

BIOTECHNOLOGY

SECTION - A PAPER - I

1. All of the members of a particular species that live in one area are called
 - a. Biome
 - b. Population
 - c. Community
 - d. Ecosystem
2. Which of the following description about the organization of an ecosystem is correct
 - a. Communities make up species, which make up populations.
 - b. Populations make up species, which make up communities.
 - c. Species make up communities, which make up populations
 - d. Species make up populations, which make up communities.
3. An organism that uses energy to produce its own food supply from inorganic compounds is called
 - a. Heterotroph
 - b. Consumer
 - c. Detritivore
 - d. Autotroph
4. A symbiosis in which both species benefit is
 - a. Commensalism
 - b. Mutualism
 - c. Predation
 - d. Parasitism
5. Which is a biotic factor that affects the size of a population in a specific ecosystem
 - a. Average temperature of the ecosystem
 - b. Type of soil in the ecosystem
 - c. Number and kinds of predators in the ecosystem
 - d. Concentration of oxygen in the ecosystem.
6. The sequence of energy flow through a food chain is
 - a. Primary consumers- producers- higher order consumers.
 - b. Producers- higher order consumers- primary consumers.
 - c. Higher order consumers- primary consumers- producers.
 - d. Producers- primary consumers- higher order consumers.

7. Many individuals of the same species living together in a defined area form a/an
- Community
 - Genus.
 - Population.
 - Ecosystem.
8. Energy flow in ecosystem is
- Bidirectional
 - Multidirectional
 - Unidirectional
 - All around
9. Which of the following is an example of artificial ecosystem?
- Forest
 - Aquarium
 - Desert
 - Grassland
10. Which of the environmental pollutions can cause birth defects?
- Smog
 - CO
 - SO₂
 - Radioactivity
11. All the terminator codons begin with the nucleotide of
- Adenine
 - Uracil
 - Guanine
 - Cytosine
12. Sickle cell anemia is
- Characterized by elongated sickle like RBCs with a nucleus
 - An autosomal linked dominant trait
 - Caused by substitution of valine by glutamic acid in the β globin chain of haemoglobin
 - Caused by a change in a single base pair of DNA
13. The F₂ generation offspring in a plant showing incomplete dominance, exhibit
- variable genotypic and phenotypic ratios
 - a genotypic ratio of 1 : 1
 - a phenotypic ratio of 3 : 1
 - similar phenotypic and genotypic ratios of 1 : 2 : 1
14. If a colourblind woman marries a normal visioned man, their sons will be
- Three-fourths colourblind and one-fourth normal
 - One-half colourblind and one-half normal
 - All normal visioned
 - All colourblind

15. Rh factor can produce life-threatening disease.
- Erythroblastosis fetalis
 - Turner's Syndrome
 - AIDS
 - Sickle cell anemia
16. Which of the following pairs is correctly matched?
- Sickle cell anemia - X chromosome
 - Down's syndrome - 21st chromosome
 - Haemophilia - Y chromosome
 - Parkinson's disease - X and Y chromosome
17. Which of the followings is a well known autosomal abnormality at birth?
- Klinefelter syndrome
 - Patau syndrome
 - Down syndrome
 - Turner syndrome
18. In a DNA strand the nucleotides are held together by:
- Peptide bonds
 - Phosphodiester bonds
 - Glycosidic bonds
 - Hydrogen bonds
19. Central dogma of protein synthesis is
- DNA $\rightarrow$ RNA $\rightarrow$ Protein
 - DNA $\rightarrow$ DNA $\rightarrow$ Protein
 - RNA $\rightarrow$ DNA $\rightarrow$ Protein
 - DNA $\rightarrow$ protein $\rightarrow$ RNA
20. Where is ribosomal RNA synthesized?
- Nucleolus
 - Mitochondrion
 - Ribosome
 - Vacuole
21. Photosynthetic pigments are located in
- Stroma
 - Grana
 - Cytoplasm
 - Thylakoids
22. The Dark reaction of photosynthesis was worked out by:
- Hatch and Slack
 - Melvin Calvin
 - Amold
 - Emerson

