SET-"X" (Total No. of printed pages: 25)

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PG-EE-July, 2025 (Chemistry)

Code

Sr. No.10089

Time: 1¼ Hours	Total Question	ons: 100	Max. Marks: 100
Roll No.	(111 218 111 /	Date of Birth:	
Name:		Mother's Name:	
Father's Name:		Mother s rame.	
Date of Examination:			

(Signature of the candidate)

(Signature of the Invigilator)

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MUST NOT be ticked in the Question book-let.

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Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-

BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD 8. ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

Questio No.	Questions
1.	The electrons present in K-shell of the atom will differ in (1) Principal quantum number (2) Azimuthal quantum number (3) Magnetic quantum number (4) Spin quantum number
2.	Wave nature of electron was demonstrated by (1) Schrodinger (2) de-Broglie (3) Davisson (4) Heisenberg
3.	Which of the following does not have any unit? (1) Electronegativity (2) Electron affinity (3) Ionisation potential (4) Atomic radii
	The orbital diagram in which Aufbau principle is violated is (1) $\uparrow\downarrow$ $\uparrow\downarrow$ \uparrow (2) \uparrow $\uparrow\downarrow$ \uparrow \uparrow (3) $\uparrow\downarrow$ $\uparrow\uparrow$ \uparrow (4) $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$ \uparrow

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Question No.	Questions
5.	According of VSEPR theory, the molecular geometry of the water molecular is
	(1) octahedral (2) distorted tetrahedral
	(3) planar triangle (4) linear
6.	${ m NaC}l$ crystal belongs to the crystal system
L .	(1) hexagonal (2) cubic
	(3) tetragonal (4) orthorhombic
7.	H-bonding is not present in
	(1) Glycerine (2) Water
	(3) Hydrogen Sulphide (4) Hydrogen Fluoride
8.	According to Fazan's rule, covalent bond is favoured by
	(1) Large cation and small anion
	(2) Large cation and large anion
*	(3) Small cation and small anion
	(4) Small cation and large anion
9.	Lithium shows diagonal relationship with
	(1) Magnesium (2) Beryllium
	(3) Aluminium (4) Boron

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Questio No.	Questions
10.	Which of the following metal is present in chlorophyll? (1) Chromium (2) Cobalt (3) Magnesium (4) Iron
11.	The type of hybridisation of boron in diborane is (1) Sp-hybridisation (2) Sp ² -hybridisation (3) Sp ³ -hybridisation (4) Sp ³ d ² -hybridisation
	The silicates which contain extended anions are (1) Pyro silicates (2) Three dimensional silicates (3) Chains silicates (4) Cyclic silicates
	Orthophosphoric acid is 1) Monobasic (2) Dibasic 3) Tribasic (4) Tetrabasic
(1	7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7
(3	$H_{2}S_{2}O_{7}$ (4) $H_{2}S_{2}O_{8}$

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Question	Code-A
No.	Questions
15.	The correct order of the increasing acidic strengths of $HClO_1$, $HClO_2$, $HClO_3$ and $HClO_4$ is
	(1) $HClO > HClO_2 > HClO_3 > HClO_4$
	(2) $HClO_3 > HClO_4 > HClO_2 > HClO$
	(3) $HClO_4 > HClO_3 > HClO_2 > HClO$
-	(4) $HClO_2 > HClO > HClO_3 > HClO_4$
16.	The shape of XeF_4 is
	(1) Square planar (2) Tetrahedral
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(3) Octahedral (4) Trigonal planar
17.	Which of the following atoms in the given oxidation state has partially filled d-orbitals
	(1) V(I) (2) Ti (IV)
* * .	(3) Zn (II) (4) Cu (I)
18.	Which of the two have almost similar size
	(1) $_{22}$ Ii and $_{40}$ Zr
-	(3) $_{39}$ Y and $_{57}$ La (4) $_{20}$ Ca and $_{31}$ Ir
19.	$CO(NH_3)_5$ Br] SO_4 and $[CO(NH_3)_5$ SO_4] Br are example of which type somersim?
	1) Linkage (2) Geometrical
(3) Ionisation (4) Optical

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Questio No.	Questions
20.	The Crystal Field Stabilisation Energy (CFSE) will be highest for (1) $[COF_6]^{3-}$ (2) $[CO(CNS)_4]^{2-}$ (3) $[Mn(H_2O)_6]^{2+}$ (4) $[CO(NH_3)_6]^{3+}$
21.	Considering H_2O as a weak field ligand, the number of unpaired electron in $[Mn(H_2O)_6]^{2+}$ will be
	(1) three (2) five
* 1	(3) two (4) four
22.	The expected spin-only magnetic moments for [Fe(CN) ₆] ⁴⁻ and [FeF ₆] ³⁻ respectively are
	(1) 1.73 and 1.73 B.M.
	(2) 1.73 and 5.92 B.M.
	(3) 0.0 and 1.73 B.M.
	(4) 0.0 and 5.92 B.M.
23.	The lowest energy transition in Orgel diagram of octahedral Ni ^{II} complex i
G	(1) ${}^{3}A_{2}g \rightarrow {}^{3}T_{1}g(F)$ (2) ${}^{3}A_{2}g \rightarrow {}^{3}T_{1}g(P)$
	(3) ${}^{3}A_{2}g \rightarrow {}^{3}T_{2}g(F)$ (4) None of these
24.	General Electronic Configuration of lanthanides is
	(1) $(n-2) f^{1-14} (n-1) s^2 p^6 d^{0-1} ns^2$
	(2) $(n-2) f^{0-14} (n-1) d^{0-1} ns^2$
	(3) $(n-2) f^{0-14} (n-1) d^{10} ns^2$
	(4) $(n-2) d^{0-1} (n-1) f^{0-14} ns^1$

