

**Department: B.Sc Biotechnology**  
**Class: S.Y.B.Sc.**  
**Semester: III**  
**Subject: Applied Chemistry I**  
**Sample Questions**

1. What prosthetic group present in haemoglobin?
  - a) Heme
  - b) Globin
  - c) Phosphoric acid
  - d) Lipoprotein
2. Which of the following statement is NOT true?
  - a) Haemoglobin act as intracellular buffer
  - b) The proximal and distal histidine residue lies on the same side of heme ring
  - c) Exposure of heme ring to water results in oxidation
  - d) Protoporphyrin-9 is a tetrapyrrol ring
3. Hemoglobin is held together by which type of bond?
  - a) H2 bonding
  - b) N2 bonding
  - c) C2 bonding
  - d) P2 bonding
4. Heme is an \_\_\_\_\_ containing compound.
  - a) Al
  - b) Fe
  - c) Mn
  - d) Mg
5. What is the reason of the red color of RBCs?
  - a) Presence of CO<sub>2</sub>
  - b) Presence of O<sub>2</sub>
  - c) Presence of O<sub>3</sub>
  - d) It is present in blood
6. The molecular weight of hemoglobin \_\_\_\_\_.
  - a) 44450
  - b) 64450
  - c) 55450
  - d) 74450
7. Hemoglobin takes up the number of molecules of oxygen \_\_\_\_\_.
  - a) 1
  - b) 2
  - c) 3
  - d) 4
8. Myoglobins occurring in the \_\_\_\_\_ cells of vertebrates and invertebrates.
  - a) Muscle

- b) Bone
  - c) Pancrease
  - d) Lung
9. The molecular weight of catalases is about \_\_\_\_\_.
- a) 225000
  - b) 25000
  - c) 222000
  - d) 22200
10. The  $\alpha$ -chains of hemoglobin A contains \_\_\_\_\_ and  $\beta$ -chain contains \_\_\_\_\_ amino acids.
- a) 141,146
  - b) 133,133
  - c) 142,144
  - d) 140,142
11. Iron is also internally linked to the nitrogen of the \_\_\_\_\_ ring of \_\_\_\_\_ of the polypeptide chains.
- a) Imidazole; histidine.
  - b) Pyrrol; histidine
  - c) Furon; histidine
  - d) Benzene;histidine
12. Name the mineral element that is needed for strong bone and teeth.
- a)  $\text{Ca}^+$
  - b)  $\text{Na}^+$
  - c)  $\text{K}^+$
  - d) P
13. The intermediate involved in E1 elimination reaction is \_\_\_\_\_.
- a) Carbocation
  - b) Carbanion
  - c) Carbene
  - d) Nitrene
14. Which of the following essential element in a biological system?
- a) As
  - b) Ti
  - c) Ar
  - d) Ca
15. Elimination reactions E1 and E2 of alkyl halides results in \_\_\_\_\_.
- a) Alkyl halide
  - b) Alkyl alcohol
  - c) Alkenes
  - d) Alkynes
16. What does ROS stands for?
- a) Residual oxygen species
  - b) Reactive oxygen species

- c) Resting oxygen species
  - d) Radical oxygen species
17. The General Mechanism is that an Enzyme Acts By:
- a) Reducing the activation energy
  - b) Increasing activation energy
  - c) Decreasing pH value
  - d) Increasing the pH value
18. The Coenzyme is:
- a) Often a metal
  - b) always a protein
  - c) often a vitamin
  - d) always an inorganic compound
19. Enzymes are Basically Made Up of:
- a) Fats
  - b) Proteins
  - c) Nucleic acid
  - d) Vitamins
20. Catalyst are Different from Enzymes:
- a) Functional at high temperature
  - b) Not used up in reaction
  - c) Being proteinaceous
  - d) Having high rate diffusion
21. Enzymes are Polymers of:
- a) Hexose sugar
  - b) Amino acids
  - c) Fatty acids
  - d) Inorganic phosphate
22. The principles of green chemistry include eliminating\_\_\_\_\_ treatments.
- a) Costly
  - b) Harmful
  - c) Hard
  - d) Easy
23. The Enzyme Minus its Coenzyme Known as:
- a) Apoenzyme
  - b) Metalloenzyme
  - c) Isoenzyme
  - d) Cofactor
24. The total content of Ca in adult man is\_\_\_\_\_.
- a) 1 to 1.5kg
  - b) 500gm
  - c) 3kg
  - d) 100gm

