

- N.B. :** (1) All questions are **compulsory**.
 (2) **Figures** to the **right** indicate **full marks**

1. (a) Choose the correct alternative (any **eight**) :- **(08)**
- (i) _____ means the integration of national economy with the world economy.
 (Liberalisation, Privatisation, Globalisation)
 - (ii) Maximum number of farmers' suicides have occurred in the state of _____.
 (Madhya Pradesh, Andhra Pradesh, Maharashtra)
 - (iii) Right to Freedom is enumerated in Article _____ of Indian constitution.
 (17, 18, 19)
 - (iv) _____ is the study of all living systems in relation to their environment.
 (Ecology, Biology, Physiology)
 - (v) Human Rights are _____.
 (absolute, inalienable, revocable)
 - (vi) The General Assembly adopted UDHR on 10th December, _____.
 (1945, 1948, 1950)
 - (vii) Working with the farmers by corporate firms and sharing the profit is known as _____.
 (Contract farming, Corporate farming, Private farming)
 - (viii) Acid Rain is one of the harmful effects of _____ pollution.
 (Air, Water, Noise)
 - (xi) _____ is a term used to describe positive stress.
 (Eustress, Distress, Hyperstress)
 - (x) Hassels of everyday life are _____ stressors.
 (Individual, Organisational, Background)
- (b) State whether the following statements are **True** or **False** (any **seven**) : **(07)**
- (i) Progressive elimination of government control over economic activities is known as liberalisation.
 - (ii) Globalisation has resulted in increase of ratio of contractual workers to total workers.
 - (iii) Article 22 of Indian constitution abolishes untouchability.
 - (iv) Articles 3-16 of UDHR proclaim economic, social and cultural rights.
 - (v) Prejudice leads to in formation of stereotypes.
 - (vi) Freedom of speech and expression is an absolute right.
 - (vii) Primary producers are small living beings such as bacteria, insects and fungi in the ecosystem.
 - (viii) Public participation is one of the guiding priniciples of sustainable development.
 - (ix) Lack of civic amenities is an individual stressor.
 - (x) Choice between two negative alternatives is known as approach-approach conflict.

2. Explain the benefits and limitations of economic liberalisation in India. (15)
- OR**
2. 'Globalisation and privatisation have provided innumerable employment opportunities in India'. Discuss.
3. Define 'Human Rights' and discuss the origin and evolution of human rights from ancient to modern period. (15)
- OR**
3. Discuss the characteristics of Fundamental Rights enshrined in our Constitution and examine the constitutional provisions which guarantee Right to Constitutional Remedies.
4. Examine the various factors responsible for environmental degradation. (15)
- OR**
4. Explain the concept of socialization and examine how the agents of socialization play an important role in the development of individual.
5. Explain the various types of conflict and elaborate the strategies for coping with conflicts. (15)
- OR**
5. Write short notes on (any three) :-
 (a) Causes of Migration
 (b) Significance of UDHR
 (c) Components of sustainable development
 (d) Maslow's theory of self-actualization
 (e) Causes of Stress.

(मराठीरूपांतर)

(२^१/२ तास)

(एकूण गुण : ७५)

- सूचना : (१) सर्व प्रश्न अनिवार्य आहेत.
 (२) उजवीकडील अंक पूर्ण गुण दर्शवतात.
 (३) आवश्यकता वाटल्यास इंग्रजी प्रश्नपत्रिका पहावी.

१. (अ) योग्य पर्याय लिहा (कोणतेही आठ) :- (८)
- (१) जागतिक अर्थव्यवस्थेशी राष्ट्रीय अर्थव्यवस्थेच्या होणाऱ्या एकत्रिकरणाच्या प्रक्रियेला ----- म्हणतात.
 (उदारीकरण, खाजगीकरण, जागतिकीकरण)
- (२) शेतकऱ्यांच्या सर्वात जास्त आत्महत्या ----- या राज्यात झाल्या आहेत.
 (मध्य प्रदेश, आंध्र प्रदेश, महाराष्ट्र)
- (३) भारतीय राज्यघटनेत स्वातंत्र्याचा हक्क कलम ----- मध्ये अनुस्यूत आहे.
 (१७, १८, १९)
- (४) सर्व जीवांचा त्यांच्या पर्यावरणाशी असलेल्या संबंधाचा अभ्यास म्हणजे ----- .
 (पर्यावरणशास्त्र, जीवशास्त्र, शरीरशास्त्र)