23. Light reaction occur in ?
- Grana
 - Stroma
 - Thylakoids
 - Mitochondria
24. Photosynthetic pigment absorb
- UV radiation
 - IR radiation
 - Visible radiation
 - Gamma radiation.
25. The amount of ATP required for the synthesis of one glucose molecule in C₄ pathway is
- 18ATP
 - 30ATP
 - 12ATP
 - 24ATP
26. Photosynthesis is maximum in
- Blue light
 - Red light
 - Blue and green light
 - Blue and red light
27. Law of limiting factor was proposed by?
- Black man
 - Hill
 - Amold
 - Engle man
28. R.Q is ratio of
- CO₂ produced to substrate consumed
 - CO₂ produced to O₂ consumed
 - Oxygen and CO₂ produced
 - Oxygen consumed to water produced
29. The site of glycolysis in a cell is
- Chloroplast
 - Nucleus
 - Cytoplasm
 - Mitochondria
30. Common immediate source of energy in cellular activity:
- NAD
 - ATP
 - DNA
 - RNA

SECTION B Paper II

31. To enter or leave a cell, substances must pass through
- microtubule.
 - a ribosome.
 - the nucleus.
 - the plasma membrane.
32. Which of the following correctly matches an organelle with its function?
- Mitochondrion . . . photosynthesis
 - Nucleus . . . cellular respiration
 - Ribosome . . . manufacture of lipids
 - Central vacuole . . . storage
33. Cell was discovered by
- Leeuwenhoek
 - Robert Hooke
 - Robert Swanson
 - Robert Brown
34. Which one of the following organelles digests the old organelles that are no longer useful to the cells?
- Ribosomes
 - Mitochondria
 - Lysosomes
 - Chromatin
35. Lampbrush chromosomes are seen in
- Prophase
 - Mitotic metaphase
 - Mitosis
 - Meiotic prophase.
36. Cell organelles are embedded in
- Nucleolus
 - Cytoplasm
 - Protoplasm
 - Mitochondria
37. Distinction of prokaryotes and eukaryotes is based on
- Proteins
 - Nucleus
 - Plasma membrane
 - DNA.
38. DNA replication takes place during
- S – phase
 - G₂ – phase
 - G₁ – phase
 - Prophase

39. Animal cell differs from plant cells in possessing
- Plastid
 - Golgi body
 - Vacuole
 - Centrosome
40. Of the following organelles, which group is involved in manufacturing substances needed by the cell?
- Lysosome, vacuole, ribosome
 - Ribosome, rough ER, smooth ER
 - Vacuole, rough ER, smooth ER
 - Rough ER, lysosome, vacuole
41. The trachea divides into two smaller tubes called _____.
- Bronchi
 - Trachea
 - Microtrachea
 - Eustachian tubes
42. Blood pressure of a healthy person is
- 140 / 60
 - 120/80
 - 80/120
 - 90/60
43. Both erythrocytes and leucocytes are formed in
- Lymph nodes
 - Bone marrow
 - Thymus
 - Arterial walls
44. Bundle of His' is a part of which one of the following organs in humans?
- Pancreas
 - Brain
 - Heart
 - Kidney
45. Deficiency of vitamin C can lead to
- Dermatitis
 - lips fissure
 - scurvy
 - rickets
46. Concentration of the urine is controlled by
- MSH
 - ADH
 - Oxytocin
 - ACTH

47. Sweetest sugar is
- Fructose
 - Sucrose
 - Glucose
 - Lactose
48. Flame cells are excretory organ of:
- Planaria
 - Hydra
 - Hydrilla
 - Cockroach
49. Which one of the following is an example of a positive feed back loop.
- Shivering causes the body temperature to increase when you are cold.
 - The body maintains the osmolarity of the plasma at 300 mOsm.
 - When sodium enters the cell more sodium channels open up to allow more sodium to enter the cell.
 - When blood glucose levels are elevated insulin is released and the glucose levels decrease.
50. The maintenance of internal conditions in the face of environmental perturbations is referred to as
- Homeostasis
 - Status quo
 - Allometric scaling
 - Reflex control.
51. DNA or RNA segment tagged with a radioactive molecule is called
- Plasmid
 - Vector
 - Probe
 - Clone
52. Molecular scissors which cut DNA at specific site is
- Pectinase
 - Polymerase
 - Restriction endonuclease
 - Ligase
53. HIV is classified as a retrovirus because its genetic information is carried in
- DNA instead of RNA
 - DNA
 - RNA instead of DNA
 - Protein coat

