



CHE 520/CHE 521/CHE 522
M.Sc. IIIrd SEMESTER EXAMINATION, 2022-23
CHEMISTRY

(Group-1 : CHE 520 -Thermodynamics and Intermolecular Forces)

(Group-2 : CHE 521-Supramolecular Chemistry)

(Group-3 : CHE 522-Biomolecules)

(4+0)

(CBCS MODE)

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Date (तिथि) : _____

Paper ID

(To be filled in the
OMR Sheet)

8210

अनुक्रमांक (अंकों में) :

Roll No. (In Figures)

अनुक्रमांक (शब्दों में) :

Roll No. (In Words) :

Time : 1 Hour

समय : 1 घण्टा

Max. Marks : 60

अधिकतम अंक : 60

नोट : पुस्तिका में 40 प्रश्न दिये गये हैं, सभी प्रश्न करने होंगे। प्रत्येक प्रश्न 1.5 अंक का होगा।

Important Instructions :

1. The candidate will write his/her Roll Number only at the places provided for, i.e. on the cover page and on the OMR answer sheet at the end and nowhere else.
2. Immediately on receipt of the question booklet, the candidate should check up the booklet and ensure that it contains all the pages and that no question is missing. If the candidate finds any discrepancy in the question booklet, he/she should report the invigilator within 10 minutes of the issue of this booklet and a fresh question booklet without any discrepancy be obtained.

महत्वपूर्ण निर्देश :

1. अभ्यर्थी अपने अनुक्रमांक केवल उन्हीं स्थानों पर लिखेंगे जो इसके लिए दिये गये हैं, अर्थात् प्रश्न पुस्तिका के मुख्य पृष्ठ तथा साथ दिये गये ओ०एम०आर० उत्तर पत्र पर, तथा अन्यत्र कहीं नहीं लिखेंगे।
2. प्रश्न पुस्तिका मिलते ही अभ्यर्थी को जाँच करके सुनिश्चित कर लेना चाहिए कि इस पुस्तिका में पूरे पृष्ठ हैं और कोई प्रश्न छूटा तो नहीं है। यदि कोई विसंगति है तो प्रश्न पुस्तिका मिलने के 10 मिनट के भीतर ही कक्ष परिप्रेक्षक को सूचित करना चाहिए और बिना त्रुटि की दूसरी प्रश्न पुस्तिका प्राप्त कर लेना चाहिए।

(Group-1 : CHE 520 - Thermodynamics and Intermolecular Forces)

1. The presence of a polar molecule in the vicinity of another molecule which may be polar or non polar gives rise to :
 - (A) Dipole-Dipole interaction
 - (B) Dipole-Induced Dipole interaction
 - (C) Induced Dipole-Induced Dipole interaction
 - (D) None of these
2. Dipole – Dipole interaction occurs in the liquids :
 - (A) In which two polar molecules are present
 - (B) In which two non-polar molecules are present
 - (C) In which one polar and one non-polar molecule is present
 - (D) None of these
3. The expression for Lennard-Jones potential is given as :
 - (A) $\phi(r) = 4 \epsilon \left[\left(\frac{\sigma}{r} \right)^{12} - \left(\frac{\sigma}{r} \right)^6 \right]$
 - (B) $\phi(r) = 4 \epsilon \left[\left(\frac{\sigma}{r} \right)^{12} + \left(\frac{\sigma}{r} \right)^6 \right]$
 - (C) $\phi(r) = 4 \epsilon \left[\left(\frac{r}{\sigma} \right)^{12} - \left(\frac{r}{\sigma} \right)^6 \right]$
 - (D) $\phi(r) = 4 \epsilon \left[\left(\frac{r}{\sigma} \right)^{12} + \left(\frac{r}{\sigma} \right)^6 \right]$
4. For two polar molecules the energy 'U' associated with the dipole moment ' μ ' is given as :
 - (A) $U = -\frac{2}{3} \frac{\mu^4}{KRT^6}$
 - (B) $U = \frac{2}{3} \frac{\mu^4}{KRT^6}$
 - (C) $U = \frac{2}{3} \frac{\mu^4}{RT^6}$
 - (D) $U = \frac{2}{3} \frac{\mu^3}{KRT^6}$