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Question No.	Questions
25.	The brown ring test for NO_3^- is due to the formation of the complex ion with formula (1) $[Fe(H_2O)_6]^{2+}$ (2) $Fe[NO(CN)_5]^{2-}$
il nosts	(3) $[Fe(H_2O)_5 NO]^{2+}$ (4) $[Fe(H_2O) (NO)_5]^{2+}$
26.	Nessler's reagent is used to detect (1) CrO_4^{2-} (2) PO_4^{3-}
4,70	(3) MnO_4^- (4) NH_4^+
27.	Actinides are (1) oxidising agents (2) weak reducing agents (3) strong reducing agents (4) none of these
28.	CH ₃ HgOH is classified as (1) Soft - Soft (2) Hard - Hard (3) Soft - Hard (4) Hard - Soft
29.	Heme is a Porphyrin complex of which metal ion? (1) Fe(II) (2) Fe(III) (3) Mg(II) (4) Zn(II)
30.	Which one of the following is the weakest Lewis base? (1) NH_2^- (2) CH_3^- (3) OH^- (4) F^-

Questic No.	Questions
31.	Which one of the following compounds will behave as ammono base ammonia? (1) NH ₄ OH (2) NaNH ₂ (3) (NH ₄) ₂ SO ₂ (4) (NH ₄) ₂ CO ₃
32.	Formula of Zeise's salt is (1) $[PtCl_3 (\eta^2-C_2H_4)^-]$ (2) $[PtCl_4]^{2-}$ and (1) (3) H_2PtCl_6 and the same of the sa
33.	Silicon is an important constituent of (1) Rocks (2) Minerals (3) Alloys (4) Vegetables
34.	In Schrodinger's equation, ∇^2 is, (1) Hermitian operator (2) Laplacian operator (3) Reciprocal of Δ (4) None of the above
	De broglie's concept of duality applies, (1) only to the electrons in an atom (2) only to a moving car (3) only to a ball in speed (4) all of above

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Questio No.	Questions
36.	Ka X Kb = 10 ⁻¹⁴ , relation is valid for conjugate acid-base pair at, (1) 25° C only (2) 90° C only (3) At every temperature as Kw is a constant for water (4) At 37°C only
37.	'The lattice energy of FeO is less than that of Fe ₂ O ₃ ' - This statement is, (1) True (2) False (3) Sometimes true (4) Unpredictable
38.	A catalyst is: (1) Specific to the reaction (2) Specific to temperature (3) Specific to the factory in which it is produced (4) Specific to the country in which it is produced
39.	Suppose, H ₂ S gas is introduced into an industrial chamber to decrease the efficiency of an unwanted catalyst, H ₂ S shall be termed as: (1) Catalytic inhibitor (2) Catalytic poison (3) Catalytic promotor (4) All correct
40.	"In Thermodynamically spontaneous processes, the entropy increases" This statement is:

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Question No.	Questions
41.	Which of the following is the law of helplessness of mankind:
	(1) 1st law of thermodynamics
	(2) 2nd law of thermodynamics
	(3) 3rd law of thermodynamics
	(4) all of these
42.	A catalyst and photosensitizer are:
	(1) Different substances
7	(2) Same substances
•	(3) Both true
	(4) Both false
43.	For an elementary reaction,
	(1) Order and molecularity are always the same
,	(2) Order and molecularity may or may not be the same
	(3) Order and molecularity are always different
	(4) All false
44.	With respect to the reactant taken in excess,
	(1) Order becomes zero but molecularity remains uninfluenced
	(2) Order and molecularity both become zero
	(3) Molecularity becomes zero but order remains uninfluenced
	(4) None of these

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Questic No.	Questions
45.	Mixture of ethyl alcohol and water is an example of:
40.	(1) Non-ideal solution with positive deviation
	(2) Non-ideal solution with negative deviation
	(3) Ideal solution
	(4) None of these
46.	Which is true:
	(1) Dilute solutions produce no heat on addition of more solvent
14	(2) Dilute solutions absorb no heat on addition of more solvent
, .	(3) Dilute solutions are ideal solutions
,	(4) All correct
	When a positive catalyst is added to a reversible reaction, it effect on rat of forward reaction (Rf) and backward reaction (Rb) is given by: (1) An increase in Rf and decrease in Rb (2) An increase in Rf and Rb both (3) An increase in Rb and decrease in Rf 4) A decrease in Ff and Rb both
	n the theory of absolute reaction rates, which of the following term epresents the complexity of reactants and the steric factor?
1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
(1	$\Delta S^{\#} \qquad (2) \Delta H^{\#}$

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Question No.	Questions
49.	Osmotic pressure is used for the determination of: (1) Weight average molecular weight (2) Number average molecular weight (3) Both (4) None
50.	Which is a necessary requirement for the salt used in salt bridge? (1) It should react with agar-agar gel (2) Transport numbers of its anion and cation should be nearly the same (3) Transport numbers of its anion and cation should be different (4) It should not be water soluble
51.	One of the methods used for determination of lowering of vapor pressure was given by: (1) Rast (2) Beckmann (3) Cottrell (4) Smith and Menzie
	Which of the following is successfully explained by First Law of Thermodynamics: (1) The direction of all spontaneous processes (2) The condition required for all spontaneous processes (3) The extent of all spontaneous processes (4) The growth of a child

