1. 'ઉડાન' માટે યોગ્ય વિશેષણ કયું છે?

   A. ઉંચી
   B. તેજ
   C. ધીમી
   D. નરમ

2. 'વિશાખા' એ કયા પ્રકારનું નામ છે?

   A. જાતિવાચક નામ
   B. વ્યક્તિવાચક નામ
   C. સમૂહવાચક નામ
   D. ભાવવાચક નામ

3. 'તમે' માટે યોગ્ય ક્રિયાપદ કયું છે?

   A. કરશો
   B. કરે
   C. કરે છે
   D. કરતો

4. ક્રિયાવિશેષણ કયું છે?
   તમે **આમતેમ** કેમ ફરો છો.

   A. તમે
   B. **આમતેમ**
   C. કેમ
   D. ઉપરમાંથી એક પણ નહિ

5. 'જળમહેલ' સંધિ માટે યોગ્ય વિભાજન શું છે?

   A. જલ + મહેલ
   B. જળ + મહલ
   C. જલ + મહલ
   D. જળ + મહેલ

6. દસ વર્ષના સમયગાળાને શું કહેવાય છે?

A. દાયકો
B. દશક
C. શતક
D. સદી

7. જે કદી હાર ન માને, તે માટે એક શબ્દ કયો છે?

A. જિજ્ઞાસુ
B. અધ્યવસાયી
C. ડરપોક
D. શાંત

8. નીચે આપેલા શબ્દોમાંથી 'સામુદાયિક' શબ્દનો વિરોધાર્થી શબ્દ કયો છે?

A. સામુહિક
B. સાંયોગિક
C. વૈયક્તિક
D. વિભક્ત

9. નીચે આપેલા પૈકીનો કયો શબ્દ 'ચંદ્ર ' શબ્દનો સમાનાર્થી શબ્દ નથી ?

A. સુધાકર
B. વિધુ
C. ઇન્દુ
D. કૌમુદી

10. નીચેનામાંથી કયો અર્થ આકાશનો સમાન અર્થ નથી?

A. અંબર
B. વિહાયત
C. જગત
D. ગગન

11. સંધિ માટે યોગ્ય વિકલ્પ પસંદ કરો:

A. સમ્ + ઈક્ષા = સમીક્ષા
B. સમ્ + ઋદ્ધ = સમૃદ્ધ
C. બંને સાચા છે
D. બંને ખોટા છે

12. જે સૂર્ય ઉગ્યા પછી થાય, તે માટે એક શબ્દ કયો છે?

A. સંધ્યાકાળ
B. મધ્યાહ્ન
C. સૂર્યોદય
D. પ્રભાત

13. નીચેનામાંથી કઇ જોડણી ખોટી છે?

A. યુનિવર્સિટી
B. યુનિફોર્મ
C. યુનિકોર્ન
D. બધા વિકલ્પો સાચા છે

14. 'ગંગા ગયા ગંગાદાસ' - આ રૂઢિપ્રયોગનો અર્થ શું છે?

A. તીર્થ સ્થળે જવું
B. મફત વસ્તુનો આનંદ માણવો
C. મરજી મુજબ કામ કરવું
D. ઘણું શ્રમ કરવું

15. 'હાથી ગયું રસ્તે અને કૂતરા ભસે' - આનો અર્થ શું થાય છે?

A. હાથી રસ્તા પર ગયો
B. માટી વાંચી શકાતી નથી
C. મહાન વ્યક્તિ પર નીચું વ્યક્તિત્વ વિમર્શ કરે
D. મોટી વસ્તુઓનો આનંદ માણવો

16. 'વાવેલા વેર નાખવા'નો અર્થ શું થાય છે?

A. એક પકડાય તેવુંનું જવાબદારી લેવાથી ઉચિત
B. પોતાના કરેલા પુણ્યનો ફળ મેળવવું
C. બીજી વ્યક્તિ માટે પ્રયત્ન કરવો
D. નિષ્ફળ થવું

17. નીચેના પૈકી પ્રત્યક્ષ શબ્દની સાચી સંધિ કઈ છે?

A. પ્રતિ + અક્ષ
B. પ્ર + ત્યક્ષ
C. પ્રતી + અક્ષ
D. પ્રતી + યક્ષ

18. 'એકવચન' ના વિકલ્પમાં શું આવે છે?

A. વૃક્ષ
B. વૃક્ષો
C. વૃક્ષના
D. વૃક્ષોમાં

19. 'શુદ્ધ જોડણી શું છે?

A. વહેલી
B. વહાલી
C. વહાલી
D. વહિલી

20. વાચ્યના પ્રકારો કેટલા છે?

A. 2
B. 4
C. 3
D. 5

21. દૂઝણી ગાયની લાત પણ સારી - આ કહેવત નો સાચો અર્થ કયો છે?

A. દૂઝણી ગાય કોઈ ને નુકસાન પહોંચાડતી નથી
B. જાહેર વસ્તુઓ સૌના ભલા માટે હોય છે
C. દૂઝણી ગાય દૂધ આપતી નથી
D. ફાયદો કરાવનારના દોષ પણ સહી લેવા યોગ્ય હોય છે

22. 'બંને વ્યક્તિઓ સરખા' - આ અર્થ નીચે આપેલ પૈકી કઈ કહેવતનો છે?

A. ઘર કી મુર્ગી દાલ બરાબર
B. ચોરનો ભાઈ ઘંટીચોર
C. ધોબીનો કૂતરો નહિ ઘરનો નહિ ઘાટનો
D. નાદાનની દોસ્તી જીવનું જોખમ

23. જન્મથી જ પૈસાદાર- શબ્દસમૂહ માટે એક શબ્દ પસંદ કરો?

