

1. The research that is especially carried out to test and validate the study hypotheses is termed
 - a. Fundamental research
 - b. Applied research
 - c. Conclusive research
 - d. Exploratory research
2. A screening test is used in the same way in two similar populations, but the proportion of false-positive results among those who test positive in population A is lower than that among those who test positive in population B. What is the likely explanation for this finding?
 - a. It is impossible to determine what caused the difference
 - b. The specificity of the test is lower in population A
 - c. The prevalence of disease is lower in population A
 - d. The prevalence of disease is higher in population A
3. In a small pilot study, 12 women with endometrial cancer (cancer of the uterus) and 12 women with no apparent disease were contacted and asked whether they had ever used estrogen. Each woman with cancer was matched by age, race, weight, and parity to a woman without disease. What kind of study design is this?
 - a. Prospective cohort study
 - b. Retrospective cohort study
 - c. Case-control study
 - d. Cross-sectional study
4. A researcher wants to investigate if tea consumption (assessed by a biomarker for tea metabolism) increases the risk of CHD. He uses a case-control study to answer this question. CHD is rare in younger people. Which two groups are best to enroll and compare for this purpose?
 - a. The group of CHD cases and a group of those who do not have CHD individually matched to the cases for tea metabolism biomarker
 - b. The group of CHD cases and a group of those who do not have CHD frequency matched to the cases for tea metabolism biomarker
 - c. The group of CHD cases and a group of those who do not develop CHD, matched for age
 - d. A random sample of those who drink tea and a random sample of those who do not drink tea, matched for age
5. The major purpose of random assignment in a clinical trial is to:
 - a. Help ensure that study subjects are representative of the general population
 - b. Facilitate double blinding (masking)
 - c. Ensure that the study groups have comparable baseline characteristics
 - d. Reduce selection bias in the allocation of treatment
6. The purpose of a double blind or double masked study is to:
 - a. Achieve comparability of treated and untreated subjects
 - b. Reduce the effects of sampling variation
 - c. Avoid observer and subject bias
 - d. Avoid observer bias and sampling variation
7. Which of the sets of activities best indicate the cyclic nature of action research strategy?
 - a. Reflect, Observe, Plan, Act
 - b. Observe, Act, Reflect, Plan
 - c. Act, Plan, Observe, Reflect
 - d. Plan, Act, Observe, reflect
8. A research intends to explore the result of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?
 - a. Descriptive survey method
 - b. Historical method
 - c. Ex-post facto method
 - d. Experimental method
9. What is the use of Factorial Analysis?
 - a. For setting the hypotheses
 - b. To understand the difference between two variables
 - c. To understand the relationship between two variables
 - d. To understand the difference between various variables
10. All the following are components of 'FINER' criteria for a research question EXCEPT
 - a. Feasible
 - b. Reliable
 - c. Novel
 - d. Ethical
11. Which of the following about PubMed is incorrect?
 - a. PubMed comprises more than 25 million citations for biomedical literature.
 - b. Citations may include links to full-text article from PubMed Central.
 - c. PubMed is developed and maintained by the National Centre for Biotechnology Information (NCBI), at the U.S. National Library of Medicine (NLM).
 - d. PubMed is a paid service provider for searching of literature.
12. The following study design provides group exposure and group response/outcome without knowing the individual exposure and response for a specific health problem.