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Question No.	Questions
53.	Which of the points of kinetic molecular theory of gases was found to be wrong especially at low temperature and high pressure?
	(1) Particles are point masses
	(2) Particles undergo elastic collisions
_	(3) Gravitational force is absent in gases
	(4) Particles undergo zigzag motion
54.	The temperature above which a gas cannot be liquified by applying and pressure, is called as:
	(1) Critical temperature
Marie a	(2) Inversion temperature
S 5	(3) Boyle's temperature
	(4) Absolute temperature
55.	Thermodynamic equilibrium is a mix of the following:
	(1) Thermal equilibrium and chemical equilibrium
e lee	(2) Mechanical equilibrium and thermal equilibrium
,	(3) Mechanical equilibrium and chemical equilibrium
	(4) All of these
56.	pH of 1M HCl is:
	(1) 0 (2) -0
	(3) 1 (4) None of these

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Question No.	Questions
57.	The Na ⁺ present in 1 M NaCl or 2 M CH ₃ COONa, or 5 M Na ₂ SO ₄ (all at infinite dilution), shows: (1) Same ionic conductance at constant temperature (2) Same ionic conductance at different temperatures (3) Different ionic conductances at constant temperature (4) None of these
58.	When a gas is passed from high pressure area into low pressure area through a minor aperture adiabatically, it warms up if the temperature before the start of the process was above:
1.0	 (1) Inversion temperature (2) Boyle's temperature (3) Critical temperature (4) All of these
59.	At high pressures, the compressibility factor of a real gas is:
l'un	(1) > 1 (2) < 1 (3) ≤ 1 (4) = 1
60.	Which of the following is true at thermodynamic equilibrium?
	$(1) \Delta G = 0 \qquad (2) \Delta G > 0$
	(3) $\Delta G^{\circ} = 0$ (4) $\Delta G^{\circ} < 0$
61.	On increasing the temperature, the rate of a reaction increases by :
	(1) 2 to 3 times
	(2) 2 times
	(3) 3 times
1	(4) Can not be predicted as the data are unavailable

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Question No.	Questions
62.	Common feature of Galvanic and electrolytic cells is: (1) Cathode is positive (2) Anode is negative (3) Both produce current (4) Oxidation takes place at anode
63.	Conductivity is: (1) Specific conductance (2) Molar conductance (3) Equivalent conductance (4) All of these
64.	The normality of 0.1 M solution of $K_2Cr_2O_7$ in acidic medium shall be: (1) 0.6 (2) 0.0166 (3) 0.5 (4) 0.1
65.	On doubling initial concentration of reactant, the half-life period doubles. The order of reaction is: (1) 1 (2) 2 (3) 0 (4) 3
66.	A substance is named as 'A'. At absolute zero temperature, the entropy of this substance is Y. What are X and Y? (1) X = Crystalline, Y = 0 (2) X = Perfectly Crystalline, Y = 0 (3) X = Perfectly Crystalline, Y > 0 (4) X = Crystalline, Y > 0

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Question No.	Questions	1
67.	Hyper conjugation is also known as:	70. 110
	(1) Baker - Nathan - effect	0
	(2) Mesomeric - effect	.3)
over-p-	(3) Inductive - effect	(33)
	(4) Resonance - effect	Page 182
68.	α -D- glucose and β -D- glucose are :	LW 137
	(1) Anomers	
	(2) Keto - aldopairs	
	(3) Epimer	-7 47
	(4) Stereoisomers	171
69.	In the given reaction,	
	N + Na NH ₂ N + Na NH ₂ N + Na NH ₃ , Heat	.67
	'X' is:	
	соон	1 17
	(1)	
.*	(3) (4) (4) pH	· · · · · · · · · · · · · · · · · · ·

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Question No.	Questions
70.	Which of the following is incorrect Statements?
	(1) Pyrrole and furan, each have 6 Pi electrons
	(2) Pyrrole and furan satisfied Huckel's rule
	(3) Both Pyrrole and furan have a planar, five membered ring structure
i	(4) Pyrrole is considered less aromatic than furan
71.	Which of the following carbohydrates does not have any chiral carbon atoms?
	(1) Glyceraldehyde (2) Erythrose
F (#)	(3) Dihydroxyacetone (4) Erythrulose
72.	The number of peaks observed in the 'HNMR of CHD_2 OD are :
7	(1) Triplet (2) Doublet
	(3) Pentet (4) Septet
73.	How many stereoisomers does have 2, 3– dichloropentane?
	(1) 2 (2) 3
	(3) 4 (4) 5
74.	Which of the following will have higher λ max?
	$(1) \qquad (2) \qquad (N)$
(3) ph (4) CN CN

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 Which of the following statements is correct? (1) All alcohols are much stronger acids than terminal alkynes (2) Most alkoxide ions are weaker bases than hydroxidation (3) Hydroxylation of epoxides gives 1, 2-cyclohexanediol (4) Ethane -1, 2- diol is obtained by the biomolecular reaction of carbonyl compounds.
Which of the following structures assigned S-configuration?
COCH ₃ CHO $HO \longrightarrow SH$ CH_3 CH_4 CH_3 CH_4 CH_3 CH_4 CH_3 CH_4 CH_4 CH_4 CH_4 CH_5 CH_5 CH_7
Ziegler-Natta Catalyst is used in polymerization of: (1) Epoxy resins (2) Polyurathanes (3) Polyamide