54. Mendel's principle of segregation means that the germ cells always receive
- One pair of alleles
 - One quarter of the genes
 - One of the paired alleles
 - Any pair of alleles
55. Which of the following occurs in RNA instead of the nitrogenous base thymine found in DNA.
- Uracil
 - Cytosine
 - Guanine
 - Ribose
56. Chromosome is made up of
- DNA+ pectin
 - RNA + DNA
 - DNA + Histone
 - Only histone
57. Mitochondria are semi autonomous as they possess
- DNA
 - DNA + RNA
 - DNA + RNA Ribosomes
 - Protein
58. There is no DNA in
- Hair root
 - An enucleated ovum
 - Mature RBCs
 - A mature spermatozoan
59. Test cross is a cross between
- Hybrid $\times$ Hybrid parent
 - Hybrid $\times$ Recessive parent
 - Hybrid $\times$ Dominant parent
 - Two distantly related species
60. An individual who has two different alleles of a gene is called
- Allelopathic
 - Homozygous
 - Heterozygous
 - Codominant

SECTION C. PAPER III

61. The conversion of methane into chloromethane in the presence of UV light is an example of
- Electrophilic addition
 - Elimination
 - Free radical substitution
 - Nucleophilic substitution
62. Which one of the following cannot be made from 1-bromopropane in a single reaction?
- Propan-1-ol
 - Propane
 - Propene
 - Propylamine
63. If the product of the reaction between C_2H_4 and HBr is treated with aqueous $NaOH$, you get...
- CH_3CHO
 - C_2H_5OH
 - C_2H_4
 - $C_2H_4Br_2$
64. Which of the following conversions does not involve oxidation?
- Propan-1-ol to propanal
 - Propan-2-ol to propanone
 - Propanal to propanoic acid
 - Propene to propane
65. The conversion of ethane into ethylamine involves...
- Electrophilic substitution followed by nucleophilic substitution
 - Free radical substitution followed by nucleophilic substitution
 - Free radical substitution followed by elimination
 - Free radical substitution followed by elimination
66. Which one of the following is the major product when chloroethane reacts with excess ammonia?
- Ethylamine
 - Diethylamine
 - Triethylamine
 - Tetraethylammonium chloride
67. Which element is present in all organic compounds?
- carbon
 - nitrogen
 - oxygen
 - phosphorous

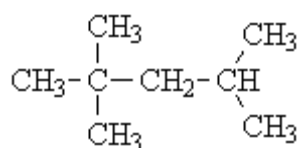
68. Which property is generally characteristic of an organic compound?
- low melting point
 - high melting point
 - soluble in polar solvents
 - insoluble in nonpolar solvents
69. Compared to the rate of inorganic reactions, the rate of organic reactions generally is
- slower because organic particles are ions
 - slower because organic particles contain covalent bonds
 - faster because organic particles are ions
 - faster because organic particles contain covalent bonds
70. Which compounds are isomers?
- 1-propanol and 2-propanol
 - methanoic acid and ethanoic acid
 - methanol and methanal
 - ethane and ethanol
71. Which statement explains why the element carbon forms so many compounds?
- Carbon atoms combine readily with oxygen.
 - Carbon atoms have very high electronegativity.
 - Carbon readily forms ionic bonds with other carbon atoms.
 - Carbon readily forms covalent bonds with other carbon atoms.
72. Which polymers occur naturally?
- starch and nylon
 - starch and cellulose
 - protein and nylon
 - protein and plastic
73. What is the name of the compound that has the molecular formula C_6H_6 ?
- butane
 - butene
 - benzene
 - butyne
74. In a molecule of CH_4 , the hydrogen atoms are spatially oriented toward the centers of a regular
- pyramid
 - tetrahedron
 - square
 - rectangle
75. In which pair of hydrocarbons does each compound contain only one double bond per molecule?
- C_2H_2 and C_2H_6
 - C_2H_2 and C_3H_6
 - C_4H_8 and C_2H_4
 - C_6H_6 and C_7H_8

