lastly proteins.
   (B) First carbohydrates, next proteins & lastly lipids.
   (C) First proteins, next lipids & lastly carbohydrates.
   (D) First carbohydrates, next fats & lastly proteins.

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134. The matrix of blood is known as:
   (A) Plasma  (B) Serum
   (C) RBC & WBC  (D) WBC & platelets

135. During blood coagulation, thromboplastin is released by:
   (A) RBC
   (B) Blood plasma
   (C) Leukocytes
   (D) Clumped platelets & damaged tissues

136. Tay Sachs disease is due to deficiency of:
   (A) Hexosaminidase A  (B) α-Galactosidase
   (C) Hexosaminidase A & B  (D) Glucocerebrosidase

137. Xeroderma pigmentosa is a disease due to:
   (A) Production of guanine-guanine dimer in DNA
   (B) Defective DNA repair
   (C) Auto immunity
   (D) Defective melanin metabolism

138. A nonsense mutation involves:
   (A) The creation of a stop codon
   (B) A regulatory sequence
   (C) An AG splice acceptor site
   (D) Creation of different amino acid
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139. The cancer that are derived from ectoderm or endoderm of epithelial cells are called:

(A) Carcinoma  (B) Sarcoma
(C) Leukemia    (D) Lymphoma

140. The X-ray diffraction studies conducted by _______ were key to the discovery of the DNA structure.

(A) Barbara McClintok  (B) William Chargaff
(C) Rosalind Franklin  (D) None of the above

141. The mutations that arise in the absence of known mutagen are known as:

(A) Induced mutation  (B) Fused mutation
(C) Spontaneous mutation  (D) All of the above

142. Mendel’s works were rediscovered by:

(A) De Vries  (B) Correns
(C) Tschemak  (D) None of the above

143. A polypeptide has a molecular weight of 22 kDa. The approximate number of amino acids residues in the given polypeptide is:

(A) 100  (B) 200
(C) 300  (D) 400

144. Ultra-violet radiation causes DNA damage by formation of:

(A) Cytidine dimer  (B) Thymidine dimer
(C) Adenine dimer  (D) Guanine dimer

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145. Luciferase gene was isolated from:
   
   (A) *E.coli.*  
   (B) *Aequorea victoria*  
   (C) *Pholipen pyralis*  
   (D) *Bacillus spp.*  

146. A set of two or more overlapping DNA fragments that form a contiguous stretch of DNA is called:

   (A) Contigs  
   (B) BAC clones  
   (C) TAC clones  
   (D) Map

147. Satellite DNAs are not typically found within which of the following:

   (A) Heterochromatin  
   (B) Euchromatin  
   (C) Telomere  
   (D) Centromere

148. How many net ATP molecules are produced during glycolysis of one molecule of glucose?

   (A) 6  
   (B) 8  
   (C) 10  
   (D) 12

149. The molecular formula of glycine is C₂H₅O₂N. What will be the molecular formula of a linear oligomer made by linking 10 glycine molecules by condensation reaction?

   (A) C₂⁰H₂₅O₂₀N₁₀  
   (B) C₂₀H₂₅O₁₁N₁₀  
   (C) C₂₀H₆₅O₂₉N₁₀  
   (D) C₂₄H₄₀O₁₀N₁₀
150. Individuals with phenylketonuria are mentally retarded unless:
   (A) Phenylalanine in the diet is restricted
   (B) Tyrosine in the diet is restricted
   (C) Homocysteine in the diet is restricted
   (D) None of the above

151. Hexokinase activity in glycolysis is inhibited by:
   (A) Fructose-6-phosphate
   (B) Fructose-1,6-biphosphate
   (C) Glucose-6-phosphate
   (D) Phosphofructokinase

152. Cholesterol is the precursor of:
   (A) Steroid hormones
   (B) Bile salts
   (C) Vitamine-A
   (D) Both (A) and (B)

153. Deficiency of Niacin causes:
   (A) Pellegra
   (B) Scurvy
   (C) Cataract
   (D) Anemia

154. During catabolism, only 40% of the energy available from oxidizing glucose is used to synthesize ATP. What happens to the Remaining 60%?
   (A) It is used to reduce NADP
   (B) It remains in the product of metabolism
   (C) It is stored as fat
   (D) It is lost as heat
155. Proteins tagged with mannose-6-phosphate are transferred to:

(A) Nucleus  
(B) Lysosome  
(C) Mitochondria  
(D) Golgi apparatus

156. The use of insulin to purify the receptor is an example of:

(A) Ion exchange chromatography  
(B) Affinity chromatography  
(C) Ligand mediated chromatography  
(D) Gel filtration chromatography

157. Hydrolysis of lactose yields:

(A) Galactose and fructose  
(B) Galactose and glucose  
(C) Glucose and fructose  
(D) Fructose and galactose