5. The difference in molecular arrangements in liquids and solids is discussed in term of :
- (A) Radial Distribution Function
 - (B) Spin Distribution Function
 - (C) Spatial Distribution Function
 - (D) None of these
6. In Solids same molecular arrangement exists in all direction thus they are said to have :
- (A) Long Range Order
 - (B) Short Range Order
 - (C) Both Long Range Order and Short Range Order
 - (D) None of these
7. Vacancy Theory of Liquids was given by :
- (A) Maxwell
 - (B) Eyring and Ree
 - (C) J.C. Slater
 - (D) D. R. Hartree
8. The Colonic Equation of State is given as :
- (A) $U = RT$
 - (B) $U = \frac{1}{2} RT$
 - (C) $U = \frac{3}{2} RT$
 - (D) $U = (RT)^{1/2}$

9. According to Vacancy Theory of Liquids, properties of liquids are similar to properties of :
- (A) Gases
 - (B) Solids
 - (C) Colloids
 - (D) Combination of both solids and gases
10. The Colonic Equation of State for real liquids is given as :
- (A) $U = \frac{3}{2} RT - \frac{a}{v}$
 - (B) $U = \frac{3}{2} RT + \frac{a}{v}$
 - (C) $U = \frac{1}{2} RT - \frac{a}{v}$
 - (D) $U = \frac{1}{2} RT + \frac{a}{v}$
11. Repulsive forces are formed due to the overlapping of :
- (A) Electron
 - (B) Proton
 - (C) Neutron
 - (D) None of these
12. The charge transfer reaction occurring at the interface is of the type :
- (A) Ion Transfer
 - (B) Assisted Ion Transfer
 - (C) Electron Transfer
 - (D) All of the above

13. The potential at the interface in Ion transfer Reaction is given by :

(A) $\Delta\phi = \phi^w - \phi^o$

(B) $\Delta\phi = \phi^w + \phi^o$

(C) $\Delta\phi = \frac{\phi^w}{\phi^o}$

(D) None of these

14. NRTL model correlates a compound's activity coefficient :

(A) With its normality

(B) With its mole fraction

(C) With its molarity

(D) None of these

15. For calculating the activity coefficient the abbreviation NRTL is used to indicate:

(A) Non-Random Three Liquids

(B) No-Random Two Liquids

(C) Not Random Three Liquids

(D) Non-Random Two Liquids

16. ASOG is an abbreviation which stands for :

(A) Analytical Solution of Groups

(B) Analysing Solution of Groups

(C) Analytical Solute of Groups

(D) None of these



17. UNIQUAC model is used to describe :
- (A) Thermodynamic Equilibria
 - (B) Chemical Equilibria
 - (C) Phase Equilibria
 - (D) None of these
18. UNIQUAC is an abbreviation used for :
- (A) Universal Quasi Chemical
 - (B) United Quasi Chemical
 - (C) Universal Quantum Chemistry
 - (D) None of these
19. UNIFAC model splits up the activity coefficient into two components :
- (A) Spontaneous and non- Spontaneous components
 - (B) Reversible and irreversible components
 - (C) Combinational and residual components
 - (D) None of these
20. UNIFAC method is used for the predication of :
- (A) Non-electrolyte activity estimation is ideal mixtures
 - (B) Non-electrolyte activity estimation is non-ideal mixtures
 - (C) Electrolyte activity estimation is non-ideal mixtures
 - (D) None of these

21. In the phase diagram of water system, triple point is :
- (A) Univariant
 - (B) Bivariant
 - (C) Variant
 - (D) Invariant
22. The reduced phase rule equation is given as :
- (A) $F = C - P + 2$
 - (B) $F = C - P + 1$
 - (C) $F = C + P - 2$
 - (D) $F = C + P - 1$
23. At triple point the Degree of Freedom, F is :
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 0
24. Gibb's Phase Rule equation for a general system is given as :
- (A) $P + F = C - 1$
 - (B) $P + F = C + 1$
 - (C) $P + F = C - 2$
 - (D) $P + F = C + 2$
25. In the phase diagram of one component system, if only one phase exists in an area, then the number of degree of freedom will be :
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 0

