

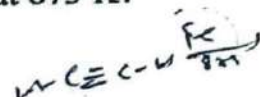
1. What is the IUPAC name for $\overset{1}{\text{CH}_3}\overset{2}{\text{CH}}\overset{3}{\text{Cl}}\overset{4}{\text{CH}}(\overset{5}{\text{CH}_3})\overset{6}{\text{CH}_2}\overset{7}{\text{CH}_2}\overset{8}{\text{CH}_2}\overset{9}{\text{CH}_2}\text{Br}$?

- A. 1-bromo-6-chloro-5-methylheptane
B. 7-bromo-2-chloro-3-methylheptane
C. 1-bromo-6-chloro-5,6-dimethylhexane
D. 6-bromo-1-chloro-1,2-dimethylhexane

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2. What do we get when ethyne is passed through red hot iron tube at 873 K?

- A. Benzene
B. Toluene
C. Mesitylene
D. Anthracene



3. Phenol, when it first reacts with concentrated sulphuric acid and then with concentrated nitric acid, gives

- A. 2,4,6-trinitrobenzene
B. O-nitrophenol
C. P-nitrophenol
D. Nitrobenzene

4. The correct statement regarding electrophile is

- A. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile.
B. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile.
C. Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile.
D. Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile.

5. $C_3H_4O_3$ is empirical formula for vitamin

A. C

B. A

C. B

D. D

CC

6. Nitrobenzene on reaction with Cone. HNO_3/H_2SO_4 at $80-100^\circ C$ forms which one of the following products ?

A. 1, 2, 4 -Trinitro benzene

B. 1, 2 - Dinitro benzene

C. 1, 3 - Dinitro benzene

D. 1, 4 - Dinitro benzene

7. Give the decreasing order of nucleophilic addition reaction of the following :-

(i) $HCHO$

(ii) $PhCHO$

(iii) CH_3CHO

(iv) Acetophenone

A. $iii > i > ii > iv$

B. $iv > ii > i > iii$

C. $i > iii > ii > iv$

D. $iii > i > iv > ii$

8. Homonuclear molecules contain?

A. polar bond

C. ionic bond

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B. covalent bond

D. coordinate bond

9. During mixed acid nitration of benzene Cone. HNO_3 behaves like :-

A. Acid

B. Base

C. Catalyst

D. Electrophile

10. Preparation of Bakelite proceeds via reactions:

- A. Condensation and elimination
- B. Electrophilic addition and dehydration
- C. Electrophilic substitution and dehydration
- D. Nucleophilic addition and dehydration

11.

UV rays cause

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- A. Deletion of Pyrimidines
- B. Dimerisation of pyrimidines
- C. Substitution of purine for pyrimidine
- D. Cross linking of purine with pyrimidine

12. Which of the following events occurs in the descending limb of loop of Henle?

- ☒ A. 70-80% of electrolytes and water are reabsorbed by this segment.
- ☐ B. It is permeable to water but almost impermeable to electrolytes. This concentrates the filtrate as it moves down .
- ☒ C. Reabsorption of HCO_3^- and selective secret ion of hydrogen and potassium ions and NH_3 to maintain the pH.
- ☐ D. It is impermeable to water but allows the transport of electrolytes actively or passively.

- A. Vander walls B. Covalent bond
C. Ionic bond D. Hydrogen bonding

- A. CH_3OH



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- A. HCl B. HBr
C. HI D. HF

- A. 3-methylpentanal B. Ethyl benzoate
C. 4,4-dimethylcyclohexanone D. 4-heptanone

- A. Addition
B. Substitution
C. Elimination
D. Cannot be predicted

18. The triple bond of acetylene is made up of

- A. Three σ bonds
- B. One σ bond and two π bonds
- C. Three π bonds
- D. Two σ and one π Bond

19. Phenols on distillation with Zinc dust give

- A. Aromatic hydrocarbons
- B. Aromatic aldehydes
- C. Alcohols
- D. Primary amines

20. Which is used in preparation of dynamite?

- A. Glycerol
- B. Ethyl alcohol
- C. Methyl alcohol
- D. Glycol

21. In Scanning Electron Microscopy (SEM), to form an image of specimen

- A. Electron should pass through the specimen
- B. Electrons are scattered from the surface of the specimen
- C. A thin film of heavy metal is evaporated
- D. Specimens are stained

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22. A deficiency of the enzyme Hypoxanthine Guanine phosphoribosyl transferase (HGPRT) may cause

- A. ~~Klinefelter's~~ syndrome
- B. Lesch-Nyhan syndrome
- C. Ehlers-Dantos syndrome
- D. Gaucher's disease

23

During sickle cell anemia which of the following takes place?