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- (५) मानवी हक्क ----- आहेत.
(अमर्यादित, अतूट, काढून घेता येण्या जोगे)
- (६) आमसभेने मानवी हक्क जाहीरनामा १० डिसेंबर ----- रोजी संमत केला.
(१९४५, १९४८, १९५०)
- (७) शेतकऱ्यांच्या सहकार्याने उद्योगधंद्यांनी केलेली शेती आणि त्यातून मिळालेला नफा वाटून घेण्याच्या पद्धतीला ----- म्हणतात.
(कंत्राटी शेती, उद्योगी शेती, खाजगी शेती)
- (८) आम्लवर्षा हा ----- प्रदुषणाचा घातक परिणाम आहे.
(हवा, पाणी, ध्वनी)
- (९) सकारात्मक ताणाला ----- हे नाव आहे.
(युस्ट्रेस, निराशा, अतीतणाव)
- (१०) दैनंदिन जीवनातल्या समस्यांना ----- ताणकारक असे म्हणतात.
(व्यक्ति, संघटनात्मक, पार्श्व)

- (ब) खालील विधाने चूक की बरोबर ते लिहा (कोणतेही सात) :- (७)
- (१) आर्थिक व्यवहारांवरचे सरकारी नियंत्रण टप्प्याटप्प्याने कमी होण्याला उदारीकरण म्हणतात.
- (२) जागतिकीकरणामुळे कंत्राटी कामगारांच्या प्रमणात (एकूण कामगारवर्गाच्या संदर्भात) वाढ झाली आहे.
- (३) राज्यघटनेच्या कलम २२ अनुसार अस्पृश्यतेचे निर्मूलन झाले आहे.
- (४) मानवी हक्क जाहीरनाम्याच्या कलम ३ ते १६ मध्ये आर्थिक, सामाजिक आणि सांस्कृतिक हक्क अनुस्यूत आहेत.
- (५) पूर्वग्रहांचे पर्यावसन चाकोरीबद्ध विचारात होते.
- (६) अभिव्यक्ती स्वातंत्र्य हा अमर्यादित हक्क आहे.
- (७) जिवाणू, कीटक आणि बुरशी हे पर्यावरणातील प्राथमिक उत्पादक आहेत.
- (८) लोकसहभाग हे शाश्वत विकासाचे एक महत्त्वाचे तत्त्व आहे.
- (९) नागरी सुविधांच्या अभावामुळे व्यक्तिगत ताण निर्माण होतो.
- (१०) दोन नकारात्मक पर्यायांमधील निवड हा दृष्टिकोन-दृष्टिकोन-संघर्ष आहे.

२. भारतात आर्थिक उदारीकरणाचे फायदे आणि मर्यादा स्पष्ट करा. (१५)

किंवा

२. 'जागतिकीकरण आणि खाजगीकरणामुळे भारतात रोजगाराच्या भरपूर संधी उपलब्ध झाल्या आहेत.' चर्चा करा.

३. 'मानवी हक्कांची' व्याख्या करून त्यांच्या, प्राचीन ते आधुनिक काळापर्यंतच्या उत्क्रांतीची चर्चा करा. (१५)

किंवा

३. भारतीय राज्यघटनेतील मूलभूत हक्कांच्या वैशिष्ट्यांची चर्चा करा आणि घटनात्मक संरक्षणाच्या हक्काचे परीक्षण करा.

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४. पर्यावरण न्हासाला कारणीभूत असलेल्या वेगवेगळ्या कारणांचे परीक्षण करा. (१५)
किंवा
४. सामाजिकीकरण ही संकल्पना स्पष्ट करा. व्यक्तीच्या विकासात सामाजिकीकरणाचे घटक काय भूमिका बजावतात ते स्पष्ट करा.
५. संघर्षाचे प्रकार स्पष्ट करा आणि संघर्षांना सामारे जाण्यासाठी करायच्या युक्त्यांची चर्चा करा. (१५)
किंवा
५. थोडक्यात टीपा लिहा (कोणत्याही तीन) :-
(अ) स्थलांतराची कारणे
(ब) मानवी हक्क जाहीरनाम्याचे महत्त्व
(क) शाश्वत विकासाचे घटक
(ड) मॅस्लॉचा आत्मपूर्वीचा सिद्धांत
(क) ताणाची कारणे.

[3 Hours]

[Total Marks. 100]

Please check whether you have got the right question paper.