26. $\text{Liq water} \rightleftharpoons \text{water vapour} \rightleftharpoons \text{Solid ice}$ involves :
- (A) Only one concentration variable
 - (B) Only two concentration variable
 - (C) Only three concentration variable
 - (D) None of these
27. A compound is said to have congruent melting point if :
- (A) It melts completely at one temperature giving a liquid of the same composition as that of the solid.
 - (B) It melts partially at one temperature giving a liquid of the same composition as that of the solid.
 - (C) It melts completely at one temperature giving a liquid of different composition as that of the solid.
 - (D) It melts partially at one temperature giving a liquid of different composition as that of the solid.
28. The presence of two phases in equilibrium along a single curve in the phase diagram of water system require that the Degree of Freedom to be :
- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
29. Phase diagram of Sulphur system has :
- (A) Sublimation Curve
 - (B) Vapour Pressure Curve
 - (C) Fusion Curve
 - (D) All of the above

30. In phase diagram of Simple Eutectic System, at eutectic point Degree of Freedom, F will be :
- (A) $F = 0$
 - (B) $F = 1$
 - (C) $F = 2$
 - (D) $F = 3$
31. Fluxes are :
- (A) Extensive Properties
 - (B) Intensive Properties
 - (C) Transport Properties
 - (D) Driving Force
32. The Phenomena of thermo-osmosis is observed when :
- (A) Heat Flow and Mass Flow occur simultaneously
 - (B) Temperature gradient is less than Mass Flow
 - (C) Heat Flow is greater than concentration
 - (D) None of the above
33. The driving force for a mass flux is :
- (A) Temperature Gradient
 - (B) Concentration Gradient
 - (C) Potential Gradient
 - (D) None of these

34. The entropy change inside the system $d_i S$ for an irreversible process will be :
- (A) $d_i S < 0$
 - (B) $d_i S = 1$
 - (C) $d_i S > 0$
 - (D) $d_i S = -1$
35. For a linear phenomenological relation $J_i = L_{i1}X_1 + L_{i2}X_2 + \dots + L_{in}X_n$ where $i = 1, 2, \dots, n$. Which coefficient is called the primary phenomenological coefficient :
- (A) L_{ij}
 - (B) L_{ji}
 - (C) L_{ii}
 - (D) L_{12}
36. Which of the following show the correct linear phenomenological relation for two flux-two force ?
- (A) $J_1 = L_{11} X_1 + L_{22} X_2, J_2 = L_{12} X_1 + L_{21} X_2$
 - (B) $J_1 = L_{11} X_1 + L_{12} X_2, J_2 = L_{21} X_1 + L_{22} X_2$
 - (C) $J_1 = L_{22} X_1 + L_{12} X_2, J_2 = L_{21} X_1 + L_{21} X_2$
 - (D) $J_1 = L_{11} X_2 + L_{12} X_1, J_2 = L_{22} X_1 + L_{21} X_2$
37. For in eversible process the change in entropy dS can be split into two parts, given as :
- (A) $dS = d_e S - d_i S$
 - (B) $dS = d_i S - d_e S$
 - (C) $dS = d_e S + d_i S$
 - (D) $d_e S = dS + d_i S$

38. Which of the following relation shows the Onsager reciprocal relation ?
- (A) $L_{11} = L_{22}$
 - (B) $L_{12} = L_{22}$
 - (C) $L_{12} = L_{21}$
 - (D) $L_{11} = L_{21}$
39. The driving force for a heat flux is :
- (A) Electric Current
 - (B) Potential Gradient
 - (C) Heat
 - (D) Temperature Gradient
40. The entropy of a liquid is _____ than the entropy of the corresponding Vapour of same substance at a given Temperature and pressure.
- (A) Higher
 - (B) Smaller
 - (C) Same
 - (D) None of these

(Group-2 : CHE 521 – Supramolecular Chemistry)