A. ગરીબ
B. મહેમાન
C. ગર્ભશ્રીમંત
D. ધનવાન

24. પગથી માથા સુધી- શબ્દસમૂહ માટે એક શબ્દ પસંદ કરો?

A. સર્વાંગી
B. નખશીખ
C. સમગ્ર
D. અંતરમુખ

25. 'બાળક' શબ્દનો વચન ફેરવો:

A. બાળકો
B. બાળકી
C. બાળપણ
D. બાળગજ

26. Identify the correctly punctuated sentence:

A. She said, "I am going to the market."
B. She said, "I am going to the market".
C. She said "I am going to the market."
D. She said "I am going to the market".

27. Choose the sentence that uses a subjunctive mood correctly:

A. If I was taller, I would join the basketball team.
B. If I were taller, I would join the basketball team.
C. If I am taller, I would join the basketball team.
D. If I would be taller, I join the basketball team.

28. Select the correct passive form of the sentence: "The committee will review the document tomorrow."

A. The document will be reviewed by the committee tomorrow.
B. The document would be reviewed by the committee tomorrow.
C. The document is being reviewed by the committee tomorrow.
D. The document will review by the committee tomorrow.

29. Choose the option with the correct use of prepositions:

A. He is good in playing football.
B. He is good on playing football.
C. He is good at playing football.
D. He is good for playing football.

30. Select the sentence with the correct pronoun agreement:

A. Everyone must bring their own books.
B. Everyone must bring his or her own books.
C. Each of the students must bring their own books.
D. None of the above.

31. Find the synonym for "Ebullient":

A. Depressed
B. Effervescent
C. Dull
D. Unexcited

32. Choose the sentence with the correct use of an indefinite article:

A. She is an university professor.
B. He is a European tourist.
C. It's an honest mistake.
D. They saw a unicorn.

33. Identify the sentence where the word 'respectively' is used correctly:

A. She gave apples and oranges to Anna and John, respectively.
B. She gave respectively apples and oranges to Anna and John.
C. She respectively gave apples and oranges to Anna and John.
D. She gave apples and oranges respectively to Anna and John.

34. Choose the synonym for "Haphazard":

A. Organized
B. Random
C. Systematic
D. Orderly

35. Choose the sentence where 'its' and 'it's' are used correctly:

A. Its a beautiful day and the bird flapped its wings.
B. It's a beautiful day and the bird flapped it's wings.
C. Its a beautiful day and the bird flapped it's wings.
D. It's a beautiful day and the bird flapped its wings.

36. The meaning of "Down to the wire":

A. To be straightforward
B. Something leading to a result that is not decided until the last possible moment
C. To be in a comfortable situation
D. To be dangerous

37. The meaning of "Feeling blue":

A. Feeling happy
B. Feeling angry
C. Feeling excited
D. Feeling sad

38. Find the antonym for "Laud":

A. Praise
B. Extol
C. Criticize
D. Compliment

39. Choose the antonym for "Meticulous":

A. Careful
B. Diligent
C. Careless
D. Thorough

40. Select the sentence in the present perfect continuous tense:

A. He has been working here since 2010.
B. He worked here since 2010.
C. He is working here since 2010.
D. He works here since 2010.

41. A person who helps even a stranger in difficulty.

A. Samaritan
B. Philanthropist
C. Benefactor
D. Altruist

42. Choose the correct past tense form: "Last year, he ____ to Spain."

A. travels
B. travelled
C. has travelled
D. was travelling

43. A place where birds are kept.

A. Zoo
B. Aquarium
C. Aviary
D. Kennel

44. His hard work will surely _____ in success in the exam.

A. result
B. fail
C. falter
D. delay

45. The audience was _____ by the singer's breathtaking performance.

A. bored
B. confused
C. captivated
D. annoyed

46. Identify the correctly spelled word:

A. Privilege
B. Priviledge
C. Privelege
D. Privlege

47. Identify the correctly spelled word:

A. Conscience
B. Consience
C. Consciense
D. Conscious

48. What does "Get cold feet" mean?

A. To have cold body parts
B. To have second thoughts
C. To walk on ice
D. To dance

49. Select the sentence with correct capitalization:

A. We will visit the Eiffel tower in the spring.
B. We will visit the Eiffel Tower in the Spring.
C. We will visit the eiffel tower in the spring.
D. We will visit the Eiffel Tower in the spring.

50. Complete the Paragraph:
The recent election was the most contentious in decades. The results were closely contested, leading to recounts in several districts. Amidst this tense atmosphere, _____

A. the previous government continued to hold power.
B. the winning party conceded defeat gracefully.
C. the election commission announced a re-election.
D. both parties called for calm and a fair resolution.

51. Which of the following is used by cells to interact with other cells?
.

A. Cell tubules
B. Cell junctions
C. Cell adhesions
D. Cell detectors

52. Once the erythrocytes enter the blood in humans, it is estimated that they have an
. average lifetime of how many days. Is it:

A. 10 days
B. 100 days
C. 120 days
D. 360 days

53. Cariology is the study of the:
.

A. human heart
B. tooth decay
C. kidneys
D. liver

54. There are several levels of protein structure, the most complex of which is
.

A. Primary
B. Secondary
C. Tertiary
D. Quaternary

55. Which of the following is not a lipid?
. Chitin

A. terpenes
B. steroids
C. prostaglandins
D. Chitin

56. In the formation of a macromolecule, what type of bond would join two amino acid
. subunits?

A. ionic bond
B. phosphodiester bond
C. peptide bond
D. hydrogen bond

57. An amino acids that yield acetyl-CoA during catabolism
.

A. Ketogenic
B. Acetyl Amino Acid
C. Essential
D. Glucogenic

58. Complex II of the electron transport chain is unique because it does not:
.

A. Pump protons across the mitochondrial membrane
B. Involve iron-sulfur clusters
C. Use oxygen as an electron acceptor
D. Contribute directly to ATP synthesis

