

Total No. of Printed Pages : 21

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU  
ARE ASKED TO DO SO)

A

SET-X

Ph.D./URS-EE-Jan-2022  
SUBJECT : Life Sciences

Sr. No. 10225

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

Name \_\_\_\_\_ Father's Name \_\_\_\_\_

Mother's Name \_\_\_\_\_ Date of Examination \_\_\_\_\_

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PHD/URS-EE-2022/(Life Sciences)(SET-X)/(A)

SEAL

1. For better resolution of minute protein bands in an SDS-PAGE, which of the following staining method is advised ?
- (1) Silver staining (2) CBB staining  
(3) Avidin staining (4) All of these
2. Synthesis of peptide bond is catalysed by :
- (1) A site of ribosome (2) P site of ribosome  
(3) 23S rRNA (4) tRNA
3. Which of the following techniques would be most useful to identify and quantify the presence of a known impurity in a drug substance ?
- (1) NMR (2) MS  
(3) IR (4) HPLC
4. Chaperon proteins help in :
- (1) Protein folding and assembly (2) Protein stability  
(3) Both (1) & (2) (4) None of these
5. Which of the following post translational modification of proteins does not occur in lumen of the endoplasmic reticulum
- (1) A Glycosylation  
(2) Formation of disulphide bonds  
(3) Folding and formation of quaternary structure  
(4) Ubiquitination
6. Red Data Book is published by :
- (1) IUCN (2) UNESCO  
(3) WHO (4) UNEP

7. The Indian Patent and Design Act enacted in :
- (1) 1910 (2) 1911  
(3) 2002 (4) 2005
8. The Ames test is a mass screening approach used for the detection of :
- (1) Toxins  
(2) Mutagenic carcinogens  
(3) Lactose intolerance  
(4) Phenylketonuria
9. Theory of panspermia is proposed by :
- (1) Aristotle  
(2) Oparin and Haldane  
(3) Richter and Arrhenius  
(4) None of these
10. A method to detect whether two mutations are located on the same gene or different genes is :
- (1) Generalised transduction  
(2) Complementation analysis  
(3) *Hfr* mapping  
(4) Karyotyping
11. Who proposed mutation theory :
- (1) J. B. Lamarck (2) Charles Darwin  
(3) Hugo de Vries (4) Mendal

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12. T4 polynucleotide kinase is used for :
- (1) Labelling of 3 ends of DNA
  - (2) Labelling 5 ends of DNA
  - (3) Creating blunt ends of DNA
  - (4) Dephosphorylation of DNA
13. Carbon dating method was developed by :
- (1) Willard Libby
  - (2) Bolt Wood
  - (3) Simpson
  - (4) Mayer
14. The discovery of Dinosaurian bones from the Intertrappean beds of a jar, Gujarat, Indicating that the Dinosaurs have survived in India even during the :
- (1) Permian
  - (2) Paleocene
  - (3) Miocene
  - (4) Pleistocene.
15. The major phenomenon responsible for micro evolution and mega evolution :
- (1) Genetic drift
  - (2) Adaptative radiation
  - (3) Natural selection
  - (4) None of these
16. BAC which can be used for cloning large fragments, is derived from :
- (1) ColE plasmid
  - (2) F plasmid
  - (3) 2 $\mu$  plasmid
  - (4) Mu phage

17. An example of convergent evolution is :
- (1) Wing of Hawkmoths, the wing of hawks
  - (2) Teeth of domestic dog, teeth of a wolf
  - (3) Wings of *Geospiza magnirostris*, wings of *Geospiza fortis*
  - (4) None of the above
18. A reporter gene :
- (1) Acts as an activator
  - (2) Allows gene expression to be readily measured
  - (3) Enhances mRNA stability
  - (4) Interacts with DNA polymerase
19. The last common ancestor of humans is :
- (1) Pan troglodytes
  - (2) Homo neanderthalensis
  - (3) Lemuroidea
  - (4) Dromaeosaurus
20. Which of the following viruses replicate in cytoplasm ?
- |                    |                  |
|--------------------|------------------|
| (1) SV40           | (2) Adenovirus   |
| (3) Vaccinia virus | (4) Herpes virus |
21. Mycoplasma are not inhibited by penicillin because they :
- (1) Produce penicillinase
  - (2) Are gram positive
  - (3) Are gram negative
  - (4) Don't have a cell wall

22. The following two organs are example of secondary lymphoid organs :
- (1) Spleen and thymus
  - (2) Lymph nodes and thymus
  - (3) Spleen and GALT
  - (4) Bone marrow and MALT
23. Which of the following does not participate in the formation of antigen-antibody complexes ?
- (1) Hydrophobic bonds
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  - (3) Electrostatic interactions
  - (4) Van der Waals forces
24. Cells that release histamine and other vasoactive substances in response to allergens are :
- |                 |                 |
|-----------------|-----------------|
| (1) Neutrophils | (2) Macrophages |
| (3) NK cells    | (4) Mast cells  |
25. The most abundant protein in human blood :
- |                    |                 |
|--------------------|-----------------|
| (1) Transferrin    | (2) Albumin     |
| (3) Gamma globulin | (4) Haemoglobin |
26. Which hormone binds to intracellular receptors ?
- (1) Insulin
  - (2) Growth hormone
  - (3) Triiodothyronine
  - (4) Thyroid stimulating hormone

27. Thyroxine is important in the control of :
- (1) Cellular metabolic rates
  - (2) Diabetes mellitus
  - (3) Mitochondrial respiration
  - (4) Calcium uptake
28. What percent of the incident solar energy do plants typically harvest during photosynthesis ?
- |            |            |
|------------|------------|
| (1) 1-2 %  | (2) 5-10%  |
| (3) 10-20% | (4) 20-50% |
29. Which man is known as Java man ?
- |                     |                      |
|---------------------|----------------------|
| (1) Ramapithecus    | (2) Australopithecus |
| (3) Pithecanthropus | (4) Sinanthropus     |
30. Which one among the following is the most important factor in speciation ?
- (1) Geographical isolation
  - (2) Reproductive isolation
  - (3) Ethological isolation
  - (4) Ecological isolation
31. Aroma in rice is due to :
- (1) Acetyl choline
  - (2) 2-benzyl pyrroline
  - (3) 2-ethyl pyrroline
  - (4) 2-acetyl 1- pyrroline