1. Supramolecular chemistry is defined as _____.
 - (A) Study of covalent bonds
 - (B) Study of large molecules
 - (C) Chemistry beyond the molecules
 - (D) Chemistry of atoms
2. Supramolecular chemistry is primarily concerned with _____.
 - (A) Thermodynamics
 - (B) Non-covalent bonding
 - (C) Covalent bonding
 - (D) Atomic forces
3. Supramolecules are very common in nature, which of the following is an example of a Supramolecule ?
 - (A) DNA
 - (B) Thymine
 - (C) Glucose
 - (D) Caffeine
4. Using the appropriate Supramolecular host, it is possible to bind which of these guests ?
 - (A) Anions
 - (B) Cations
 - (C) Neutral species
 - (D) All of the above
5. Why there is a lot of interest in the area of supramolecular catalysis ?
 - (A) Due to very efficient and stereo selective catalysis for difficult reactions.
 - (B) Due to its capability to replace catalysis metals in reactions.
 - (C) Due to its usefulness for cutting down on the amount of solvent in the reactions.
 - (D) None of the above

6. In Supramolecular Chemistry _____ molecule provides binding sites.
- (A) Colloidal
 - (B) Host
 - (C) Guest
 - (D) Aggregates
7. Supramolecular switches are _____.
- (A) Controlled by electricity and heat
 - (B) Electron regulated
 - (C) Photo regulated and chemically controlled
 - (D) All of the above
8. Peptide bond is _____.
- (A) Ionic
 - (B) Metallic
 - (C) Hydrogen
 - (D) Covalent
9. Supramolecular catalysis involves :
- (A) Binding which select the substrate
 - (B) Transformation of bound species into products
 - (C) Both (A) and (B)
 - (D) None of the above
10. Supramolecular catalysis is concerned with :
- (A) Shape
 - (B) Size
 - (C) Both (A) and (B)
 - (D) None of the above

11. Which of the following is an anion receptor ?
- (A) Carboxypeptidase
 - (B) Crown ethers
 - (C) Valinomycin
 - (D) Cryptands
12. Supramolecular Calixarene contains :
- (A) NH group
 - (B) COOH group
 - (C) CHO group
 - (D) OH group
13. Which of the following contain dumbbell shaped bulky end group ?
- (A) Catenanes
 - (B) Crown ethers
 - (C) Inclusion Complexes
 - (D) Rotaxanes
14. Which of the following alkali metal cation will form most stable complex with 18-crown-6 ?
- (A) Li^+
 - (B) Na^+
 - (C) K^+
 - (D) Rb^+
15. The crown ether guest complex is known as :
- (A) Inclusion compound
 - (B) Exclusion compound
 - (C) Polymer
 - (D) None of the above

16. Nonactin is ____.
- (A) Synthetic antibiotic
 - (B) Naturally occurring antibiotic
 - (C) Both (A) and (B)
 - (D) None of the above
17. Which of the reagents were used by M. Lehn for cryptand synthesis ?
- (A) $LiAlH_4$ and B_2H_6
 - (B) $NaBH_4$ and B_2H_6
 - (C) $KMnO_4$ and B_2H_6
 - (D) None of the above
18. Crown ether shows the coordination with Lewis Acid through :
- (A) $\pi - \pi$ interaction
 - (B) Electrostatic and $\sigma - \text{hole}$ interaction
 - (C) Dipole-dipole interactions
 - (D) All of the above
19. 15-crown-5 binds easily with ____.
- (A) Rb^+
 - (B) K^+
 - (C) Na^+
 - (D) Li^+
20. Cryptands are ____.
- (A) Three dimensional molecules
 - (B) Two dimensional molecules
 - (C) One dimensional molecules
 - (D) None of the above

21. Cryptands form complexes with :
- (A) Hard cations
 - (B) Soft cations
 - (C) Anions
 - (D) None of the above
22. Spherands are :
- (A) Without cavities
 - (B) Self-assembled molecules
 - (C) Pre-organized cavities containing molecules
 - (D) All of the above
23. Spherands form strong complexes with _____.
- (A) Li^+ and Na^+
 - (B) Ca^{2+} and H^+
 - (C) NH_4^+
 - (D) Mg^{2+} and H^+
24. Crown ethers and cryptands form _____.
- (A) Salts of alkali metal
 - (B) Complexes with alkali metal ions
 - (C) Hydroxides of alkali metal
 - (D) Organic salts of alkali metals
25. The term cryptand refers to _____.
- (A) Macrocyclic ligand with nitrogen donor atom
 - (B) Macrocyclic ligand with nitrogen and oxygen donor atoms
 - (C) Macrocyclic ligand with nitrogen and sulphur donor atoms
 - (D) None of the above