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Questic No.	Questions
78.	The correct IUPAC Name for thiol is:
	(1) Butane-1-ol (2) Butanol
	(3) Butyl mercaptan (4) Butanethiol
79.	Unfolding of protein can be termed as
	(1) Reduction (2) Oxidation
	(3) Denaturation (4) Renaturation
80.	Choose the correct statement about chromophore
	(1) A group that shifts the absorption to longer wavelength
	(2) A group that increases the intensity of absorption
	(3) A group that has no effect on absorption
	(4) A group that absorbs UV or visible light
81.	Which of the following is involved in E ₁ reaction mechanism?
V	(1) Carbene (2) Nitrene
	(3) Carbocation (4) Carbanion
82.	The equation $\log I_0/I = \epsilon.c.x$ is an expression of:
	(1) Beer's Law (2) Lambert's Law
	(3) Beer-Lambert's Law (4) Hess's Law

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Question No.	Questions
83.	When two esters having α -hydroxy atoms is treated with strong base, the product will be: $(1) \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$
84.	Which of the following carboxylic acid is more acidic? (1) p-nitrobenzoic acid (2) p-aminobenzoic acid (3) p-methoxybenzoic acid (4) p-fluorobenzoic acid
85.	Finger print region in IR spectroscopy consists: (1) 1660-1730 cm ⁻¹ (2) 600-1400 cm ⁻¹ (3) 100-400 cm ⁻¹ (4) 2800-3200 cm ⁻¹

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Question No.	Questions
86.	In the given reaction,
	$R \xrightarrow{\bigcup_{OH} \frac{i) Br_2, P}{ii) H_2O}} 'X'$
	'X' is:
. 1	(1) R COOH
	(2) $R \downarrow C_{\delta}H_{s}$
	(3) R COOH
	$(4) \qquad \begin{matrix} O \\ R \end{matrix} \qquad OH \\ Br \end{matrix}$
87.	In the IR spectrum, primary amines show two bands around the region
1	(1) 1670cm^{-1} (2) 2850cm^{-1}
	3) 3350 cm ⁻¹ (4) 2200 cm ⁻¹
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Question No.	Questions	
88.	Match the list-I and list-II and select the correct answer using codes give below:	n
	List-II List-II	
	(i) Grignard reagents (a) Ethylene oxide	
	(ii) C ₆ H ₅ Mg Br (b) 1-Ethoxy-2-propanol	
	(iii) Oxirane (c) C ₆ H ₅ CH ₂ CH CH ₃	
	(iv) Methyloxirane (d) very strong bases	
	(1) i-d, ii-c, iii-a, iv-b	
	(2) i-c, ii-b, iii-d, iv-a	
	(3) i-b, ii-a, iii-d, iv-c (4) i-a, ii-d, iii-b, iv-d	
89.	Halogenation of alkanes is an example of:	
	(1) Nucleophilic substitution	
1	(2) Electrophilic substitution	
	(3) Elimination	
	(4) Free radical substitution	
90.	Which of the following reagents is used to convert nitrobenzene into anilin	ıe?
	(1) DDQ (2) PPA	
	(3) PCl ₅ (4) SN/HCl	

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Question No.	Questions
91.	The product formed in the reaction of primary amine with nitrous acid is
	(1) Alcohol
	(2) Nitroalkene
	(3) Tert. amine
	(4) Alkyl nitrile
92.	Which of the following reactions is used for the synthesis of Azo dyes?
	(1) Perkin reaction
Å	(2) Azo coupling reaction
	(3) Diels-Alder reaction
	(4) Wittig reaction
93.	The oxidation of acetylene by $KMnO_4$ give: (1) Oxalic acid
- 1	(2) Propanoic acid
	(3) Ethyl alcohol
	(4) Formaldehyde
94.	Which of the following is least reactive towards a nucleophilic attack?
- 1	(1) Propanone
1.	
	(2) Di-isopropyl ketone
. (3) Di-tertbutyl ketone
17	4) Propanaldehyde

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Question No.	Questions
95.	The reaction of benzaldehyde with acetic anhydride in presence of sodium acetate and sodium hydroxide will give :
	(1) OH (2) $H_{,C}$ $O O$ $O O$
	(3) CH, (4) CH,
96.	An organic reaction where an enolizable carbonyl compound react with formaldehyde and a secondary amine to form β-aminocarbonyl compound is known as: (1) Cannizzaro reaction (2) Peckmann Condensation (3) Mannich reaction (4) Aldol Condensation
97.	In the following reaction, H CH, $\frac{i) O_3}{ii) H_2 O_2}$ 'X' $+ H, C$ OH 'X' is: (1) (2) OH (3) (4)

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Question No.	Questions
98.	What is the wavelength range for UV spectrum?
	(1) $400 \text{nm} - 800 \text{nm}$
	(2) $10 \text{ nm} - 400 \text{ nm}$
	(3) $800 \text{ nm} - 1 \text{ nm}$
	(4) 0.01 nm – 400 nm
99.	What type of signals does chloroethane (CH_3CH_2Cl) have in HNMR spectrum?
	(1) A triplet and a quartet
k Tajan Tajan	(2) A doublet and a triplet
	(3) A singlet and doublet
	(4) A doublet and quartet
100.	Which of the following alkylhalide has the highest reactivity towards SN reaction?
	(1) $CH_3 - I$ (2) $CH_3 - Br$
	(3) $CH_3 - Cl$ (4) $CH_3 - F$