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32. Primordial soup is a set of hypothetical conditions on ancient earth first proposed by .....
- (1) Dmitri Ivanovsky
  - (2) Alexander Oparin
  - (3) Dmitry Anuchin
  - (4) Nikolay Shatsky
33. Which of the following is archaebacteria ?
- (1) Methanogens
  - (2) Mycoplasma
  - (3) Green sulphur bacteria
  - (4) Mycobacterium
34. The brain's ability to change in response to experience or damage is called :
- (1) lateralization
  - (2) lesioning
  - (3) neuroplasticity
  - (4) functionality
35. Which of the following favours endospore formation :
- (1) High concentration of nitrogenous nutrients
  - (2) Low concentration of nitrogenous nutrients
  - (3) Low concentration of oxygen
  - (4) None of the above
36. Recombinant DNase is used for the treatment of :
- (1) Cystic fibrosis
  - (2) Growth defects
  - (3) Kidney disorder
  - (4) Multiple sclerosis



37. A technique by which protein of interest can be purified in a single step :
- (1) Gel filtration chromatography
  - (2) Ion exchange chromatography
  - (3) Affinity chromatography
  - (4) Hydrophobic interaction chromatography
38. The plasmodium initially multiplies within the liver cells and then attacks RBCs causing their rupture. The rupture of RBCs is associated with the release of a toxic substance .....
- (1) Hirudin
  - (2) Heptoin
  - (3) Heparin
  - (4) Heamozoin
39. Organic molecules found in minute quantities in food but that are essential to normal metabolism are called :
- (1) Coenzymes
  - (2) Vitamins
  - (3) Pro vitamins
  - (4) Cofactors
40. In the human skeletal muscle and brain cells, the energy yield per molecule of glucose in aerobic respiration is ..... times higher than the energy yield in anaerobic respiration.
- (1) 2
  - (2) 19
  - (3) 16
  - (4) 18
41. Which of the following processes is involved in using proteins as a source of energy ?
- (1) Oxidative deamination
  - (3) Ketogenesis
  - (2) Glycolysis
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42. Which of the following substances are *NOT* stored in the body ?
- (1) Amino acids (2) Glycogen  
(3) Triglyceride (4) Cholesterol
43. Which of the following processes is involved in converting amino acids into glucose ?
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49. Which of the following disrupts homeostasis ?
- (1) Positive feedback  
(2) Pressure filtration  
(3) Thermoregulation  
(4) Cellular respiration
50. Which of the following is *not* a conjugated protein ?
- (1) Peptone (2) Phosphoprotein  
(3) Lipoprotein (4) Chromoprotein
51. Chitin is a :
- (1) Polysaccharide  
(2) Protein  
(3) Nitrogenous Polysaccharide  
(4) Lipoprotein
52. Fluidity of bio-membranes can be shown by :
- (1) Electron microscope  
(2) Tissue culture  
(3) Phase contrast-microscope  
(4) Fluorescence Microscope

53. The extent bacterial group that is most closely related to the ancestor from which mitochondria evolved is :
- (1) Cyanobacteria
  - (2) Purple photosynthetic bacteria
  - (3) Archaeobacteria
  - (4) Methanogens
54. Which of the following amino acids migrates to the positive electrode on paper electrophoresis at a pH of 7.0 ?
- |                   |               |
|-------------------|---------------|
| (1) glutamic acid | (2) Histidine |
| (3) lysine        | (4) Arginine  |
55. Lincoln index is used to measure :
- (1) Population size
  - (2) Population mortality rate
  - (3) Population natality rate
  - (4) Population density
56. Which of the following is *not* a polypeptide ?
- |               |                       |
|---------------|-----------------------|
| (1) Myoglobin | (2) $\alpha$ -keratin |
| (3) Heme      | (4) Fibroin           |
57. When  $[S] = K_M$ , the velocity of an enzyme catalyzed reaction is about :
- |                   |                   |
|-------------------|-------------------|
| (1) $0.5 V_{max}$ | (2) $0.4 V_{max}$ |
| (3) $0.2 V_{max}$ | (4) $0.9 V_{max}$ |

58. The most commonly employed cross-linked polymer is the :
- (1) Polyacrylamide gel
  - (2) Collagen
  - (3) Celluloses
  - (4) Cation exchange resin
59. Which of the following process offers the greatest opportunities for accelerating the evolution of new useful proteins ?
- (1) Exon shuffling
  - (2) Interon excision
  - (3) Transposon insertion
  - (4) DNA amplification
60. Peripheral part of blastoderm where cells lie unseparated from yolk is termed as :
- (1) area opaca
  - (2) area pellucida
  - (3) area translucent
  - (4) zone of junction
61. When are interferons secreted in the body ?
- (1) When antibody reacts with antigen
  - (2) When lymphocytes become active
  - (3) When serotonin become active
  - (4) When the cells are infected with virus

62. CpG islands & codon bias are tools used in eukaryotic genomics to :
- (1) Identify ORF
  - (2) Find regulatory sequences
  - (3) Identify gene function
  - (4) Find signal sequences
63. How so many different antibodies are produced from less than 300 genes ?
- (1) A Gene duplication
  - (2) Alternate splicing
  - (3) Formation of polyprotein
  - (4) Recombination, deletions and random assortment of DNA fragments
64. Two dimensional gels are used to :
- (1) Separate DNA fragments
  - (2) Separate RNA fragments
  - (3) Separate DNA & RNA fragments
  - (4) Separate different proteins
65. Variable number of tandem repeats (VNTRs) in the DNA molecule are highly useful in :
- (1) Monoclonal antibody production
  - (2) DNA fingerprinting
  - (3) Recombinant DNA technology
  - (4) Stem cell culture

