

Ph.D. Entrance Examination, 2024

Shivaji University, Kolhapur.

CHEMISTRY/ APPLIED CHEMISTRY/ INDUSTRIAL CHEMISTRY

Answer-key

Day and Date

Total Marks: 100

Time :

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/blue 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 calculator is allowed.

SECTION – I

1. Many journals and editors encourage to use _____ voice because it is less verbose and unambiguous.

- a) Simple b) Complex c) **Active** d) Passive

2. _____ is heart and art of presentation or presenting your work.

- a) results
b) conclusion
c) **introduction**
d) abstract

3. What is full form of CAS?
a) Chemical Assessment System b) **Chemical Abstracts Service**
c) Cognitive Assessment System d) Central Authentication Service
4. Encoding is important because it
a) **Produces messages**
b) Guarantees that one's message will be decoded
c) Encourages listener feedback
d) Eliminates noise
5. A message can only be deemed effective when it is
a) **Understood by others and produces the intended results**
b) Repeated back as proof of understanding
c) Delivered with confidence
d) Communicated face-to-face
6. Which of the following is an example of a nonverbal message?
a) Mumbling
b) Yelling
c) Jargon
d) **Eye contact**
7. Which of the three components are part of human communication process?
a) Feedback, message, critiquing
b) Message, recording, feedback
c) **Message, noise, feedback**
d) Noise, feedback, jargon
8. An example of a communication channel is
a) Context
b) Noise
c) Feedback
d) **Face-to-face conversation**
9. To decode a message is to
a) **Interpret a message**
b) Reject a message
c) Evaluate a message
d) Translate ideas into code
10. Feedback is a listener's
a) Aversion
b) Acceptance of a message
c) **Verbal or non verbal responses to a message**
d) Verbal critique of your message
11. A researcher divides the populations into PG, graduates and 10+2 students and using the random digit table he selects some of them from each. This is technically called
a) Stratified sampling

- ☒ b) **Stratified random sampling** ✓
c) Representative sampling
d) None of these
12. Attributes of objects, events or things which can be measured are called
a) Qualitative measure
b) Data
☒ c) **Variables** ✓
d) None of the above
13. An example of scientific knowledge is
a) Authority of the prophet or great men
b) Social traditions and customs
c) Religious scriptures
☒ d) **Laboratory and field experiments** ✓
14. What is the aim of basic research or fundamental research?
a) Developing methodology
b) Developing technology
c) Improving quality of research, product and technology
☒ d) **Scientific research** ✓
15. What kind of tools are used for searching literature survey or research topic.
(i) Web of Science (ii) SciFinder (iii) Scopus (iv) Focus
☒ a) **(i), (ii) and (iii)** ✓
b) (i) and (iii)
c) (i) and (iv)
d) All of the above
16. 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
17. Action research means
a) A longitudinal research
b) An applied research
☒ c) **A research initiated to solve an immediate problem**
d) A research with socioeconomic objective
18. The essential qualities of a researcher are
a) Spirit of free enquiry
b) Reliance on observation and evidence
c) Systematization or theorizing of knowledge
☒ d) **All the above**
19. A research paper is a brief report of research work based on
a) Primary Data only
b) Secondary Data only
☒ c) **Both Primary and Secondary Data**

d) None of the above

20. One of the following is an open source software:

- a) Origin
- b) Windows
- c) MS Office
- ☒ d) **Linux**

21. Classification of all types of libraries has been made by-

- a) IFLA
- b) UNISIST
- ☒ c) **UNESCO**
- d) USA

22. Informal self -Education is possible in what kind of library?

- a) National Library
- ☒ b) **Public Library**
- c) Specific Library
- d) College Library

23. What is Bibliometry?

- a) Function of Library Network
- b) Information Management Service
- ☒ c) **Information Management Tool**
- d) Library Service

24. One of the following search engine is exclusively meant for scientific information :

- a) Google
- b) Yahoo
- ☒ c) **SCIRUS**
- d) Altavista

25. UNESCO assisted Model Public Library in India is located at :

- ☒ a) Kolkata
- ☒ b) **Delhi**
- c) Mumbai
- d) Chennai

SECTION-II

26. Compounds with low R_f value can be effectively separated by _____ paper chromatography.
- a) Radial/circular b) Ascending ☒ c) **Descending** d) None of these
27. Effective separation of analytes in gas chromatography can be achieved by _____.
- a) Isocratic elution b) Gradient elution c) Flow rate ☒ d) **Temperature programming**
28. The best recommended detector used in gas chromatography _____.
- a) Thermal conductivity detector ☒ b) **Mass spectrometry detector** c) Refractive index detector d) Flame ionization detector
29. If m and t are respectively the flow rate and drop time of mercury of the DME, the limiting diffusion current I_d is proportional to-----.
- ☒ a) $m^{2/3} t^{1/6}$ b) $m^{1/6} t^{2/3}$ c) $m^{3/2} t^{1/6}$ d) $m^{1/6} t^{3/2}$
30. In polarography any change in diffusion current is denoted by ----
- (a) Arrhenius equation (b) Nernst Equation ☒ (c) **Ilkovic equation** (d) Stock equation
31. The efficiency of the ion-exchange resin depends on
- a) Strong/weak resin b) Ion-Exchange efficiency
- ☒ c) **Ion-Exchange capacity** d) Packing density of the resin
32. Which of the following is correct for adsorption?
- a) Increase in entropy of the system.
- b) Increase in enthalpy of the system.
- ☒ c) **Decrease in enthalpy of the system.**
- d) $T\Delta S$ for the system is positive
33. The chemical adsorption is ----
- a) Multilayer ☒ b) **Monolayer** c) No adsorption d) None of these
34. For a first order reaction, the units of Arrhenius factor (A) will be

