Q. Multiple choice based questions (MCQs).

1. Who discovered Microinjection of DNA?
   a. M.A. Barber
   b. Darwin
   c. Mendel
   d. Aristotle

2. Which of the following statement is INCORRECT for gene knockout?
   a. Nonfunctional gene is introduced
   b. Make gene inoperative
   c. Introduction of functional gene in an organism
   d. It can be used to study the effect of loss of gene

3. DNA solution injected directly into the cell using micromanipulators is known as -------
   a. Macroinjection
   b. Micromanipulator mediated DNA delivery
   c. Microfiction
   d. Microinjection

4. Use of hypodermic syringe to insert DNA into growing inflorescence is known as----------
   a. Macroinjection
   b. Micromanipulator mediated DNA delivery
   c. Microfection
   d. Microinjection

5. GMO stand for _____
   a. Grass modified organism
   b. Genetically modified organism
   c. Genome modified organism
   d. All of these

6. An organism or cell whose genome has been altered by the introduction of one or more foreign DNA sequences from another species by artificial is called as _____
   a. Transgenic
   b. Transgensis
   c. Transition
   d. Translation

7. The concept of nuclear transfer was first conceived by _____
   a. Hans Spemann
   b. Darwin
   c. Mendel
   d. Sewall wright

8. The introduction of the nucleus from a cell into an enucleated egg cell is called as _____
   a. Nuclear transfer
   b. Gene transfer
   c. Cell transfer
   d. Genome transfer

9. A type of virus that inserts a copy of its RNA genome into the DNA of a host cell that change genome that cell is called as_____
    a. Virus   b. Retrovirus
    c. Lentivirus   d. All of these

10. Which of the following is not an RNA virus?
        a. Retrovirus   b. Enterovirus
        c. Rhabadovirus   d. Adenovirus

11. The process of_____involves the introduction of gene in to a cell where it exchange places with its counterpart in the host cell.
    a. rDNA   b. Gene Targeting
    c. Knockout technology   d. Transgenic technology

12. What is special about "knockout" mice?
        a. They are very attractive   b. their DNA has been modified
        c. they are easy to knock out   d. they are unusually aggressive

13. DNA microinjection in to the egg has been used to produce which of the following transgenic animals_____
    a. Mice   b. Chicken
    c. Pig   d. all of these

14. Vector that has properties of both bacteriophage as well as plasmid called as_____
        a. Virus   b. Cosmid
    c. Phasmid   d. Probe

15. What is the application of transgenic animal"s _____
        a. Study disease   b. Biological products
        c. Pharmaceutical Product   d. All of these

16. The father of animal cell culture was-----
        a. Ross Harrison   b. Watson

        c. Johnson   d. Chris Harris

17. The first vaccine developed from animal cell culture was for------
        a. Hepatitis B   b. Somatostatin
        c. Small pox   d. Polio

18. Embryonic stem cells can differentiate into which types of cells?
        a. Only brain stem cells and specialized brain cells A
        b. All types of specialized cells in the body
        c. Only cells that can produce insulin
        d. Only cells that can produce artificial skin

19. What are the roles of stem cells in our bodies?
    a. We are not sure what roles stem cells play in the body
    b. They produce new specialized cells to replace cells that die or are used up
    c. They fight against infections
    d. They perform specialized roles in the body

20. _____are a unique kind of primitive, immature cells that have a
    remarkable capacity to develop into different kinds of cells.
    a. Stem cells   b. Epithelial cells
    c. Mesenchymal cells   d. Ectodermal cells

21. _____refers to the varying ability of stem cells to differentiate into specialized   cell

types.

    a. Cell potency   b. Cell viability
    c. Cell-therapy   d. Cell-regeneration

22. In developing embryo, the stem cells can be differentiated into---
    a. Ectoderm   b. Endoderm

    c. Mesoderm   d. All of above

23. What is a stem cell?
    a. A cell only found in the stem of plants.
    b. An unspecialised cell with the ability to create specialised cells
    c. A specialised cell who can only generate cells of the same type
    d. Zygote

24. The process whereby cells or tissue are frozen is called…
    a. Cryopreservation   b. Proliferation
    c. Differentiation   d. Blastocyst

25.…….are the most well-known type of pluripotent stem cell.
    a. Red Blood cells   b. Adherent cells
    c. Embryonic Stem cells   d. Carcinoma cells

26. _____are also known as somatic stem cells.
    a. Adult stem cells   b. Cancer cells

    c. Endometrial cells   d. Epithelial cells

27. _____are the most well-known type of pluripotent stem cell.
    a. Red Blood cells   b. Adherent cells

    c. Embryonic Stem cells   d. Carcinoma cells

28. Embryonic stem cells are derived from the_____of the blastocyst.
      a. Inner cell mass   b. Ectoderm
      c. Blastocoel   d. Mesoderm

29. Stem cells are present in
      a. Unicellular organisms   b. Multicellular organism
      c. Non- living thing   d. Viruses