N.B:

1. All questions are compulsory
2. Figures to the right indicate full marks
3. Draw neat and labeled diagrams whenever necessary

Q1.A Choose the correct option from the following and rewrite the sentence. 10

- a. _____ is required for guttation on *Nephrolepis* leaflets.
 - i) Ramentum ii) Hydathode iii) Stolon iv) Caudex
- b. In *Nephrolepis* the vascular bundle with xylem in the centre, surrounded by phloem is called _____.
 - i) Centripetal ii) Amphicribal iii) Centrifugal iv) Leptocentric
- c. Stolons of *Nephrolepis* arise from _____.
 - i) Root ii) Rhizomatic stem iii) Rachis iv) Leaf
- d. *Nephrolepis* sporangium produces _____ number of haploid kidney shaped spores.
 - i) 16 ii) 32 iii) 64 iv) Indefinite
- e. The stem of female plant of *Cycas* shows _____ growth.
 - i) Sympodial ii) Monopodial iii) Centripodial iv) Multipodial
- f. *Cycas* leaves show typical _____ adaptation.
 - i) Mesophytic ii) Hydrophytic iii) Xerophytic iv) Halophytic
- g. *Cycas* shows _____ type of Pollination.
 - i) Anemophilous ii) Entomophilous iii) Hydrophilous iv) Chiroptrophilous
- h. _____ stipules are found in *Rosa indica*.
 - i) Adnate ii) Interpetiolar iii) Free lateral iv) Intrapetiolar
- i. Pulvinus leaf base is found in _____ leaf.
 - i) Banana ii) Mango iii) Pea iv) Spider-lily
- j. *Agave americana* is commonly known as _____.
 - i) Lady's finger ii) Cotton plant iii) Century plant iv) Deccan Hemp

Q1. B Answer the following in one sentence**10**

- a) What is Indusium? Give its functions.
- b) Define Chemotaxis.
- c) Which are the two main species of *Cycas* found in India?
- d) State the method of Seed germination in *Cycas*.
- e) Define Opposite decussate leaf phyllotaxy.

- Q.2. Answer any two of following: 20**
- a. Give an account of external morphology of *Nephrolepis*.
 - b. Describe primitive types of steles giving suitable examples.
 - c. Describe the structure of prothallus and sex organs in *Nephrolepis*.
 - d. Describe the structure of sporangium of *Nephrolepis*. Add a note on its dehiscence.
- Q.3. Answer any two of the following: 20**
- a. Describe T.S. of *Cycas* leaflet.
 - b. Describe in detail external morphology of *Cycas* plant.
 - c. Describe microsporophyll of *Cycas*.
 - d. Give an account of economic importance of gymnosperms.
- Q.4. Answer any two of the following: 20**
- a. Give classification, distinguishing characters, two plants of economic importance and floral formula of family Malvaceae.
 - b. Explain any five types of Cymose inflorescence giving suitable examples.
 - c. What is palmately compound leaf? Describe its various types.
 - d. Assign the following plants to their respective families giving reasons and give their economic importance:
 - i) *Gossypium hirsutum*
 - ii) *Amaryllis belladonna*
- Q.5. Write short notes on any four: 20**
- a. Hydathode of *Nephrolepis*
 - b. Ramentum
 - c. Systematic position of *Cycas*
 - d. Parts of a typical leaf
 - e. Reticulate Venations & its types
 - f. Distinguishing characters of Amaryllidaceae

[Time: Three Hours]

[Marks: 100]

Please check whether you have got the right question paper.

- N.B:** i) All questions are compulsory
 ii) Figures to the right indicate full marks
 iii) Draw neat and labeled diagrams whenever necessary

Q.1 A. Choose the **correct option** from the following:

10

- a) Cells surrounding the guard cell are called _____ cells.
 i) accessory ii) subsidiary iii) motor iii) bulliform
- b) _____ is a complex permanent tissue.
 i) Parenchyma ii) Xylem iii) Collenchyma iv) Sclerenchyma
- c) Cotton fibre is the part of _____ tissue system.
 i) Epidermal ii) Vascular iii) Ground iv) Meristematic
- d) _____ are unicellular structures present on epidermis.
 i) Glandular hairs ii) Scales iii) Ramentum iv) Dendroid hairs
- e) _____ is the essential pigment for photosynthesis.
 i) Anthocyanin ii) Carotene iii) Chlorophyll iv) Xanthophyll
- f) During photosynthesis the final product of Calvin cycle is _____ .
 i) Pyruvate ii) PGA iii) RuBP iv) Glycerinaldehyde
- g) Plants during non-cyclic Photophosphorylation produce _____ .
 i) ATP ii) NADPH iii) NADPH and ATP iv) NADH and ATP
- h) _____ part of *Zingiber officinale* is of medicinal importance.
 i) Roots ii) Dried rhizome iii) Leaves iv) Entire plant
- i) _____ are the constituents of the basic molecular structure of the cell.
 i) Primary metabolites ii) Secondary metabolites
 iii) Alkaloids iv) Lectins
- j) Turmeric powder is prepared from _____ of *Curcuma longa*.
 i) Root ii) Leaf iii) Rhizome iv) Bark

