M/P ENT – 25

Total No. of Pages : 12

Seat No.	

M.Phil/Ph.D. Entrance Examination, September - 2022
NANOSCIENCE AND TECHNOLOGY
Sub. Code : 81175

Day and Date : Thursday, 22 - 09- 2022 **Total Marks : 100**
Time : 10.00 a.m. to 12.00 Noon

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.**

1) _____ is a quality of Good Hypothesis.

(A) Small in size (B) Conceptual Clarity

(C) Durability (D) Applicability

2) 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

3) Who can not successfully conduct Research?

(A) Someone who is a hard worker

(B) Possesses post-graduation degree

(C) Has less knowledge in the field

(D) Possesses thinking and reasoning ability

P.T.O.

4) What does not a good thesis involve?

(A) Plagiarism

(B) Correct reference citations

(C) Consistency in the way of thesis writing

(D) Well defined abstract

5) The index forms a part of the :

(A) End matter (B) Main body

(C) Front matter (D) Glossary

6) Field study is related to

(A) Real life situations (B) Laboratory situations

(C) Experimental situations (D) Theory

7) The chapter which summarize the other's research is called as _____.

(A) Literature review

(B) Research methodology

(C) Data analysis

(D) Conclusion and recommendations

8) Synopsis of the research is _____.

(A) Research paper (B) Research proposal

(C) Patent (D) Book chapter

9) Research conducted to solve industrial problem is called as _____.

(A) Basic Research (B) Applied Research

(C) Industrial Research (D) Theoretical Research

10) Research communication means :

(A) Sharing of ideas (B) Sharing of experiences

(C) Perception (D) Sharing of emotion

11) Research is _____.

(A) Searching again and again

(B) Finding solution to any problem

(C) Working in a scientific way to search for truth of any problem

(D) None of the above

12) "One of the methods of logical reasoning process" is called _____.

(A) Induction (B) Deduction

(C) Research (D) Experiment

13) The main energy source for the environment is _____.

(A) Solar energy (B) Chemical energy

(C) Bioelectric energy (D) Electrical energy

14) UGC Stands for _____.

(A) University Grants Commission

(B) Union Government Commission

(C) University Governance Council

(D) Union government Council

15) In the formulation of the problem we need to give a _____.

(A) Title (B) Index

(C) Bibliography (D) Concepts

16) Which of the following is an initial mandatory requirement for pursuing research?

(A) Developing a research design

(B) Formulating a research question

(C) Deciding about the data analysis procedure

(D) Formulating a research hypothesis

17) High temperature and pressure is used to prepare nanomaterials in _____.

(A) Sol-gel (B) Pulsed laser deposition

(C) Hydrothermal (D) Electrospinning

18) In XRD, wavelength of X-ray lies in the range of _____ nm.

(A) 400 – 700 (B) 0.1 – 1

(C) 1 – 10 (D) 10 – 100

19) Which method can be used to prepare iron nitriles nanocrystals using ammonia gas?

(A) Pulsed laser deposition (B) Sol-gel technique

(C) Electro-deposition (D) Mechanical crushing

20) Infrared spectroscopy provides valuable information about

(A) molecular weight (B) melting point

(C) conjugation (D) functional groups

21) For increasing thin-film uniformity in the PVD, we could :

(A) make source-to-substrate distances longer

(B) increase the substrate temperature

(C) use lower deposition rate

(D) rotate and wobble the substrate holder

22) Which of the following is an example of top-down approach for the preparation of nanomaterials?

(A) Gas phase agglomeration

(B) Molecular self-assembly

(C) Mechanical grinding

(D) Molecular beam epitaxy

23) Quantum confinement results in _____.

(A) Energy gap in semiconductor is proportional to the inverse of the square root of size

(B) Energy gap in semiconductor is proportional to the inverse of the size

(C) Energy gap in semiconductor is proportional to the square of size

(D) Energy gap in semiconductor is proportional to the inverse of the square of size

24) The efficiency of today's best solar cell is about _____.

(A) 15-20%

(B) 40%

(C) 50%

(D) 75%

25) Nylon- 6, 6 is prepared by which type of polymerization?