66. In bird's egg, process of cell division is confined to small disc of protoplasm lying on surface of :
- (1) yolk at animal pole (2) yolk at vegetative pole  
(3) egg white at animal pole (4) none of above
67. Which is *not* a DNA binding Domain ?
- (1) Leucine zipper (2) Helix turn helix  
(3) Zinc finger (4) Interon-exon-interon
68. Which is the most specific recombinant library ?
- (1) Genomic (2) Protein  
(3) C-RNA (4) C DNA
69. Gram negative bacterial cell wall contains higher content of :
- (1) Peptidoglycan (2) Lipid  
(3) Protein (4) Carbohydrate
70. Reverse transcriptase is :
- (1) RNA dependent RNA polymerase  
(2) DNA dependent RNA polymerase  
(3) DNA dependent DNA polymerase  
(4) RNA dependent DNA polymerase
71. In eukaryotic DNA replication lagging strand is formed by :
- (1) RNA fragment (2) Okazaki fragment  
(3) DNA fragment (4) Nucleotide fragment

72. A quantitative way to measure the expression of a gene :
- (1) PCT (2) RT-PCR  
(3) Real time RT-PCR (4) Nested PCR
73. In positional cloning the starting point is knowledge of the :
- (1) Isolation of the gene  
(2) DNA sequence flanking the gene  
(3) Amino acid sequence of the gene  
(4) DNA sequence of the gene
74. For culturing, plasma from the adult chicken is preferred to mammalian plasma because :
- (1) It forms a clear and solid coagulum even after dilution  
(2) It is too opaque  
(3) It doesn't produce solid clots  
(4) It forms a semi solid coagulum
75. Range of osmolarity tolerated/accepted in mOsm/Kg of H<sub>2</sub>O by mammalian cells is :
- (1) 150-300 (2) 280-360  
(3) 300-325 (4) 360-400
76. According to Eagle, the growth of L-strain and Hela-strain cultures require to have mandatory presence of :
- (1) 6 amino acids  
(2) 8 amino acids  
(3) 10 amino acids  
(4) 12 amino acids



77. What is the concentration of CO<sub>2</sub> required for culturing animal cells ?
- (1) 2-5% (2) 1-10%  
(3) 10-15% (4) 15-20%
78. What are the main constituents of culture for animal cell growth ?
- (1) Glucose and Glutamine  
(2) Growth factors  
(3) Cytokines  
(4) All of these
79. Protective covering over radical during seed germination is :
- (1) Suspensor (2) Coleorhizha  
(3) Epithelium (4) Coleoptile
80. Little leaf disease is due to deficiency of :
- (1) Nitrogen  
(2) Zinc  
(3) Molybdenum  
(4) Manganese
81. Which of the following abnormality, resulted from the inheritance of an unbalanced complement of chromosomes can be diagnosed through karyotyping ?
- (1) Down's syndrome  
(2) Turner's syndrome  
(3) Klinefelter's syndrome  
(4) All of these

A

82. A coefficient of correlation is computed to be  $-0.95$  means that :
- (1) The relationship between two variables is weak
  - (2) The relationship between two variables is strong and positive
  - (3) The relationship between two variables is strong but negative
  - (4) Correlation coefficient cannot have these values
83. What test statistic is used for a global test of significance ?
- (1) Z test
  - (2) T test
  - (3) Chi-square test
  - (4) F test
84. Which of the following is the technique used for the embryo culture ?
- (1) Organ cultures on plasma clots
  - (2) Organ cultures on agar
  - (3) Whole embryo cultures
  - (4) All of these
85. The first bioinformatics database was created by :
- (1) Richard Durbin
  - (2) Dayhoff
  - (3) Michael j. Dunn
  - (4) Pearson

86. Which of the following oncogenes is incorrectly paired with its function ?
- (1) hTERT: enzyme in DNA replication
  - (2) ras : transcription factor
  - (3) HER-2/neu : growth factor receptor
  - (4) src: receptor-associated tyrosine kinase
87. Distyly is :
- (1) Presence of two styles in a flower
  - (2) Not self-incompatible
  - (3) A form of dichogamy
  - (4) A form of herchogamy
88. Which of the following is *not* a type of signaling molecule ?
- (1) Testosterone
  - (2) Insulin
  - (3) Adenylate Cyclase
  - (4) Thyroxin
89. Epicatechin gallate (ECG) is a type of flavonoid, found in which of the following ?
- (1) Orange
  - (2) Green tea
  - (3) Berries
  - (4) Carrot
90. Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that both balls are red :
- (1)  $8/81$
  - (2)  $20/81$
  - (3)  $16/81$
  - (4)  $40/81$

91. Crypsis is a type of :
- (1) Offensive behavior (2) Courtship behavior  
(3) Defensive behavior (4) Forging behavior
92. *Saccharomyces cerevisiae* is used for the production of all of these except :
- (1) Bread (2) Beer  
(3) Brandy (4) Cheese
93. Which method of vinegar production requires that the product be filtered to remove microbes prior to use ?
- (1) Trickle method (2) Bubble method  
(3) Orleans method (4) Open-Vat method
94. Which of the following is a secondary metabolite ?
- (1) Tetracycline (2) Citric acid  
(3) Ethanol (4) None of these
95. The strain of fungi used for the large scale production of citric acid is :
- (1) *Penicillium chrysogenum*  
(2) *Aspergillus niger*  
(3) *Streptomyces Aurecus*  
(4) *Saccharomyces sps*
96. Juice clarification extraction is facilitated by using :
- (1) Amylase (2) Pectinase  
(3) Inulinase (4) Lactase