30. Name the type of culture which is prepared by inoculating directly from the tissues of an organism to culture media?
      a. Primary cell culture   b. Secondary cell culture
      c. Cell lines   d. Transformed cell culture

31. Father of Biostatistics is ......
      a. Francis Galton   b. Ronald Fisher
      c. John Tukey   d. Raphael Weldon

32. Primary data means……..
      a. Original data   b. Results of survey
      c. Results of enquiry   d. All of above

33. Data are classifies on the basis of geographical areas is called ....
      a. Geographical classification   b. Chronological classification
      c. Qualitative Classification   d. Quantitative Classification

34. Arrangement of data in rows and columns is called ………..
      a. Classification   b. Tabulation
      c. Distribution   d. Interpretation

35. Source note should be at.......position in table
      a. Top of table   b. In body
      c. Heading of stub   d. Base of table

36. In tables, the headings of columns are known as ....
      a. Stubs   b. Captions
      c. Tittles   d. Source note

37. Graphical representation of the data in the form of adjacent rectangular block is calledas ………..
      a. Scatter diagram   b. Histogram
      c. Polygon   d. Bar diagram

38. In a histogram, the frequency is represented by ………
      a. Heights of rectangle   b. Area of rectangle
      c. Width of the rectangle   d. None of above

39. When data is classified according to the region like nation, States, districts, cities andvillages is called……..
   a. Quantitative classification
   b. Qualitative classification
   c. Chronological classification
   d. Geographical classification.

40………….is an average which divides the data into two equal halves.
   a. Mode
   b. Mean
   c. Median
   d. Variable

41. The chronological classification is based on………
   a. Time of its occurrence
   b. Quantity
   c. Location
   d. Well defined attributes

42. Which of the following is not measure of central tendency ………….. ?
   a. Mean
   b. Mode
   c. Median
   d. Range

43. Which of the following are the methods of measures of dispersion… ………?
   a. Standard deviation
   b. Mean deviation
   c. Range
   d. All of the above

44. While calculating the standard deviation, the deviations are only taken from _____.
   a. The mode value of a series
   b. The median value of a series
   c. The quartile value of a series
   d. The mean value of a series

45. Which of the following are the methods of studying the correlation ………………….?.
   a. Scattered diagram
   b. Karl Pearson"s correlation
      coefficient
   c. Spearman"s rank correlation coefficient
   d. All of above

46. In methods of studying correlation coefficient, the calculation based on order or rank isknown as ………….
   a. Scattered diagram
   b. Karl Pearson"s correlation
      coefficient
   c. Spearman"s rank correlation coefficient
   d. All of above

47. The person who collects the statistical information is known as …………
   a. Collector
   b. Invigilator
   c. Investigation
   d. Distributer

48……………………ntroduced the concept of standard deviation in 1893.
   a. Karl Pearson
   b. Prof Bodding
   c. Charles Darwin
   d. Robert Koch

49. Karl Pearson''s coefficient of correlation is designated by letter …………
    a. β   b. γ
    c. δ   d. r

50. When ,,R'' = 0.90, then it is ....Correlation.
    a. High degree of +ve   b. High degree of -ve
    c. Low degree of +ve   d. Low degree of +ve

Q. Long Questions

1. Describe the nuclear transplantation with suitable example.

2. Explain in detail retroviral method with suitable example.

3. Define Knockout mice? Explain in detail process of knockout mice.

4. Explain in detail techniques in microinjection and it''s advantages.

5. Describe somatic cell nucleus method with suitable example.

6. Explain animal cell culture principle and application in brief.

7. Define stem cells and explain the pleurepotency in brief.

8. Define stem cells and add a note on embryonic stem cells.

9. Explain in brief animal cell culture.

10. Describe the sources of stem cells?.

11. Define classification and explain the various methods of data collection.

12. What is Tabulation? and add note on parts of table.

13. What is measure of Central Tendency? Describe the mean with merits and demerits.

14. Define correlation and explain the scatter diagram.

15. What is dispersion? Explain the types of dispersion with their merits and demerits.

Q. Short notes

1. Application of transgenic animals

2. Retrovirus mediated gene transfer

3. Process of DNA microinjection

4. Application of Nuclear transplantation

5. Application of Knockout Mice

6. Xenotransplantation

7. Ti plasmid

8. Difference between DNA microinjection and Retrovirus

9. Application of microinjection techniques

10. Animal Pharming

11. Cell line

12. Embryonic stem cells.

13. Totipotency.

14. Pleurepotency.

15. Bone marrow.

16. Fetal stem cells.

17. Unipotency.

18. Stem cells.

19. Difference between Unipotency and Multipotency.

20. Adult stem cells

21. Types of classification

22. Frequency distribution

23. Types of table

24. Histogram

25. Polygon curve

26. Standard deviation

27. Karl Pearson‟s correlation coefficient and

28. Merits and demerits of mean

29. Merits and demerits of median

30. Scatter diagram