59. Choose the incorrect statement

A. Lysine is the only exclusively ketogenic amino acids.
B. Isoleucine, threonine both glucogenic and ketogenic.
C. Aspartatic acid, asparagine glucogenic.
D. None of the options are correct

60. Who is most likely to develop scurvy – A vitamin C deficiency?

A. A pregnant woman
B. A malnourished child
C. A long-time alcoholic
D. A person with the eating disorder anorexia nervosa

61. Choose the incorrect statement :

A. Vitamin D helps regulate the amount of calcium and phosphate in the body
B. A lack of vitamin D can lead to bone deformities such as rickets
C. Vitamin D is water soluble and obtained from sun exposure
D. Vitamin D also referred to as calciferol

62. Ribozymes are :

A. RNA acting as enzymes
B. Ribose sugar acting as enzyme
C. Antibodies acting as enzymes
D. Protein acting as enzyme

63. Choose the incorrect statement :

A. A proenzyme, also known as a zymogen
B. Proenzymes are produced and secreted in an inactive form
C. The activation processes are reversible.
D. Proenzymes can be used to control gene editing in diseased cells.

64. Lock and Key model is also known as :

A. Template model
B. Induced fit model
C. Khosland's Model
D. Enzyme-substrate interaction model

65. Choose the correct options about the Motifs :

A. A *motif* is a short conserved sequence pattern associated with distinct functions of a protein or DNA
B. A typical motif, such as a Zn-finger motif, is ten to twenty amino acids long
C. Motifs and domains are evolutionarily more conserved than other regions of a protein
D. All are correct

66. Apoenzymes dissociates from co-enzymes due to a :

A. Change in pH
B. Change in temperature
C. Change in substrate concentration
D. Change in inhibitor concentration

67. Who is considered the father of modern animal biotechnology?

A. Robert Hooke
B. Gregor Mendel
C. Edward Jenner
D. Ian Wilmut

68. In animal biotechnology, which gene-editing tool is widely used for precise genome editing?

A. CRISPR-Cas9
B. RNA interference
C. Polymerase chain reaction (PCR)
D. Restriction enzymes

69. The first genetically modified food animal, a transgenic fish, was developed in the 1980s. What was this fish called?

A. Fishzilla
B. GloFish
C. AquaBounty salmon
D. Salmonox

70. What is the most commonly used nutrient medium for the culture of animal cells?

A. Murashige and Skoog (MS) medium
B. Dulbecco's Modified Eagle's Medium (DMEM)
C. Luria-Bertani (LB) medium
D. Earle's Balanced Salt Solution (EBSS)

71. Adenoviral vectors are commonly used in animal tissue culture due to their:

A. Ability to integrate into the host genome
B. Non-infectivity
C. Inability to infect animal cells
D. High efficiency in gene transfer

72. Which hormone is typically used to stimulate ovulation in IVF patients?

A. Progesterone
B. Luteinizing hormone (LH)
C. Human chorionic gonadotropin (hCG)
D. Follicle-stimulating hormone (FSH)

73. In IVF, what is the purpose of performing a intracytoplasmic sperm injection (ICSI)?

A. To increase sperm count
B. To directly inject sperm into the egg when sperm motility is low
C. To extract sperm from the testicles
D. To enhance egg maturation

74. In a CO_2 incubator, what is the significance of maintaining a CO_2 concentration of around 5%?

A. It helps to maintain the pH of the culture medium by balancing the acid-base environment
B. It enhances the growth rate of all cells
C. It reduces microbial contamination
D. It provides essential nutrients for cell growth

75. Which type of biosafety cabinet is used when working with materials that may contain infectious agents?

A. Class I
B. Class II
C. Class III
D. Class IV

76. Which of the following plant growth regulators are commonly used in tissue culture media to promote shoot regeneration?

A. Gibberellic acid
B. Indole-3-acetic acid (IAA)
C. Benzylaminopurine (BAP)
D. D. Abscisic acid

77. What role do vitamins play in plant tissue culture media?

A. They serve as hormones for growth regulation
B. They enhance cell differentiation and organogenesis
C. They act as antibiotics to prevent microbial growth
D. They provide essential cofactors for enzymatic reactions

78. Which of the following is the primary function of the T-DNA region of the Ti plasmid in Agrobacterium-mediated transformation?

A. To transport the T-DNA from Agrobacterium to the plant nucleus
B. To encode for the synthesis of opines in plant cells
C. To produce virulence proteins that are involved in the infection process
D. To mediate the integration of the Agrobacterium genome into the host plant genome

79. What role does phosphorus play in plant growth?

A. It helps in the formation of amino acids and proteins.
B. It is involved in the process of photosynthesis.
C. It is important for energy transfer and root development.
D. It helps in regulating the water balance in plants.

80. Potassium is important in plants because it helps with:

A. Enhancing cell division
B. Regulating water and nutrient movement
C. Increasing nitrogen fixation
D. Promoting flowering and fruit development

81. The synthesis of which plant hormone is primarily associated with the mevalonate pathway?

A. Gibberellins
B. Auxins
C. Cytokinins
D. Abscisic Acid

82. Which of the following is the primary precursor for the synthesis of abscisic acid (ABA) in plants?

A. Mevalonic acid
B. Carotenoids
C. Indole-3-acetic acid
D. d) Glutamine

83. Jasmonic acid (JA) is synthesized from which of the following fatty acids?

A. Oleic acid
B. Linoleic acid
C. Palmitic acid
B. D. Stearic acid

84. In plant tissue culture, what is the term for the process of inducing a whole plant from a single cell or a group of cells?