25. \_\_\_\_\_ is the type of organic reaction in which two substituents are removed from a molecule in either one or two steps mechanism.
- Addition
  - Substitution
  - Elimination
  - Redox
26. A small molecule essential for the activity of some enzyme is known as \_\_\_\_\_.
- Co-enzyme
  - Apoenzyme
  - Protein
  - Co factor
27. Substitution reactions are also known as \_\_\_\_\_ reaction.
- Aldol
  - Perkin
  - Displacement
  - Reformatsky
28. In vertebrates \_\_\_\_\_ is delivered to cells by haemoglobin.
- O<sub>2</sub>
  - CO<sub>2</sub>
  - N<sub>2</sub>
  - O<sub>3</sub>
29. Zaitsev's rule states that the \_\_\_\_\_ substituted alkene tends to be formed in E2 reaction.
- Least
  - Most
  - Same
  - No any
30. Which electrophile is involved in the electrophile nitration substitution?
- NO
  - NO<sub>2</sub>
  - NO<sub>3</sub>
  - N<sub>2</sub>
31. The intermediate involved in E1 elimination reaction is \_\_\_\_\_.
- Carbocation
  - Carbanion
  - Carbene
  - Nitrene
32. In vertebrates \_\_\_\_\_ is delivered to cells by haemoglobin.
- O<sub>2</sub>
  - CO<sub>2</sub>
  - N<sub>2</sub>
  - O<sub>3</sub>
33. The general formula for Grignard reagent is \_\_\_\_\_.
- R<sub>2</sub>-CuLi

- b) R-Mg-X
- c) R-Li
- d) Mg-X<sub>2</sub>

## Unit II

34. Reformatsky reaction involves the use of \_\_\_\_\_ .
- a) Organometallic compound
  - b) Organozinc compounds
  - c) Organocarbon compound
  - d) Alkanes
35. Ultrasound refers to sound with frequency \_\_\_\_\_ KHz
- a) > 16
  - b) > 100
  - c) 15
  - d) 18
36. When a particular functional group reacts in preference over the other functional group in reactant is called \_\_\_\_\_.
- a) Chemoselectivity
  - b) Enantioselectivity
  - c) Regioselectivity
  - d) Diastereoselectivity
37. \_\_\_\_\_ metal activated by iodine under ultrasound condition.
- a) Pb
  - b) Na
  - c) Zn
  - d) Mg
38. Reformatsky reaction involves reaction of ketone with \_\_\_\_\_.
- a) Alpha bromoester
  - b) Zn/ $\alpha$  bromo ester
  - c) Zn acetic acid
  - d) Zn/Hg, HCl
39.  $\beta$ -hydroxy could be prepared from the corresponding aldehyde using \_\_\_\_\_.
- a) Grignard Reagent
  - b) LiAlH<sub>4</sub>
  - c) Reformatsky reaction
  - d) Aldol condensation
40. Diels Alder reaction is an example of \_\_\_\_\_ reaction.
- a) Addition
  - b) Cyclization
  - c) Addition and cyclization
  - d) Double bond formation reaction

41. In polypeptide synthesis to remove solid support deprotection of \_\_\_\_\_ is required.
- Acetic acid
  - Trifluoroacetic acid
  - Oxalic acid
  - Succinic acid
42. In Merrifield's synthesis solid support is copolymer of styrene and \_\_\_\_\_.
- Benzene
  - Hexane
  - Propane
  - Divinyl benzene
43. In novel technique of organic synthesis the use of \_\_\_\_\_ is modern technique.
- Catalyst
  - IR radiation
  - Ultrasound
  - Lot of energy
44. Hantzsch synthesis is the type of \_\_\_\_\_ synthesis.
- Multi component
  - Polymer supported
  - MW assisted
  - Inorganic
45. Synthetic planning starts with the product, which is fixed and works backwards towards the starting material is called \_\_\_\_\_ synthesis.
- Linear
  - Retro-synthesis
  - Reagent
  - Disconnection
46. Ullmann coupling can be done at low temperature and in short time by using \_\_\_\_\_.
- Zn
  - Ag
  - Cu
  - Hg
47. Reformatsky reaction involves reaction of ketone with \_\_\_\_\_.
- Alpha bromoester
  - Zn / alpha bromoester
  - Zn/ acetic acid
  - Zn/Hg,HCl
48. In \_\_\_\_\_ organic synthesis, water as solvent and solid phase can be used.
- Ultrasound
  - MW assisted
  - Polymer supported
  - Multicomponent
49. Synthesis of p-bromoaniline is an example of \_\_\_\_\_ synthesis.
- Linear