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Code B		Sr. No. 10098
Time: 1¼ Hours	Total Questions: 100	Max. Marks: 100
Roll No.	(in figure)Date of Birth:	(in words)
Name:Father's Name:	Mother's Name:	
Date of Examination:		
0.1	(Signati	are of the Invigilator)
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Code-	manner (door
Questions	
The type of hybridisation of boron in diborane is	
(1) Sp-hybridisation	
(2) Sp ² -hybridisation	
(3) Sp ³ -hybridisation	
(4) Sp ³ d ² -hybridisation	
The silicates which contain extended anions are	
(1) Pyro silicates	
(2) Three dimensional silicates	
(3) Chains silicates	
(4) Cyclic silicates	
Orthophosphoric acid is	
(1) Monobasic (2) Dibasic	
(3) Tribasic (4) Tetrabasic	
Oleum is chemically known as	
$(4) H_2 S_2 O_8$	
	Questions The type of hybridisation of boron in diborane is (1) Sp-hybridisation (2) Sp ² -hybridisation (3) Sp ³ -hybridisation (4) Sp ³ d ² -hybridisation The silicates which contain extended anions are (1) Pyro silicates (2) Three dimensional silicates (3) Chains silicates (4) Cyclic silicates Orthophosphoric acid is (1) Monobasic (2) Dibasic (3) Tribasic (4) Tetrabasic

Contractions	Code-E
-	Questions
5.	The correct order of the increasing acidic strengths of HClO, HClO $_2$, HClO $_3$
	(1) $HClO > HClO_2 > HClO_3 > HClO$
	$(2) HClO_3 > HClO_4 > HClO_2 > HClO$
	(3) $HClO_4 > HClO_3 > HClO_2 > HClO$
	$(4) \text{HC}lO_2 > \text{HC}lO > \text{HC}lO_3 > \text{HC}lO_4$
6.	The shape of XeF_4 is
	(1) Square planar
	(2) Tetrahedral
	(3) Octahedral
	(4) Trigonal planar
7.	Which of the following atoms in the given oxidation state has partially
	filled d-orbitals
la .	(1) V(I) (2) Ti (IV)
	(3) Zn (II) (4) Cu (I)
8.	Which of the two have almost similar size
78	(1) $_{22}$ Ii and $_{40}$ Zr
	(3) $_{20}$ Y and $_{57}$ La (4) $_{20}$ Ca and $_{31}$ Ir

PG-EE-July-2025 (Chemistry) Code-B
(2)

0		
Question No. Questions		
9.	$[CO(NH_3)_5 Br] SO_4$ and $[CO(NH_3)_5 SO_4] Br$ are example of which type of isomersim?	
	(1) Linkage (2) Geometrical	
10x= <	(3) Ionisation (4) Optical	
10.	The Crystal Field Stabilisation Energy (CFSE) will be highest for	
•	(1) $[COF_6]^{3-}$ (2) $[CO(CNS)_4]^{2-}$	
	(3) $[Mn(H_2O)_6]^{2+}$ (4) $[CO(NH_3)_6]^{3+}$	
11.	The product formed in the reaction of primary amine with nitrous acid is: (1) Alcohol (2) Nitroalkene	
	(3) Tert. amine (4) Alkyl nitrile	
12.	Which of the following reactions is used for the synthesis of Azo dyes? (1) Perkin reaction (2) Azo coupling reaction (3) Diels-Alder reaction (4) Wittig reaction	
13.	The oxidation of acetylene by KMnO ₄ give: (1) Oxalic acid	
	(2) Propanoic acid	
	(3) Ethyl alcohol	
	(4) Formaldehyde	

PG-EE-July-2025 (Chemistry) Code-B

	Coue-D
Questic No.	Questions
14.	Which of the following is least reactive towards a nucleophilic attack?
	(1) Propanone (2) Di-isopropyl ketone
	(3) Di-tertbutyl ketone (4) Propanaldehyde
15.	The reaction of benzaldehyde with acetic anhydride in presence of sodium
	acetate and sodium hydroxide will give:
	(1) OH
	0 0
	$\begin{array}{c c} (2) & & \\ & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ &$
	(3) CH,
	СН,
1	(4) CH,
10	
1	An organic reaction where an enolizable carbonyl compound react with formaldehyde and a secondary amine to form β-aminocarbonyl compound
	is known as:
	(1) Cannizzaro reaction
((2) Peckmann Condensation
(3) Mannich reaction
	4) Aldol Condensation

N	Questions Questions
1	7. In the following reaction,
	$ \begin{array}{c c} H & i) O_3 \\ \hline CH_3 & ii) H_2O_2 \end{array} $ $ X' + H_3C $ OH
	'X' is:
	(1) (2) OH
	$(3) \qquad CH_{_{1}} \qquad (4) \qquad C_{_{1}}H_{_{1}} \qquad (4)$
18.	What is the wavelength range for UV spectrum?
	(1) $400 \text{ nm} - 800 \text{ nm}$ (2) $10 \text{ nm} - 400 \text{ nm}$
	(3) $800 \text{ nm} - 1 \text{ nm}$ (4) $0.01 \text{ nm} - 400 \text{ nm}$
19.	What type of signals does chloroethane (CH_3CH_2Cl) have in HNM spectrum?
	(1) A triplet and a quartet (2) A doublet and a triplet
	(3) A singlet and doublet (4) A doublet and quartet
20.	Which of the following alkylhalide has the highest reactivity towards Si reaction?
	(1) $CH_3 - I$ (2) $CH_3 - Br$ (3) $CH_3 - Cl$ (4) $CH_3 - F$

