



GOVERNMENT DEGREE COLLEGE RAMPACHODAVARAM

(Affiliated to Adikavi Nannaya University)

Devipatnam Road, Rampachodavaram - 533288, Alluri Sitharama Raju Dist, A.P. INDIA

ISO9001 : 2015, ISO14001 : 2015, ISO50001 : 2018, Certified Organization

Accredited by NAAC with "B" Grade



DEPARTMENT OF CHEMISTRY

PREVIOUS QUESTION PAPERS-2024-25

23BCH402
UG PROGRAM (4 YEARS HONOURS) WITH SINGLE MAJOR
AT THE END OF FOURTH SEMESTER
CHEMISTRY - GENERAL AND PHYSICAL CHEMISTRY
(B.Sc HONOURS-MAJOR)
(w.e.f. Admitted Batch 2023-24)

Time: 3 Hours
Maximum: 70 marks

SECTION - A
5x4=20
Answer any Five questions.

1. Define enantiomers and diastereomers.
2. Write about Optical rotation and specific rotation.
3. Write notes on Haemoglobin.
4. Explain Cis-platin as anti-cancer drug.
5. Write a note on selection of Indicators.
6. Explain Order and molecularity of a reaction.
7. Derive integrated rate equation for Zero order reaction.
8. Define enzyme catalysis and what are the factors affecting it?

SECTION - B
5x10=50
Answer ALL questions.

9. (a) What is optical isomerism? Discuss on optical isomerism with examples.
(Or)
(b) Explain E, Z-configuration with example.
10. (a) Discuss about toxicity of metal ions (Hg, Pb) and write reasons for toxicity.
(Or)
(b) Discuss the role of Iron and its application in bio-systems.
11. (a) Define ionization constant and ionic product of water with examples. Give the applications of ionization constant.
(Or)
(b) Explain solubility product and common ion effect with applications.
12. (a) Explain general methods for determination of order of reaction.
(Or)
(b) Define First Order reaction with examples? Derive integrated rate equation for first order reaction.
13. (a) Discuss on Collision theory and Activated Complex theory of reaction rates.
(Or)
(b) Derive Michaels- Menten equation.

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AT THE END OF FOURTH SEMESTER**

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(B.Sc HONOURS-MAJOR)

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23BCH202

UG PROGRAM (4 YEARS HONOURS) WITH SINGLE MAJOR
AT THE END OF SECOND SEMESTER
CHEMISTRY - INORGANIC CHEMISTRY-I (B.Sc HONOURS-MAJOR)
(w.e.f. Admitted Batch 2023-24)

Time: 3 Hours

Maximum: 70 marks

SECTION – A

Answer any FIVE Questions.

5×4=20

1. Write the structure and bonding of diborane.
2. Explain the uses and classification of silanes.
3. Write a short note on phosphonitrilic chloride ($P_3N_3Cl_6$).
4. Classify oxides and give two examples of each type.
5. Write a note on stability of various oxidation states of d-block elements.
6. What is lanthanide contraction? What are its consequences?
7. Explain the significance of electronic configuration of d-block elements.
8. Define isotopes. Discuss any two applications of radioactivity.

SECTION – B

Answer ALL Questions.

5×10=50

9. (a) Describe the preparation and structure of Borazine and $(BN)_x$ compounds.

(Or)

- (b) Discuss the preparation and classification of silicones. Mention their uses.

10. (a) Describe the structure and oxidation states of oxoacids of Sulphur.

(Or)

- (b) What are pseudo halogens? Compare them with halogens using examples.

11. (a) Explain the characteristics of d-block elements with examples.

(Or)

- (b) Write about the stability of oxidation states in 3d series using Latimer diagrams.

12. (a) Describe the chemistry of lanthanides with respect to electronic configuration, colour and magnetic properties.

(Or)

- (b) Compare lanthanides and actinides with suitable points.

13. (a) Explain Soddy-Fajan's displacement law. Discuss radioactive decay series briefly.

(Or)

- (b) Write notes on nuclear fission and fusion with their applications.