Q 1. B. Answer the following in **one sentence**:

10

- a) Write any two functions of parenchyma tissue.
 b) Write any two active constituents of *Aloe*.
 c) Name any two energy rich metabolites
 d) How many NADPH & ATP molecules are required to fix one CO₂ molecule in Calvin cycle?
 e) State the functions of medullary rays.

- Q.2 Answer **any two** from the following: 20
- Describe T.S. of young Dicot stem.
 - Explain the anatomy of monocot root.
 - Explain the structure and functions of simple permanent tissues.
 - Describe various epidermal appendages.
- Q.3 Answer **any two** from the following: 20
- Explain Calvin pathway in C_3 plants.
 - Describe the process of fixation of carbon dioxide in C_4 plants.
 - Describe the role of plant pigments involved in photosynthesis.
 - Describe the process of Non-cyclic photophosphorylation.
- Q.4 Answer **any two** from the following: 20
- What are secondary metabolites? Give types and functions of secondary metabolites?
 - What is medicinal botany? Add a note on active constituents & uses of Turmeric and Ginger.
 - Give an account of botanical name, family, active constituents and uses of Sandalwood and Tulsi.
 - What are the components of grandma's pouch? State the botanical name, family, source, active constituents and medicinal uses of Adulsa.
- Q.5 Write short notes on (**any four**): 20
- Structure of Vascular bundles in monocot stem
 - Phloem tissue
 - Schematic representation of CAM pathway
 - Active constituents of *Aloe*
 - Primary metabolites
 - Nature & role of light in photosynthesis

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(Time: 3 Hours)

(Marks: 100)

Please check whether you have got the right question paper.

- 1) All the Questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) The use of log table /programmable calculator is allowed.
- 4) Answers for the same question should be written together.

Q.1A) Select the correct option and complete the following sentences **(Attempt any twelve)** **12**

- i) Molar volume of NH_3 gas at NTP is _____.
 a) 22.083dm^3 b) 22.084dm^3 c) 22.4dm^3
- ii) The second law thermodynamics introduces concept of _____.
 a) free energy b) enthalpy c) entropy
- iii) The compressibility factor is expressed by equation _____.
 a) $PV = ZnRT$ b) $PV = RT$ c) $Z = PV$
- iv) The mass of 22400 cm^3 of CO_2 (C =12,O=16)gas at NTP will be _____.
 a) 4.4g b) 8.5g c) 44g
- v) For the reaction $\text{C}_2\text{H}_4(\text{g}) + \text{H}_2(\text{g}) \rightleftharpoons \text{C}_2\text{H}_6(\text{g})$ _____.
 a) $K_p = K_c$ b) $K_p = K_c /RT$ c) $K_p = K_c RT$
- vi) When salt dissolves in water, entropy _____.
 a) decreases b) increases c) remains constant
- vii) Carbon dioxide, and sulphur dioxide are _____ gases.
 a) acidic b) basic c) neutral
- viii) The colour of the bromine gas is _____.
 a) reddish brown b) yellow c) black
- ix) Ions with negative charges are called _____.
 a) anion b) cation c) mixture
- x) According to Lowry- Bronsted concept base is _____.
 a) protophilic b) protogenic c) both a & b
- xi) _____ is the Bronstead base
 a) S^{2-} b) Cl^- c) Al^{3+}