- A. Glutamic acid changes to aspartic acid
- B. Valine changes to glutamine
- ☒ C. Aspartic acid changes to glutamic acid
- D. Glutamine changes to valine

24

B cells mature in the _____ while T cells mature in the

- ~~A. Thymus/bone marrow and gut-associated lymphoid tissue (GALT)~~
- ☒ B. Spleen/bone marrow and GALT
- ~~C. Bone marrow and GALT/Thymus~~
- ~~D. Liver/Kidneys~~

25. The cross linkage of antigens by antibodies is known as

- ☒ A. Cross Reaction
- ~~B. Complement fixation~~
- ☒ C. Agglutination
- D. Precipitation

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Which of the following molecule is produced from the fixation of CO_2 in C_4 plants?

- ☒ A. Pyruvate
- B. Malate
- C. Oxaloacetate
- ☒ D. Alpha-Ketoglutarate

27. Plants derived sexually from the same plant are _____ while those derived from somatic tissue from the same plant are _____.
- A. Different, identical B. Different, also different
C. Identical, different D. Identical, identical
28. In Prokaryotes, the first amino acid in the polypeptide chain is
- A. N' formyl Methionine B. Methionine
C. Cysteine D. N' Formyl-Cysteine
29. A researcher made an interesting observation about a protein that was translocated into the rough endoplasmic reticulum (ER) during its synthesis and eventually ending up in the plasma membrane. Significantly, the protein in the plasma membrane was found to be slightly larger than the cognate protein in the ER. The protein was probably changed in the
- A. Nucleus B. Mitochondria
C. Golgi body D. Smooth Endoplasmic Reticulum

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30.

A PCR cycle consists of

- A. Three steps, denaturation, primer annealing and elongation
B. Three steps, denaturation, initiation and elongation
C. Three steps, primer annealing, elongation and termination
D. Three steps, initiation, elongation and termination

31.

Southern blotting involves

- A. Electrophoresis of DNA molecules and then blotting the separated DNA bands followed by incubation
- B. Electrophoresis of DNA molecules and then blotting the separated RNA bands followed by incubation
- C. Electrophoresis of DNA molecules followed by incubation
- D. Electrophoresis of RNA molecules and then blotting the separated RNA bands followed by incubation

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32. In _____ disorder, phenylalanine is accumulated and converted into phenyl pyruvic acid and other derivative. Accumulation of these in brain results in mental retardation. These are also excreted through urine because of its poor absorption by kidney:

- | | |
|-----------------------|---------------------|
| A. Alkaptonuria | B. Phenyl ketonuria |
| C. Sickle cell anemia | D. Albinism |

33. An amino acid that does not form an α -helix is

- | | |
|-------------|---------------|
| A. Valine | B. Proline |
| C. Tyrosine | D. Tryptophan |

34.

How many moles and how many grams of NaCl are present in 250 mL of 0.5N NaCl?

- A. 0.125 mol and 732 g B. 7.32 mol and 125 g
C. 0.125 mol and 0.125 g D. 7.32 mol and 732 g

35.

Resolution in adsorption chromatography is achieved at

- A. Elution stage only B. Binding stage only
C. Equilibration stage only D. Both binding and elution stage

36. How many moles of HCl are there in 10 mL of a solution with a concentration of 0.5 mol.L^{-1} ?

- A. 0.05 mol B. 5.0 mol
C. 0.5 mol D. 1.0 mol

37. The process of using microbes and plants to break down or recycle environmental pollutants is called

- ~~A.~~ Biodegradation B. Bioremediation ✓
~~C.~~ Amplification ~~D.~~ Annealing

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38. What function might you postulate for a polypeptide having a Zn-finger motif?

- A. Signal transduction B. Transcription factor
C. Growth hormone receptor D. Cytoskeletal component

39

Which of the following groups of antibodies can cross placenta?

- A. IgM
- B. IgG
- C. IgD
- D. IgA

40. An octapeptide composed of four repeating glycylalanyl units has:

- A. one free amino group on an alanylresidue
- B. one free amino group on an alanylresidue and one free carboxyl group on a glycyl residue
- C. one free amino group on a glycyl residue and one free carboxyl group on an alanyl residue
- D. two free amino and two free carboxyl groups

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41. A kind of covalent modification which occurs on both Histones and DNA is

- A. Methylation
- B. Acetylation
- C. Succinylation
- D. Phosphorylation

42.