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23BCP102

UG PROGRAM (4 YEARS HONORS) WITH SINGLE MAJOR

AT THE END OF FIRST SEMESTER

ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Common for B.Sc. (Mathematics, Statistics, Chemistry, Electronics, Physics, Data Science, Computer Science, Artificial Intelligence and Robotics, Psychology, Internet of Things, Chemistry / Analytical Chemistry, Geology, Geography))

(w.e.f. Admitted Batch 2023-24)

Time: 3Hours

Maximum: 70 marks

Section-A (Multiple Choice Questions)

30x1=30

1. Intercept form of straight line $x + y + 1 = 0$ is ()(a) $\frac{x}{1} + \frac{y}{1} = -1$ (b) $\frac{x}{-1} + \frac{y}{-1} = 1$ (c) $\frac{x}{-1} + \frac{y}{1} = -1$ (d) $\frac{x}{-1} + \frac{y}{-1} = -1$

2. The point of concurrence of the concurrent straight lines

 $2x - 3y - 23 = 0$, $2x + y - 3 = 0$ and $3x + 2y - 2 = 0$ is ()

(a) (0, 2) (b) (4, -3) (c) (4, -5) (d) (5, -4)

3. Slope of a straight line $ax + by + c = 0$ is equal to ()(a) $\frac{b}{a}$ (b) $-\frac{a}{b}$ (c) 0 (d) None4. $\lim_{x \rightarrow 0} \log(1+x) =$ ()

(a) 1 (b) 0 (c) -1 (d) None

5. $\frac{d}{dx}(\log x) =$ ()(a) $1/x$ (b) 0 (c) $1/x$ (d) e6. $\frac{d}{dx}(x e^x) =$ ()(a) $e^x + 1$ (b) $x + 1$ (c) e^x (d) $e^x(x + 1)$ 7. $\int x \cos x \, dx =$ ()(a) $x \sin x - \cos x + c$ (b) $x \sin x + \cos x + c$ (c) $x \sin x \cos x + c$ (d) None8. If $\begin{bmatrix} x & 4 \\ 2 & 8 \end{bmatrix}$ is a singular matrix then $x =$ ()

(a) 1 (b) 0 (c) 8 (d) None

9. Which of the following is NOT considered a renewable energy source? ()

(a) Coal (b) Solar (c) Wind (d) Hydropower

10. Which of the following is common form of chemical energy storage used in batteries? ()

(a) Compressed air (b) Flywheels (c) Hydrogen (d) Molten salt

11. What type of display technology uses quantum dots to produce vivid colors and high-definition displays ()

- (a) OLED (b) CRT (c) QLED (d) LCD

12. What recent advancement in biophysics has improved our understanding of protein folding and misfolding in diseases like Alzheimer's, Parkinson's? ()

- (a) Cryo-electron microscopy (b) Atomic force microscopy
(c) Nuclear magnetic resonance (NMR) spectroscopy
(d) X-ray diffraction

13. Which technology is commonly used for large-scale energy storage in smart grids? ()

- (a) Lithium-ion batteries (b) Flywheel energy storage
(c) Lead-acid batteries (d) Hydrogen fuel cells

14. What is the term used to describe the process of using nanoparticles to enhance imaging techniques for medical diagnostics? ()

- (a) Nanoscopy (b) Nano therapy (c) Nano diagnostics (d) Nano treatment

15. What is the key application of biophysics in neuro science? ()

- (a) Quantum computing (b) Brain imaging techniques
(c) Agricultural genetics (d) Weather prediction

16. What is the primary imaging modality used in nuclear medicine? ()

- (a) X-rays (b) Magnetic Resonance imaging (MRI) (c) Computed tomography (CT)
(d) Single photon Emission computed tomography (SPECT)

17. What role does virtual screening play in CADD? ()

- (a) Identifying potential drug candidates
(b) Synthesizing actual drugs
(c) Conducting clinical trials
(d) Marketing pharmaceutical products

18. Which of the following is an example of a chemical probe used in chemical biology research? ()

- (a) Antibiotic (b) Painkiller (c) Antacid (d) Fluorescent dye

19. What is the main goal of chemical genetics in chemical biology? ()

- (a) Developing new drugs
(b) Understanding the genetic code
(c) Manipulating biological systems with small molecules
(d) Cloning genes

