

Seat No.

Total No. of Pages : 12

Ph.D. Entrance Examination 2024-25
NANOSCIENCE AND TECHNOLOGY
Subject Code : 81175

Day and Date : Wednesday, 13-11-2024**Total Marks : 100****Time : 10.00 AM To 12.00 Noon**

Instruction :

1. This question paper carries fifty multiple choice questions.
 2. Each Question carries two marks.
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1. How to judge the depth of any research?
 - a) By research title
 - b) By research duration
 - c) By research objectives
 - d) By total expenditure on research
2. What does a good thesis involve?
 - a) Reducing punctuations as well as grammatical errors to minimalist
 - b) Correct reference citations
 - c) Consistency in the way of thesis writing
 - d) Well defined abstract

Select the answers from the codes given below:

- | | |
|------------------|-----------------------|
| a) b), c) and d) | b) a), b), c) and d). |
| c) a), b) and c) | d) a), b) and d) |

3. A hypothesis is a
- a) Tentative statement whose validity is still to be tested
 - b) Supposition which is based on the past experiences
 - c) Statement of fact
 - d) All of the above
4. When academicians are called to deliver a lecture or presentations to an audience on certain topic or set of topics of educational nature, it called
- a) Symposium
 - b) Seminar
 - c) Training Program
 - d) Workshop
5. Which one of the following is referred as Reservoir of Indian Theses?
- a) University Grant Commission
 - b) Ministry of Education.
 - c) Shodhganga
 - d) INFLIBNET
6. The F-test:
- a) is basically one-sided
 - b) is basically two-sided
 - c) can be either, depending on the hypothesis
 - d) can never be two-sided
7. The quality of a research journal is indicated by its.....
- a) h-index
 - b) g-index
 - c) i/o score
 - d) impact factor

8. Bibliography given in a research report
- a) shows vast knowledge of researcher
 - b) helps those interested in further research
 - c) has no relevance to research
 - d) list of published articles of researcher
9. One of the following method is not a bottom up approach used for nanoparticles synthesis.
- a) Lithography
 - b) co-precipitation
 - c) sol-gel
 - d) green synthesis
10. Which of the following features are considered as critical in qualitative research?
- a) Collecting data with the help of standardized research tools.
 - b) Design sampling with probability sample techniques.
 - c) Collecting data with bottom-up empirical evidence.
 - d) Gathering data with top-down schematic evidence.
11. A field of study concerned with the ethics & philosophical implications of certain biological & medical procedures, technologies & treatments is called.....
- a) Bio-medics
 - b) Bioethics
 - c) Biogeography
 - d) Biotechnology
12. Typical precursor used in sol-gel are.....
- a) Metal oxides
 - b) Metal dioxides
 - c) Metal alkoxides
 - d) Metal fluorides

13. Over tones are mainly observed in.....
- a) near IR
 - b) mid IR
 - c) far IR
 - d) not in IR region.
14. Which of the following molecules will not show infrared spectrum?
- a) H_2
 - b) HCl
 - c) CH_4
 - d) H_2O
15. Which of the following is not an application of electroplating?
- a) Decorative purposes
 - b) Coating of metal
 - c) Metal protection
 - d) Corrosion prevention
16. X-ray diffractometers provide information about the compounds present in a solid sample.
- a) Quantitative
 - b) Qualitative
 - c) Quantitative and qualitative
 - d) Either quantitative or qualitative
17. What do you mean by an assumption?
- a) It is a framework in which research work has to be done
 - b) It simplifies the logical process of arriving at the solution
 - c) It is a restrictive condition
 - d) None of the above

18. What's the procedure in Top-down fabrication method?
- a) Nano-particles -> Powder -> Bulk
 - b) Powder -> Bulk -> Nano-particles
 - c) Bulk -> Powder -> Nano-particles
 - d) Nano-particle -> Bulk -> Powder
19. How to judge the depth of any research?
- a) By research title
 - b) By research objectives
 - c) By total expenditure on research
 - d) By research duration
20. Research can be classified as:
- a) Basic, Applied and Action Research.
 - b) Philosophical, Historical, Survey and Experimental Research
 - c) Quantitative and Qualitative Research
 - d) All the above
21. What do you mean by synopsis of a research project?
- a) The blue print of research
 - b) Extracts from the research observations
 - c) A plan of the research
 - d) Summary of the findings of the research