97. Whey is the by-product in the manufacture of :
- (1) Skimmed milk (2) Butter  
(3) Cheese (4) Yogurt
98. The method of preventing or reducing pathogens in food products by combining many methods like high temperature during processing, low temperature during storage, increasing the acidity etc is called :
- (1) Mixed preservation approach  
(2) High pressure food preservation  
(3) Hurdle technology  
(4) Stumbling technology
99. Cancer of  $\beta$  lymphocytes is called :
- (1) Myeloma (2) Sarcoma  
(3) Melanoma (4) Carcinoma
100. The technique of DNA finger printing was given by ?
- (1) Alec Jeffary (2) Paul Terasaky  
(3) James Clarke (4) Franklin

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  - (4) Sinanthropus
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- (1) Geographical isolation
  - (2) Reproductive isolation
  - (3) Ethological isolation
  - (4) Ecological isolation
21. For better resolution of minute protein bands in an SDS-PAGE, which of the following staining method is advised ?
- (1) Silver staining
  - (2) CBB staining
  - (3) Avidin staining
  - (4) All of these
22. Synthesis of peptide bond is catalysed by :
- (1) A site of ribosome
  - (2) P site of ribosome
  - (3) 23S rRNA
  - (4) tRNA

23. Which of the following techniques would be most useful to identify and quantify the presence of a known impurity in a drug substance ?
- (1) NMR (2) MS  
(3) IR (4) HPLC
24. Chaperon proteins help in :
- (1) Protein folding and assembly (2) Protein stability  
(3) Both (1) & (2) (4) None of these
25. Which of the following post translational modification of proteins does not occur in lumen of the endoplasmic reticulum
- (1) A Glycosylation  
(2) Formation of disulphide bonds  
(3) Folding and formation of quaternary structure  
(4) Ubiquitination
26. Red Data Book is published by :
- (1) IUCN (2) UNESCO (3) WHO (4) UNEP
27. The Indian Patent and Design Act enacted in ;
- (1) 1910 (2) 1911 (3) 2002 (4) 2005
28. The Ames test is a mass screening approach used for the detection of :
- (1) Toxins  
(2) Mutagenic carcinogens  
(3) Lactose intolerance  
(4) Phenylketonuria

29. Theory of panspermia is proposed by :
- (1) Aristotle
  - (2) Oparin and Haldane
  - (3) Richter and Arrhenius
  - (4) None of these
30. A method to detect whether two mutations are located on the same gene or different genes is :
- (1) Generalised transduction
  - (2) Complementation analysis
  - (3) *Hfr* mapping
  - (4) Karyotyping
31. Crypsis is a type of :
- |                        |                        |
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| (1) Offensive behavior | (2) Courtship behavior |
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32. *Saccharomyces cerivisiae* is used for the production of all of these except :
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34. Which of the following is a secondary metabolite ?
- (1) Tetracycline (2) Citric acid  
(3) Ethanol (4) None of these
35. The strain of fungi used for the large scale production of citric acid is :
- (1) *Penicillium chrysogenum*  
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41. When are interferons secreted in the body ?
- (1) When antibody reacts with antigen  
(2) When lymphocytes become active  
(3) When serotonin become active  
(4) When the cells are infected with virus
42. CpG islands & codon bias are tools used in eukaryotic genomics to :
- (1) Identify ORF  
(2) Find regulatory sequences  
(3) Identify gene function  
(4) Find signal sequences
43. How so many different antibodies are produced from less than 300 genes ?
- (1) A Gene duplication  
(2) Alternate splicing  
(3) Formation of polyprotein  
(4) Recombination, deletions and random assortment of DNA fragments

44. Two dimensional gels are used to :

- (1) Separate DNA fragments
- (2) Separate RNA fragments
- (3) Separate DNA & RNA fragments
- (4) Separate different proteins

45. Variable number of tandem repeats (VNTRs) in the DNA molecule are highly useful in :

- (1) Monoclonal antibody production
- (2) DNA fingerprinting
- (3) Recombinant DNA technology
- (4) Stem cell culture

46. In bird's egg, process of cell division is confined to small disc of protoplasm lying on surface of :

- (1) yolk at animal pole
- (2) yolk at vegetative pole
- (3) egg white at animal pole
- (4) none of above

47. Which is *not* a DNA binding Domain ?

- (1) Leucine zipper
- (2) Helix turn helix
- (3) Zinc finger
- (4) Interon-exon-interon

48. Which is the most specific recombinant library ?

- (1) Genomic
- (2) Protein
- (3) C-RNA
- (4) C DNA

49. Gram negative bacterial cell wall contains higher content of :
- (1) Peptidoglycan (2) Lipid  
(3) Protein (4) Carbohydrate
50. Reverse transcriptase is :
- (1) RNA dependent RNA polymerase  
(2) DNA dependent RNA polymerase  
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71. Which of the following abnormality, resulted from the inheritance of an unbalanced complement of chromosomes can be diagnosed through karyotyping ?
- (1) Down's syndrome  
(2) Turner's syndrome  
(3) Klinefelter's syndrome  
(4) All of these
72. A coefficient of correlation is computed to be  $-0.95$  means that :
- (1) The relationship between two variables is weak  
(2) The relationship between two variables is strong and positive  
(3) The relationship between two variables is strong but negative  
(4) Correlation coefficient cannot have these values
73. What test statistic is used for a global test of significance ?
- (1) Z test  
(2) T test  
(3) Chi-square test  
(4) F test

74. Which of the following is the technique used for the embryo culture ?
- (1) Organ cultures on plasma clots
  - (2) Organ cultures on agar
  - (3) Whole embryo cultures
  - (4) All of these
75. The first bioinformatics database was created by :
- (1) Richard Durbin
  - (2) Dayhoff
  - (3) Michael j. Dunn
  - (4) Pearson
76. Which of the following oncogenes is incorrectly paired with its function ?
- (1) hTERT: enzyme in DNA replication
  - (2) ras : transcription factor
  - (3) HER-2/neu : growth factor receptor
  - (4) src: receptor-associated tyrosine kinase
77. Distyly is :
- (1) Presence of two styles in a flower
  - (2) Not self-incompatible
  - (3) A form of dichogamy
  - (4) A form of herchogamy