Question No.	Questions
21.	Which of the following carbohydrates does not have any chiral carbon atoms? (1) Glyceraldehyde (2) Erythrose (3) Dihydroxyacetone (4) Erythrulose
22.	The number of peaks observed in the 'HNMR of CHD ₂ OD are: (1) Triplet (2) Doublet (3) Pentet (4) Septet
23.	How many stereoisomers does have 2, 3- dichloropentane? (1) 2 (2) 3 (3) 4 (4) 5
- 4	Which of the following will have higher λ max? $ \begin{array}{c} \text{mn } 001 - \text{mn } 01 \\ \text{CN} \end{array} $ (2) $ \begin{array}{c} \text{CN} \\ \text{CN} \end{array} $
I NMI	19. What typ NO does chloroethane NO (E) have in (B) (C) have in (B) (A) (B) (B) (B) (B) (B) (B) (B) (B) (B) (B
(1	(2) CH - Br 1 - 1

0-51		de-B
Question No.	Questions	w
26.	Which of the following structures assigned S-configuration?	.08
	dignelayor regnol of noisqueda edicitids and curve A (1) COCH, CHO coloqueda to guaranti edicasa funi indi querg A (2) HO SH H NH,	
	(1) HO SH CH, SH	
rueasur	rogev to g CH=CH, to neiteniment to be see should us and to on U	
	(3) HO Cl amenabell ((4) H ₅ C ₂ H OH CH ₂ CH ₃ A bas diags (b)	
27.	Ziegler-Natta Catalyst is used in polymerization of:	32.
1. 4	(1) Epoxy resins (2) Polyurathanes	
	(3) Polyamide a sucens and (4) Alpha-Olifins Polymers	
28.	The correct IUPAC Name for thiol is:	
	(1) Butane-1-ol (2) Butanol	
d of be	(3) Butyl mercaptan in bus out (4) Butanethiol	W
29.	Unfolding of protein can be termed as	
	(1) Reduction (2) Oxidation	
	(3) Denaturation (4) Renaturation	

Ques No	stion o. Questions
3(Choose the correct statement about chromophore (1) A group that shifts the absorption to longer wavelength (2) A group that increases the intensity of absorption
	(3) A group that has no effect on absorption (4) A group that absorbs UV or visible light
31.	was given by:
	(1) Rast (2) Beckmann (3) Cottrell (4) Smith and Menzie
32.	Which of the following is successfully explained by First Law of Thermodynamics: (1) The direction of all spontaneous processes (2) The condition required for all spontaneous processes (3) The extent of all spontaneous processes (4) The growth of a child
	Which of the points of kinetic molecular theory of gases was found to be wrong especially at low temperature and high pressure? (1) Particles are point masses (2) Particles undergo elastic collisions (3) Gravitational force is absent in gases (4) Particles undergo zigzag motion

Question No.	Questions
34.	The temperature above which a gas cannot be liquified by applying and pressure, is called as:
	(1) Critical temperature (2) Inversion temperature
<u>.</u> #	(3) Boyle's temperature (4) Absolute temperature
35.	Thermodynamic equilibrium is a mix of the following:
	(1) Thermal equilibrium and chemical equilibrium
0.2	(2) Mechanical equilibrium and thermal equilibrium
* 10.	(3) Mechanical equilibrium and chemical equilibrium
	(4) All of these
36.	pH of 1M HC l is:
	(1) 0 (2) -0
: 974	(3) None of these
37.	The Na ⁺ present in 1 M NaCl or 2 M CH ₃ COONa, or 5 M Na ₂ SO ₄ (all at infinite dilution), shows:
and the second	(1) Same ionic conductance at constant temperature
,	(2) Same ionic conductance at different temperatures
	(3) Different ionic conductances at constant temperature
	(4) None of these

PG-EE-July-2025 (Chemistry) Code-B

Questio No.	n Questions
38.	When a gas is passed from high pressure area into low pressure area through a minor aperture adiabatically, it warms up if the temperature before the start of the process was above:
	(1) Inversion temperature (2) Boyle's temperature
	(3) Critical temperature (4) All of these
39.	At high pressures, the compressibility factor of a real gas is:
	$(1) > 1 \qquad (2) < 1$
	$(3) \leq 1 \qquad (4) = 1$
40.	Which of the following is true at thermodynamic equilibrium?
	$(1) \Delta G = 0 \qquad (2) \Delta G > 0$
	(3) $\Delta G^{\circ} = 0$ (4) $\Delta G^{\circ} < 0$
41.	Which one of the following compounds will behave as ammono base in ammonia?
e të ji	(1) NH ₄ OH (2) NaNH ₂
*	(3) $(NH_4)_2 SO_2$ (4) $(NH_4)_2 CO_3$
42.	Formula of Zeise's salt is
	(1) $[PtCl_3 (\eta^2-C_2H_4)^-]$ (2) $[PtCl_4]^{2-}$
	(3) $H_2 PtCl_6$ (4) $[ZnCl_4]^{2-}$

PG-EE-July-2025 (Chemistry) Code-B (10)