The effect of auxin diffusing from the apical bud on the lateral shoots is known as:

- A. Promoting Effect
- B. Compensatory effect
- C. Inhibitory effect
- D. Supporting Effect

What is the strongest oxidizing agent in the photosynthetic electron transfer reactions:

44. In the normal human being the concentrations of various antibodies in the serum is /are in the order:

- A. $\lg M > \lg A > \lg G > \lg E$
 B. $\lg G > \lg A > \lg M > \lg E$
 C. $\lg E > \lg G > \lg M > \lg A$
 D. $\lg A > \lg M > \lg E > \lg G$

45. If mother is a carrier for colour blindness and father is normal. then in the offsprings this disease may be seen in?

- A. 25% of the sons
- B. All the daughters
- C. 50% sons and 50% daughters (carrier)
- D. All the sons not in daughters

46. Protein kinases phosphorylate proteins at hydroxyl group on an amino acid side chains. Which one of the following groups of amino acids contains side chain hydroxyl group?

- A. Aspartate, glutamate and serine
- B. Serine, threonine and tyrosine
- C. Lysine, arginine and proline
- D. Threonine, phenylalanine and arginine

47. In a tissue culture experiment a student desires to have more differentiation of shoots. Which of the following plant growth hormone ratios should be used?

- A. High gibberellin to cytokinin B. High gibberellin to auxin
C. High cytokinin to auxin D. High auxin to cytokinin

48. Which one of the following factors released from damaged tissue initiate a chain of clotting events?

- A. Thrombin B. Prothrombin
C. Tissue thromboplastin D. Fibrin

49. For neurons, typical values of the resting potential range from:

- A. 60 mv to 70 mv B. -70 mv to -80 mv
C. 100 mv to 110 mv D. 0 mv

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50. Which one of the following sequence is a palindrome?

- A. 5' ACGGATTCGC 3' B. 5' ATGCCG 3'
C. 5' CCATT 3' D. 5' AGGCCT 3'
3' TCGGAT 5'

51. What is the pH of 10^{-8} M solution of HCl?

- A. 6.959 B. 8.121
C. 5.876 D. 6.367

52. Which one of the following viruses contain single stranded DNA as the genome?

- A. Parvo virus
B. ~~Herpes virus~~
C. ~~Adeno virus~~
D. Pox virus

53. The parasite which completes its life cycle in a single host is:

- A. Fasciola hepatica
B. Ascaris lumbricoides
C. Plasmodium vivax
D. Taenia solium

54. The 20 different amino acids found in proteins are normally coded by

- A. 59 codons
B. 60 codons
C. 61 codons
D. 63 codons

55. Two-dimensional gel electrophoresis is a technique for separating proteins:

- A. Based on isoelectric point
B. Based on size
C. Based on both isoelectric point and size
D. Based on its mass

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56. Under which of the following conditions, the lac operon will exhibit high levels of transcription.

- A. High Glucose, Low lactose
B. High Glucose, High lactose
C. Low Glucose, High lactose
D. Low Glucose, Low lactose

57. Rate of centrifugation of a particle in a centrifuge is increased by
- A. Decreasing the particle diameter
 - B. Increasing the centrifuge speed
 - C. Decreasing the density difference between the particle and liquid
 - D. Increasing the viscosity of suspended fluid

58. Which one of the following is true during the separation of biomolecules by reversed phase chromatography?

- A. Stationary phase is less polar than the mobile phase
- B. Stationary phase is more polar than the mobile phase
- C. Both the stationary and mobile phases are having the same polarity
- D. Polarity of the mobile phase does not play any role

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59. DNA polymerase III of *E. coli* is
- A. Required for de novo synthesis of new strands of DNA
 - B. Involved in the repair of damaged DNA
 - C. Required to restart replication fork
 - D. Involved in DNA recombination

60. Read the given statements and select the correct option.

- (i) Right end of a polysaccharide chain is called reducing end while left end is called non-reducing end.
- (ii) Starch can hold iodine molecules in its helical secondary structure but cellulose being non-helical, cannot hold iodine.
- (iii) Starch and glycogen are branched molecules.
- (iv) Starch and glycogen are the reserve food materials of plants and animals respectively.