78. Which of the following is *not* a type of signaling molecule ?
- (1) Testosterone (2) Insulin  
(3) Adenylate Cyclase (4) Thyroxin
79. Epicatechin gallate (ECG) is a type of flavonoid, found in which of the following ?
- (1) Orange (2) Green tea  
(3) Berries (4) Carrot
80. Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that both balls are red :
- (1)  $8/81$  (2)  $20/81$   
(3)  $16/81$  (4)  $40/81$
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- (1) J. B. Lamarck  
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- (1) Genetic drift  
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(3) Natural selection  
(4) None of these
86. BAC which can be used for cloning large fragments, is derived from :
- (1) ColE plasmid (2) F plasmid  
(3)  $2\mu$  plasmid (4) Mu phage
87. An example of convergent evolution is :
- (1) Wing of Hawkmoths, the wing of hawks  
(2) Teeth of domestic dog, teeth of a wolf  
(3) Wings of *Geospiza magnirostris*, wings of *Geospiza fortis*  
(4) None of the above

88. A reporter gene :

- (1) Acts as an activator
- (2) Allows gene expression to be readily measured
- (3) Enhances mRNA stability
- (4) Interacts with DNA polymerase

89. The last common ancestor of humans is :

- (1) Pan troglodytes
- (2) Homo neanderthalensis
- (3) Lemuroidea
- (4) Dromaeosaurus

90. Which of the following viruses replicate in cytoplasm ?

- (1) SV40
- (2) Adenovirus
- (3) Vaccinia virus
- (4) Herpes virus

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- (1) Polysaccharide
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**PHD/URS-EE-2022/(Life Sciences)(SET-X)/(B)**



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Total No. of Printed Pages : 21

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ARE ASKED TO DO SO)

C

SET-X

Ph.D./URS-EE-Jan-2022  
SUBJECT : Life Sciences

10223

Sr. No. ....

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

Name \_\_\_\_\_ Father's Name \_\_\_\_\_

Mother's Name \_\_\_\_\_ Date of Examination \_\_\_\_\_

\_\_\_\_\_  
(Signature of the Candidate)

\_\_\_\_\_  
(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE  
STARTING THE QUESTION PAPER.**

- 1. All questions are compulsory.**
- The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
- The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
- There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
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C

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  - (2) Are gram positive
  - (3) Are gram negative
  - (4) Don't have a cell wall

C

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- (1) Spleen and thymus
  - (2) Lymph nodes and thymus
  - (3) Spleen and GALT
  - (4) Bone marrow and MALT
53. Which of the following does not participate in the formation of antigen-antibody complexes ?
- (1) Hydrophobic bonds
  - (2) Covalent bonds
  - (3) Electrostatic interactions
  - (4) Van der Waals forces
54. Cells that release histamine and other vasoactive substances in response to allergens are :
- |                 |                 |
|-----------------|-----------------|
| (1) Neutrophils | (2) Macrophages |
| (3) NK cells    | (4) Mast cells  |
55. The most abundant protein in human blood :
- |                    |                 |
|--------------------|-----------------|
| (1) Transferrin    | (2) Albumin     |
| (3) Gamma globulin | (4) Haemoglobin |
56. Which hormone binds to intracellular receptors ?
- (1) Insulin
  - (2) Growth hormone
  - (3) Triiodothyronine
  - (4) Thyroid stimulating hormone

57. Thyroxine is important in the control of :
- (1) Cellular metabolic rates
  - (2) Diabetes mellitus
  - (3) Mitochondrial respiration
  - (4) Calcium uptake
58. What percent of the incident solar energy do plants typically harvest during photosynthesis ?
- |            |            |
|------------|------------|
| (1) 1-2 %  | (2) 5-10%  |
| (3) 10-20% | (4) 20-50% |
59. Which man is known as Java man ?
- |                     |                      |
|---------------------|----------------------|
| (1) Ramapithecus    | (2) Australopithecus |
| (3) Pithecanthropus | (4) Sinanthropus     |
60. Which one among the following is the most important factor in speciation ?
- (1) Geographical isolation
  - (2) Reproductive isolation
  - (3) Ethological isolation
  - (4) Ecological isolation
61. Which of the following processes is involved in using proteins as a source of energy ?
- (1) Oxidative deamination
  - (3) Ketogenesis
  - (2) Glycolysis
  - (4) Beta oxidation

C

62. Which of the following substances are **NOT** stored in the body ?
- (1) Amino acids (2) Glycogen  
(3) Triglyceride (4) Cholesterol
63. Which of the following processes is involved in converting amino acids into glucose ?
- (1) Glucogenolysis (2) Transamination  
(3) Gluconeogenesis (4) Lipogenesis
64. In species where young are precocial, the father is more likely to be :
- (1) Monogamous (2) Polyandrous  
(3) Polygamous (4) Monoandrous
65. Polycistronic gene means :
- (1) One transcription unit encodes one translation unit  
(2) One translation unit organised in one transcription unit  
(3) Several translation units organised in one transcription unit  
(4) Several translation units organised in several transcription units
66. The hormone that promotes rapid elongation of internodes or petiole in deep water rice plant is .....
- (1) Ethylene (2) Gibberllin  
(3) Abscisic acid (4) Cytokinin
67. Which of the following immunoglobulin is present normally in plasma at highest concentration ?
- (1) IgG (2) IgM  
(3) IgA (4) IgD



68. What is the ratio of hydrogen to oxygen molecules in a carbohydrate ?
- (1) 1:1 (2) 1:2  
(3) 2:1 (4) 3:1
69. Which of the following disrupts homeostasis ?
- (1) Positive feedback  
(2) Pressure filtration  
(3) Thermoregulation  
(4) Cellular respiration
70. Which of the following is **not** a conjugated protein ?
- (1) Peptone (2) Phosphoprotein  
(3) Lipoprotein (4) Chromoprotein
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  - (3) Separate DNA & RNA fragments
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(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU  
ARE ASKED TO DO SO)

D

SET-X

Ph.D./URS-EE-Jan-2022

SUBJECT : Life Sciences

Sr. No. ....10224...