26. For crown ether 12-crown-4 the number of atoms in the ring and number of oxygen atoms are _____.
- (A) 12 and 4
 - (B) 4 and 12
 - (C) 4 and 4
 - (D) 12 and 12
27. Expanded porphyrins are anion receptors based upon _____.
- (A) Protonated N atoms
 - (B) Protonated O atoms
 - (C) Protonated S atoms
 - (D) None of the above
28. How many minimum pyrrole residues are present in expanded porphyrins ?
- (A) Four
 - (B) Five
 - (C) Six
 - (D) Seven
29. Diprotonated saphyrin forms an extremely stable complex with _____.
- (A) F^-
 - (B) Cl^-
 - (C) Br^-
 - (D) None of the above
30. Which type of expanded porphyrins posses much larger cavity ?
- (A) Normal porphyrins
 - (B) Non-aromatic porphyrins
 - (C) Aromatic porphyrins
 - (D) All of the above

31. Arginine residue contains which of the following groups ?
- (A) Guanidine
 - (B) PT Pase
 - (C) Kinase
 - (D) Superoxide dismutase
32. Guanidinium remains protonated over the wide pH range is $pK_a =$ _____.
- (A) 10.5
 - (B) 11.5
 - (C) 12.5
 - (D) 13.5
33. Which is an important arginine containing biological system ?
- (A) Carboxypeptidase
 - (B) Peptidase
 - (C) Super oxide dismutase
 - (D) None of the above
34. Bicyclic guanidinium derivatives are capable of recognizing _____ oxoanions.
- (A) Tetrahedral
 - (B) Trigonal
 - (C) Octahedral
 - (D) None of the above
35. The host molecule crystallized and containing a cavity but empty of guest is known as :
- (A) Apohost
 - (B) β_o - phase
 - (C) Both (A) and (B)
 - (D) None of the above

36. Tetragonal urea is known as :
- (A) α - phase
 - (B) β_o - phase
 - (C) β - phase
 - (D) γ - phase
37. Some gas clathrate hydrates are stable upto following temperature :
- (A) 11.5°C
 - (B) 21.5°C
 - (C) 31.5°C
 - (D) 41.5°C
38. The most recent application of clathrate hydrates is in _____.
- (A) H - storage
 - (B) O - storage
 - (C) N - storage
 - (D) All of the above
39. Zeolites are naturally occuring and artificial porous _____.
- (A) Silicates
 - (B) Aluminosilicates
 - (C) Both (A) and (B)
 - (D) None of the above
40. Sodalite has the channel system of type :
- (A) 1D
 - (B) 2D
 - (C) 3D
 - (D) None

(Group-III : CHE 522 – Biomolecules)

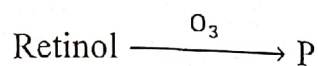
1. Statement "Vitamins are organic compounds which are indispensable for the growth and maintenance of the animal organism" was proposed by :
 - (A) Franz Holfmeister
 - (B) Hoffmann
 - (C) Alex Hoffmann
 - (D) None of the above
2. Word Vitamine was given by :
 - (A) Hoffmann
 - (B) Alex Hoffmann
 - (C) Funk
 - (D) Maxwell
3. Vitamins have been classified on basis of solubility into :
 - (A) Three groups
 - (B) Two groups
 - (C) Four groups
 - (D) Five groups
4. Vitamin B₂ is soluble in :
 - (A) Fat
 - (B) Water
 - (C) Acetone
 - (D) None of the above
5. Following vitamin is example of isoprenoid compounds :
 - (A) Vitamin B₁
 - (B) Vitamin B₂
 - (C) Vitamin C
 - (D) Vitamin A

6. Excess of following vitamin is excreted readily through urine :
- (A) Vitamin E
 - (B) Vitamin C
 - (C) Vitamin K
 - (D) Vitamin A
7. Following vitamin is also known as antixerophthalmic factor :
- (A) Vitamin E
 - (B) Vitamin K
 - (C) Vitamin C
 - (D) Vitamin A
8. Prolonged deficiency of following leads to xerophthalmia :
- (A) Vitamin E
 - (B) Vitamin K
 - (C) Vitamin C
 - (D) Vitamin A
9. Vitamin A₂ on catalytic hydrogenation adds :
- (A) Four molecules of H₂
 - (B) Five molecules of H₂
 - (C) Three molecules of H₂
 - (D) Six molecules of H₂
10. Retinol contains :
- (A) One primary alcoholic group
 - (B) One Secondary alcoholic group
 - (C) Two primary alcoholic group
 - (D) One tertiary alcoholic group