- A. Statements (i) and (ii) are correct
- B. Statements (ii) and (iii) are correct
- C. Only statements (iv) is correct
- D. All statements are correct

61. The triplet on coding strand of DNA is ATG. What would be the required anti-codon on corresponding tRNA during translation?

- A. TAC
- B. AUG
- C. UAC
- D. CAU

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62. The molecular formulae of deoxyribose sugar and ribose sugar, respectively are:

- A. $C_5H_{10}O_4$ and $C_5H_{10}O_5$
- B. $C_5H_{10}O_4$ and $C_5H_{10}O_5$
- C. $C_5H_{10}O_5$ and $C_5H_{10}O_4$
- D. $C_5H_{10}O_5$ and $C_6H_{10}O_4$

63. Which part of the ribosome identifies the Shine - Dalgarno sequence?

- A. Protein
- B. 16S rRNA
- C. 23S rRNA
- D. 55 rRNA

64. The water potential of pure water is

- A. Zero
- B. Less than zero
- C. More than zero but less than one
- D. More than one

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65. The domestic sewage in large cities

- A. Has a high BOD as it contains both aerobic and anaerobic bacteria
- B. Is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plants (STPs)
- C. When treated in STPs does not really require the aeration step as the sewage contains adequate oxygen.
- D. Has very high amounts of suspended solids and dissolved salts.

66. The Following ratio is generally constant for a given species:

- A. $A + G / C + T$
- B. $T + C / G + A$
- C. $G + C / A + T$
- D. $A + C / T + G$

[18]

67. Which is not a vector less gene transfer method?

- A. Gene gun
- B. Liposome mediated
- C. Agrobacterium mediated gene transfer
- D. PEG

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68. Which one of the following statements is not correct?

- A. Catalyst does not initiate any reaction
- B. The value of equilibrium constant is changed in the presence of a catalyst in the reaction at equilibrium
- C. Enzymes catalyze mainly bio-chemical reactions
- D. Coenzymes increase the catalytic activity of enzyme

69. After 34 cycles of PCR amplification, 4.8 billion copies of the DNA sequence was obtained. After how many cycles, we would get 1.2 billion copies:

- A. 10 cycles
- B. 32 cycles
- C. 17 cycles
- D. 22 cycles

70. Which of the following technique is used to isolate and separate chloroplasts:

- A. Electrophoresis
- B. Chromatography
- C. Differential centrifugation
- D. Dialysis

71. The movement of molecules from an area of low concentration to an area of high concentration against the concentration gradient is known as:

A. ~~Active Transport~~

B . Osmosis

C . Diffusion

D. ~~Phagocytosis~~

72. A drug interferes with the transport of which of the following neurotransmitter?

A. Dopamine

B. Acetyl choline

C. Prostaglandin

D. Serotonin

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73. Restriction enzymes can have all the following applications except:

A. Cloning

B. DNA mapping

C. RFLP

D. Western blotting

74. The essential components of cell membrane (proteins and lipids) are synthesized

A. Golgi apparatus

B. ER

C. lysosomes

D. vesicle

M31 SET - B

[20]

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75.

GenBank the nucleic acid sequence data base is maintained by

- A. Brookhaven laboratory
- B. DN A database of Japan (DDBJ)
- C. European Molecular Biology laboratory (EMBL)
- D. National Centre for Biotechnology Information (NCBI)

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76. Bt cotton can effectively control these bollworm pests, except:

- A. Helicoverpa armigera
- B. Earias vittella
- C. Aphis gossypii
- D. Pictinophora gossypiella

77. Which of the following transgenic crop is developed using antisense RNA technology

- A. Golden Rice
- B. ~~Flavr Savr~~
- C. Bt Cotton
- D. Bt Brinjal

78. During mitosis. ER and nucleolus begin to disappear at

- A. Late prophase
- B. Early prophase
- C. Late metaphase
- D. Early metaphase

79. Expression vectors differ from a cloning vector in having
- A. An origin of replication
 - B. Suitable marker genes
 - C. Unique restriction sites
 - D. Control elements

80. Microtubules are made up of

- A. Flagellin
- B. Desmin
- ☒ C. Tubulin
- ☒ D. Actin and myosin

81. In Krebs's cycle

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- ☒ A. Energy is stored in the form of ATP
- B. Energy is stored in the form of ADP
- C. Energy is liberated from ADP
- ☒ D. Energy is liberated from ATP

