Chapter: 01

Introduction to Biology

Objective

Most Important MCQs

- **You have four choices for each objective type question as A, B, C and D. The choice which you think is correct.**

1. The technology used for achieving eugenic aims:
   a) Gene therapy b) Radiotherapy c) Chemotherapy d) Cloning ✓

2. HIV virus causes:
   a) Tuberculosis b) Cancer c) AIDS ✓ d) Hepatitis

3. Radiotherapy is used for:
   a) Cancer ✓ b) AIDS c) Hepatitis d) Malaria

4. A technique has been developed to repair the defective gene is:
   a) Chemotherapy b) Radiotherapy c) Gene Therapy ✓ d) None

5. In human gene therapy the normal genes are inserted into the host through:
   a) Blood cells b) Bone marrow cells ✓ c) Bone cells d) Muscle cells

6. In 1997, scientists in Scotland succeeded in cloning a:
   a) Sheep ✓ b) Horse c) Goat d) Cow

7. Techniques which issued to check, whether a certain nutrient is essential for plant is:
   a) Integrated disease management b) Hydroponic culture technique ✓
   c) Cloning d) Pasteurization

8. The method by which pests are destroyed by using some living organism is called:
   a) Bio-pesticide b) Biological control ✓
   c) Integrated disease management d) Pasteurization

9. Aphid attacking walnut tree is biologically controlled by:
   a) Wasp ✓ b) House fly c) Honey bee d) Mosquito

10. A method in which pests are destroyed by using living organism or natural enemies is called:
    a) Genetic engineering b) Biological control ✓
    c) Integrated disease management d) Pasteurization

11. Milk and milk products are preserved by:
    a) Pasteurization ✓ b) Vaccination c) Immunization d) Cloning

12. Which one of the following is employed in treatment of cancer?
    a) Antibiotics and vaccination b) Radiotherapy and chemotherapy ✓
    c) Chemotherapy and antibodies d) All of the above

13. Which one of the following is not a viral disease?
    a) Cow pox b) Mumps c) Tetanus ✓ d) Small pox

14. Which one of the following is not related to cloning?
    a) Replacement of the nucleus of zygote, by another nucleus of same organism.
    b) Separation of cells of embryo to form more embryos.
    c) The individuals resulting have similar genetic make-up.

d) Removal of piece of DNA or gene from the cell and incorporating another gene or piece of DNA in its place. ✓

15. The study of tissues is called:
a) Anatomy b) Histology ✓ c) Paleontology d) Physiology

16. The study of parasites is called:
a) Paleontology b) Histology c) Microbiology d) Parasitology ✓

17. The branch of biology that deals with cell functions is called:
a) Histology b) Molecular biology c) Physiology ✓ d) Microbiology

18. Use of living organisms, system or processes in manufacturing and service industries is studied by branch is called:
a) Social biology b) Human biology c) Biotechnology ✓ d) Marine biology

19. The study of animals in nature is called:
a) Zoogeography ✓ b) Geography c) Biodiversity d) Wild life

20. The study of distribution of animals in nature is called:
a) Zoogeography ✓ b) Biodiversity c) Geography d) Wildlife

21. The branch of biology deals with the study of social behaviors and communal life of human being is:
a) Human biology b) Molecular biology c) Social biology ✓ d) Environmental biology

22. Branch of biology which deals with the structure of organisms, the cells and their organelles at molecular level is:
a) Molecular biology ✓ b) Marine biology c) Physiology d) Histology

23. The branch of biology which deals with the study of ancestral history of living organism is called as:
a) Paleontology b) Zoogeography c) Evolution ✓ d) Heredity

24. Embryology is the study of:
a) Internal gross structure b) Tissues c) Development ✓ d) Fossils

25. The experiments on DNA molecules in chromosomes for knowing the basis of inherited diseases are conducted by:
a) Molecular biologists ✓ b) Microbiologists c) Freshwater biologists d) Social biologist

26. Synthetic insulin from pork was formed by which technique:
a) Parasitology b) Social biological techniques c) Biotechnology ✓ d) Both a and c

27. The concept that various organisms dominated this planet during various geological time period and thus placing organisms in a time sequence came from the studies by:
a) Environmental biologist b) Paleontologist ✓ c) Marine biologist d) Social biologist

28. It is possible to date the rocks by comparing the amount of specific radioactive isotopes they contain. Which of the statement is correct in this respect:
a) Older sediment layers have equal amount of these radioactive isotopes as that of the young ones
b) Older sediment layers have less amount of these radioactive isotopes as that of the young ones ✓
c) Older sediment layers have greater amount of these radioactive isotopes as that of the young ones

d) Older sediment layers did not have these radioactive isotopes

29. How many Bio-elements account for 99% of the total mass in a human body?
a) 16 b) 06 ✓ c) 10 d) 12

30. What is number of naturally occurring chemical elements?
a) 32 b) 92 ✓ c) 150 d) 102

31. Percentage of Hydrogen in human body is:
a) 5% b) 10% ✓ c) 15% d) 20%

32. The amount of Na by weight in human body is:
a) 0.35% b) 0.25% c) 0.15% ✓ d) 0.05%

33. The amount of potassium by weight in human body is:
a) 0.35% ✓ b) 0.25% c) 0.15% d) 0.05%

34. The lowest percentage of bio-elements in man among the following, is of:
a) Chlorine b) Sulphur c) Manganese ✓ d) Iron