11. Vitamin A₁ on catalytic hydrogenation adds :

- (A) Four molecules of H₂
- (B) Five molecules of H₂
- (C) Three molecules of H₂
- (D) Six molecules of H₂

12. In following reaction :



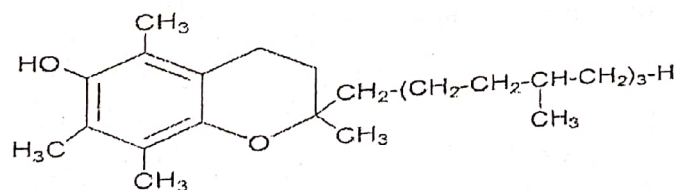
Product P is :

- (A) Geronic acid
- (B) β - ionone
- (C) Perhydroretinol
- (D) Retinal

13. Carr-Price reaction is associated with :

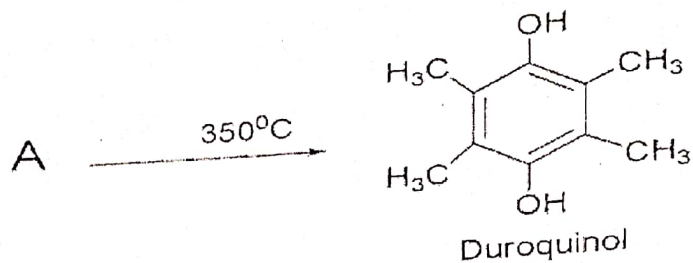
- (A) Vitamin D
- (B) Vitamin A
- (C) Vitamin K
- (D) Vitamin C

14. Following structure is of :



- (A) γ -Tocopherol
- (B) β -Tocopherol
- (C) α -Tocopherol
- (D) Vitamin K

15. In the following reaction C is :

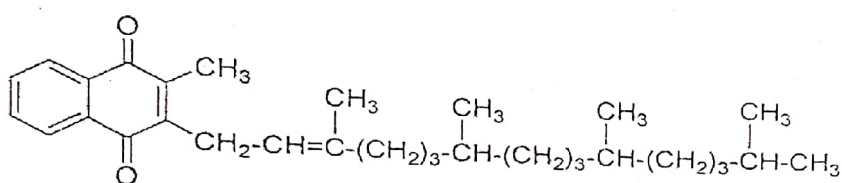


- (A) Vitamin A
 - (B) α -Tocopherol
 - (C) Vitamin D
 - (D) Vitamin B₁
16. α -Tocopherol contains :
- (A) Coumaran ring
 - (B) Chroman ring
 - (C) β -ionone ring
 - (D) Geronic acid
17. Following is also known as anti-sterility vitamin :
- (A) Vitamin A
 - (B) Vitamin K
 - (C) Vitamin C
 - (D) Vitamin E

18. Following is also known as antihaemorrhagic vitamin ;

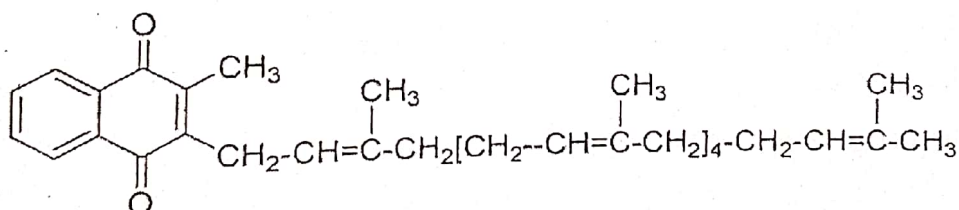
- (A) Vitamin A
- (B) Vitamin K
- (C) Vitamin C
- (D) Vitamin E

