

Seat
No.

PD-25

Total No. of Pages : 10

Shivaji University, Kolhapur
Ph.D. Entrance Examination, February- 2024
School of Nanoscience and Biotechnology
Nanoscience and Technology,
BOS-88 (BOS in Ph.D. Entrance)
Sub. Code : 81175

Day and Date : Wednesday, 07-02-2024

Total Marks : 100

Time : 01:00 pm to 03:00 pm

Instructions:

- 1) All questions are compulsory.
- 2) Each question carries 2 marks.
- 3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
- 4) Use black ball point pen only for marking the circle. Do not make any stray mark on the OMR Answer Sheet.
- 5) Follow the instructions given on OMR Sheet.
- 6) Rough work shall be done on the sheet provided at the end of question paper.
- 7) Only non programmable calculators are allowed.

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1. What are the core elements of a dissertation?
 - a) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
 - b) Executive Summary: Literature Review; Data Gathered; Conclusions; Bibliography
 - c) Research Plan; Research Data, Analysis; References.
 - d) Introduction: Literature Review; Research Methodology; Results; Discussions and Conclusions

2. The first step of research is:
- a) Identifying a problem
 - b) Searching a problem
 - c) Finding a problem
 - d) Selecting a problem
3. Bibliography given in a research report:
- a) Shows vast knowledge of the researcher
 - b) Helps those interested in further research
 - c) Has no relevance to research
 - d) All the above
4. The research is always _____
- a) Verifying the old knowledge
 - b) Exploring new knowledge
 - c) Filling the gap between knowledge
 - d) All of these
5. A short summary of technical report is called
- a) Abstract
 - b) Article
 - c) Summary
 - d) Conclusion
6. An exhaustive and critical reading of the available literature on the research topic prior to its investigation is called as
- a) Researching of literature
 - b) Review of literature
 - c) Assessment of literature
 - d) Classification of literature

7. One of the following is reference management software
- a) Endnote
 - b) Turnitin
 - c) Copyscape
 - d) Viper
8. Doing research involves these steps:
- 1) Stating research objectives and hypothesis;
 - 2) Methodology;
 - 3) Identification of research problem;
 - 4) Collection and analysis of data;
 - 5) Statement of results and discussion.
- Identify their correct sequence:
- a) 1_2_3_4_5
 - b) 4_1_3_2_5
 - c) 3_1_2_4_5
 - d) 2_1_5_3_4
9. In order to augment the accuracy of the study a researcher
- a) should be honest and unbiased
 - b) should increase the size of the sample
 - c) should keep the variance high
 - d) all of these
10. The study in which the investigators attempt to trace an effect is known
- a) Survey Research
 - b) Summative Research
 - c) Historical Research
 - d) Ex-post Facto Research
11. Which of the following statistical tests is appropriate to test the difference between medians of two groups?
- a) T-test
 - b) ANOVA
 - c) Wilcoxon rank-sum test
 - d) Regression analysis

12. Which of the following is not one of the seven major parts to the research report?
- a) Results
 - b) Abstract
 - c) Method
 - d) Footnotes
13. The glossary is the list of _____
- a) Technical terms used in the report
 - b) References
 - c) Subject covered in the report
 - d) Diagrams used in the report
14. Applied research is the type of research that _____
- a) is made for performing the basic or pure research; its a theoretical research.
 - b) is intended for finding some solution to the problem considered.
 - c) includes fact-finding enquires and surveys.
 - d) uses available information as the base to make the further critical evaluation.
15. _____ is the last step of research methodology,
- a) Formation of a problem
 - b) Analysis of Data
 - c) Research report
 - d) Hypothesis
16. Research ethics do not include _____
- a) Integrity
 - b) Honesty
 - c) Objectivity
 - d) Subjectivity

17. A null hypothesis is
- a) hypothesis of no difference
 - b) Hypothesis that assigns value of zero to the variable
 - c) (Hypothesis of zero significance
 - d) None of the above
18. Research is _____
- a) Searching again and again
 - b) Finding a solution to any problem
 - c) Working in a scientific way to search for the truth of any problem
 - d) None of the above
19. Who defined "Research" as "systematized effort to gain new knowledge"
- a) Tom & Zerry
 - b) Redman and Mory
 - c) FW Taylor
 - d) Ross Taylor
20. Where do we obtain the magnified image of the specimen in SEM?
- a) cathode ray tube
 - b) phosphorescent screen
 - c) anode
 - d) scanning generator
21. The secondary electrons radiated back in scanning microscope are collected by?
- a) specimen
 - b) anode
 - c) vacuum chamber
 - d) cathode
22. The appropriation of another person's ideas, processes, results or words without giving appropriate credit is called.....
- a) Fabrication
 - b) Publication
 - c) Jurisdiction
 - d) Plagiarism