A. Micropropagation
B. Embryogenesis
C. Clonal propagation
D. Organogenesis

85. Which of the following is a primary advantage of plant tissue culture techniques in agriculture?

A. Genetic modification of plants
B. Mass production of genetically identical plants
B. Enhancement of biodiversity
C. Creating resistant plant varieties

86. In the production of ethanol from sugar, the microorganism Saccharomyces cerevisiae primarily utilizes which metabolic pathway for fermentation?

A. Pentose phosphate pathway
B. Embden-Meyerhof-Parnas (EMP) pathway
C. Tricarboxylic acid (TCA) cycle
B. Entner-Doudoroff pathway

87. In the production of recombinant proteins using *Escherichia coli* in an industrial setting, which of the following is most commonly used to induce gene expression?

A. Lactose
B. Arabinose
C. IPTG (Isopropyl β-D-1-thiogalactopyranoside)
D. Glucose

88. Which of the following organisms is commonly used in the commercial production of vitamin B12?

A. *Streptomyces griseus*
B. *Propionibacterium shermanii*
C. *Pseudomonas aeruginosa*
D. *Corynebacterium glutamicum*

89. What is the main disadvantage of using E. coli for the production of recombinant proteins in industrial fermentation?

A. Low protein yield
B. Limited growth conditions
C. Formation of inclusion bodies
D. Lack of post-translational modifications

90. Robert Koch's postulates were essential in proving the causative relationship between pathogens and diseases. Which of the following is one of Koch's postulates?

A. The pathogen must be present in all cases of the disease but absent from healthy organisms.
B. The disease-causing organism can only be cultured in vivo.
C. The disease-causing organism must be able to grow on a solid medium.
D. A vaccine must be developed to prevent the disease.

91. Which of the following is the correct sequence of reagents used in Gram Staining?

A. Crystal violet → Iodine → Alcohol → Safranin
B. Crystal violet → Alcohol → Iodine → Safranin
C. Safranin → Crystal violet → Alcohol → Iodine
D. Iodine → Crystal violet → Alcohol → Safranin

92. What is the temperature range for warm trypsinization in cell culture?

A. 28-30 °C
B. 36.5 – 37°C
C. 40-45°C
D. 50-50.5°C

93. Which of the following is caused by a microbial virus?

A. Tuberculosis
B. Malaria
C. Influenza
D. Tetanus

94. Which of the following is an example of selective media used for isolating specific types of microorganisms?

A. Nutrient agar
B. MacConkey agar
C. Sabouraud agar
D. Blood agar

95. In industrial fermentation, the term "yield coefficient" refers to:

A. The amount of raw material consumed in the fermentation process
B. The total biomass produced in relation to the limiting nutrient
C. The ratio of product formation to the limiting nutrient consumed
D. The time required to complete the fermentation process

96. Which of the following is NOT typically used in the production of biofuels through microbial fermentation?

A. *Saccharomyces cerevisiae* (Yeast)
B. *Escherichia coli*
C. *Clostridium acetobutylicum*
D. *Lactobacillus bulgaricus*

97. In the context of bioreactor design, which parameter is critical for controlling microbial growth?

A. Temperature
B. pH
C. Oxygen concentration
D. All of the above

98. A fermenter operates at a volume of 1000 L with a dilution rate of 0.1 h^{-1}. The steady-state biomass concentration in the fermenter is 5 g/L. Calculate the rate of biomass production (g/h) in the bioreactor.

A. 500 g/h
B. 50 g/h
C. 500 kg/h
D. 5000g/h

99. In fermenter design, the aspect ratio (height/diameter) is important because:

A. It controls the rate of heat transfer in the system
B. It influences the efficiency of mixing and oxygen transfer
C. It determines the maximum amount of biomass produced
D. It is irrelevant to the overall performance of the fermenter

100. Which of the following is the primary function of a baffle in a fermenter?

A. To maintain the pH balance of the culture
B. To provide a surface for microbial growth
C. To promote turbulence and improve oxygen transfer efficiency
D. To increase the fermentation temperature

101. Reverse transcriptase is commonly used in which of the following techniques?

A. DNA sequencing
B. PCR amplification of DNA
C. RNA sequencing and cDNA library construction
D. Southern blotting

102. Which of the following restriction enzymes has an 8-base recognition sequence?

A. EcoRI
B. NotI
C. BamHI
D. Hind III

103. For a recognition sequence that is 4 bases long, how frequently would it occur in a DNA sequence?

A. Every 4 base pairs
B. Every 16 base pairs
C. Every 256 base pairs
D. Every 65,536 base pairs

104. Which of the following statements is correct about the role of alkaline phosphatase in molecular cloning?

A. Alkaline phosphatase adds phosphate groups to the 5' ends of DNA fragments to prevent re-ligation.
B. Alkaline phosphatase removes phosphate groups from the 3' ends of DNA fragments to enhance ligation.
C. Alkaline phosphatase removes phosphate groups from the 5' ends of DNA fragments to prevent re-ligation.
D. Alkaline phosphatase adds phosphate groups to the 3' ends of DNA fragments to prevent re-ligation.