35. Which of the following is trace bio-elements in human body?
a) Hydrogen b) Carbon c) Oxygen d) Iodine ✓

36. Bio-element which account for 18% in human body is:
a) Hydrogen b) Carbon ✓ c) Oxygen d) Iodine

37. The elements commonly used in the formation of chemical compounds of living organisms are called bio-elements. Which of the following are trace elements?
a) Potassium –Sulphur –Copper –Sodium b) Calcium –Zinc –Iodine –Chlorine
c) Copper –Manganese –Zinc –Iodine ✓ d) Carbon –Nitrogen –Iodine –Sulphur

38. Which character differentiates living things from non-living organisms?
a) They live in the same ecosystem b) They are acted upon by the same environment
c) They are highly organized and complex made of one or more cells and contain genetic material ✓ d) Both a and b

39. Biological organization is:
a) Simple b) Advance c) Complex d) Highly complex ✓

40. The unit of life is called:
a) Organ b) Cell ✓ c) Tissue d) Organelle

41. Living substance of living things is called:
a) Cytoplasm b) Cell c) DNA d) Protoplasm ✓

42. The arrangement of ……. speaks of the division of labor within cell:
a) Molecule b) Subatomic particles c) Atoms d) Organelles ✓

43. The atoms of different elements combine with each other through ionic or covalent bonding to produce compounds this stable form is called:
a) An organ b) A molecule ✓ c) Tissue d) Both a and c

44. One of the following is a micro molecule:
a) Starch b) Protein c) Cellulose d) Glucose ✓

45. Which one is a micro-molecule?
a) Polysaccharide b) Protein c) Hemoglobin d) ATP ✓

46. A group of similar cells that perform similar or specific function is:
a) Organ b) Tissue ✓ c) System d) Organelles

47. Muscles of stomach are of which type:
a) Skeletal b) Smooth ✓ c) Cardiac d) All of above

48. A structure normally composed of several tissue types that form a functional unit called:
a) Organ system b) Organelles c) Organ ✓ d) Tissue

49. Different tissues having related functions together form:
a) Organ ✓ b) Organelles c) Individual d) Molecules

50. The part of body which forms a structural and functional unit and is composed of more than one tissue is:
a) Organ ✓ b) Organ system c) Organelle d) Whole organisms

51. The first ever clone was prepared in 1997 in:
a) England b) Ireland c) Scotland ✓ d) Maryland

52. Which one of the following is a correct sequence in biological methods?
a) Observation – Hypothesis – Law - Theory
b) Observations – Hypothesis – Deduction – Testing of deduction ✓
c) Hypothesis – Observation –Deduction –Testing of deduction
d) Law –Theory –Deduction –Observation

53. In animals' coordination is achieved by means of:
a) Respiratory system b) Nervous system c) Endocrine system d) Both b and c ✓

54. The lowest level of biological organization is:
a) Ecosystem b) Population ✓ c) Community d) Biosphere

55. Which of the following can be defined as the group of living organisms of the same species locates in the same place at the:
a) Species b) Community c) Population ✓ d) Individuals

56. Which of the following is not the attribute of population:
a) Population density b) Gene frequency c) Gene flow d) Gene structure ✓

57. Populations of different species living in an area in specific time form a:
a) Community ✓ b) Tribe c) Committee d) Colony

58. Population of different species (plants and animals) in the same habitat form a:
a) Community ✓ b) Biosphere c) Ecosystem d) Microhabitat

59. Population of different species living in the same habitat form a:
a) Biome b) Biosphere ✓ c) Ecosystem d) Community

60. A community together with its non-living surroundings is:
a) Biosphere b) Population c) Ecosystem ✓ d) Species

61. Communities are ..... collection of organisms:
a) Static b) Dynamic ✓ c) May be static or dynamic d) None of these

62. The most recent era is:
a) Proterozoic b) Paleozoic c) Cenozoic ✓ d) Mesozoic

63. The number and variety of species in place is called:
a) Population b) Community c) Biodiversity ✓ d) Diversity

64. The described species number of living organisms is:
a) 1.5 Million b) 2.5 Million ✓ c) 3.00 Million d) 4.00

65. About how many species of organism are currently known to science?
a) 2,50,000 b) 2,500,000 ✓ c) 25000 d) 2,000,000

66. The number of the species of insects are:
a) 53.1 % ✓ b) 17.6 % c) 19.9% d) 9.4%

67. Fungi algae, protozoan and various prokaryotes are:
a) 17.6 % b) 19.9 % c) 9.4 % ✓ d) 9.1 %

68. Statement made by a scientist that may or may not be true is:
a) Theory b) Scientific law c) Hypothesis ✓ d) Statement