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

Name \_\_\_\_\_ Father's Name \_\_\_\_\_

Mother's Name \_\_\_\_\_ Date of Examination \_\_\_\_\_

\_\_\_\_\_  
(Signature of the Candidate)

\_\_\_\_\_  
(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE  
STARTING THE QUESTION PAPER.**

- 1. All questions are compulsory.**
- The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him-/ her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
- The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
- There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
- Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
- Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.**

PHD/URS-EE-2022/(Life Sciences)(SET-X)/(D)



1. In eukaryotic DNA replication lagging strand is formed by :
  - (1) RNA fragment
  - (2) Okazaki fragment
  - (3) DNA fragment
  - (4) Nucleotide fragment
  
2. A quantitative way to measure the expression of a gene :
  - (1) PCT
  - (2) RT-PCR
  - (3) Real time RT-PCR
  - (4) Nested PCR
  
3. In positional cloning the starting point is knowledge of the :
  - (1) Isolation of the gene
  - (2) DNA sequence flanking the gene
  - (3) Amino acid sequence of the gene
  - (4) DNA sequence of the gene
  
4. For culturing, plasma from the adult chicken is preferred to mammalian plasma because :
  - (1) It forms a clear and solid coagulum even after dilution
  - (2) It is too opaque
  - (3) It doesn't produce solid clots
  - (4) It forms a semi solid coagulum
  
5. Range of osmolarity tolerated/accepted in mOsm/Kg of H<sub>2</sub>O by mammalian cells is :
  - (1) 150-300
  - (2) 280-360
  - (3) 300-325
  - (4) 360-400

6. According to Eagle, the growth of L-strain and Hela-strain cultures require to have mandatory presence of :
- (1) 6 amino acids
  - (2) 8 amino acids
  - (3) 10 amino acids
  - (4) 12 amino acids
7. What is the concentration of CO<sub>2</sub> required for culturing animal cells ?
- (1) 2-5%
  - (2) 1-10%
  - (3) 10-15%
  - (4) 15-20%
8. What are the main constituents of culture for animal cell growth ?
- (1) Glucose and Glutamine
  - (2) Growth factors
  - (3) Cytokines
  - (4) All of these
9. Protective covering over radical during seed germination is :
- (1) Suspensor
  - (2) Coleorhizha
  - (3) Epithelium
  - (4) Coleoptile
10. Little leaf disease is due to deficiency of :
- (1) Nitrogen
  - (2) Zinc
  - (3) Molybdenum
  - (4) Manganese

11. Chitin is a :
- (1) Polysaccharide
  - (2) Protein
  - (3) Nitrogenous Polysaccharide
  - (4) Lipoprotein
12. Fluidity of bio-membranes can be shown by :
- (1) Electron microscope
  - (2) Tissue culture
  - (3) Phase contrast-microscope
  - (4) Fluorescence Microscope
13. The extent bacterial group that is most closely related to the ancestor from which mitochondria evolved is :
- (1) Cyanobacteria
  - (2) Purple photosynthetic bacteria
  - (3) Archaeobacteria
  - (4) Mehanogens
14. Which of the following amino acids migrates to the positive electrode on paper electrophoresis at a pH of 7.0 ?
- (1) glutamic acid
  - (2) Histidine
  - (3) lysine
  - (4) Arginine
15. Lincoln index is used to measure :
- (1) Population size
  - (2) Population mortality rate
  - (3) Population natality rate
  - (4) Population density

16. Which of the following is *not* a polypeptide ?
- (1) Myoglobin (2)  $\alpha$ -keratin  
(3) Heme (4) Fibroin
17. When  $[S] = K_M$ , the velocity of an enzyme catalyzed reaction is about :
- (1)  $0.5 V_{max}$  (2)  $0.4 V_{max}$   
(3)  $0.2 V_{max}$  (4)  $0.9 V_{max}$
18. The most commonly employed cross-linked polymer is the :
- (1) Polyacrylamide gel  
(2) Collagen  
(3) Celluloses  
(4) Cation exchange resin
19. Which of the following process offers the greatest opportunities for accelerating the evolution of new useful proteins ?
- (1) Exon shuffling  
(2) Interon excision  
(3) Transposon insertion  
(4) DNA amplification
20. Peripheral part of blastoderm where cells lie unseparated from yolk is termed as :
- (1) area opaca  
(2) area pellucida  
(3) area translucent  
(4) zone of junction

21. Aroma in rice is due to :
- (1) Acetyl choline
  - (2) 2-benzyl pyrroline
  - (3) 2-ethyl pyrroline
  - (4) 2-acetyl 1- pyrroline
22. Primordial soup is a set of hypothetical conditions on ancient earth first proposed by .....
- (1) Dmitri Ivanovsky
  - (2) Alexander Oparin
  - (3) Dmitry Anuchin
  - (4) Nikolay Shatsky
23. Which of the following is archaebacteria ?
- (1) Methanogens
  - (2) Mycoplasma
  - (3) Green sulphur bacteria
  - (4) Mycobacterium
24. The brain's ability to change in response to experience or damage is called :
- (1) lateralization
  - (2) lesioning
  - (3) neuroplasticity
  - (4) functionality
25. Which of the following favours endospore formation :
- (1) High concentration of nitrogenous nutrients
  - (2) Low concentration of nitrogenous nutrients
  - (3) Low concentration of oxygen
  - (4) None of the above