105. Which of the following factors primarily determines the copy number of a plasmid in a bacterial cell?

A. The size of the plasmid
B. The sequence of the origin of replication (ori)
C. The presence of antibiotic resistance genes
D. d) The type of bacterial host used

106. Which of the following statements about plasmid size is correct?

A. Smaller plasmids are always more stable in bacterial cells than larger plasmids.
B. Larger plasmids generally have higher copy numbers than smaller plasmids.
C. Larger plasmids tend to be more stable and easier to maintain in bacterial cultures.
D. d) Smaller plasmids are generally easier to clone and manipulate than larger plasmids.

107. The PBR322 plasmid contains two antibiotic resistance genes. Which of the following are they?

A. Ampicillin and Kanamycin resistance genes
B. Tetracycline and Chloramphenicol resistance genes
C. Ampicillin and Tetracycline resistance genes
D. Streptomycin and Ampicillin resistance genes

108. Which of the following is true about cDNA libraries?

A. cDNA libraries contain the entire genomic sequence of an organism.
B. cDNA libraries are made by reverse transcription of mRNA into complementary DNA (cDNA).
C. cDNA libraries include both exonic and intronic sequences of genes.
D. cDNA libraries are constructed using genomic DNA as a template.

109. Which of the following best describes the role of an adaptor in programming?

A. An adaptor changes the behaviour of a system to meet user requirements.
B. An adaptor allows two incompatible interfaces to communicate by translating calls from one interface to another.
C. An adaptor is used to connect hardware devices to a system.
D. An adaptor provides additional memory to a program

110. What is the main principle behind RAPD (Random Amplified Polymorphic DNA) technique?

A. Amplifying specific regions of DNA using sequence-specific primers
B. Identifying specific genes in the genome
C. Randomly amplifying DNA fragments using arbitrary primers
D. Cloning and sequencing entire genomes

111. What is one of the major limitations of RAPD analysis?

A. It requires long sequencing times.
B. Nearly all RAPD markers are dominant, i.e. it is not possible to distinguish whether a DNA segment is amplified from a locus that is heterozygous (1 copy) or homozygous (2 copies).
C. It can only be applied to animal DNA.
D. It requires the use of a very specific set of primers.

112. Which of the following statements about DNA methylation is correct?

A. DNA methylation occurs primarily at cytosine residues in CpG dinucleotides.
B. DNA methylation is associated with gene activation and increased transcription.
C. DNA methylation leads to the loss of gene expression by promoting histone acetylation.
D. DNA methylation is involved only in prokaryotic organisms.

113. What is the key step in the mechanism of DNA ligase in joining two DNA fragments?

A. DNA ligase directly cleaves the phosphate backbone of DNA.
B. DNA ligase forms a covalent bond between the 3' hydroxyl group and 5' phosphate group of adjacent nucleotides.
C. DNA ligase adds a methyl group to the DNA backbone.
D. DNA ligase unwinds the DNA double helix to expose single-stranded regions

114. Match of the following :

1. Exonuclease I	A) Removes single-stranded DNA from the 3' end.
2. Exonuclease II	B) Involved in the repair of double-strand breaks by removing 3' overhangs.
3. Exonuclease III	C) It has RNase activity
4. Exonuclease IV	D) This exonuclease requires Mg 2+.

A. 1-A 2-B 3-C 4-D.
B. 1-D 2-C 3-B 4-A
C. 1-A 2-C 3-B 4-D
D. 1-A 2-B 3-C 4-D

115. Which of the following statements is true regarding topoisomerase type II?

A. It introduces negative supercoils into DNA
B. It cuts one strand of the DNA to relieve supercoiling
C. It requires ATP to perform its function
D. It only works on linear DNA molecules

116. DNA polymerase I in prokaryotes is responsible for which of the following?

A. Synthesizing the leading strand
B. Replacing RNA primers with DNA
C. Repairing DNA damage
D. Unwinding the DNA helix

117. Which of the following is a clinical application of topoisomerase inhibitors?

A. Treatment of bacterial infections
B. Prevention of DNA replication during chemotherapy
C. Blocking protein synthesis
D. Inhibition of protein degradation

118. Which of the following statements about the genetic code is correct?

A. The genetic code is universal, meaning it is the same in all organisms.
B. The genetic code consists of 20 codons, each corresponding to one amino acid.
C. The genetic code is degenerate, meaning some amino acids are encoded by multiple codons.
D. The genetic code uses only 4 different bases to encode information

119. Which of the following is a characteristic of eukaryotic ribosomes?

A. They consist of a 50S large subunit and a 30S small subunit.
B. They are found exclusively in the cytoplasm of the cell.
C. They consist of a 60S large subunit and a 40S small subunit.
D. They are only involved in the translation of mRNA in the mitochondria.

120. Which of the following is true about polyadenylation in mRNA processing?

A. It adds a poly-A tail to the 5' end of the mRNA
B. It occurs in prokaryotes but not in eukaryotes
C. It protects the mRNA from exonucleases and aids in export to the cytoplasm
D. It removes exons from the pre-mRNA

121. Which type of RNA is primarily involved in the removal of introns from pre-mRNA during splicing?

A. Ribosomal RNA (rRNA)
B. Messenger RNA (mRNA)
C. Small nuclear RNA (snRNA)
D. Transfer RNA (tRNA)

122. The trp operon is an example of a(n):

A. Inducible operon
B. None of the above
C. Constitutive operon
D. Repressible operon

123. Which of the following is true about the lac operon in the presence of lactose?

A. The repressor binds to the operator, preventing transcription
B. The repressor binds to the lactose molecule, enabling transcription
C. Lactose acts as an activator of transcription
D. The operon is not affected by lactose presence

124. A regulon that is involved in controlling genes for stress responses (e.g., heat shock or DNA repair) is usually regulated by:

A. A single operator sequence
B. Multiple transcription factors acting on different operons
C. Ribosomal RNA
D. A single repressor protein

125. In the case of the ara operon, the presence of arabinose causes:

A. The repressor to bind to the operator, blocking transcription
B. A decrease in gene expression
C. The activation of transcription by the AraC protein
D. The promoter to be inhibited by the repressor protein

126. Which of the following is NOT a criterion for patentability under Indian law?

A. Novelty
B. Inventive step
C. Industrial applicability
D. Public use

127. What is the term of protection for a patent in India?

A. 10 years
B. 15 years
C. 20 years
D. 25 years

128. A trademark is used to identify and distinguish the goods or services of one party from those of others. Which of the following is true about trademark protection in India?