69. Tentative explanation of observation is called as:
a) Hypothesis ✓ b) Deduction c) Law d) Theory

70. The reasoning from the general to specific is:
a) Deductive ✓ b) Inductive c) Scientific d) Theoretical

71. Biology is short in laws because of:
a) Exclusive nature of life ✓ b) Less falsification
c) Less tentation d) Large population of human

72. Biological sciences have a set methodology and it is based on:
a) Experimental inquiry ✓ b) Esthetic preference c) Philosophical ideas d) Imaginations

73. A series of hypothesis supported by the results of many tests is called:
a) Scientific law b) Theory ✓ c) Data d) Deduction

74. Which one is not correct for a productive theory?
a) It is predictive b) It has explanatory power
c) It discourages suggestion of different hypotheses ✓ d) None of these

75. Conclusion of Mendel's work latter became a:
a) Scientific hypothesis b) Theory c) Scientific law ✓ d) Productive theory

76. Which of the following is the correct sequence in the biological method?
a) Observation → hypothesis →law → theory
b) Observation → hypothesis →deduction → testing of deduction ✓
c) Hypothesis → observation → deduction → testing of deduction
d) Law → theory → deduction → observation

77. Plant having foreign DNA incorporated into their cells are called:
a) Vascular plants ✓ b) Plasmid c) Transamerican plants d) Transgenic plants

78. Which one of the following is employed in treatment of cancer:
a) Antibiotics and vaccination b) Radiotherapy and chemotherapy ✓
c) Chemotherapy and antibodies d) All of these

79. A cell or organism and all its asexually produced offspring constitute a:
a) Clone ✓ b) Variety c) Population d) Species

80. Which statement is incorrect for cloning?
a) The nucleus of a fertilized egg is replaced by the nucleus from the cell of a fully developed individual
b) Division of a single egg into one or more separate embryos
c) The individual is the mirror image of the parent organism
d) It involve methods of sexual reproduction ✓

81. First vaccination techniques was developed by:
a) Jenner ✓ b) Koch c) Pasteur d) Brown

82. Which scientist first developed the technique of vaccination in 1796?
a) Robert Brown b) Edward Jenner ✓ c) Emil Fischer d) Koshland

83. Which statement is incorrect for pasteurization?
a) It is used to preserve yogurt and milk
b) It was developed by Louis Pasteur
c) It involves heating the substance at high temperature for just few sec
d) It can be used to preserve vegetables and meat ✓

84. Which of the following is not a viral disease?
a) Cowpox b) Mumps c) Tetanus ✓ d) Small pox

85. Which disease can be controlled by vaccination?
a) Measles ✓ b) Cancer c) Diabetes d) Heart attack

86. Which disease has been totally eradicated from the world because of effective vaccination?
a) Measles b) Polio c) Small pox ✓ d) Hepatitis

87. Bioremediations uses one of the followings:
a) Fungi & Algae b) Bacteria c) Algae ✓ d) Fungi

88. In cities, particularly the exhaust from auto mobiles is enormously adding into atmosphere:
a) Chromium b) Nitrogen c) Lead ✓ d) Cyanide

89. A relationship between two or more organism of different species in which all parents get benefit is:
a) Symbiosis ✓ b) Commensalism c) Parasitism d) Predation

90. Removal or degradation of environmental pollutants or toxic materials by living organisms is called:
a) Integrated disease management b) Hydroponic culture technique
c) Pasteurization ✓ d) Bioremediation

91. Percentage of Oxygen in human body is:
a) 50% b) 65% ✓ c) 70% d) 40%

92. The percentage of Carbon in human body is:
a) 65% b) 10% c) 18% ✓ d) 3%

93. The percentage of Phosphors in human body is:
a) 1% ✓ b) 2% c) 3% d) 4%

94. A biome is a large regional community primarily determined by:
a) Specie b) Weather c) Climate ✓ d) Predation

Important MCQs for MDCAT previous years repeated

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1. Treatment by using attenuated culture of bacteria is called:
   a) Chemotherapy b) Antisepsis c) Sterilization d) Vaccination ✓

2. Which one of the following edible products is widely pasteurized?
   a) Soft drinks b) Milk ✓ c) Mango squash d) Orange Juice

3. The simplest independent unit of life is known as:
   a) Bacterial colony b) Chloroplast c) Cell ✓ d) DNA

4. .....is the branch of Biology used for the identification and interpretation of fossils.
   a) Evolution b) Zoogeography c) Paleontology ✓ d) Biodiversity