23. What kinds of metals are used for milling operations?
- a) Soft and brittle
 - b) Soft and elastic
 - c) Hard and brittle
 - d) Hard and elastic
24. Ethical Norms in research do not involve guideline for _____
- a) Thesis Format
 - b) Copyright
 - c) Patenting Policy
 - d) Data sharing Policy
25. The first step of research is: _____
- a) Selecting a problem
 - b) Searching a problem
 - c) Finding a problem
 - d) Identifying a problem
26. When current flows through the cell, additional heat generated by ohmic resistance in electrode and electrolytes and polarization called _____
- a) Heat transfer coefficient
 - b) Heat flux
 - c) Enthalpy
 - d) Joules heating
27. _____ material/materials are used as electrode material for pseudocapacitor.
- a) RuO_2
 - b) MnO_2
 - c) CuO
 - d) all of the above
28. Ragone plot is plotted against _____
- a) Specific capacitance Vs power density
 - b) Energy density Vs power density
 - c) Specific capacitance Vs energy density
 - d) None of them

29. Which of the following electronic configurations is the best description of carbon in its ground state?
 - a) $1s^2, 2s^2, 2p^2$
 - b) $1s^2, 2s^2, 2p_x^2$
 - c) $1s^2, 2s^2, 2p_x^1, 2p_y^1$
 - d) $1s^2, 2s^2, 2p_x^2, 2p_y^2, 2p_z$
30. The graphite is _____
 - a) Paramagnetic
 - b) Diamagnetic
 - c) Ferromagnetic
 - d) Ferrimagnetic
31. In field emission display, carbon nanotubes are used as _____ material.
 - a) Anode
 - b) Cathode
 - c) Spacer
 - d) Display
32. Self-assembled closed colloidal structures composed of lipid bilayers are called as _____.
 - a) Micelles.
 - b) Liposomes
 - c) Polymers.
 - d) Dendrimers.
33. _____ is an example of radioactive carcinogen
 - a) Alpha particles
 - b) Asbestos
 - c) Dioxins
 - d) Tobacco smoke
34. Non-cancerous tumour is known as _____ tumour
 - a) Malignant
 - b) Benign
 - c) Metastatic
 - d) Carcinoma
35. _____ Synthesis is carried out at ambient pH, temperature, and pressure.
 - a) Physical
 - b) Biological
 - c) Chemical
 - d) Top-down

36. Which of the following is not natural biopolymer
- | | |
|------------------|--------------|
| a) Starch | b) Cellulose |
| c) Polycarbonate | d) Alginate |
37. Diamagnetism is because of orbital magnetic moment and no permanent dipoles are present so net magnetic moment is _____
- | | |
|---------|---------|
| a) zero | b) high |
| c) low | d) one |
38. According to Hund's rule, electrons occupy orbitals of the same energy in such a way that makes the number of electrons with the _____ spin direction as large as possible.
- | | |
|---------|-----------------|
| a) same | b) opposite |
| c) no | d) Both A and B |
39. The coercivity and retentivity are _____ in hard magnetic materials.
- | | |
|-----------------|----------------------|
| a) large | b) small |
| c) intermediate | d) None of the above |
40. Which of the following is not a property of strong permanent magnets?
- | | |
|------------------------|-------------------|
| a) High coercivity | b) Low remanence |
| c) High magnetic field | d) High remanence |
41. Which of the following property is dimensionless?
- | |
|-----------------------------|
| a) Magnetic induction |
| b) Magnetic field intensity |
| c) Magnetic susceptibility |
| d) None of the above |

42. Which of the following are the example of Diamagnetic material?
 - a) H_2O
 - b) Bi
 - c) Zn
 - d) All of the above
43. The drug eluting _____ significantly reduce bacterial adhesion on the surface while maintaining the osseointegrative properties of the nanostructured surface.
 - a) QDs
 - b) MOFs
 - c) Nanofibers
 - d) TiO_2 , Nanotubes
44. With respect to the architecture of CdSe, Se atoms tend to arrange at the _____, while the Cd atoms are rather found _____ region of the MSNC.
 - a) Outer, Inner
 - b) Inner, Outer
 - c) Middle, Inner
 - d) Outer, Middle
45. _____ technique used to investigate the mechanical response of TiO_2 with nanophase microstructure.
 - a) Nano-indentation
 - b) XRD
 - c) EDAX
 - d) SEM
46. _____ exhibits the central vision of endless porosity, a reliable framework, a large pore volume and high surface area.
 - a) QDs
 - b) MOFs
 - c) Nanofibers
 - d) Nanotubes
47. Rheology is study of _____ of polymers.
 - a) conductivity
 - b) dielectric constant
 - c) flow behavior
 - d) none of these

48. In Anodization process, the _____ undergoes _____ layer is formed over the metallic surface. and as a result, a protective decorative
- a) anode, oxidation
 - b) cathode, oxidation
 - c) anode, reduction
 - d) Both A & B
49. The unavoidable drawbacks such as _____ delivery application.. which restricted MOFs for the drug
- a) poor loading efficiency
 - b) cytotoxicity
 - c) instability
 - d) All of the above
50. Iron nails and paper clips are the example of _____ magnet.
- a) temporary
 - b) permanent
 - c) Both A and B
 - d) None of the above.

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