	Code-L
Questio No.	Questions Questions
43.	Silicon is an important constituent of
	(1) Rocks (2) Minerals
	(3) Alloys (4) Vegetables
44.	In Schrodinger's equation, ∇^2 is,
	(1) Hermitian operator (2) Laplacian operator
ter in	(3) Reciprocal of Δ (4) None of the above
45.	De broglie's concept of duality applies,
	(1) only to the electrons in an atom
. ,	(2) only to a moving car
	(3) only to a ball in speed
-	(4) all of above
46.	Ka X Kb = 10^{-14} , relation is valid for conjugate acid-base pair at,
de uniti.	(1) 25° C only
· · · · · · · · · · · · · · · · · · ·	(2) 90° C only
-	(3) At every temperature as Kw is a constant for water
	(4) At 37°C only
	Circ 35 Int Ward and a company to the con-
47.	'The lattice energy of FeO is less than that of $\mathrm{Fe_2O_3}$ ' - This statement is,
_	(1) True (2) False
	(3) Sometimes true (4) Unpredictable

-X B

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Ougati	Code-B
Questi No.	Questions
48.	A catalyst is:
	(1) Specific to the reaction
Commence and the last	(2) Specific to temperature
	(3) Specific to the factory in which it is produced
	(4) Specific to the country in which it is produced
49.	Suppose, H_2S gas is introduced into an industrial chamber to decrease the efficiency of an unwanted catalyst, H_2S shall be termed as:
	(1) Catalytic inhibitor (2) Catalytic poison
54	(3) Catalytic promotor (4) All correct
50.	"In Thermodynamically spontaneous processes, the entropy increases" - This statement is:
23.	(1) Always true (2) Always false
	(3) Sometimes true (4) All wrong
51.	Considering H_2O as a weak field ligand, the number of unpaired electron in $[Mn(H_2O)_6]^{2+}$ will be
	(1) three (2) five
Şiş.	(3) two (4) four
- HT 12	The expected spin-only magnetic moments for $[Fe(CN)_6]^{4-}$ and $[FeF_6]^{3-}$ respectively are
	(1) 1.73 and 1.73 B.M. (2) 1.73 and 5.92 B.M.
(3) 0.0 and 1.73 B.M. (4) 0.0 and 5.92 B.M.
	1 000F (Classisters) Codo D

Questions
The lowest energy transition in Orgel diagram of octahedral Ni ²¹ complex is
(1) ${}^{3}A_{2}g \rightarrow {}^{9}\Gamma_{1}g(F)$ (2) ${}^{3}A_{2}g \rightarrow {}^{9}\Gamma_{1}g(P)$
(3) ${}^{3}A_{2}g \rightarrow {}^{9}\Gamma_{2}g(F)$ (4) None of these
General Electronic Configuration of lanthanides is
(1) $(n-2) f^{1-14} (n-1) g^2 p^6 d^{6-1} ng^2$
(2) $(n-2) f^{0-14} (n-1) d^{0-1} ns^2$
(3) $(n-2) f^{0-14} (n-1) d^{10} ns^2$
(4) $(n-2) d^{0-1} (n-1) f^{0-14} ns^1$
The brown ring test for NO ₃ is due to the formation of the complex io with formula
(1) $[Fe(H_2O)_6]^{2+}$
(2) Fe[NO(CN) ₅] ²
(3) [Fe(H ₂ O) ₅ NO] ²⁺
(4) [Fe(H ₂ O) (NO) ₅] ²⁺
Nessler's reagent is used to detect
(1) CrO_4^{2-} (2) PO_4^{2-}
(3) MnO_4^- (4) NH_4^+
Actinides are
(1) oxidising agents (2) weak reducing agents
(3) strong reducing agents (4) none of these

Question No.	Questions	C
58.	CH ₃ HgOH is classified as (1) Soft - Soft (2) Hard - Hard (3) Soft - Hard (4) Hard - Soft	
59.	Heme is a Porphyrin complex of which metal ion? (1) Fe(II) (2) Fe(III) (3) Mg(II) (4) Zn(II)	
60.	Which one of the following is the weakest Lewis base? (1) NH_2^- (2) CH_3^- (3) OH^- (4) F^-	-
61.	Which of the following is the law of helplessness of mankind: (1) 1st law of thermodynamics (2) 2nd law of thermodynamics (3) 3rd law of thermodynamics (4) all of these	•
62.	A catalyst and photosensitizer are: (1) Different substances (2) Same substances (3) Both true (4) Both false	

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	-	3	
	_		1

Questi No.	on Questions
63.	For an elementary reaction, (1) Order and molecularity are always the same (2) Order and molecularity may or may not be the same (3) Order and molecularity are always different (4) All false
65.	With respect to the reactant taken in excess, (1) Order becomes zero but molecularity remains uninfluenced (2) Order and molecularity both become zero (3) Molecularity becomes zero but order remains uninfluenced (4) None of these Mixture of ethyl alcohol and water is an example of: (1) Non-ideal solution with positive deviation (2) Non-ideal solution with negative deviation (3) Ideal solution (4) None of these
66.	Which is true: (1) Dilute solutions produce no heat on addition of more solvent (2) Dilute solutions absorb no heat on addition of more solvent (3) Dilute solutions are ideal solutions (4) All correct