5. Cloning is a form of:
   a) Sexual Reproduction b) Vegetative Propagation
   c) Asexual Reproduction ✓ d) Genetic Recombination

6. Group of interbreeding individuals of particular species, sharing common geographical area is called:
   a) Population ✓ b) Community c) Community ecology d) Autecology

7. Which of the following is the lowest level of biological organization with respect to others?
   a) Multicellular organisms ✓ b) Species c) Biosphere d) Population

8. Newly produced cells/individuals which are identical in each other are known as:
   a) Genetically Modified ✓ b) Transgenic Bacteria c) Transgenic Animals d) Clones

9. Which of the following is a blood borne disease?
   a) Hepatitis ✓ b) Influenza c) Cholera d) Candidiasis

10. The control of pest has traditionally meant regulation by natural enemies, predators, parasites and pathogens. This type of control is known as:
    a) Cultural Control b) Pesticides Control c) Biological Control ✓ d) Insecticides Control

11. Population of different species (plants and animals) living in the same habitat form a:
    a) Community ✓ b) Biosphere c) Ecosystem d) Microhabitat

12. The part of the body which forms a structural and functional unit and is composed of more than one tissue is called:
    a) Organ ✓ b) Organ system c) Organelle d) Whole organism

13. A method in which pests are destroyed by using same living organisms or natural enemies is called:
    a) Pasteurization b) Biological control ✓
    c) Integrated disease management d) Genetic engineering

14. The plants having foreign DNA incorporated into their cells are called:
    a) Clonal plants b) Biotech plants c) Transgenic plants ✓ d) Tissue cultured plants

15. Pasteurization technique is widely used for preservation of:
    a) Water b) Milk products ✓ c) Heat d) Vaccines

16. The production of genetically identical copies of organisms by asexual reproduction is called:
a) Genetic engineering b) Hydroponic culture technique
c) Integrated disease management d) Cloning ✓

17. The use of living organisms in industry for the production of useful products is known as:
a) Parasitology b) Biotechnology ✓ c) Biochemistry d) Molecular Biology

18. When an electron pair is shared between two atoms:
a) Two covalent bonds are formed b) Single covalent bond is formed ✓
c) Hydrogen bond is formed d) Ionic bond is formed

19. Which of the following diseases can be prevented through vaccination?
a) AIDS and Cancer b) Typhoid and Cancer
c) Malaria and AIDS d) Measles and Mumps ✓

20. Chemicals produced by microorganisms which are capable of destroying the growth of microbes are called:
a) Antigen b) Antiseptics c) Biocidal d) Antibiotics ✓

Chapter : 01 Introduction to Biology

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Subjective

Q1: ***What do you mean by Hypothesis?***

Ans: ***Hypothesis:***

A statement made on the basis of observation, data, experience and background knowledge of event is called hypothesis. OR

An observer organizes observations into data form and gives a statement as per experience and background knowledge of the event. This statement is the hypothesis.

- *Or hypothesis is the statement made by a scientist on the basis of observation or available information.*
- *It is tentative explanation of observations.*
- *It is a statement which is to be tested.*

Q2: ***Write a short note on cloning.***

Ans: ***Cloning:***

Cloning is the production of genetically identical copies of organisms/cells by asexual reproduction.

- *Cloning is a technology for achieving eugenic aims.*
- *A clone is defined as a cell or individual and all its asexually produced offspring.*
- *All members of a clone are genetically identical except when a mutation occurs.*
- *Generally, no normal animal reproduced naturally by cloning. Several insects and many plants do, in some circumstance whereas few do so regularly.*
- *In 1997 scientists in Scotland succeeded in cloning a sheep. In this procedure the nucleus from a fertilize egg is removed and a nucleus from a cell of a fully developed individual is inserted in its place. The altered Zygotes is then implemented in a suitable womb where it completes its development. The new individual formed in this*

way is a genetically identical clone of the individual whose nucleus was used. Thus, cloning could make multiple copies of a desired genotype.

Q3: ***How does Theory different from Law.***

Ans: The difference between Theory and Law is:

Theory	***Law***
➢ *A theory is made from hypothesis which has been tested by many experiments. A good theory is predictive and has explanatory power.* ➢ *It can be disapproved by scientific by scientists after scientists after greater efforts.* ➢ *Due to changing nature of life biology is full theories.* ➢ *Theory may not remain uniform and constant in science.* ➢ *It is more specific than law.* ➢ *It gives answers of simple questions.* ➢ *Example of theory is Cell theory, Lamarck and Darwin theory of natural selection etc.*	➢ *If a theory survives skeptical approach of other scientists and continues to be supported by experimental evidences, it becomes a scientific law.* ➢ *It is virtually irrefutable theory.* ➢ *Due to changing nature of life biology has few laws.* ➢ *A scientific law is a uniform or constant fact of nature.* ➢ *It is more general than theory.* ➢ *It can afford answers to even more complex questions.* ➢ *Examples of the biological laws are: Hardy-Weinberg Law and Mendel's law of inheritance.*

Q4: ***What is deduction/deductive reason?***

Ans: ***Deduction/deductive reasoning:***

The logical consequence of a hypothesis is called a deduction. OR

It involves drawing specific conclusion from some general principal assumption or statements.