- b) Convergent
  - c) Ultrasound induced
  - d) Multicomponent
50. Which of the following catalyst can be used in Fries rearrangement?
- a)  $\text{HNO}_3$
  - b)  $\text{AlCl}_3$
  - c) Zn-Hg
  - d) Raney Nickel
51. Following one of the criteria considered for an ideal organic synthesis is \_\_\_\_\_ .
- a) Cost effectiveness
  - b) % conversion
  - c) Selectivity
  - d) E factor
52. Yield of reaction can be calculated in terms of \_\_\_\_\_ .
- a) % conversion
  - b) Selectivity
  - c) Rate of reaction
  - d) Product weight
53. The organic reaction brought about using ultrasound are called \_\_\_\_\_ reaction.
- a) Elimination
  - b) Sonochemical
  - c) Ulmann
  - d) Substitution
54. If a particular site of reactant undergoes a reaction in preference to other site then it is called \_\_\_\_\_ .
- a) Enantioselectivity
  - b) Diastereoselectivity
  - c) Chemoselectivity
  - d) Regioselectivity
55. Synthesis of Benadryl carried out by \_\_\_\_\_ synthesis.
- a) Linear
  - b) Convergent
  - c) Multicomponent
  - d) Hantzsch
56. Microwave passing through a sample lead to heating by \_\_\_\_\_ .
- a) Ionization
  - b) Collosion
  - c) Light generation
  - d) Cavitation
57. \_\_\_\_\_ is an imaginary bond cleavage corresponding to the reterosynthesis.
- a) Synthons
  - b) SE
  - c) TM

- d) Disconnection
58. In polymer synthesis DCC stands for\_\_\_\_\_.
- Dimethyl Cholin- Chloride
  - N,N' Dicyclohexylcarbodiimide
  - DichloroCholine Chloride
  - Dicyclo carbide
59. A novel method of bringing the two reactant in the same phase is by using \_\_\_\_\_catalyst.
- Homogeneous
  - Heterogeneous
  - Phase transfer
  - LiAlH<sub>4</sub>
60. The reaction of diene with dienophile to form cyclic product is known as \_\_\_\_\_reaction.
- Diels-Alder
  - Grignard
  - Van-Arkel
  - Ogel
61. In polypeptide synthesis trifluoro acetic acid is used for\_\_\_\_\_.
- Drivatization
  - Deprotection
  - Washing
  - Addition of amino group
62. \_\_\_\_\_ molecules are inert to microwaves.
- Non polar
  - Polar
  - Neutral
  - Target
63. Microwave have wavelength between \_\_\_\_\_to\_\_\_\_\_.
- 1cm to 1m
  - 10cm to 10m
  - 100cm to 100m
  - 1000cm to 1000m
64. In Fries rearrangement P-cresyl acetate on MW assisted reaction gives\_\_\_\_\_.
- Benzene
  - Chlorobenzene
  - 2-hydroxy 5-methyl acetophenone
  - Acetophenone
65. The ultrasound is generated with the help of \_\_\_\_\_.
- Sun
  - Heat
  - Cavitation
  - Transducer

66. Microwave synthesis cannot be carried out \_\_\_\_\_ .
- In water
  - In organic solvent
  - In solid state without support
  - In presence of enzyme
67. \_\_\_\_\_ is the process of designing a molecule which may be natural or synthetic using basic principles of organic chemistry.
- Organic synthesis
  - Linear synthesis
  - Mannich reaction
  - Aldol condensation

### UNIT III

68. DES is an example of \_\_\_\_\_ .
- Green reactant
  - Green solvent
  - Catalyst
  - Isomerising agent
69. Prevention is better than \_\_\_\_\_ .
- Cure
  - Clean up
  - Treatment
  - No action
70. A reaction is said to be atom economical if most of the atoms of reactant are \_\_\_\_\_ product.
- Hydrolysed to
  - Eliminated from
  - Incorporated into
  - Added to
71. Hydrogenation of nitrobenzene to aminophenol is done using \_\_\_\_\_ catalyst.
- Pt
  - Fe
  - Ag
  - Mg
72. Product of green synthesis are \_\_\_\_\_ .
- Toxic
  - Green solvent
  - Biodegradable
  - Non biodegradable
73. E-factor is the ratio of mass of \_\_\_\_\_ generated to mass of the \_\_\_\_\_ .
- Waste, desired product
  - Desired product, waste
  - Desired product, catalyst