20. What is the primary consequence of habitat destruction caused by chemical pollutants? ()

- (a) Increased species diversity (b) Improved ecosystem resilience
- (c) Loss of biodiversity and ecosystem (d) Accelerated ecological succession

21. How does exposure to lead in drinking water primarily affect children? ()

- (a) Improved cognitive development
- (b) Enhanced digestion
- (c) Neurological damage and development delays
- (d) Increased energy levels

22. Which catalysis method is commonly used for the degradation of organic dyes in waste water treatment? ()

- (a) Photocatalysis (b) Electrolytic catalysis
- (c) Thermal catalysis (d) Enzymatic catalysis

23. In catalytic dye removal, what is the primary role of a catalyst? ()

- (a) Change the color of the dye (b) Speed up the degradation of dye molecules
- (c) Increase the intensity of the dye (d) Prevent the interaction with other chemicals

24. Which of the following is a common disinfection method used in water treatment? ()

- (a) Coagulation (b) Filtration (c) Chlorination (d) pH adjustment

25. What is the decimal equivalent of the binary number 10101? ()

- (a) 20 (b) 15 (c) 21 (d) 17

26. 4 bit binary value of the hexadecimal symbol "D" is? ()

- (a) 1101 (b) 1111 (c) 1001 (d) 1000

27. In which form are digital signal transmitted? ()

- (a) Voltage (b) Waveforms (c) 0s and 1s (d) Frequencies

28. Telephone lines? ()

- (a) ADSL (b) V.92 (c) Fiber-optic (d) Ethernet

29. Widely used for web graphics? ()

- (a) JPEG (b) PNG (c) GIF (d) TIFF

30. Which of the following is an example of a gateway device? ()

- (a) Router (b) Switch (c) Modem (d) Firewall

Section – B(Fill in the Blanks)

10x1=10

31. $x \cos \alpha + y \sin \alpha = P$ is called _____ form of a straight line
32. $D(a^x) =$ _____
33. $\int \tan x dx =$ _____
34. $D(\tan x) =$ _____
35. Quantum dots are _____
36. Advantage of hydro power is _____
37. Quantum dots are mainly used in the field _____
38. _____ is a key component of DNA structure
39. ASCII stands for _____
40. Binary equivalent of the octal number 67 is _____

Section – C(Very short answer questions)

10x1=10

41. Find the equation of the straight line parallel to the straight line $3x + 4y + 5 = 0$ and passes through $(4, -5)$
42. Find $\lim_{x \rightarrow 3} \frac{x^4 - 3^4}{x - 3}$
43. Find $D(x \tan^{-1} x)$
44. How has artificial intelligence been integrated with medical physics?
45. Which process involves the removal of dissolved impurities by forcing water through a semi-permeable membrane?
46. What is the primary environmental concern associated with open dumping of solid waste?
47. What is the full form of CADD?
48. What is the function of RNA in the cell?
49. What is modem?
50. What is the full form of Wi-Fi?

Section – D(Matching)

2x5=10

I.

- | | | |
|---------------|-----|-------------------------|
| 51. $\sin 0$ | () | a. $\sqrt{3}/2$ |
| 52. $\cos 0$ | () | b. $1/2$ |
| 53. $\sin 60$ | () | c. 1 |
| 54. $\cos 60$ | () | d. $\sqrt{2}$ |
| 55. $\sin 45$ | () | e. 0 |
| | () | f. $\frac{1}{\sqrt{2}}$ |

II.

56. Coagulation () a. Chlorination
57. Disinfection () b. Settling of suspended particles
58. Sedimentation () c. Reverse osmosis
59. Desalination () d. Removing odor & taste
60. Carbon adsorption () e. Removal of suspended particles
() f. Forcing water

Section – E (True Or False)

10x1=10

61. Wind turbines can generate electricity at any time ()
62. Pesticide use in agriculture causes acid rain ()
63. Wood is an example of biomass energy ()
64. The process of splitting atoms to release energy is known as chemical energy ()
65. Wind energy converts sunlight into electricity ()
66. Optical fiber is used for long distance communication ()
67. Decimal equivalent of $(1110)_2$ is 15 ()
68. Hexadecimal equivalent of 1238 is 4D7 ()
69. Cable modem works with the help of Telephone line ()
70. Computer science is depended on hexadecimal number system ()