- *It moves from general to specific.*
- *A number of deductions can be made to explain the hypothesis.*

Example:

If all birds have wings, and sparrows are birds, then sparrows have wings.

Q5: ***Define Vaccination.***

Ans: ***Vaccination:***

In vaccination, vaccines (inactive or weakened bacteria or viruses or their toxins) are inoculated to as to stimulate the production of antibodies or lymphocytes. OR

- *It is an artificially induced passive immunity.*
- *Edward Jenner first developed the technique of vaccination in* 1796.
- *Vaccination is the injection of vaccine to make the people immune from the intending degree of their being exposed to the virus or bacteria at the time of epidemics or in some diseases the individuals are vaccinated in their early life to make them immune to those diseases.*
- *Many diseases such as polio, whooping cough, measles, mumps etc. can be easily controlled by vaccination or shots.*

Q6: ***Differentiate between Organ and Organelles.***

Ans: The difference between Organ and Organelles is:

Organ	Organelles
➢ *It is the structure of organisms that is specialized to perform a particular function.* ➢ *It is normally composed of several tissue types.* ➢ *Organ combines to organ systems.* ➢ *The arrangement of organs speaks of division of labor in the organisms.* ➢ ***Examples**: Heart, stomach, eye etc.*	➢ *It is the structure within the cells that performs a specific function.* ➢ *It is a sub - cellular structure.* ➢ *Organelles combine to form cells.* ➢ *The arrangement of organs speaks of division of labor within the cell.* ➢ ***Examples:** Mitochondrion, Nucleus, Ribosomes etc.*

Q7: ***Differentiate between Organ formation in plants and animals.***

Ans: The difference between Organ formation in plants and animals is:

Organ formation in plants	Organ formation in animals
➢ *The level of organization is much less definite in plants than it is in animals.* ➢ *Organs in plants are not part of organ system.* ➢ *They cannot be assigned with clear cut function.* ➢ ***Examples:** Roots, shoots, leaves and flowers etc.*	➢ *In animas organ formation is far more complex and defined.* ➢ *Organs in animals are part of organ systems.* ➢ *They can be assigned with clear cut functions.* ➢ ***Examples:** Heart, brain, stomach, eyes etc.*

Q8: ***Differentiate between Population and Community.***

Ans: The difference between Population and Community is:

Population	Community
➢ *Population is a group of organisms of one species inhabiting the same are at the same time.* ➢ *It is simple collections of organisms of one species.* ➢ *It is lower level of biological than community.* ➢ *Autecology is the study at population level.* ➢ ***Examples:** The number of rats in a field of rice, the number of students in a class room.*	➢ *It is the group of organisms of two or more species inhabiting the same area at the same time.* ➢ *It is dynamic collections of two or more species.* ➢ *It is higher level of biological organization than population. It includes more than one population.* ➢ *Synecology is study at community level.* ➢ ***Example:** Birds, rats and other animals in the field of rice.*

Q9: ***Define theory. Give important features of a good theory.***

Ans: ***Theory:***

A theory is a set statement which is found to be true as a result of testing of many hypotheses. *OR*