 - a. Ecological study
 - b. Cross-sectional survey
 - c. Case report
 - d. Case series
13. The ability of a tool to correctly measure what it is supposed to measure is called as
 - a. Precision
 - b. Validity
 - c. Reliability
 - d. Consistency
14. Which of the following statement is true regarding Participant Observation
 - a. Observer becomes a part of the event/group
 - b. Systematic collection of data is easy
 - c. Analytic methods for observation are well described
 - d. Data is brief as compared to in-depth interviews
15. The list of all individuals in the study population from whom study participants in a research are to be selected is known as
 - a. Sampling frame
 - b. Study population
 - c. Sampling unit
 - d. Study sample
16. A researcher wants to estimate the prevalence of surgical site infection following cesarean section at a tertiary care hospital. What would be the minimum number of the sample size to estimate the magnitude of surgical site infection following cesarean section if it is estimated that the proportion of surgical site infection will be 10% in the hospital considering 5% absolute precision and 95% confidence level ($Z_{\alpha/2} = 1.96$)
 - a. 100
 - b. 138
 - c. 148
 - d. 158

17. Glasgow coma Scale (GCS) is a scoring system to understand the consciousness level of a person. The score varies between 3 and 15. A researcher has included a question in research tool- "What is the GCS score during admission?" This question is an example of-
- Open question
 - Closed question with dichotomous option
 - Closed question with multiple option
 - Closed question with quantitative answers
18. In an observational study on menstrual hygiene among school going girls aged 14 to 16 years, informed assent will be required to be taken from the adolescent girls. In addition, informed consent will be required from:
- Parent of adolescent girls
 - Institutional Head
 - both
 - None of the above
19. Immediately after identification of research topic and statement of objectives, it may be preferable to
- Write protocol
 - Outline one-page concept paper
 - Prepare dummy tables as per the analysis plan
 - Seek review by an institutional ethics committee
20. A study participant can be forced by the investigator to continue in a trial against his will. This is in conflict with which of the following ethical principles?
- Autonomy
 - Justice
 - Beneficence
 - None of the above
21. If the genetic code consisted of four bases per codon rather than three, the maximum number of unique amino acids that could be encoded would be
- 16
 - 256
 - 128
 - 64
22. A second mutation in the same gene restores the wild-type phenotype. This phenomenon is referred to as
- Intergenic complementation
 - Gene conversion
 - Synthetic enhancement
 - Intragenic suppression
23. Two protein sequences are compared by BLAST and produce an e value of e^{-100} . This e value most likely signifies which of the following about the genes encoding these two proteins?
- They function in the same tissue.
 - They have unrelated functions.
 - They are descended from a common ancestor.
 - They are derived from related species.
24. The primary action of steroid hormones is at the level of
- RNA export from the nucleus
 - Transcription
 - pre-mRNA splicing
 - mRNA degradation
25. The processes that lead to the synthesis of the functional light chain of an antibody molecule include
- DNA rearrangement but no RNA splicing
 - DNA rearrangement but no gene duplication
 - DNA rearrangement but no protein processing
 - RNA splicing but no DNA rearrangement
26. A microarray is a large collection of specific DNA oligonucleotide spotted in a defined pattern on a microscope slide. What is the most useful experiment that can be done with such a tool?
- Predicting the presence of specific metabolites in a cell
 - Comparing newly synthesized nuclear RNA with cytoplasmic RNA to locate introns
 - Comparing RNA produced under two different physiological conditions to understand patterns of gene expression
 - Comparing proteins produced under two different physiological conditions to understand their function
27. With respect to microRNAs, which, if any, of the following statements, is false?
- MicroRNA is a generic term that covers all tiny RNAs, ones that are less than 35 nucleotides long when mature.
 - MicroRNAs usually work as transcription factors.
 - MicroRNAs regulate target genes by binding to complementary sequences on one DNA strand of the target gene.
 - All are false.
28. RFLP analysis is a technique that:
- Uses hybridization to detect specific DNA restriction fragments in genomic DNA
 - Is used to determine whether a gene is transcribed in specific cells
 - Measures the transfer frequency of genes during conjugation
 - None of them
29. The PCR used to generate single stranded copies of a DNA sequencing or can be used as probes or even as primers
- Inverse PCR
 - RT PCR
 - Asymmetric PCR
 - None of them
30. What is the role of Hsp60 in protein folding?
- To direct the three dimensional folding of a protein.
 - To hold a peptide in extended form until its synthesis is complete and correct folding can occur.
 - To provide a sequestered chamber where protein folding can occur without interference from surrounding molecules.