- xii) _____ is the hard acid
a) Co^{3+} b) NO_2^- c) SCN^-
- xiii) Bromination of propane gives _____ as a major product.
a) n-propyl bromide b) iso-propyl bromide c) 1,2-dibromopropane
- xiv) Reaction intermediate in E_1 reaction is _____.
a) carbocation b) carbanion c) carbon free radical
- xv) More polar solvents favours _____ reaction.
a) E_1 b) E_2 c) E_{1cB}
- xvi) Diels-Alder reaction is an example of _____ reaction
a) addition b) cyclo-addition c) substitution
- xvii) sp hybridized carbon is more _____ than sp^2 or sp^3 hybridized carbon atom.
a) acidic b) basic c) neutral
- xviii) Catalytic hydrogenation of alkenes is _____ addition.
a) cis b) trans c) anti

B) State whether the following sentences are **true** or **false**. (Attempt any **three**) **3**

- Reaction between NaOH and HCl is reversible.
- Entropy is an extensive property.
- Ammonium chloride and ammonium hydroxide have uncommon ions.
- To maintain constant pH a buffer mixture is used.
- Hydroxylation of alkene by OsO_4 is stereospecific reaction.
- Alkenes undergo addition reactions.

C) Match the following (attempt any five). **5**

- | | |
|-------------------------|--------------------------------|
| i) Boyles law | a) Second order reaction |
| ii) n is zero | b) Toxic |
| iii) Fe^{+3} | c) KOH |
| iv) As | d) $V \propto 1/P$ |
| v) Alkene hydroxylation | e) $k_4\text{Fe}(\text{CN})_6$ |
| vi) E_1 reaction | f) $K_p = K_c$ |
| | g) KMnO_4 |
| | h) First order reaction |

- Q.2 Attempt **any four** of the following.
- A) State and explain Joule Thomson's effect. **5**
- B) Derive van der Waals equation for pressure correction. **5**
- C) Calculate the pressure exerted by 1 mol of NH_3 in 30dm^3 at 300K using **5**
 a) ideal gas equation b) van der Waals equation. The value of van der Waals constant 'a' and 'b' for NH_3 are $a=0.5563\text{Nm}^4\text{mol}^{-2}$ and $b=6.38\times 10^5\text{m}^3\text{mol}^{-1}$ ($R=8.314\text{JK}^{-1}\text{mol}^{-1}$)
- D) What are K_p and K_c ? Obtain relationship between them. **5**
- E) State the Le-Chateliers principle and discuss its application. **5**
- F) Explain entropy of a system. For the reaction **5**
 $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$ standard free energy at 298K is -103.25KJ . Calculate equilibrium constant for the reaction at same temperature ($R=8.314\text{JK}^{-1}\text{mol}^{-1}$).
- Q.3 Attempt **any four** of the following.
- A) Write short note on use of complexes forming ability in qualitative analysis with any one example. **5**
- B) What do you mean by qualitative analysis? What are the types of it on the basis of weight of sample? **5**
- C) How will you prepare starch iodide paper and lead acetate reagent papers? **5**
- D) Explain Arrhenius concept of acids and bases. **5**
- E) What is Pearson's concept of hard soft acids and bases? **5**
- F) Give any three advantages and limitations of Lewis concept of acids and bases. **5**
- Q.4 Attempt **any four** of the following.
- A) i) Explain Wurtz-Fittig reaction with examples. **3**
 ii) Explain : Iodination of alkanes is difficult. **2**
- B) Complete the following reaction and give its mechanism **5**

$$\begin{array}{c} \text{CH}_3 - \text{C} = \text{CH}_2 \\ | \\ \text{CH}_3 \end{array} \xrightarrow[\text{H}_2\text{O}]{\text{Hg}(\text{OCOCH}_3)_2} ? \xrightarrow[\text{NaOH}]{\text{NaBH}_4} ?$$
- C) i) State and explain Hofmann elimination with suitable example. **3**
 ii) Complete the following reactions **2**

$$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ | \\ \text{OH} \end{array} \xrightarrow{\text{conc. H}_2\text{SO}_4} ?$$

$$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_3 \\ | \\ \text{Br} \end{array} \xrightarrow{\text{alc. KOH}} ?$$

- D) i) How does acetylene converted into following compounds? **3**
 a) Acetaldehyde b) Vinyl chloride
 ii) Give ozonolysis products of 2-methyl propene. **2**
- E) Explain the mechanism of hydroboration-oxidation of alkene with suitable example. **5**
- F) Explain the mechanism of E₂- elimination reaction with energy profile diagram. **5**

Q.5

Attempt **any four** of the following.