158. A reversible inhibitor binds to an enzyme at a site other than the active site. The activity will:

(A) Increase $K_m$ but $V_{max}$ remains constant  
(B) Decrease $V_{max}$ but $K_m$ remains constant  
(C) Increase $V_{max}$ but $K_m$ remains constant  
(D) No change in both $V_{max}$ and $K_m$
159. The most abundant type of RNA in the cell is:

(A) rRNA  (B) mRNA
(C) tRNA  (D) hnRNA

160. Which of the amino acids is having its pI at physiological pH?

(A) Alanine  (B) Lysine
(C) Histidine  (D) Glutamate

161. Apoptosis is related with:

(A) Caspase cascade inactivation
(B) Programmed cell death
(C) Caspase cascade activation
(D) Both (B) and (C)

162. Isozymes or iso-enzymes are those enzymes which:

(A) Have same structural forms
(B) Have different structural forms but identical catalytic properties
(C) Catalyses oxidation reactions
(D) Causes isomerization

163. What is red shift?

(A) The shifting of an absorption towards the blue end of the spectrum
(B) The shifting of an absorption to higher energy
(C) The shifting of an absorption to lower energy
(D) The shifting of an absorption towards shorter wavelength
164. Biodiesel is produced by:

(A) Transesterification    (B) Fermentation
(C) High pressure oxidation  (D) Esterification

165. How many fragments will be obtained if the following peptide is cleaved by CNBr Ser-Thr-Met-Gly-Met-Arg-Lys?

(A) 1    (B) 2
(C) 3    (D) 4

166. Which of the following is a serine protease?

(A) Chymotrypsin    (B) Trypsin
(C) Elastase        (D) All of the above

167. Cancer stem cells are:

(A) Hematopoietic stem cells
(B) Pluripotent stem cells
(C) A Heterogenous cell population
(D) Cancer cells with stem cell markers

168. The activation of cell survival pathway by growth factor receptor is:

(A) Epidermal growth factor ligand dependent
(B) Insulin growth factor ligand dependent
(C) Cell proliferation and survival
(D) All of the above
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169. Eukaryotic Pre mRNA is:
   (A) Alternative Spliced gene   (B) Unspliced gene
   (C) Spliced gene               (D) (A and C)

170. Diploid chromosome number in human is 46. However, if you count chromatids which are visible during mitotic or meiotic cell divisions, you would be able to count different sets of chromatid numbers depending on the stage and the type of the cell division in question. Match the chromatid numbers given on the left with cell division stage shown on the right.

   A. 46      1. Mitotic metaphase
   B. 23      2. Aneuploid meiotic telophase II
   C. 92      3. Meiotic telophase I
   D. 24      4. Meiotic anaphase II

   (A) A-3, B-4, C-1, D-2   (B) A-2, B-4, C-1, D-3
   (C) A-1, B-4, C-2, D-3   (D) A-1, B-2, C-3, D-4

171. The cells of macula densa produce:
   (A) Erythropoietin   (B) Renin
   (C) Angiotensinogen  (D) Angiotensin

172. Foramen ovale/fossa ovalis is present in:
   (A) Partition between middle and inner ear
   (B) Inter-auricular septum
   (C) Inter-ventricular septum
   (D) Aortic and pulmonary arclus

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173. Blue blood in arthropod is due the presence of:

(A) Chlorocruostroin  
(B) Iron

(C) Haemocyanin  
(D) Copper

174. ADH controls water permeability of:

(A) Collecting ducts

(B) Proximal convoluted tube

(C) Distal convoluted tube

(D) All of the above

175. 4th ventricle of brain occurs in:

(A) Olfactory lobe

(B) Medulla oblongata

(C) Cerebral hemisphere

(D) Diencephalon

176. In some eggs the future organ can be demarcated as the region even before the beginning of cleavage, it is:

(A) Regulated development

(B) Mosaic development

(C) Cryogenesis

(D) Determined development

177. The forces that change the frequency of an allele in a population are:

(A) Forward mutation, gene conversion, neutral evolution and random genetic drift.

(B) Selection, mutation, migration, interbreeding and random genetic drift.

(C) Dominance, family selection, fitness and diversification.

(D) Gene interaction, gene transfer, gene mutations and out breeding.
178. Which of the following will not cause triploidy?

(A) Fusion of an egg and polar body with subsequent fertilization by sperm cells
(B) Meiotic failure, producing diploid sperm or egg
(C) Dispermy
(D) Mitotic failure in the early embryo

179. The Nobel Prize in Physiology or Medicine for year 2011 was awarded to which scientist who died before receiving it?