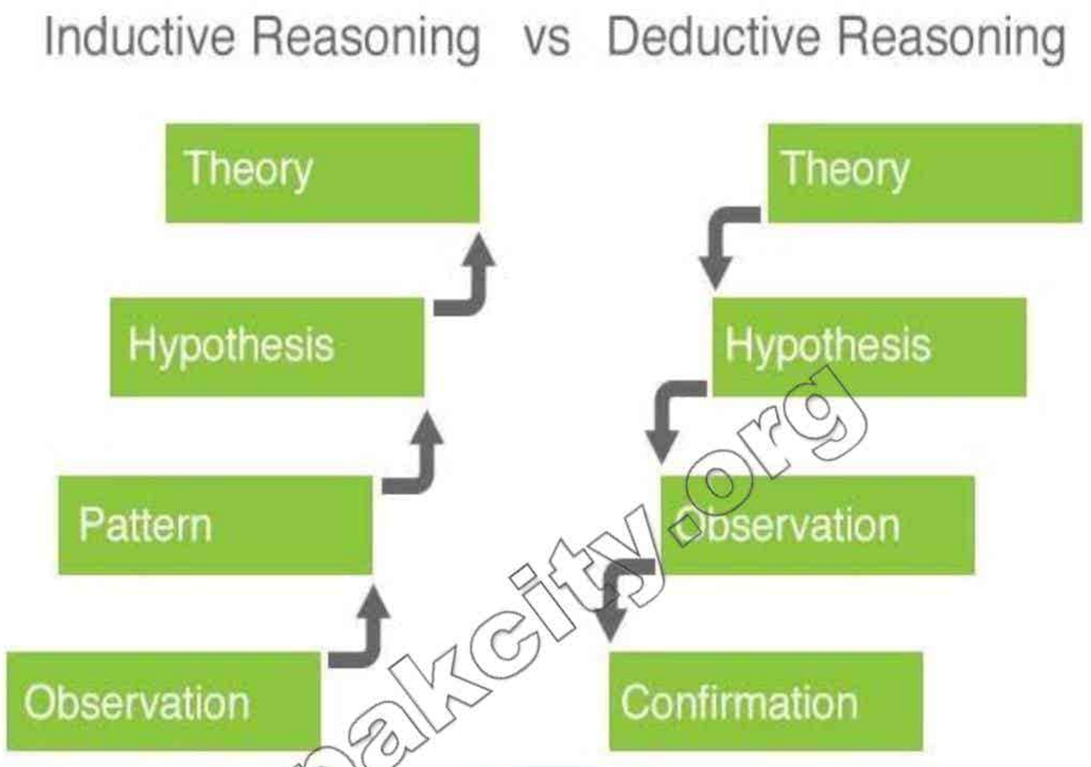
A theory is made from hypothesis which has been tested by many experiments.

- *A good theory has explanatory power.*
- *It may suggest new and different hypothesis.*
- *A theory should be productive.*

Q10: ***Differentiate between Deductive and Inductive reasoning.***

Ans: The difference between Deductive and Inductive reasoning is:

Deductive reasoning	***Inductive reasoning***
➢ *It involves drawing specific conclusion from some general principle assumptions or statements.* ➢ *It moves from general to specific.* ➢ ***Example:*** *If "all birds have wings" and "sparrows are birds", then we conclude that "sparrows have wings".*	➢ *It involves drawing general conclusion from some specific observation or statements.* ➢ *It moves from specific to general.* ➢ ***Example:*** *If "sparrows have wings and are birds" and eagle, parrot, hawk and crow are birds", then we conclude that "all birds have wings".*



Q11: ***How and when a Hypothesis becomes a theory?***

Ans: A hypothesis becomes a theory when it is tested again and again without ever being falsified and is considered well supported and generally accepted. This may be used the basis of formulating further hypothesis. So, there is soon a series of supported by the result of many tests which is then called a theory.

Q12: ***Name of the four Eras of Geological Time Chart.***

Ans: Four eras of Geological time chart:

- *Proterozoic Era*
- *Palaeozoic Era*
- *Mesozoic Era*
- *Caenozoic Era*

Q13: ***What is integrated disease management?***

Ans: ***Integrated disease management:***

It is defined as the control of various diseases by utilizing all the relevant methods with the education and participation of community.

- *It is used to control a particular disastrous disease or all the common diseases of a plant or control of dangerous diseases from human society.*
- *In this program all methods, as and when required, are utilized.*
- *It requires awareness of the community about the severity of the problem, its causes and remedies.*

Q14: ***Differentiate between Biome and Biosphere.***

Ans: The difference between Biome and Biosphere is:

Biome	***Biosphere***
➢ *A large regional community primarily determined by its climate is called biome.* ➢ *A biome is large distinct reginal land ecosystem characterized by certain climatic conditions and particular types of plants.* ➢ ***Example:*** *Grassland, deserts, tropical rain forests, tundra etc.*	➢ *The part of the earth inhibited by living organisms including both living and non-living components.* ➢ *The entire biosphere is an ecosystem, a place where organisms interact among themselves and with the physical and chemical environment.* ➢ ***Example:*** *Earth (This includes land as well as sea where life found).*

Q15: ***Give four characteristics of living organism?***

Ans: Four characteristics of living organism:

- *They are made up of one or more cells.*
- *They contain genetic program of their characteristics.*
- *They can acquire and use energy.*
- *They can carry out and control numerous chemical reactions.*

Q16: ***What is pasteurization. Give its application.***

Ans: ***Pasteurization:***

The process to kill microorganisms from milk and milk containing products by the supply of heat is called pasteurization.

- *It was developed by Louis Pasteur.*
- *Heat is supplied (63-64^{o}C for 15 to 20 minutes OR 73-74^{0}Cfor 1 sec to 1 minute).*
- *By this techniques food can be stored for long time without damaging its nutritional value.*
- *The transport of food from one place to another can be made easy.*

Q17: ***What is meant by phyletic lineage? How new species arise?***

Ans: ***Phyletic lineage:***

It is an unbroken series of species arranged in ancestor to descendant sequence with each later species evolved from the former one.