23BCP101

UG PROGRAM (4 YEARS HONORS) WITH SINGLE MAJOR
AT THE END OF FIRST SEMESTER
ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND
CHEMICAL SCIENCES

(Common for B.Sc. (Mathematics, Statistics, Chemistry, Electronics, Physics, Data Science,
Computer Science, Artificial Intelligence and Robotics, Psychology, Internet of Things,
Chemistry / Analytical Chemistry, Geology, Geography))

(w.c.f. Admitted Batch 2023-24)

Time: 3Hours

Maximum: 70 Marks

SECTION-A (Multiple Choice Questions)

30x1=30

- Find the value of $(i)^{15}$ ()
(a) i (b) $-i$ (c) 1 (d) -1
- What is the imaginary part of $\frac{a+bi}{b}$ ()
(a) -1 (b) 1 (c) a/b (d) $\frac{b}{a^2+b^2}$
- $\sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ ()
(a) 0 (b) -1 (c) 1 (d) None
- If $\sin A = \frac{4}{5}$ What is the value of $\tan A$ ()
(a) $\frac{3}{4}$ (b) $\frac{4}{3}$ (c) $\frac{3}{5}$ (d) $\frac{5}{4}$
- If $\vec{a} = 3\vec{i} + 2\vec{j} - 2\vec{k}$ and $\vec{b} = 2\vec{i} + 4\vec{j} + 3\vec{k}$ then find $\vec{a} \cdot \vec{b}$ ()
(a) 8 (b) 6 (c) 7 (d) 0
- If $\vec{a} = \vec{i} + \vec{j} + \vec{k}$ and $\vec{b} = 3\vec{i} + 2\vec{j} - \vec{k}$ then find $\vec{a} + 3\vec{b}$ ()
(a) $2\vec{i} + 3\vec{j} + \vec{k}$ (b) $10\vec{i} + 7\vec{j} - 2\vec{k}$ (c) 0 (d) $\vec{i} + \vec{j} + \vec{k}$
- Find the mean of the data 103, 105, 102, 104 ()
(a) 102 (b) 103 (c) 104 (d) 103.5
- Write the relation between mean, median and mode ()
(a) Mode = 2 median - 3 mean (b) Mode = 3 median - 2 mean
(c) Mode = 2 median + 3 mean (d) Mode = 3 median + 2 mean
- Which branch of physics deals with the behavior of matter at the atomic and subatomic levels? ()
(a) Classical mechanics (b) Thermodynamics (c) Quantum mechanics (d) Relativity

10. The rate of change of momentum is called?

- (a) Acceleration (b) Force (c) Work (d) Inertia

11. The special theory of relativity was introduced in 1905 by...

- (a) Planck (b) Albert Einstein
(c) Maxwell (d) Rutherford

12. Which law talks about "Entropy"?

- (a) Zeroth law (b) Second law
(c) First law (d) None of these

13. In which waves particles of the medium vibrates perpendicular to the direction of wave propagation?

- (a) Transverse waves (b) Longitudinal waves
(c) Matter waves (d) Both a & b

14. Which substance particle determines the chemical properties of an element?

- (a) Proton (b) Neutron (c) Electron (d) Alpha particle

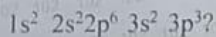
15. What force binds protons and neutrons together in the atomic nucleus?

- (a) Electromagnetic force (b) Gravitational force
(c) Strong nuclear force (d) Weak nuclear force

16. Which sustainable technology focuses on reducing greenhouse emissions and energy consumptions?

- (a) Renewable energy sources (b) Recycling
(c) Composting (d) sustainable waste management

17. How many unpaired electrons are in the ground-state electron configuration



- (a) 0 (b) 1 (c) 2 (d) 3

18. The magnetic quantum number specifies?

- (a) The size of the orbital (b) The shape of the orbital
(c) The orientation of the orbital (d) The spin of the electron

19. Which of the following is a evidence of a chemical changes?

- (a) Change in temperature (b) Change in shape
(c) Change in volume (d) Change in density

20. What is the law of conservation of mass? ()

- (a) Mass is created during a chemical reaction
- (b) Mass is destroyed during a chemical reaction
- (c) Mass is conserved during a chemical reaction
- (d) Mass is irrelevant during a chemical reaction