- d) Waste, solvent used
74. DES is the combination of \_\_\_\_\_.
- Urea with choline chloride
  - Urea with  $\text{CCl}_4$
  - Urea with  $\text{CHCl}_3$
  - Urea with benzene
75. For hydroxylation of Nicotinic acid \_\_\_\_\_ enzyme used as catalyst.
- Yeast
  - Achromobacter xylosoclans*
  - Pepsin
  - Trypsin
76. Is a novel heterogeneous catalyst in chemical transformation.
- Ti
  - Te
  - Sn
  - Pb
77. Which is an excellent green solvent?
- Formaldehyde
  - Benzene
  - Ethanol
  - Water
78. After the use of chemicals, we must \_\_\_\_\_ them properly.
- Use
  - Reuse
  - Dispose
  - Store
79. One of the principles of green chemistry says that to produce \_\_\_\_\_ goods.
- Harmful
  - Commercial
  - Safer
  - Most used
80. The first listed of the 12 principles of Green Chemistry is \_\_\_\_\_.
- Prevent waste
  - Catalysis
  - Atom Economy
  - Benign solvents
81. The following terms refers to the relative proportion of chemical components.
- Togetherness
  - Stoichiometry
  - Metric
  - Colligative
82. Green chemistry improves \_\_\_\_\_ of chemical manufacturers.
- Competitiveness

- b) Easiness of production
  - c) Services
  - d) Chemicals
83. Green chemistry synthesis could also involves \_\_\_\_\_.
- a) High temp.
  - b) Dichloro methane
  - c) Fossile fuel
  - d) Microwave
84. An example of green chemistry is \_\_\_\_\_.
- a) Recycle carpet
  - b) A product made on Earth Day
  - c) A sublimation Reaction
  - d) Bioplastic
85. The atom economy obtained for green synthesis in the range of \_\_\_\_\_.
- a) 62-70%
  - b) 72-82%
  - c) 40-50%
  - d) 90-100%
86. Green chemistry eliminates waste \_\_\_\_\_.
- a) At the end of process
  - b) At source
  - c) Somewhere in the middle of process
  - d) Nothing to do with waste remediation
87. A smaller E-factor is desirable as it produces \_\_\_\_\_.
- a) High waste
  - b) Less waste
  - c) No waste
  - d) Same as E-factor
88. Green synthesis method is \_\_\_\_\_ than the conventional method.
- a) More costlier
  - b) More efficient
  - c) Slower
  - d) Less efficient
89. In green synthetic methods, the high quality product with no \_\_\_\_\_ are produced.
- a) Good product
  - b) Catalyst
  - c) Reaction
  - d) Comtamination
90. The green synthesis method should have \_\_\_\_\_.
- a) Low efficiency
  - b) High harmful byproduct
  - c) Low energy requirement
  - d) Low atom efficiency

91. Which is starting material for synthesis of Nylon-66?
- Acetic anhydride
  - 2-methyl propyl benzene
  - Adipic acid
  - Nitric acid
92. In green synthesis to avoid production of harmful byproduct the catalyst used is \_\_\_\_\_.
- Rh-metal
  - Benzene
  - Adipic acid
  - Cyclohexane
93. Dimethyl carbonate is used as \_\_\_\_\_ agent.
- Methylating
  - Carboxylating
  - Halogenating
  - Isomerising
94. We must use feed stock derived from annually renewable resources from \_\_\_\_\_.
- Chemicals
  - Organic compounds
  - Abundant waste
  - Plants
95. The principles of green chemistry includes eliminating \_\_\_\_\_ treatments.
- Costly
  - Harmful
  - Hard
  - Easy
96. Green chemistry applies across the \_\_\_\_\_ of chemical product like design, manufacture and use.
- Life cycle
  - Properties
  - Uses
  - Efficiency
97. Green chemistry reduces the use of \_\_\_\_\_.
- Liquid fuels
  - Energy
  - Gaseous fuels.
  - Solid fuels.
98. According to green chemistry, the chemical involved in the production must be \_\_\_\_\_.
- Non toxic
  - Toxic
  - Flammable
  - Produces toxic byproduct
99. Green chemistry reduces the \_\_\_\_\_ and protect the environment.

- a) Pollution
- b) Temperature
- c) Air
- d) Water

100. \_\_\_\_\_ is an excellent green solvents as well as green house gas.

- a) Methanol
- b) CFC's
- c) CO
- d) CO<sub>2</sub>