(A) Condensation (B) Addition

(C) Subtraction (D) Oxidative

26) Example of vinyl polymer is

(A) Dacron (B) Polystyrene

(C) Nylon 6, 6 (D) Polycarbonate

27) Polypyrrole is an example of _____ conductive polymer.

(A) Natural (B) Semisynthetic

(C) Homocyclic (D) Heterocyclic

28) The dispersity of a polymer can be calculated by

(A) Mw × Mn (B) Mw – Mn

(C) Mw/Mn (D) Mw + Mn

29) The temperature at which a polymer becomes soft and rubbery is called as its

(A) Melting temperature

(B) Glass transition temperature (Tg)

(C) Degradation temperature

(D) Boiling point

30) Which technique(s) is(are) commonly used to determine the quality of epitaxial growth of thin films?

(A) X-ray diffraction

(B) Reflection high energy electron diffraction

(C) Transmission high energy electron diffraction

(D) Reflection low energy electron diffraction

31) For which conditions will a thin film have larger grains?

(A) High deposition rate and high substrate temperature

(B) High deposition rate and low substrate temperature

(C) Low deposition rate and high substrate temperature

(D) Low deposition rate and low substrate temperature

32) The transition zone for Raman spectra is

(A) Between vibrational and rotational levels

(B) Between electronic levels

(C) Between magnetic levels of nuclei

(D) Between magnetic levels of unpaired electrons

33) The criteria for electronic spin resonance is

(A) Periodic change in polarisability

(B) Spin quantum number of nuclei > 0

(C) Presence of unpaired electron in a molecule

(D) Presence of chromophore in a molecule

34) The dielectric material that shows spontaneous and reversible dielectric polarisation are

(A) Piezoelectrics
(B) Pyroelectrics
(C) Ferroelectrics
(D) None of the mentioned

35) The DC magnetron plasma can not be used to deposit _____.

(A) Metals
(B) Alloys
(C) Insulators
(D) Brass

36) In superconductors the energy gap is tied with the _____.

(A) Lattice
(B) Fermi level
(C) Conduction band
(D) Valence band

37) The minimum energy required to ionize hydrogen atom from its ground state is above _____.

(A) 13.6 eV
(B) 1.3 eV
(C) 130 eV
(D) 0.136 eV

38) DNA is made of two chains that twist about one another in the shape of a

(A) Broken ladder
(B) Straight ladder
(C) Straight spiral
(D) Double helix

39) Agriculture by using only biofertilizersis called

(A) Manuring
(B) Composting
(C) Inorganic farming
(D) Organic farming

40) S Layer found in bacteria is made up of

(A) Phospholipid (B) Glycoproteins

(C) Glycolipids (D) Liposomes

41) Ion channels are made of

(A) Protein (B) Lipid

(C) Carbohydrate (D) Fattyacid

42) Which of the following is a well known bone repairing widely used in orthopaedics and dentistry?

(A) Dendrimer (B) Quantumn dot

(C) Titanium (D) None of the above

43) Which of the following is the example of for attached growth biological treatment?

(A) Aerated lagoon (B) Oxidation pond

(C) Membrane bioreactor (D) Activated sludge process

44) The common methods used for disinfection in waste water treatment plants are

(A) chlorination (B) UV light

(C) both (A) and (B) (D) phenolic solvent

45) PM10 stands for Particulate Matter up to

(A) 10 micrometer (B) 10 nm

(C) 10 cm (D) 10 mm

46) Which of the following is mostly used for preparation of Mesoporous material

(A) Triton-X
(B) Polyvinyl alcohol
(C) Silica
(D) Iron

47) _____ is an example of temperature transducer.

(A) Thermistor
(B) Inductive Transducer
(C) Bourdon Tube
(D) LVDT

48) In the microscopy, the analysis probe must be _____ than the feature being analyzed.

(A) Smaller
(B) Greater
(C) Equal
(D) Identical

49) The Inelastic Scattering is a basic process of _____.

(A) Diffraction
(B) X-ray generation
(C) Raman effect
(D) Interference

50) The sources used in modern Raman spectrometry are nearly always _____.

(A) Xenon Lamp
(B) Polychromatic source
(C) LASER
(D) Tungsten Filament Lamp

▽▽▽▽

Rough Work

Rough Work