76. The reaction $\text{CH}_2\text{CH}_2 + \text{H}_2 \rightarrow \text{CH}_3\text{CH}_3$ is an example of
- substitution
 - addition
 - esterification
 - fermentation
77. The products of the fermentation of sugar are ethanol and
- water
 - oxygen
 - carbon dioxide
 - sulfur dioxide
78. Which compound is a saturated hydrocarbon?
- ethane
 - ethene
 - ethyne
 - ethanol
79. What type of reaction is $\text{CH}_3\text{CH}_3 + \text{Cl}_2 \rightarrow \text{CH}_3\text{CH}_2\text{Cl} + \text{HCl}$?
- an addition reaction
 - a substitution reaction
 - a saponification reaction
 - an esterification reaction
80. What is the maximum number of covalent bonds that an atom of carbon can form?
- 1
 - 2
 - 3
 - 4
81. Which class of organic compounds can be represented as $\text{R} - \text{OH}$?
- acids
 - alcohols
 - esters
 - ethers
82. Which molecule contains a total of three carbon atoms?
- 2-methylpropane
 - 2-methylbutane
 - propane
 - butane
83. What substance is made up of monomers joined together in long chains?
- ketone
 - protein
 - ester
 - acid

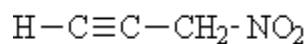
84. During fractional distillation, hydrocarbons are separated according to their
- boiling points
 - melting points
 - triple points
 - saturation points

85. Which compound is an organic acid?
- CH_3OH
 - CH_3OCH_3
 - CH_3COOH
 - $\text{CH}_3\text{COOCH}_3$

86. What is the IUPAC name for the following compound?



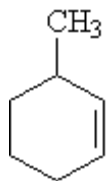
- 1,3-pentamethylpropane
 - 1,1,3,3-tetramethylbutane
 - 2,4,4-trimethylpentane
 - 2,2,4-trimethylpentane
87. How many dichlorinated isomers can be formed by the halogenation of $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ with Cl_2 in the presence of light?
- 2
 - 3
 - 5
 - 6
88. Which of the following would not be a reasonable nucleophile in a $\text{S}_{\text{N}}2$ reaction?
- NH_3
 - NC^-
 - H_2O
 - HO^-
89. Which of the following compounds would have the highest boiling point?
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
 - CH_3NH_2
 - CH_3OH
 - CH_2F_2
90. What is the total number of pi bonds found in the following compound?



- 1
- 2

- c. 3
- d. 4

91. What is the best name for the following compound?



- a. 2-methylcyclohexene
 - b. 3-methylhexene
 - c. 1-methylcyclohex-2-ene
 - d. 3-methylcyclohexene
92. Which of the following bonds would show the strongest absorption in the IR?
- a. carbon-hydrogen
 - b. oxygen-hydrogen
 - c. nitrogen-hydrogen
 - d. sulfur-hydrogen
93. Which of the following transitions is the highest energy transition?
- a. n to σ^*
 - b. n to π^*
 - c. σ to σ^*
 - d. π to π^*
94. . Which of the following is not a disaccharide?
- a. Sucrose
 - b. Mannose
 - c. Lactose
 - d. Maltose
95. Which of the following is not a reducing sugar
- a. Sucrose
 - b. Mannose
 - c. Lactose
 - d. Fructose

96. . What is invert sugar, and why is it so named?
- a. The sugar mixture from hydrolysis of sucrose; fructose is isomerized to glucose.
 - b. The sugar mixture from hydrolysis of sucrose; the optical rotation changes from(+) to (-).
 - c. The sugar mixture from hydrolysis of starch; α -glycosidic bonds are changed to β -glycosidic bonds.
 - d. The sugar mixture from hydrolysis of starch; glucose is isomerized to fructose.
97. Which of the following is not a common component of both DNA and RNA?
- a. Ribose
 - b. Phosphate
 - c. Cytosine
 - d. Adenine
98. . How many nucleotides are needed to code for a specific amino acid?
- a. One
 - b. Two
 - c. Three
 - d. Four
99. The amino acid cysteine often forms a disulfide bond with another nearby cysteine. How is this reaction best classified?
- a. An addition
 - b. A substitution
 - c. An oxidation
 - d. A reduction
100. Fatty acids are important components of many lipids. For which of the following lipid classes or lipid derivatives are fatty acids not a significant component?
- a. Phospholipids
 - b. Triglycerides
 - c. Waxes
 - d. Steroids.