26. Recombinant DNase is used for the treatment of :
- (1) Cystic fibrosis
  - (2) Growth defects
  - (3) Kidney disorder
  - (4) Multiple sclerosis
27. A technique by which protein of interest can be purified in a single step :
- (1) Gel filtration chromatography
  - (2) Ion exchange chromatography
  - (3) Affinity chromatography
  - (4) Hydrophobic interaction chromatography
28. The plasmodium initially multiplies within the liver cells and then attacks RBCs causing their rupture. The rupture of RBCs is associated with the release of a toxic substance .....
- |             |               |
|-------------|---------------|
| (1) Hirudin | (2) Heptoin   |
| (3) Heparin | (4) Heamozoin |
29. Organic molecules found in minute quantities in food but that are essential to normal metabolism are called :
- |                  |               |
|------------------|---------------|
| (1) Coenzymes    | (2) Vitamins  |
| (3) Pro vitamins | (4) Cofactors |
30. In the human skeletal muscle and brain cells, the energy yield per molecule of glucose in aerobic respiration is ..... times higher than the energy yield in anaerobic respiration.
- |       |        |        |        |
|-------|--------|--------|--------|
| (1) 2 | (2) 19 | (3) 16 | (4) 18 |
|-------|--------|--------|--------|

31. Who proposed mutation theory :
- (1) J. B. Lamarck (2) Charles Darwin  
(3) Hugo de Vries (4) Mendal
32. T4 polynucleotide kinase is used for :
- (1) Labelling of 3 ends of DNA  
(2) Labelling 5 ends of DNA  
(3) Creating blunt ends of DNA  
(4) Dephosphorylation of DNA
33. Carbon dating method was developed by :
- (1) Willard Libby (2) Bolt Wood  
(3) Simpson (4) Mayer
34. The discovery of Dinosaurian bones from the Intertrappean beds of a jar, Gujarat, Indicating that the Dinosaurs have survived in India even during the :
- (1) Permian (2) Paleocene  
(3) Miocene (4) Pleistocene.
35. The major phenomenon responsible for micro evolution and mega evolution :
- (1) Genetic drift  
(2) Adaptative radiation  
(3) Natural selection  
(4) None of these

36. BAC which can be used for cloning large fragments, is derived from :
- (1) ColE plasmid (2) F plasmid  
(3) 2 $\mu$  plasmid (4) Mu phage
37. An example of convergent evolution is :
- (1) Wing of Hawkmoths, the wing of hawks  
(2) Teeth of domestic dog, teeth of a wolf  
(3) Wings of *Geospiza magnirostris*, wings of *Geospiza fortis*  
(4) None of the above
38. A reporter gene :
- (1) Acts as an activator  
(2) Allows gene expression to be readily measured  
(3) Enhances mRNA stability  
(4) Interacts with DNA polymerase
39. The last common ancestor of humans is :
- (1) Pan troglodytes (2) Homo neanderthalensis  
(3) Lemuroidea (4) Dromaeosaurus
40. Which of the following viruses replicate in cytoplasm ?
- (1) SV40 (2) Adenovirus  
(3) Vaccinia virus (4) Herpes virus
41. Crypsis is a type of :
- (1) Offensive behavior (2) Courtship behavior  
(3) Defensive behavior (4) Forging behavior



42. *Saccharomyces cerevisiae* is used for the production of all of these except :
- (1) Bread (2) Beer  
(3) Brandy (4) Cheese
43. Which method of vinegar production requires that the product be filtered to remove microbes prior to use ?
- (1) Trickle method (2) Bubble method  
(3) Orleans method (4) Open-Vat method
44. Which of the following is a secondary metabolite ?
- (1) Tetracycline (2) Citric acid  
(3) Ethanol (4) None of these
45. The strain of fungi used for the large scale production of citric acid is :
- (1) *Penicillium chrysogenum*  
(2) *Aspergillus niger*  
(3) *Streptomyces Aurecus*  
(4) *Saccharomyces sps*
46. Juice clarification extraction is facilitated by using :
- (1) Amylase (2) Pectinase  
(3) Inulinase (4) Lactase
47. Whey is the by-product in the manufacture of :
- (1) Skimmed milk (2) Butter  
(3) Cheese (4) Yogurt

48. The method of preventing or reducing pathogens in food products by combining many methods like high temperature during processing, low temperature during storage, increasing the acidity etc is called :
- (1) Mixed preservation approach
  - (2) High pressure food preservation
  - (3) Hurdle technology
  - (4) Stumbling technology
49. Cancer of  $\beta$  lymphocytes is called :
- (1) Myeloma
  - (2) Sarcoma
  - (3) Melanoma
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- (1) Produce penicillinase
  - (2) Are gram positive
  - (3) Are gram negative
  - (4) Don't have a cell wall
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- (1) Spleen and thymus
  - (2) Lymph nodes and thymus
  - (3) Spleen and GALT
  - (4) Bone marrow and MALT
83. Which of the following does not participate in the formation of antigen-antibody complexes ?
- (1) Hydrophobic bonds
  - (2) Covalent bonds
  - (3) Electrostatic interactions
  - (4) Van der Waals forces
84. Cells that release histamine and other vasoactive substances in response to allergens are :
- |                 |                 |
|-----------------|-----------------|
| (1) Neutrophils | (2) Macrophages |
| (3) NK cells    | (4) Mast cells  |
85. The most abundant protein in human blood :
- |                    |                 |
|--------------------|-----------------|
| (1) Transferrin    | (2) Albumin     |
| (3) Gamma globulin | (4) Haemoglobin |