- A) State and explain the law of mass action. What is the significance of equilibrium constant? **5**
- B) Explain the assumptions of kinetic theory of gases **5**
- C) Calculate the solubility in pure water of silver chloride whose solubility product is 1.1×10^{-10} at 298 K. **5**
- D) What are the different types of titrations on the basis of reaction involved? **5**
- E) How are metal acetylides prepared? How is sodium acetylide converted to propyne and 1- butyne ? **5**
- F) Explain the mechanism of 1,2 and 1,4- addition of Br₂ to 1,3-butadiene. **5**

[Time: Three Hours]

[Marks: 100]

Please check whether you have got the right question paper

- NB:** 1. All questions are compulsory.
 2. Answers to the same questions must be written together.
 3. Figures to the right indicate full marks.
 4. The use of log table/ non programmable calculator is allowed.

- Q 1 (A)** Select the correct option and complete the following statements (Any twelve) **(12)**
- The H^+ ion concentration in water at $25^\circ C$ is _____.
 a) 7 b) 10^{-14} c) 10^{-7}
 - The pH of 0.05M H_2SO_4 is _____.
 a) 1 b) 2 c) 4
 - The pH of Sea water is _____.
 a) 7.5 b) 8.5 c) 8.0
 - Amorphous solids have solid state properties, but they do not possess _____.
 a) specific volume b) orderly arrangement c) density
 - _____ is the axial distances and axial angles for rhombohedral system?
 a) $a = b = c, \alpha = \beta = \gamma \neq 90^\circ$
 b) $a = b \neq c, \alpha = \beta = \gamma = 90^\circ$
 c) $a \neq b \neq c, \alpha = \beta = \gamma = 90^\circ$
 - Electromagnetic waves travel _____.
 a) without medium
 b) with medium
 c) with medium and without medium
 - If steric number of the central atom is five then the arrangement of electron pairs around the central atom is _____.
 a) trigonal planar b) pentagonal bipyramidal
 c) trigonal bipyramidal
 - The electrostatic forces of attraction between oppositely charge ions are called as _____.
 a) covalent bonds b) ionic bonds c) metallic bonds

- ix) Covalent bond is formed when two electrons in a molecule is _____.
- shared equally by both the atoms.
 - not shared equally by both the atoms.
 - are transformed from one atom to another atom.
- x) The bond angle in SF_6 is _____.
- 120°
 - 90°
 - 180°
- xi) Iodine is insoluble in water, the solutions of iodine is prepared by using _____.
- KI
 - NH_4I
 - NaCl
- xii) Strong oxidizing agent in the electrochemical series is _____.
- Li
 - F_2
 - H_2
- xiii) Thiophene is _____.
- antiaromatic
 - aromatic
 - non-aromatic
- xiv) In nitration of benzene nitric acid is used along with _____.
- hydrochloric acid
 - sulphuric acid
 - phosphoric acid
- xv) _____ is a meta directing group.
- $-\text{OH}$
 - $-\text{NH}_2$
 - $-\text{NO}_2$
- xvi) Transannular strain is in _____ conformation of cyclohexane.
- chair form
 - boat form
 - half chair form
- xvii) Aromatic compound is _____ than anti aromatic compound.
- less stable
 - more stable
 - equally stable
- xviii) Planar cyclo-octatetraene is _____.
- aromatic
 - antiaromatic
 - non aromatic

(B) State whether the following statements are True or False **(3)**
(Any Three)

- Ionic equilibria is established in aqueous solutions of all electrolytes.
- All electromagnetic waves travel through a vacuum at the same speed.
- Polarizability of LiCl is more than NaCl .
- The number of lone pairs in HF molecule is one.
- Resonance energy of benzene is 36 kcal / mol .
- According to Huckels rule monocyclic ring which have eight pi electrons show aromaticity.

(C) Match the following columns(Any Five) (5)

Column A		Column B	
(i)	The pH of Human blood	(a)	Edge
(ii)	Intersection of two adjacent faces in a crystal	(b)	Oxidation
(iii)	Decrease of oxidation number	(c)	Staggered form
(iv)	Iodimetry	(d)	Less stable
(v)	Chair conformation	(e)	Interfacial angle
(vi)	Antiaromatic compound	(f)	Free iodine solution
		(g)	7.3
		(h)	Reduction