A. Trademark protection is granted for 10 years and can be renewed indefinitely.
B. Trademark protection lasts for 25 years with no possibility of renewal.
C. Trademark protection in India is automatically granted for all registered businesses.
D. Trademarks are not valid under Indian law unless registered

129. In India, which of the following is eligible for Geographical Indication (GI) registration?

A. Products with specific quality and reputation linked to their geographical origin
B. Any product with mass appeal
C. Any product produced anywhere in the world
D. A product that has no specific connection to its origin

130. Which of the following biosafety levels is considered the highest level of containment, suitable for working with highly dangerous pathogens?

A. Biosafety Level 1 (BSL-1)
B. Biosafety Level 2 (BSL-2)
C. Biosafety Level 3 (BSL-3)
D. Biosafety Level 4 (BSL-4)

131. The Biosafety Guidelines in India regulate which of the following aspects in relation to biotechnology research?

A. Prevention of unauthorized export of genetic materials
B. Environmental safety and human health risks associated with genetically modified organisms (GMOs)
C. Granting patents for biotechnology inventions
D. Protection of traditional knowledge in biotechnology

132. Which of the following statements about biotech-related patents in India is correct?

A. Genetic material can be patented, but only if it is isolated and purified.
B. Biotechnological inventions cannot be patented if they are derived from traditional knowledge.
C. Biotech patents are automatically granted in India without a detailed examination process.
D. The patent law in India prohibits patents for biotechnological inventions under all circumstance

133. Where is the headquarters of the World Intellectual Property Organization (WIPO) located?

A. Geneva, Switzerland
B. Paris, France
C. New York, USA
D. Tokyo, Japan

134. The Cartagena Protocol on Biosafety is an international agreement aimed at:

A. Protecting biodiversity from genetic modification risks
B. Regulating the trade of genetically modified organisms (GMOs) across borders
C. Promoting the patenting of genetically modified crops
D. Establishing biosafety guidelines for pharmaceutical companies

135. The SOS response regulon in *E. coli* is activated in response to:

A. Nitrogen starvation
B. Heat shock
C. The presence of glucose
D. DNA damage

136. The major histocompatibility complex (MHC) class I molecules are primarily involved in presenting antigens to:

A. Helper T cells (CD4+)
B. Cytotoxic T cells (CD8+)
C. B cells
D. Dendritic cells

137. The peptide-binding groove of MHC class I molecules typically binds peptides of how many amino acids in length?

A. 9-11
B. 5-8
C. 12-15
D. 15-20

138. What is the primary role of epitopes in immunology?

A. To activate B cells only
B. To inhibit immune responses
C. To neutralize foreign pathogens
D. To serve as the part of the antigen recognized by the immune system

139. Which of the following best describes an autoimmune disease?

A. A condition where the immune system overreacts to foreign pathogens
B. A disease in which the immune system attacks the body's own tissues
C. A disease where the body does not produce enough antibodies
D. A response to foreign antigens that doesn't involve immune cells

140. Which of the following is an example of an autoimmune disease?

A. Tuberculosis
B. Malaria
C. Rheumatoid arthritis
D. Influenza

141. Antibodies are primarily composed of which type of protein structure?

A. Alpha helix
B. Beta sheets
C. Polypeptide chains with heavy and light chains
D. Lipid bilayers

142. The Fc region of an antibody is responsible for:

A. Binding to the antigen
B. Activating T cells
C. Neutralizing pathogens
D. Mediating interactions with immune cells and complement proteins

143. What is the main function of liposomes in drug delivery systems?

A. To enhance drug absorption by cells
B. To target specific tissues for controlled release of drugs
C. To reduce the toxicity of drugs
D. To degrade drugs in the body

144. Nanoparticles in drug delivery are used to:

A. Increase the solubility and bioavailability of drugs
B. Prevent the release of drugs from the system
C. Activate immune responses
D. Reduce the side effects of drugs by blocking the immune system

145. Which of the following is NOT a characteristic of nanoparticles in drug delivery?

A. High surface area to volume ratio
B. Ability to encapsulate both hydrophilic and hydrophobic drugs
C. Ability to specifically target cells or tissues
D. Cannot cross biological membranes

146. In which part of the immune system do T lymphocytes mature?

A. Bone marrow
B. Thymus
C. Lymph nodes
D. Spleen

147. Which of the following immune system cells are primarily responsible for producing antibodies?

A. Helper T cells
B. B cells
C. Cytotoxic T cells
D. Dendritic cells

148. What is the purpose of using nanoparticles in vaccine delivery systems?

A. To prolong the shelf life of the vaccine
B. To enhance the immune response and increase antigen presentation
C. To reduce the cost of vaccine production
D. To prevent the need for booster doses