86. Which hormone binds to intracellular receptors ?
- (1) Insulin
  - (2) Growth hormone
  - (3) Triiodothyronine
  - (4) Thyroid stimulating hormone
87. Thyroxine is important in the control of :
- (1) Cellular metabolic rates
  - (2) Diabetes mellitus
  - (3) Mitochondrial respiration
  - (4) Calcium uptake
88. What percent of the incident solar energy do plants typically harvest during photosynthesis ?
- |            |            |
|------------|------------|
| (1) 1-2 %  | (2) 5-10%  |
| (3) 10-20% | (4) 20-50% |
89. Which man is known as Java man ?
- |                     |                      |
|---------------------|----------------------|
| (1) Ramapithecus    | (2) Australopithecus |
| (3) Pithecanthropus | (4) Sinanthropus     |
90. Which one among the following is the most important factor in speciation ?
- (1) Geographical isolation
  - (2) Reproductive isolation
  - (3) Ethological isolation
  - (4) Ecological isolation

91. Which of the following processes is involved in using proteins as a source of energy ?
- (1) Oxidative deamination (3) Ketogenesis  
(2) Glycolysis (4) Beta oxidation
92. Which of the following substances are **NOT** stored in the body ?
- (1) Amino acids (2) Glycogen  
(3) Triglyceride (4) Cholesterol
93. Which of the following processes is involved in converting amino acids into glucose ?
- (1) Glucogenolysis (2) Transamination  
(3) Gluconeogenesis (4) Lipogenesis
94. In species where young are precocial, the father is more likely to be :
- (1) Monogamous (2) Polyandrous  
(3) Polygamous (4) Monoandrous
95. Polycistronic gene means :
- (1) One transcription unit encodes one translation unit  
(2) One translation unit organised in one transcription unit  
(3) Several translation units organised in one transcription unit  
(4) Several translation units organised in several transcription units
96. The hormone that promotes rapid elongation of internodes or petiole in deep water rice plant is .....
- (1) Ethylene (2) Gibberlin  
(3) Abscisic acid (4) Cytokinin

97. Which of the following immunoglobulin is present normally in plasma at highest concentration ?
- (1) IgG (2) IgM  
(3) IgA (4) IgD
98. What is the ratio of hydrogen to oxygen molecules in a carbohydrate ?
- (1) 1:1 (2) 1:2  
(3) 2:1 (4) 3:1
99. Which of the following disrupts homeostasis ?
- (1) Positive feedback  
(2) Pressure filtration  
(3) Thermoregulation  
(4) Cellular respiration
100. Which of the following is **not** a conjugated protein ?
- (1) Peptone (2) Phosphoprotein  
(3) Lipoprotein (4) Chromoprotein

2021-22

Answerkey of Entrance Test PHD/URS Life Sciences 2021-

22 ✓

Q No.	A	B	C	D
1	1	1 ✓	3	2
2	3	1 ✓	2	3
3	4	3 ✓	1	2
4	3	3 ✓	2	1
5	4	3 ✓	3	2
6	1	1 ✓	2	4
7	2	1 ✓	1	2
8	2	3 ✓	2	1
9	4	1 ✓	1	2
10	2	1 ✓	3	2
11	3	4 -	3	3
12	2	3 -	4	4
13	1	1 -	2	2
14	2	4 -	1	1
15	3	4 -	2	4
16	2	3 ✓	2	3
17	1	1 ✓	3	1
18	2	1 ✓	3	1
19	1	3 -	1	1
20	3	2 ✓	1	1
21	4	1 ✓	2	4
22	3	3 -	3	2
23	1	4 -	2	1
24	4	3	1	3
25	4	4	2	2
26	3	1	4	1
27	1	2	2	3
28	1	2	1	4
29	3	4	2	2
30	2	2 ✓	2	3
31	4	3 -	3	3
32	2	4 ✓	4	2
33	1	2 -	2	1
34	3	1 ✓	1	2
35	2	2 ✓	4	3
36	1	2 ✓	3	2
37	3	3 -	1	1
38	4	3 ✓	1	2
39	2	1 ✓	1	1
40	3	1 ✓	1	3
41	1	1 ✓	4	3
42	1	4 ✓	2	4
43	3	4 ✓	1	2
44	3	4 ✓	3	1
45	3	2 -	2	2
46	1	1 ✓	1	2
47	1	3 ✓	3	3
48	3	4 ✓	4	3
49	1	2 ✓	2	1
50	1	4 ✓	3	1

Alau  
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Syadaw  
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	A	B	C	D
51	3	4 ✓	4	1
52	4	2 ✓	3	4
53	2	1 ✓	1	4
54	1	3 ✓	4	4
55	4	2 ✓	4	2
56	3	1 ✓	3	1
57	1	3 ✓	1	3
58	1	4 ✓	1	4
59	1	2 ✓	3	2
60	1	3 ✓	2	4
61	1	2 ✓	1	4
62	4	3 ✓	1	3
63	4	2 ✓	3	4
64	4	1 ✓	3	4
65	2	2 ✓	3	2
66	1	4 ✓	1	2
67	3	2 ✓	1	4
68	4	1 ✓	3	3
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70	4	2 ✓	1	3
71	2	4 ✓	1	1
72	3	3 ✓	4	3
73	2	4 ✓	4	4
74	1	4 ✓	4	3
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79	2	2 ✓	2	4
80	2	3 ✓	4	2
81	4	3 ✓	1	4
82	3	2 ✓	3	3
83	4	1 ✓	4	1
84	4	2 ✓	3	4
85	2	3 ✓	4	4
86	2	2 ✓	1	3
87	4	1 ✓	2	1
88	3	2 ✓	2	1
89	2	1 ✓	4	3
90	3	3 ✓	2	2
91	3	3 ✓	4	1
92	4	4 ✓	3	1
93	2	2 ✓	4	3
94	1	1 ✓	4	3
95	2	4 ✓	2	3
96	2	3 ✓	2	1
97	3	1 ✓	4	1
98	3	1 ✓	3	3
99	1	1 ✓	2	1
100	1	1 ✓	3	1

Alamir  
12/2/22

Sumit  
12/2/22

Wij  
12/2/22

Qul  
12/2/22

Syadaw  
12/2/22