19. Following is structure of :



- (A) Vitamin A
- (B) Vitamin K₁
- (C) Vitamin B₁
- (D) Vitamin E

20. Following is structure of :



- (A) Vitamin K₁
- (B) Vitamin K₂
- (C) Vitamin D
- (D) Vitamin B₆

21. Rodopsin is related with :

- (A) Vitamin B₁
- (B) Vitamin K₂
- (C) Vitamin A
- (D) Vitamin B₆

22. Nictalopia occurs due to deficiency of :

- (A) Vitamin A
- (B) Vitamin K₂
- (C) Vitamin C
- (D) Vitamin B₆

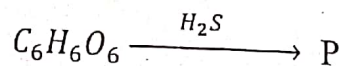
23. Hexuronic acid is also known as :

- (A) Vitamin C
- (B) Vitamin K₂
- (C) Vitamin A
- (D) Vitamin B₆

24. Vitamin C contains following number of carboxylic group :

- (A) One
- (B) Two
- (C) Three
- (D) Zero

25. In the following reaction P is :



Dehydroascorbic acid

- (A) Ascorbic acid
- (B) Acetaldehyde
- (C) Furfuraldehyde
- (D) None of the above

26. Ring size of vitamin C is :
(A) Three
(B) Five
(C) Six
(D) None of these
27. Sulphur containing vitamin is :
(A) B₂
(B) B₁
(C) B₁₂
(D) None of the above
28. Korsakoff's syndrome is caused by deficiency of vitamin :
(A) C
(B) B₁
(C) A
(D) K
29. Riboflavin contains following number of hydroxyl groups :
(A) One
(B) Two
(C) Three
(D) Four
30. Vitamin is search of disease is :
(A) Vitamin A
(B) Vitamin E
(C) Vitamin C
(D) Vitamin K
31. Epinephrine belongs of following class of compound :
(A) Catechol
(B) Aliphatic monocarboxylic acid
(C) Aromatic monocarboxylic acid
(D) Aromatic aldehyde

32. Adrenaline on fusion with potassium hydroxide gives :

- (A) Benzoic acid
- (B) Protocatechuic acid
- (C) Veratric acid
- (D) Acetic acid

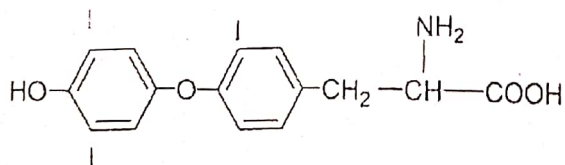
33. Following is iodinated derivative :

- (A) Norepinephrine
- (B) Epinephrine
- (C) Thyroxine
- (D) Vitamin B₁

34. Thyronine contains following number of iodine :

- (A) One
- (B) Two
- (C) Three
- (D) None of the above

35. Following is :



- (A) T₄
- (B) T₃
- (C) rT₃
- (D) None of the above

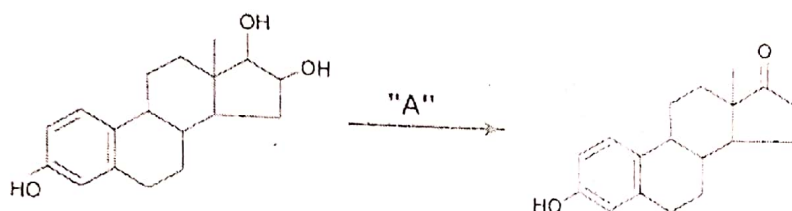
36. Progesterone is :

- (A) Amino hormone
- (B) Steroid hormone
- (C) Peptide hormone
- (D) Protein hormone

37. Oestrone couples with diazonium salts in alkaline solution which indicates the presence of :

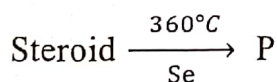
- (A) Amino group
- (B) Phenolic group
- (C) Ketonic group
- (D) Carboxylic group

38. What is "A" in following reaction is ?



- (A) C_2H_5OH
- (B) $LiAlH_4$
- (C) $KHSO_4$
- (D) CH_3COOH

39. "P" in following reaction is :



- (A) Diels hydrocarbon
- (B) Chrysen
- (C) Picene
- (D) Anthracene

40. Cholesterol contains one $-OH$ group at :

- (A) C-3
- (B) C-10
- (C) C-17
- (D) C-5