Q. 2 Attempt any Four of the following

- (A) Explain the use of Hendersons equation for the measurement of pH of an acidic buffer solution. (5)
- (B) Calculate the pH of 0.1M solution of ammonia. (5)
[Given, $K_b = 1.77 \times 10^{-5}$].
- (C) What is degree of ionization? Discuss the factors that affect the degree of ionization. (5)
- (D) Determine the wavelength and energy of the microwave radiation emitted (5)
a) by a microwave oven of frequency 2.45×10^9 Hz and
b) by a cordless phone of frequency 5.8×10^9 Hz.
[Given: $c = 3 \times 10^8$ m/s: $h = 6.626 \times 10^{-34}$ Js].
- (E) Explain the different types of interaction between radiation and matter. (5)
- (F) Define Unit cell. State the three laws of crystallography. (5)

Q. 3

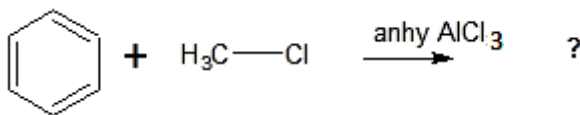
Attempt any Four of the following

- (A) What is isoelectronic principle ? Explain it with suitable examples. (5)
- (B) Explain the effect of lone pair of electron in the geometry of molecule by giving suitable example. (5)
- (C) What is steric number ? Calculate the steric number of the following molecules: (5)
- a) CO_2 and b) NH_3
- (D) Draw the Lewis dot structure of the following: (5)
- a) BCl_3 and b) H_2O
- (E) Balance the following reaction with stepwise explanation: (5)
- $$\text{CrO}_4^{2-} + \text{SO}_3^{2-} \rightarrow \text{Cr}(\text{OH})_4^- + \text{SO}_4^{2-}$$
- (in Basic medium)
- (F) Discuss redox stability in water with example. (5)

Q. 4

Attempt any Four of the following

- (A) Explain sulphonation of benzene with mechanism. (5)
- (B) What are the criteria which must be satisfied for the compound to be aromatic? (5)
- (C) Draw the conformations of cyclohexane. Give the relative stabilities of these conformations ? (5)
- (D) Which of the following are aromatic, antiaromatic or non aromatic. Justify: (5)
- a) cyclobutadiene b) pyrrole c) pyridine
- (E) Explain why cyclopropane is less stable than cyclopentane. (5)
- (F) Complete the following reaction? Give its name and mechanism. (5)



Q. 5

Attempt any Four of the following

- (A) Calculate the pH of a solution which contains 0.2 mol sodium acetate and 0.1 mol acetic acid per dm^3 . [Given : K_a for the acid is 1.8×10^{-5}]. (5)
- (B) Define axis of symmetry. Draw the different axis of symmetry of a cubic crystal. (5)

- (C) i) Find out the oxidation number of Cr in $K_2Cr_2O_7$ and K_2CrO_4 . (2)
ii) What are disproportionation reactions? Explain the disproportionation reaction of Cu^+ to Cu^{2+} and Cu^0 . (3)
- (D) Explain the titration curve of reaction between Fe(II) and Ce(IV) solution. (5)
- (E) i) What is flipping of cyclohexane? (3)
ii) Explain steric strain. (2)
- (F) State Hammond's Postulate. How does it help to identify the structure of transition states? (5)
-

[Time: 3 hours]

[Marks : 100]

Please check whether you have got the right question paper.

- N.B: **1. All** questions are **compulsory**.
2. All questions carry **equal** marks.
3. Draw neat and labelled **diagrams** wherever **necessary**.

1. A) Fill in the blanks by choosing the correct option given in the bracket. **5**
- a) Convex survivorship curve is observed in _____.
1. elephant
 2. bird
 3. insect
- b) A group of individuals of the same age is referred to as a _____.
1. cohort
 2. aggregate
 3. species
- c) Azadirachtin is found in various parts of _____ tree.
1. Jamun
 2. mango
 3. neem
- d) Number of organism per unit area is _____ density.
1. specific
 2. ecological
 3. crude
- e) India's oldest National park is _____.
1. Keoladeo National Park
 2. Sanjay Gandhi Park
 3. Jim Corbett National Park

- B) Match the column I and column II and rewrite. **5**

Column I

Column II

- | | |
|-------------------------|------------------|
| a) Sigmoid growth curve | i) Butterflies |
| b) Stairstep curve | ii) Maharashtra |
| c) Photoautographs | iii) Gujrat |
| d) Tadoba | iv) Paramoecium |
| e) Gir | v) Cyanobacteria |

- C) State whether true or false : **5**

- a) Sex ratio is the number of females per 100 males in a population.
- b) Profundal zone is the deepest, dark zone of a pond.
- c) Cartagena protocol is an international agreement to ensure safe living modified organisms.
- d) Neem is known for its antidiabetic property.
- e) Obligate parasite can survive outside the body of the host.