 - To 'rescue' denatured or incorrectly folded protein giving it a chance to refold.
31. In Electrophoresis separation is based upon
- Charge
 - Shape
 - Size
 - All of above
32. The technique used to identify specific DNA sequence in bacterial colonies is
- Colony hybridization
 - In situ hybridization
 - Dot blot analysis
 - Western blotting
33. What is the role of SDS in SDS Page?
- Protein denaturation and imparting overall negative charge
 - Imparting overall negative charge to protein
 - Imparting overall positive charge
 - Protein unfolding and imparting overall positive charge

34. **What is the correct sequence of donning of PPEs?**
- Gloves → Gown → Mask → Goggles
 - Gown → Mask → Goggles → Gloves
 - Goggles → Gloves → Mask → Gown
 - Mask → Gown → Goggles → Gloves
35. **The technique used to identify some specific gene in the chromosome is**
- Colony hybridization
 - In situ hybridization
 - Dot blot analysis
 - Western blotting
36. **A variety of different techniques are used to separate, analyze, and purify different chemical compounds. Select the techniques that can be used to estimate the molecular weight of a protein?**
- Isoelectric focusing.
 - Electrophoresis.
 - Size exclusion gel Chromatography.
 - Both b and c
37. **If a strand of coding DNA has the following nucleotide sequence**
 — ATTCGCTAGACC —
What will be the nucleotide sequence of micro RNA (miRNA) be?
- UAAGCGAUCUGG
 - AUUCGCUAGACC
 - TAAGCGATCAGG
 - None of the above
38. **The chemical EDTA is routinely used in many experiments. For example, EDTA is used in electrophoresis buffer solutions. Which of the following statements is not true?**
- EDTA has a strong binding affinity for divalent and some trivalent cations.
 - EDTA is a catalyst for polymer formation and essential for protein and nucleic acid polymerization.
 - EDTA is a chelator.
 - EDTA is used to help denature proteins and weaken cell membranes.
39. **In a spectrophotometer, light of a specific wavelength can be isolated from white light with a(n)?**
- Double beam
 - Diffraction grating
 - Aperture
 - Slit
40. **The degree that a procedure deviates from a known value or from a calculated mean value is known as**
- Coefficient variation
 - Quality control
 - Standard deviation
 - Percent deviation
41. **The centrifugal force required to form nucleus pallet is**
- 600-750 xg
 - 10,000 to 15000xg
 - 18,000 to 25000xg
 - 35,000 to 40,000xg
42. **Beer's law states that the darker the color produced, the more light absorbed in the specimen; the more light absorbed, the**
- Lower the concentration of the analyte
 - Higher the concentration of the analyte
 - More light transmitted
 - Longer the wavelength required
43. **What is the normality of a solution of sodium hydroxide (molecular weight=40) containing 20 grams in 100 mL of solution?**
- 5.0N
 - 1.0N
 - 0.5N
 - 0.4N
44. **The association of endotoxin in gram negative bacteria is due to the presence of**
- Steroids
 - Peptidoglycan
 - Lipopolysaccharides
 - Polypeptide
45. **Which of the following are true for gram negative bacteria?**
- Upon alcohol treatment, the permeability of cell wall increases
 - Crystal violet – iodine complex is extracted
 - Pore size decreases and the crystal violet- iodine complex cannot be extracted
 - Alcohol treatment increases the permeability of the cell wall and the crystal violet- iodine complex can be extracted
46. **Which of the following role is performed by a bacteriophage in transduction?**
- Vector
 - Donor
 - Recipient
 - Episome
47. **COVISHIELD vaccine for COVID is**
- Inactive vaccine
 - Effective against spike protein
 - Effective against whole
 - None of the above
48. **Humans MHC genes are present on chromosome**
- 6
 - 11
 - 14
 - 21
49. **Which immunity plays role in graft rejection**
- Humoral
 - CMI
 - Both
 - Natural killer cells
50. **Complement fixation is not a function of**
- IgG
 - IgM
 - IgE
 - IgA

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