149. A vaccine that contains a weakened form of the pathogen is known as a:

A. Inactivated vaccine
B. Subunit vaccine
C. Attenuated vaccine
D. DNA vaccine

150. Which of the following is a common type of nanoparticle used in drug delivery?

A. Gold nanoparticles
B. Copper nanoparticles
C. Iron nanoparticles
D. Zinc nanoparticles

151. What is the FASTA format used for in bioinformatics?

A. Storing protein sequence data
B. Storing genetic data for storage purposes
C. Storing DNA or protein sequence data
D. Analysis of protein structure

152. In a dot plot, a "dot" represents:

A. The difference between two aligned sequences
B. The exact match of two corresponding residues
C. The length of a sequence
D. The mutation rate between sequences

153. The BLOSUM matrix is primarily used in:

A. Structural alignment of RNA sequences
B. Predicting the folding of proteins
C. Sequence alignment of proteins
D. Mapping the gene locations

154. Which of the following is a key feature of flow cytometry?

A. It analyzes only the genetic material in cells
B. It uses antibodies tagged with fluorescent markers to identify specific cell types
C. It can only analyze single cells but not cell populations
D. It is used only for microbial analysis

155. The unit of turbidity in water is typically measured in:

A. Parts per million (ppm)
B. Hazzan Unit
C. Micrograms per liter
D. Nephelometric Unit

156. The standard noise pollution limit for residential areas, according to WHO, is typically:

A. 40 dB
B. 55 dB
C. 70 dB
D. 90 dB

157. Which of the following zones in a lake is known as the **photic zone**, where most biological activity occurs?

A. Littoral zone
B. Profundal zone
C. Pelagic zone
D. Aphotic zone

158. Minamata disease is primarily caused by the accumulation of which toxic substance in the environment?

A. Arsenic
B. Lead
C. Mercury
D. Cyanide

159. Which of the following is a primary application of NMR in biological research?

A. Determining DNA sequence
B. Analyzing protein structure
C. Measuring the DNA replication rate
D. Observing enzyme activity

160. In native SDS-PAGE, proteins are separated based on their:

A. Charge
B. Shape
C. Size and charge
D. Size and shape

161. The Human Genome Project successfully mapped how many base pairs in the human genome?

A. Approximately 1 billion
B. Approximately 3 billion
C. Approximately 5 billion
D. Approximately 6 billion

162. The A-class genes in the ABC model are primarily responsible for the development of which part of the flower?

A. Carpels
B. Stamens
C. Sepals
B. d) Petals

163. In the NOD gene classification, the NodA, NodB, and NodC genes are involved in the synthesis of:

A. Nitrogenase enzyme
B. The lipochitin oligosaccharides essential for nodulation
C. The production of amino acids
D. The formation of root hairs

164. In an MBR system, the membrane is used to:

A. Remove excess nutrients from the wastewater
B. Increase the microbial population in the reactor
C. Separate solids from liquids before biological treatment
D. Remove suspended solids and pathogens from the treated water

165. The biosynthesis of aromatic amino acids in plants and bacteria occurs via which pathway?

A. Shikimate pathway
B. Pentose phosphate pathway
C. Glycolytic pathway
D. TCA cycle

166. Which of the following is required for performing a Chi-square test?

A. The data must be normally distributed
B. The data should consist of continuous variables
C. The data should be in the form of counts or frequencies
D. The sample size must be greater than 30

167. Which of the following is the correct sequence of reactions in the urea cycle?

A. Carbamoyl phosphate → Citrulline → Arginine → Ornithine → Urea
B. Ammonia → Carbamoyl phosphate → Citrulline → Argininosuccinate → Arginine → Ornithine → Urea
C. Citrulline → Argininosuccinate → Ornithine → Urea → Carbamoyl phosphate
D. Arginine → Citrulline → Carbamoyl phosphate → Urea → Argininosuccinate

168. Which of the following statements accurately describes the mechanisms of uniport and symport transport across cell membranes?

A. Uniport involves the movement of two or more molecules in the same direction, while symport involves the movement of only one molecule across the membrane.
B. Uniport refers to the transport of a single type of molecule in one direction, while symport involves the simultaneous movement of two or more molecules in the same direction.
C. Uniport requires ATP, whereas symport does not require ATP.
D. Uniport and symport both require energy in the form of ATP to function.

169. Which of the following is a characteristic feature of primary succession?

A. It occurs in areas that have experienced a disturbance, such as fire or flood.
B. It begins with the colonization of lichens and mosses in barren environments.
C. It requires the presence of a soil layer for the process to start.
D. It leads to the rapid growth of established plant communities within a few years.

170. Which of the following factors is NOT considered in the calculation of the Shannon-Wiener Index?

A. The number of species in the community
B. The relative abundance of each species
C. The size of each individual organism
D. The evenness of species distribution

171. The impact factor of a scientific journal is calculated based on which of the following?

A. The number of articles published in the journal per year.
B. The number of citations received by articles published in the journal over a specific period.
C. The size of the journal's editorial board.
D. The reputation of the publisher.

172. In a bioreactor, increasing the Reynolds number is likely to lead to:

A. Decreased shear stress on cells.
B. Increased mixing efficiency and possibly more cell growth.
C. A decrease in the oxygen transfer rate.
D. Reduced turbulence, leading to lower heat dissipation.

173. Which of the following is an example of divergent evolution?

A. The development of wings in birds and bats from a common ancestor.
B. The development of similar traits in organisms that are not closely related, like sharks and dolphins.
C. The formation of new species in different environments, like the finches of the Galápagos Islands.
D. The development of antibiotic resistance in bacteria.

