

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. Which of the following regarding an X-ray tube is false-
- consists of a small coil of wire cathode.
  - is a gas-filled tube.
  - has a glass envelope.
  - is located within a CT scanner
22. Which of these is NOT a Type of electromagnetic radiation-
- visible light.
  - X-rays.
  - sound waves.
  - infrared.
23. Regarding anode angle which of the following is true:
- It is usually between  $6^\circ$  and  $20^\circ$ .
  - It is an angle between the target surface and the central electron beam.
  - Smaller angle increases the field coverage.
  - Bigger angle improves geometrical unsharpness.
24. The total number of bones found in right upper limb is \_\_\_\_\_
- 25
  - 26
  - 30
  - 60
25. Regarding radiation damage to DNA, which of the following is false-
- The DNA damage is caused by free radicals produced from X-ray interaction.
  - The damage leads to cell death.
  - The process is beneficial for radiotherapy.
  - The damage is irreparable.
26. The technique used to minimise scatter includes all except-
- collimation of the beam.
  - increasing the kVp.
  - using an air gap between the patient and the detector.
  - using anti-scatter grids
27. The following are true regarding an X-ray photon except-
- is an electromagnetic radiation.
  - is deflected in a magnetic field.
  - ionises an atom.
  - travels at light velocity in a vacuum.
28. Which of the following bone is called collar bone?
- Acetabulum
  - Pelvic
  - Scapula
  - Clavicle
29. Regarding SPECT which of the following is false-
- The computational time in SPECT reconstruction is longer than CT.
  - SPECT imaging is less susceptible to motion artefacts than CT imaging.
  - SPECT allows over- and underlying distribution of radioactivity with improved contrast.
  - Radiopharmaceutical used in general planar imaging is used in SPECT procedures.
30. Regarding ultrasound used in medical diagnosis, which of the following is false-
- has an average speed in tissue of 1540 m/s.
  - causes microcavitation of blood.
  - has a frequency range of 1–20 Hz.
  - measures blood velocity.
31. Fertilization of an ovum by a spermatozoon occurs in which of the following structures?
- Cervix
  - Fallopian tube
  - Ovary
  - Uterus
32. Advantage of spiral compared with conventional CT includes-
- slower image acquisition.
  - delayed response to contrast media.
  - less partial volume artefact.
  - more motion artefacts.
33. Part of fluoroscopic imaging chain does not include-
- charge-coupled device (CCD) camera.
  - kerma air product (KAP) metre.
  - flat panel image receptor.
  - molybdenum filter.
34. Regarding CT number which of the following is true:-
- Tissues with high attenuation coefficient have negative CT number.
  - CT number for grey matter is similar with white matter.
  - CT numbers vary depending on beam filtration.
  - Changing the window width will change the CT number values.

35. Which cup lies at the junction of 3 bones of pelvic girdle?
- Ilium
  - Ischium
  - Pubis
  - Acetabulum
36. Which of these is true regarding electrons in an atom-
- have a higher mass compared to proton.
  - have a positive charge.
  - are equal to the number of protons in a non-ionised atom.
  - are equal to the mass number.
37. All of these are deterministic effects of Radiation except-
- sterility.
  - leukaemia.
  - formation of cataract.
  - hair loss.
38. Regarding computed tomography (CT) imaging, which of these is true-
- the CT number of fat is higher than water.
  - high level of scatter reaches the CT detectors.
  - windowing is a technique to adjust the greyscale.
  - air corresponds to a CT value of 0 HU
39. Which cell in the blood does not have a nucleus?
- Lymphocyte
  - Monocyte
  - Erythrocyte
  - Basophil
40. Regarding the nucleus of an atom, which of the following is false:-
- It is made up of protons and neutrons.
  - The nucleons are held by a strong nuclear force.
  - The nucleus has zero charge.
  - The size is smaller than the atom
41. All of the following are true for X-rays except
- They are invisible
  - They form part of electromagnetic spectrum
  - They cannot travel through vacuum
  - They cause ionization.
42. All of the following are ferromagnetic substances except?
- Iron
  - Nickel
  - Cobalt
  - Gadolinium
43. The attenuation of water on CT (Hounsfield units) is
- +100
  - 100
  - 0
  - +1000
44. Which of the following is used in radiation protection shields and gowns?
- Lead
  - Iron
  - Copper
  - Glass
45. Which of the following doesn't use ionizing radiation?
- X-rays
  - PET scan
  - MRI scan
  - Fluoroscopy
46. Which of the following closes and seals off the lower airways during swallowing?
- Epiglottis
  - Larynx
  - Uvula
  - Vocal cords
47. What is SI unit of radiation dose equivalent?
- Sievert
  - Gray
  - Roentgen
  - Curie
48. Which of the following has highest radiation dose?
- IVP
  - Barium enema
  - Chest X-ray PA view
  - X-ray Hand AP view
49. Which of the following is not a radiation monitoring device?
- TLD
  - Film Badge
  - Grid
  - Pocket Dosimeter
50. An impulse is transmitted from one neuron to another neuron at which of the following structure?
- Dendrite
  - Glial cell
  - Synapse
  - Terminal plate
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