- *The life today has come through the phyletic lineage or evolving populations of the organisms living in the remote past.*
- *Due to evolutionary process, the new species are formed and this causes increase in biodiversity.*

Q18: ***What is hydroponic culture technique. What are its advantages and applications?***

Ans: ***Hydroponic culture techniques:***

In this technique the plants are grown in aeriated water to which nutrient mineral salt are added.

- *It is actually the science of growing terrestrial plants in an aerated solution.*
- *Hydroponic forming is not feasible yet.*

Advantages:

- *This technique is used to check whether certain nutrient is essential for plant or not because it is impossible to conduct experiments on nutrients requirements of plants by growing them in soil.*
- *Astronauts may use it for growing vegetables in space.*

Q19: ***Differentiate between Biological control and Bioremediation.***

Ans: The difference between Biological control and Bioremediation is:

Biological control	***Bioremediation***
➢ *The process in which living organisms are used to control harmful organism by competing or killing it is called biological control. OR* ➢ *It is the control of living organisms by other living organisms.* ➢ *It is used to increase food production control of pests/ insects.* ➢ ***Examples:*** *Control of Aphids by Wasp. Some bacteria are used as bio-pesticides.*	➢ *The detoxification of harmful chemicals by means of living organisms is called bioremediation. OR* ➢ *It is removal or degradation of non-living materials by living organisms.* ➢ *It is used to lessen population.* ➢ ***Examples:*** *Removal of heavy metals by Algae. Fungi degrade a diverse range of persistent or toxic environmental pollutants.*

Q20: ***Differentiate between Hybridization and Cloning.***

Ans: The difference between Hybridization and Cloning is:

Hybridization	***Cloning***
➢ *Hybridization is a method of sexual reproduction.* ➢ *Hybrid animals are sterile.* ➢ *Hybrid organisms contain DNA from male and female parents.* ➢ *Hybridization gives rise to genetically different organisms from its parents known as hybrid.* ➢ *Hybrid has superior characters over its parents (improved hybrid vigor).*	➢ *Cloning is method of asexual reproduction.* ➢ *Cloned animals are fertile.* ➢ *Cloned organisms contain DNA from only one type of parent.* ➢ *Cloning gives rise to an identical copy of parent organism known as a clone.* ➢ *Clones are 100 % identical to their parents.*

Q21: ***Differentiate between Hypothesis and Theory.***

Ans: The difference between Hypothesis and Theory is:

Hypothesis	***Theory***
➢ *A tentative explanation of observations is called hypothesis.* ➢ *Hypothesis is not experimentally tested and proven.* ➢ *It is derived from data collected during observations.* ➢ *It is based upon projections or possibilities.*	➢ *A series of hypothesis supported by the results of many tests from theory.* ➢ *Theory is experimentally tested and proven.* ➢ *It is derived from experimentally tested hypothesis.* ➢ *Theory is certain and can give rise to new hypothesis.*

Q22: ***Define fossil. Also give significance of study of fossil.***

Ans: ***Fossil:***

The remains or impression of a prehistoric plant or animal embedded in rock and preserved in petrified form.

Significance of fossil:

- *Fossil showed that at various organisms dominated this planet during various periods of geological time chart.*
- *Study of fossils allows biologists to place organisms in a time sequence.*
- *We can find age of organisms and place them according to sequence.*

Q23: ***Differentiate between Anatomy and Morphology.***

Ans: The difference between Anatomy and Morphology is:

Anatomy	***Morphology***
➢ *The study of internal gross structure is called anatomy.*	➢ *The study of form, appearance and external structure is called morphology.*
➢ *Anatomy is subdivision of morphology.*	➢ *However, morphology is a branch of biology.*
➢ *It is concerned about the cellular and tissue level composition of organisms.*	➢ *It is concerned with gross size, shape, color of organisms.*

Q24: ***Differentiate between Marine water biology and Fresh water biology.***

Ans: The difference between Marine water biology and Fresh water biology is:

Marine water biology	***Fresh water biology***
➢ *This is the study of marine life.*	➢ *This deals with the organism living in fresh water bodies.*
➢ *This includes study of life in seas and oceans and physical and chemical characteristics of the sea acting as factors for marine life.*	➢ *This includes life in rivers, lakes etc. and physical and chemical parameters of these water bodies.*

Q25: ***Differentiate between Chemotherapy and Radiotherapy.***

Ans: The difference between Chemotherapy and Radiotherapy is:

Chemotherapy	***Radiotherapy***
➢ *In chemotherapy certain anticancer chemicals are given to the patients at regular intervals.*	➢ *In radiotherapy, the cancerous part is exposed to short wave radiations from radioactive material.*
➢ *These chemicals may kill both cancerous as well as normal cells.*	➢ *This process is repeated at regular intervals.*
➢ *In Pakistan usually chemotherapy is used to control cancer.*	➢ *In Pakistan several centers carry out radiotherapy to control cancer.*