- D) Answer in **one** sentences only. **5**

- a) Define fecundity
- b) Give full form of UNESCO
- c) Define saprophytes
- d) Define population density
- e) Give full form of GIS

2. A) Define survivorship growth curve. Explain convex and concave curves. **10**

OR

Define population dispersal. Add a note on its distribution pattern. **10**

B) Answer **any two** of the following : **10**

- a) Illustrate age distribution as pyramids.
- b) Describe concept of human census and its significance.
- c) Define mortality. Add a note on its types.
- d) Explain life tables and its uses.

3. A) Define ecosystem. Describe biotic components of an ecosystem. **10**

OR

A) Explain nitrogen cycle. **10**

B) Write short notes on **any two** of the following: **10**

- a) Food web and its significance.
- b) Abiotic components of pond ecosystem.
- c) Pyramid of numbers.
- d) Predation and Antibiosis

4. Answer **any two** of the following : **20**

- a) What is biopiracy? Add a note on biopiracy in India.
- b) Describe Gir National Park with two representative animal and species.
- c) Enlist and explain critically endangered vertebrates.
- d) Give an account on the habitat, flora and fauna of Jim Corbett National Park.

5. Write short notes on **any four** of the following : **20**

- a) Natality
 - b) Sigmoid growth pattern
 - c) Lentic habitat
 - d) Oxygen cycle
 - e) Ecotourism
 - f) Project Tiger
-

Q.P. Code :12104

[Time: Three Hours]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory.
 2. All questions carry equal marks.
 3. Draw neat, labelled diagrams wherever necessary.

Q.1. A) Fill in the blanks by choosing correct options given in the bracket:

- a) In the Goitre disorder there is enlargement of _____ gland.
(Adrenal, thyroid, Pituitary)
- b) Smallpox is caused by _____ virus.
(Variola, Varity, Very)
- c) pH range of drinking water is _____.
(6.5 to 8.5, 4.5 to 6.5, 8.5 to 9.5)
- d) Insulin hormone is secreted by _____ cells of Islet of Langerhans.
(Alpha, Beta, delta)
- e) *Neisseria gonorrhoea* is a _____ infection.
(Bacterial, viral, protozoal)

B) Match the column and rewrite

- | I | II |
|-----------------|--------------------------------|
| a) Ig A | i. Arteriosclerosis |
| b) Dengue | ii. <i>Treponema pallidum</i> |
| c) Leprosy | iii. Colostrum |
| d) Hypertension | iv. <i>Flaviviridae</i> family |
| e) Syphilis | v. MLEC |

C) State whether True or False

- a) Rickets is caused by deficiency of Vitamin D.
- b) Piles are inflamed veins in the stomach area.
- c) Water canals are natural water resources.
- d) Radiation from cell phone is too weak to heat the biological tissues.
- e) Blood pressure lowers during sleep.

D) Answer the following in one sentence:

- a) What is "Infantile Pellagra and Nutritional Oedema".
- b) Give full form of PPIP.
- c) Explain "Anomalous behavior of water".
- d) What is Psychotherapy.
- e) What is Bronchial thermoplasty?

TURN OVER

Q.P. Code :12104

- Q.2 A)** Discuss causes and consequences of obesity. **10**
OR
A) Describe causes, symptoms, precaution and remedy for Swine flu. **10**
B) Explain **any two** of the following: **10**
a) Dietary recommendation for adult.
b) Causes and symptoms of Flatulence.
c) Symptoms and prevention of Anemia.
d) Causes and remedy for Marasmus.
- Q.3 A)** Explain the concept of water footprint and give its significance. **10**
OR
A) Define health and add a note on psychological and social health. **10**
B) Write short note on **any two** of the following: **10**
a) Small scale water purification methods.
b) Source of fresh water.
c) Polio eradication programmes in India.
d) Radiations risks of mobile phones.
- Q.4** Give an detailed account of causes, symptoms, diagnosis, precautions and remedy of the following diseases (**any two**) **20**
a) Asthma
b) Diabetes Type II
c) AIDS
d) Tuberculosis
- Q.5** Write short notes on **any four** **20**
a) BMI significance
b) Importance of dietary fibers
c) Aims of First Aid
d) Infections and treatment for Dog bite.
e) Causes and Symptoms of Hepatitis A
f) Oral cancer.