22. Who defined "Research" as "systematized effort to gain new knowledge"
- a) Tom & Zerry
 - b) Redman and Mory
 - c) F. W. Taylor
 - d) Ross Taylor
23. Review of literature is useful for finding
- a) Data
 - b) People
 - c) Research gap
 - d) None of these
24. Which of the following is not a research method?
- a) Historical.
 - b) Comparative
 - c) Empirical
 - d) Interview
25. When reading a journal article, one should do
- a) Use the same ideas for pour project
 - b) Accept their ideas after all they are published authors
 - c) Approach it with a questioning style
 - d) Read it as a way of obtaining more information
26. What does chirality (n, m) denote for carbon nanotube?
- a) CNT is single walled or multi walled
 - b) CNT is insulating or metallic
 - c) A direction that the graphene sheet is rolled up to form a tube
 - d) A direction that CNT extends along

27. A chemical process that can be used to generate graphene oxide through the addition of potassium permanganate to a solution of graphite, sodium nitrate and sulphuric acid is called as.....
- a) Hummers.
 - b) Nanotube Slicing
 - c) All of the above
 - d) None of the above
28. CNT possesses high Young's modulus due to
- a) Four valance electronic bonds of carbon atoms that equally shares stress in any direction
 - b) A perfect construction in a tubular manner
 - c) Covalent SP bonds formed between individual carbon atoms to increase strength
 - d) Delocalization Pi electrons that travel across several carbon atoms to increase strength
29. The quantum efficiency is defined as the resulting in generation and collection of an electron in the solar cell.
- a) probability of an incident photon
 - b) incident of radiations
 - c) probability of an incident of visible light
 - d) probability of an incident electron
30. The negative pole of NICAD battery is made up of
- a) Cadmium
 - b) Nickel
 - c) Palladium
 - d) Lead

31. In batteries, polarization =
 - a) Ohmic voltage drop
 - b) Overvoltage
 - c) Overvoltage + ohmic voltage drop
 - d) Voltage
32. Separation of protein in 2-D gel electrophoresis is dependent on
 - a) Mass of protein alone
 - b) Charge of protein alone
 - c) Mass and hydrophobicity of the protein
 - d) Charge and mass of the protein
33. is the study of interaction between an antigen and an antibody.
 - a) Serology
 - b) Cytology
 - c) Mycology
 - d) Neurology
34. The process by which a eukaryotic cell separates the nuclear DNA and chromosomes and divides into two different but similar sets of nuclei is known as
 - a) Meiosis
 - b) Mitosis
 - c) Cytokinesis
 - d) None of these
35. Which of these bacteria lack a cell wall?
 - a) Escherichia
 - b) Pseudomonas
 - c) Mycoplasma
 - d) Mycobacterium

36. The portion of the growth curve where rapid growth of bacteria is observed is known as
- a) Lag phase
 - b) Logarithmic phase
 - c) Stationary phase
 - d) Decline phase
37. In recombinant DNA technology, the term vector refers to
- a) The enzyme that cuts DNA into restriction fragments
 - b) The sticky end of DNA fragments
 - c) A plasmid used to transfer DNA into living cells
 - d) A DNA probe used to identify a particular gene
38. What happens when the local anisotropy is strong for particulate nanomagnets?
- a) Magnetization changes gradually
 - b) Magnetization remains unaffected
 - c) Magnetization alters rapidly
 - d) Magnetization gets well aligned
39. Superparamagnetic state no longer holds any at small particle size?
- a) paramagnetism
 - b) antiferromagnetism
 - c) diamagnetism
 - d) ferromagnetism

46. Apart from the composition of electrolyte and pH, Which of the following parameters are involve in the superior production of TiO_2 , NTs?
- a) anodization potential b) temperature
c) time d) All of the above
47. Chemical modifications of carbon nanotubes can be achieved by intermolecular interactions using
- a) van der waals forces b) hydrogenation
c) radical addition d) electrophilic addition
48. Highly fluorescent and photostable QDs can allow live imaging of individual cellular components with
- a) high resolution
b) selectivity
c) precision and bright fluorescence
d) All of the above
49. The method of MOFs uses electrons as a source of metal ions that are passed through a reaction mixture, which contains dissolved organic linker molecules and an electrolyte.
- a) electrochemical b) solvothermal
c) Microwave assisted d) sonochemical
50.relies on the carbon-carbon double bond across which addition occurs readily.
- a) Chain growth b) Step growth
c) Condensation growth. d) None of the above

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- ROUGH WORK -