(A) Ralf Steinmann
(B) James Rothman
(C) Shinya Yamanaka
(D) Bruce Beuther

180. According to immunity theory, ageing is due to:

(A) Accumulation of errors
(B) Reduced functioning of endocrine glands
(C) Degeneration of thymus
(D) Accumulation of waste products

181. Husband and wife should know their Rh factors because the situation can be serious due to biological incompatibility in one of the following cases:

(A) Rh+ husband and Rh+ wife
(B) Rh- husband and Rh- wife
(C) Rh- husband and Rh+ wife
(D) Rh+ husband and Rh- wife
182. Macrophages which are called monocytes, have the ability to:

(A) Process and present antigens to T cells
(B) Produce antibodies
(C) Express Ig M molecules on their cell surface
(D) Differentiate into dendritic cells when necessary

183. If a man who is colour blind marries a women who is homozygous for normal color vision, the probability of their being colour blind is:

(A) 0. (B) 1
(C) 0.5 (D) 0.75

184. What are the sexual phenotypes of the following genotypes in drosophila: XXY, XO?

(A) Male, female (B) Male, male
(C) Intersex, female (D) Female, male

185. Which of the following statements are correct?

i. Down’s syndrome/mongolism is due to extra 21st chromosome

ii. Down’s syndrome is due to non disjunction of chromosomes

iii. Trisomy has chromosome complement of 2n+1

iv. Monosomics are 2n-1

(A) P, Q (B) R, S
(C) P, Q, R (D) P, Q, R, S
186. In Ca^{2+} homeostasis, the hormone counteracting calcitonin action is:

(A) Glucagon  
(B) Thyroxine  
(C) Insulin  
(D) Parathyroid hormones

187. Which of the following is true of steroid hormones?

(A) They have only cell surface receptor  
(B) They are lipophilic  
(C) They are produced by adrenal cortex  
(D) They are produced by adrenal medulla

188. An isolated population of humans, with approximately equal numbers of blue-eyed and brown-eyed individuals, was decimated by an earthquake. Only a few brown-eyed people remained to form the next generation. This kind of change in the gene pool is called a:

(A) Hardy-Weinberg equilibrium  
(B) Blocked gene flow  
(C) Bottleneck effect  
(D) Founder effect

189. What characteristic domain is found in eukaryotic proteins that enable them to enter the endoplasmic reticulum?

(A) Stop transfer domain  
(B) Signal sequence  
(C) Signal sequence receptor  
(D) Signal recognition protein

190. Each protein has a particular 3D structure which is decided by its:

(A) Primary structure  
(B) Secondary structure  
(C) Tertiary structure  
(D) Quaternary structure
191. Alpha helical domain could be best identified by the absence of the following amino acids:

(A) Alanine  (B) Leucine
(C) Glutamine  (D) Proline

192. The Hill coefficient for myoglobin and hemoglobin are respectively:

(A) 2.8 and 1.0  (B) 1.0 and 2.8
(C) 1.1 and 4.5  (D) 1.2 and 1.2

193. Which of the following statements about enzymes or their functions are true?

(A) Enzymes speed up reactions by lowering activation energy
(B) Enzymes do not alter the overall change in free energy for a reaction
(C) Enzymes are proteins whose tertiary structure is key to their functions
(D) All of the above

194. The Ramachandran plot illustrates the fact that:

(A) The peptide bond is planar
(B) The $\Phi$ and $\Psi$ angles can assume only a single value in a protein
(C) The $\Phi$ and $\Psi$ angles can assume approximately 3 different values
(D) The $\Phi$ and $\Psi$ angles can assume any value in a peptide

195. During vigorous exercise, pyruvate produced by glycolysis is converted to:

(A) Acetate  (B) Pyruvic acid
(C) Lactate  (D) Monosodium phosphate
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196. HDLs are synthesized in:
   (A) Blood       (B) Liver
   (C) Intestine   (D) Pancreas

197. Ptyalin is an enzyme produced in the:
   (A) Salivary gland  (B) Pituitary gland
   (C) Thyroid gland   (D) Pancreas

198. Which of the following statement is correct:
   (A) In ion exchange chromatography, the bound proteins are eluted using NaCl solution
   (B) The separation in gel filtration chromatography is based on size, shape and net charge of the protein
   (C) In affinity chromatography, lectins are used to purify a glycoprotein
   (D) In affinity chromatography, the binding of a protein to a ligand is by specific non-covalent interactions

199. The effect of a reversible competitive inhibitor can be nullified by:
   (A) Increasing the product concentration
   (B) Increasing the substrate concentration
   (C) Increasing the temperature
   (D) None of these

200. Hyperphosphorylation of the Tau protein is a hallmark of:
   (A) Alzheimer’s disease (B) Parkinson’s disease
   (C) Hepatocarcinoma (D) Cerebral Malaria

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