82. The half-life of a radioactive substance is 30 minutes. The time (in minutes) taken between 40% decay and 85% decay of the same radioactive substance is

- A. 15 minutes
- B. 30 minutes
- C. 45 minutes
- D. 60 minutes

83. The molarity of solution obtained by mixing 750ml of 0.5M HCl with 250ml of 2M HCl will be

A. 0.875 M

B. 1.0 M

C. 1.75 M

D. 0.975 M

84. Among the following which is used for the reductive cleavage of disulphide bonds

A. Urea

B. SOS

C. β -mercaptoethanol

D. Bromophenol blue

85. Construction of first recombinant DNA was done by using plasmid of:

A. Salmonella typhimurium

☒ B. Escherichia coli

C. Bacillus thuringiensis

D. Yeast

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86. The Erythroblastosis foetal is can be avoided by:

A. Administering anti-Rh antibodies to the mother immediately after conception

B. Injecting Rh-antigen into mother's blood immediately after the delivery of the first child

C. Artificially introducing Rh+ve blood into future mother

D. Administering anti-Rh antibodies in mother's blood immediately after delivery of the first child.

87. Recombinant DNA technology involves several steps in specific sequence. What is the correct sequence for r-DNA technology ?

- i. Downstream processing.
- ii. Cutting of DNA at specific location.
- iii. Obtaining the foreign gene product.
- iv. Isolation of the genetic material.
- v. Insertion of r-DNA into the host cell.

A. ii \rightarrow iv \rightarrow v \rightarrow i \rightarrow iii

B. iv \rightarrow ii \rightarrow v \rightarrow iii \rightarrow i

C. ii \rightarrow v \rightarrow iv \rightarrow i \rightarrow iii

D. v \rightarrow iv \rightarrow i \rightarrow iii \rightarrow ii

88. HIV that causes AIDS first starts destroying-

A. Thrombocytes

B. B-lymphocytes

C. RBC

D. Helper T-lymphocytes

89. Which is correct about Fab fragment

A. Produced by T-lymphocyte

B. Contains paratope

C. Produced by separation of heavy chain and light chain

D. Lacks light chain

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90. Which of the following is not a source of single cell protein (SCP)?
- A. Agrobacterium
B. Chlorella
C. Saccharomyces cerevisiae
D. Methylophilus methylotrophus

91. A square matrix M of any order is called an orthogonal, if it satisfies the condition (where M^{-1} and M^T are inverse and transpose matrix, respectively)

- A. $\det M = M^T$
B. $M^{-1} = M^T$
C. $M M^T = 0$
D. None of the above

92. In a given matrix, "The numbers of rows (R) are equal to the number of columns (C)". Then it is called as

A. Null Matrix

B. Unit Matrix

C. Square Matrix

D. Orthogonal Matrix

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93. The integral $I = \int \frac{dx}{1+e^x}$ is equal to

A. $\log_e \left(\frac{1+e^x}{e^x} \right) + C$

B. $\log_e \left(\frac{e^x}{1+e^x} \right) + C$

C. $\log_e (e^x)(1+e^x) + C$

D. $\log_e (e^{2x} + 1) + C$

94. The value of $\int_0^{2\pi} |\cos x| dx$ is

A. 0

B. 1

C. 2

D. 4

[25]

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225
95. A process by which we estimate the value of dependent variable on the basis of one or more independent variable is called

A. ~~Correlation~~

B. Regression

C. Residual

D. Slope

96. Zero skewness refers:

A. Mean = Mode

B. Mean > Mode

C. Mean < Mode

D. None of the above

97. Two regression lines are perpendicular to each other the coefficient of correlation (r) is

A. $r = 0$

B. $r = +1$

C. $r = -1$

D. $r \leq 1$

98. The rate at which a radioactive substance decays is proportional to the remaining number of atoms. If there are N_0 atoms at $t = 0$, the remaining number N at time t is [where λ is the decay constant]

A. $N = N_0 e^{\lambda t}$

B. $N = N_0 e^{-\lambda t}$

C. $N = N_0 e^{\lambda/t}$

D. $N = N_0 e^{-\lambda/t}$

99. The mean or average used to measure central tendency is called
- A. Sample mean
 - B. ~~Arithmetic mean~~
 - C. Negative mean
 - D. Population mean

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- X 100. The discrete probability distribution in which the outcome is very small with a very small period of time is classified as

- 025
- A. Posterior distribution
 - B. Cumulative distribution
 - C. Normal distribution
 - D. Poisson distribution