174. Which of the following statements about the M phase of the cell cycle is true?

A. It is the phase where the cell grows and prepares for DNA replication.
B. It includes both mitosis and cytokinesis, leading to cell division.
C. It is the phase where the cell performs its normal functions without dividing.
D. DNA replication occurs during the M phase.

175. In a Cot curve, which type of DNA sequence will show a steep slope during the initial phase of reassociation?

A. Repetitive DNA sequences
B. Unique (non-repetitive) DNA sequences
C. Highly methylated DNA sequences
D. tRNA sequences

176. Which of the following happens when an F+ cell conjugates with an F- cell?

A. The F- cell becomes Hfr
B. The F+ cell maintains its F plasmid, and the F- cell becomes F+
C. Both cells lose the F factor
D. The F+ cell becomes an F- cell

177. Which of the following describes a situation in which the F plasmid excises from the chromosome and takes some chromosomal DNA with it?

A. Hfr transfer
B. Transformation
C. F' plasmid formation
D. Transduction

178. In FISH (Fluorescence In Situ Hybridization), the probe is used to:

A. Quantify the amount of DNA in a sample
B. Visualize specific nucleic acid sequences in a cell
C. Measure cell viability
D. Measure protein expression levels

179. The DPPH assay is primarily used to measure:

A. Antioxidant activity
B. Cell apoptosis
C. Protein-protein interactions
D. Bacterial growth rate

180. A cell leakage assay is used to determine:

A. The expression of certain genes
B. cell membrane integrity
C. The rate of cell migration
D. The formation of extracellular matrix

181. The function of the pinhole in a confocal microscope is to:

A. Focus the light onto the specimen
B. Block out scattered light and improve resolution
C. Control the intensity of the light reaching the sample
D. Collect emitted fluorescence from the sample

182. The optical sectioning capability of a confocal microscope is primarily due to:

A. The high-power objective lens
B. The use of multiple lasers
C. The pinhole aperture
D. The photomultiplier tube

183. The Maxam-Gilbert method of DNA sequencing is based on:

A. Enzymatic cleavage of DNA at specific bases
B. Chemical modification of DNA and subsequent cleavage
C. Polymerase chain reaction amplification
D. Reverse transcription of RNA into DNA

184. Complex II of the electron transport chain is also known as:

A. NADH dehydrogenase
B. Succinate dehydrogenase
C. Cytochrome c oxidase
D. ATP synthase

185. The IgG5 subclass of antibodies is primarily known for:

A. Its ability to bind to mast cells
B. Its involvement in neutralizing bacterial toxins
C. Its role in immune complex formation and complement activation
D. Its inability to activate the complement system

186. Which of the following is a key feature of HeLa cell lines?

A. They are derived from a healthy individual
B. They have a high rate of mutation and chromosomal instability
C. They do not divide in culture
B. d) They are commonly used in clinical treatments

187. Which of the following is a limitation of the PCR-based method for site-directed mutagenesis?

A. It requires the use of a high-fidelity polymerase enzyme to minimize errors.
B. The method is limited by the length of the DNA fragment being mutated.
C. It can only introduce point mutations and cannot handle larger insertions.
D. It cannot be used in eukaryotic cells.

188. Which of the following is a fungal disease that affects plants?

A. Wilt
B. Powdery mildew
C. Root rot
D. old wilt

189. he Bradford method for protein estimation is based on the binding of the dye to which type of residues in the protein?

A. Carboxyl groups
B. Amino groups
C. Aromatic amino acids
D. Peptide bonds

190. Which of the following microorganisms is commonly used in the bioremediation of mercury?

A. Pseudomonas fluorescens
B. Bacillus subtilis
C. Desulfovibrio desulfuricans
D. Escherichia coli

191. According to the Solid Waste Management Rules 2016 in India, which of the following is a responsibility of the waste generator?

A. To segregate waste at source
B. To pay for waste collection and disposal
C. To manage e-waste
D. All of the above

192. World Cancer Day is celebrated on which of the following dates?

A. April 7
B. November 1
C. February 4
D. December 10

193. Which of the following statements about cellular respiration is true?

A. It occurs only in the presence of oxygen
B. It involves the breakdown of glucose to produce ATP
C. It occurs only in plant cells
D. It occurs only in prokaryotic cells

194. The hemoglobin oxygen dissociation curve shifts to the right in response to which of the following conditions?

A. Decrease in pH
B. Increased oxygen concentration
C. Decreased carbon dioxide levels
D. Decreased temperature

195. Which of the following agreements was incorporated into the GATT framework to address intellectual property rights (IPR)?

A. TRIPS Agreement
B. Berne Convention
C. Paris Convention
D. Madrid Protocol

196. What is the role of the WTO in the enforcement of TRIPS provisions?

A. It negotiates licensing agreements between companies
B. It monitors and ensures compliance with IPR laws among member countries
C. It settles disputes related to IPR within member countries
D. It provides funding for patent research and development

197. Who is responsible for heading the Department of Biotechnology (DBT) in India?

A. Prime Minister of India
B. Minister of Science and Technology
C. Secretary of Biotechnology
D. Director General of CSIR

198. Which of the following programs is supported by the DBT to promote innovation in biotechnology in India?

A. Biotechnology Industry Research Assistance Program (BIRAC)
B. Start-Up India
C. Atal Innovation Mission
D. Make in India

199. The Student Startup and Innovation Policy (SSIP) was launched by the Government of Gujarat in which year?

A. 2015
B. 2016
C. 2017
D. 2018

200. What does the SHODH Scheme in Gujarat stand for :

A. Scheme of Developing High end research
B. Scheme of Developing High Impact research
C. Scheme of Developing High education and research
D. Scheme of Developing High quality research

ROUGH WORK