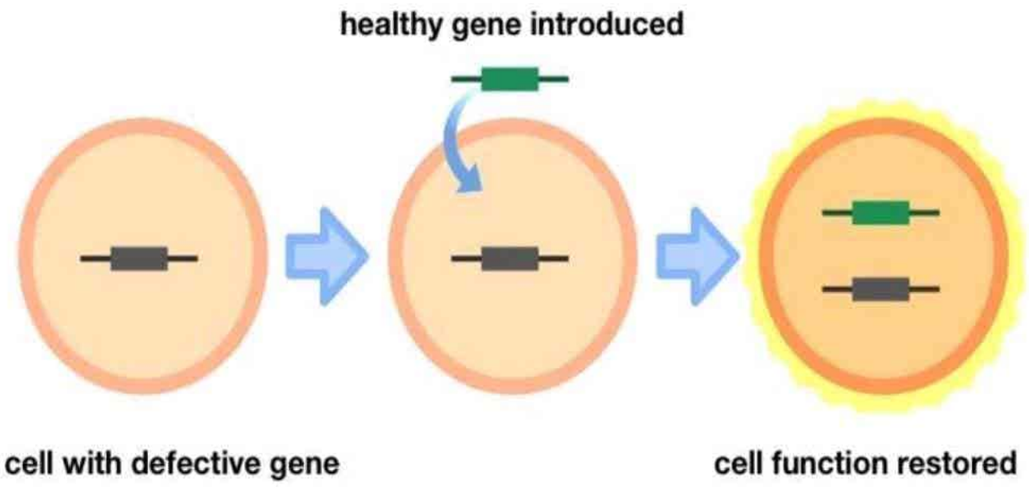
Q26: ***What is gene therapy.***

Ans: ***Gene Therapy:***

Gene therapy is the treatment of the defective gene by introducing normal and healthy gene into the body through bone marrow cells.

- *It is the insertion of genetic material into human cells for the treatment of a disorder.*
- *It is a new technique in which defective genes are repaired.*

- *In gene therapy, the normal genes are first isolated and then are inserted into the patient through bone marrow.*



Q27: ***Differentiate between Biotechnology and Molecular Biology.***

Ans: The difference between Biotechnology and Molecular Biology is:

Biotechnology	Molecular Biology
➢ *It deals with the use of living organism, system or processes in manufacturing and service industries.* ➢ *This includes production of Insulin, hormones, transgenic organisms.*	➢ *This deals with the structure of organisms, the cells and their organelles at molecular level.* ➢ *This includes structure and function of the macromolecules (e.g. proteins and nucleic acids) essential to life.*

Q28: ***What is Bio-elements and give their proportion in human body.***

Ans: ***Bio-elements:***

Bio elements are naturally occurring chemical elements that are commonly used in forming the chemical compounds from which the living organisms are made.

- *They are found in all organisms.*
- *Bio elements have special properties which make them suitable as basis for life.*

Proportion of bio elements:

Major bio elements	Minor bio elements	Trace bio elements
➢ *Oxygen 65%* ➢ *Carbon 18%* ➢ *Hydrogen 10%* ➢ *Nitrogen 3%* ➢ *Calcium 2%* ➢ *Phosphorous 1%*	➢ *Potassium 0.35%* ➢ *Sulphur 0.15%* ➢ *Chlorine 0.15 %* ➢ *Sodium 0.15%* ➢ *Magnesium 0.05%* ➢ *Iron 0.004%*	➢ *Copper* ➢ *Manganese* ➢ *Zinc* ➢ *Iodine*

Q29: ***What is molecular level in organization level of organism. Differentiate between Micro molecules and Macro molecules.***

Ans: ***Molecular level:***

In organisms elements usually do not occur in isolated form. The atoms of different elements combine with each other through ionic and covalent bonding to produce compounds. This stable form is called molecules.

Micro molecules	Macro molecules
➢ *A low molecular weight molecule is called micro-molecules.* ➢ ***Examples:*** CO_2, H_2O	➢ *A high molecular weight molecule is called macro molecules.* ➢ ***Examples:*** *Starch, protein etc.*

Q30: ***Define population with examples and also give its attributes.***

Ans: ***Population:***

A population is a group of living organisms of the same species located in the same place at the same time.

Examples:

- *The number of rats in a field of rice.*
- *The number of students in your biology class.*
- *Human population in a city.*

Attributes of population are:

- *Gene frequency*
- *Gene flow*
- *Age distribution*
- *Population density*
- *Population pressure*

Q31: ***How science of biology helping mankind?***

Ans: ***Biology and service of mankind:***

The science of biology has been helping mankind in many ways:

- *In increasing food production/Agriculture*
- *In combating disease/Health*
- *In protecting and conserving environment/ Environment*