- a) $\text{JK}^{-1}\text{s}^{-1}$ b) s^{-1} c) $\text{mol L}^{-1}\text{s}^{-1}$ d) $\text{JK}^{-1}\text{L}^{-1}\text{s}^{-1}$

35. Which of the following is thermosetting polymer?

- a) Nylon 6 b) Polyethylene
c) Bakelite d) PVC

36. In battery the role of anode is ----

- a) Take part in oxidation b) Take part in reduction
c) Migrate the ions d) Make the separation of ions.

37. Name the phenomenon in which emission of light continues even after the excitation light is turned off

- a) Fluorescence b) Phosphorescence
c) Electroluminescence d) Chemiluminescence

38. Which of the following is most reactive in electrophilic substitution?

- a) Nitrobenzene b) Acetophenone c) Trifluoromethyl benzene d) Anisole

39. Which of the following is an alkane which can exhibit optical activity?

- a) Pentane b) Isopentane c) 3-Methylhexane d) Cycobutane.

40. Which of the following reagent is used in Hunsdiecker reaction?

- a) $\text{TiCl}_3, \text{LiAlH}_4$ b) $\text{CuO}, \text{K}_2\text{CO}_3$
c) $\text{Br}_2, \text{CCl}_4$ d) All the above

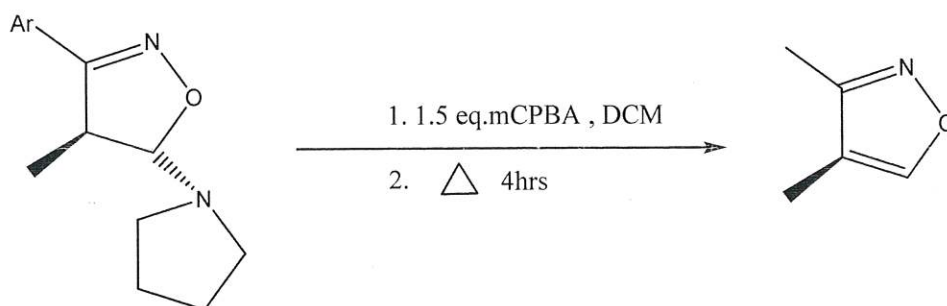
41. Carbenes are obtained by thermal or photochemical decomposition of-----
-----.

- a) Alkenes b) Diazoalkanes c) Triazines d) Both a and c

42. Bridgehead carbons generally have difficulties undergoing SN^2 reactions because a bridgehead alkyl halide will be -----.

- a) Secondary **b) Tertiary** c) Primary d) None of these

43. Predict the type of following elimination reaction.



- a) $\text{E}_1\text{C}_\text{B}$ elimination
b) E_2 elimination
c) E_1 elimination
d) Pyrolytic elimination

44. The magnitude of Δ_0 value depend upon

- a) Charge of the central metal ion
b) Nature of ligand
c) Principal quantum number of the d-electron
d) All of the above

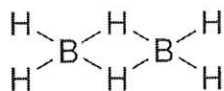
45. Which transition metal is present in Zeise's salt?

- a) Au
b) Pt
c) Rh
d) Pd

46. In $\text{Mn}_2(\text{CO})_y$ the Mn-Mn bond is a normal two-electron covalent bond; there is no bridging CO group. Then, how many CO groups are present in this complex?

- a) 10 b) 8 c) 9 d) 12

47. Which is the symmetry point group of the following compound?

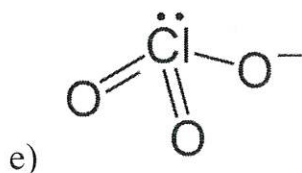


- a. C_{3v} b. D_{2h} c. D_{6h} d. C_{4v}

48. Amphoteric oxides are

- a. Al_2O_3 , PbO b. N_2O_5 , CO_2
c. Na_2O , CuO d. B_2O_3 , SiO_2

49. Predict the geometry of the following compound



- a. Trigonal pyramidal
b. tetrahedral
c. square pyramidal
d. pentagonal bipyramidal

50. A pair among the following that have the same size is

- a. Fe^{2+} , Ni^{2+} b. Zr^{4+} , Ti^{4+} c. Zr^{4+} , Hf^{4+} d. Zn^{2+} , Hf^{4+}

+++++END+++++