21. What is the building block of proteins? ()

- (a) Nucleotide
- (b) Amino acid
- (c) Monosaccharide
- (d) Fatty acid

22. Which sugar is commonly found in milk? ()

- (a) Glucose
- (b) Lactose
- (c) Fructose
- (d) Sucrose

23. The structure of a protein is often described in how many levels? ()

- (a) 1
- (b) 2
- (c) 3
- (d) 4

24. What is the primary function of fats in the body? ()

- (a) Energy storage
- (b) Enzyme catalysis
- (c) Genetic information storage
- (d) Structural support

25. WWW stands for? ()

- (a) World wide web
- (b) World Web Wide
- (c) Organization
- (d) Website

26. The server on the internet is also known as a? ()

- (a) Hub
- (b) Host
- (c) Gateway
- (d) Repeater

27. Internet is a network of which computer network? ()

- (a) All over the state
- (b) Country
- (c) World
- (d) None of these

28. Many networks include a central computer that may be called? ()

- (a) Bridges
- (b) Servers
- (c) Client
- (d) Gateways

29. Which of the following networks extends a private network across public network? ()

- (a) LAN
- (b) EPN
- (c) SAN
- (d) VPN

30. Computer virus is? ()

- (a) A hard ware
- (b) Windows tool
- (c) A computer program
- (d) A system software

SECTION - B (Fill in the Blanks)

10x1=10

31. The conjugate complex of $\frac{1}{3+4i}$ is 25 $3+4i$
32. The value of $(1 - \sin^2 A) \sec^2 A$ is 1
33. If $\vec{a} = 3\hat{i} + 2\hat{j} - 6\hat{k}$ and $\vec{b} = 4\hat{i} - 3\hat{j} + \hat{k}$ then the angle between $\vec{a}$ and $\vec{b}$ is 0
34. Angstrom is a unit of length
35. Newtonian principle involved in motion of rocket is conservation of momentum
36. Transverse wave consists of wave length
37. K Vitamin is important in blood clotting
38. Emulsification is the primary function of a food stabilizer?
39. Full form of INTERNET is International Network
40. VPN stands for Virtual Private Network

SECTION - C (Very short answer questions)

10x1=10

41. Find the median of the data 6, 12, 9, 10, 16, 28, 25, 13, 15, 17
42. Find $|2\hat{i} + 3\hat{j} + 3\hat{k}|$
43. What is the theory related to origin of universe?
44. What field involves the design, construction and programming of robots?
45. What is the function of ATP in the cell?
46. What is the chemical name for table sugar?
47. What is a chemical change?
48. Which method is commonly used for preserving food by removing water content?
49. What is E-mail?
50. Give one application of joy stick

SECTION - D (Matching)

2x5=10

I.

- | | | |
|----------------------------------|-------|--------------------------------|
| 51. $\cos\theta_1 \cos\theta_2$ | (c) | a. $\cos\theta + i \sin\theta$ |
| 52. $\cos\theta$ | (a) | b. $\cos\theta - i \sin\theta$ |
| 53. $\cos(-\theta)$ | (b) | c. $\cos(\theta_1 + \theta_2)$ |
| 54. Very large scale Integration | (e) | d. III generation |
| 55. Stored programme | () | e. IV generation |
| | () | f. II generation |

II.

56. Mercury (A) a. C_6H_6
57. Thorium (C) b. CH_4
58. Benzene (A) c. Radio active metal
59. Methane (B) d. Liquid metal
60. Acetylene (A) e. C_2H_6
(C) f. C_2H_2

SECTION - E (True Or False)

10x1=10

61. $\tan 3A = \frac{2\tan A}{1+\tan^2 A}$ is ()

62. In a data the maximum value is 100 and minimum value is 10 then the range = 90 ()

63. Infrared waves are used in night vision devices (X)

64. Barium belong to III group of periodic table ()

65. Isotopes are atoms of the same element ()

66. Atomic number of zinc is 31 (X)

67. Bluetooth allows your device to connect with another device (X)

68. A firewall is a type of hardware ()

69. Radio waves are lowest frequency waves in electromagnetic spectrum ()

70. $E = mc^2$ is Newtonian principle ()