Questi No.	Questions
67.	When a positive catalyst is added to a reversible reaction, it effect on rate of forward reaction (Rf) and backward reaction (Rb) is given by:
	(1) An increase in Rf and decrease in Rb
·	(2) An increase in Rf and Rb both
	(3) An increase in Rb and decrease in Rf
	(4) A decrease in Ff and Rb both
68.	In the theory of absolute reaction rates, which of the following term represents the complexity of reactants and the steric factor?
	(1) $\Delta S^{\#}$ (2) $\Delta H^{\#}$
	(3) $\Delta G^{\#}$ (4) $\Delta A^{\#}$
69.	Osmotic pressure is used for the determination of:
	(1) Weight average molecular weight
× ,*	(2) Number average molecular weight
	(3) Both
· .	(4) None
70.	Which is a necessary requirement for the salt used in salt bridge?
	(1) It should react with agar-agar gel
	(2) Transport numbers of its anion and cation should be nearly the sa
	(3) Transport numbers of its anion and cation should be different
	(4) It should not be water soluble

Question No.	Questions			
71.	On increasing the temperature, the rate of a reaction increases by:			
	(1) 2 to 3 times			
	(2) 2 times			
	(3) 3 times			
į.	(4) Can not be predicted as the data are unavailable			
72.	Common feature of Galvanic and electrolytic cells is:			
1	(1) Cathode is positive			
	(2) Anode is negative			
II a a	(3) Both produce current			
	(4) Oxidation takes place at anode			
73.	Conductivity is:			
	(1) Specific conductance (2) Molar conductance			
	(3) Equivalent conductance (4) All of these			
74.	The normality of 0.1 M solution of $K_2Cr_2O_7$ in acidic medium shall be:			
	(1) 0.6 (2) 0.0166			
	(3) 0.5 (4) 0.1			
75.	On doubling initial concentration of reactant, the half-life period doubles.			
	The order of reaction is:			
	(1) 1 (2) 2			
	(3) 0 (4) 3			
DC EI	E-July-2025 (Chemistry) Code-B			

	Questi No.	
	76.	townsersture, the entropy of
		(1) $X = Crystalline, Y = 0$
		(2) $X = Perfectly Crystalline, Y = 0$
		(3) $X = \text{Perfectly Crystalline}, Y > 0$
		(4) $X = Crystalline, Y > 0$
	77.	Hyper conjugation is also known as :
		(1) Baker - Nathan - effect (2) Mesomeric - effect
		(3) Inductive - effect (4) Resonance - effect
	78.	α-D- glucose and β-D- glucose are :
•		(1) Anomers (2) Keto - aldopairs
		(3) Epimer (4) Stereoisomers
	79.	In the given reaction,
	y 13 - 3 - 4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	
		'X' is:
		СООН
	Taken of	$(1) \qquad (2) \qquad (N) \qquad NH_2$
		3) $\bigcirc \bigcirc \bigcirc$

Question No.	Questions Code-B
80.	Which of the following is incorrect Statements?
	, and the same same of the electrons
	(2) Pyrrole and furan satisfied Huckel's rule
	(3) Both Pyrrole and furan have a planar, five membered ring structure
l	(4) Pyrrole is considered less aromatic than furan
81.	The electrons present in K-shell of the atom will differ in
	(1) Principal quantum number
2.	(2) Azimuthal quantum number
	3) Magnetic quantum number
(4) Spin quantum number
82. V	Vave nature of electron was demonstrated by
1	1) Schrodinger (2) de-Broglie
	N D
- (3) Davisson (4) Heisenberg
83. W	Thich of the following does not have any unit?
(1	
(2	
(3	
. (4)	
(4)	Atomic radii

Questio No.	Questions
84.	The orbital diagram in which Aufbau principle is violated is
	(3) [1] [1 1 1
	(4) [] [] [] [] [] [] [] [] [] [] [] [] []
85.	According of VSEPR theory, the molecular geometry of the water molecule is
	(1) octahedral (2) distorted tetrahedral
-	(3) planar triangle (4) linear
86.	NaCl crystal belongs to the crystal system
	(1) hexagonal (2) cubic
	(3) tetragonal (4) orthorhombic
87.	H-bonding is not present in
	(1) Glycerine (2) Water
	(3) Hydrogen Sulphide (4) Hydrogen Fluoride

Questions	
According to Fazan's rule, covalent bond is favoured by	
(1) Large cation and small anion	
(2) Large cation and large anion	
(3) Small cation and small anion	
(4) Small cation and large anion	
Lithium shows diagonal relationship with	
(1) Magnesium (2) Beryllium	
(3) Aluminium (4) Boron	
Which of the following metal is present in chlorophyll?	
(1) Chromium (2) Cobalt	
(3) Magnesium (4) Iron	
Which of the following is involved in E ₁ reaction mechanism?	
(1) Carbene (2) Nitrene	
(3) Carbocation (4) Carbanion	
The equation $\log I_0/I = \epsilon.c.x$ is an expression of:	
(1) Beer's Law (2) Lambert's Law	
(3) Beer-Lambert's Law (4) Hess's Law	

	Question No.		Questions		
	93	3.	When two esters having α -hydroxy atoms is treated with strong hasa, the product will be: (1) \bigcirc		
	94.	(2) (3) (4)	Which of the following carboxylic acid is more acidic? 1) p-nitrobenzoic acid 2) p-aminobenzoic acid 3) p-methoxybenzoic acid		
•		Fir (1) (2) (3) (4)	nger print region in IR spectroscopy consists: 1660-1730 cm ⁻¹ 600-1400 cm ⁻¹ 100-400 cm ⁻¹ 2800-3200 cm ⁻¹		

Question No.	Questions
96.	In the given reaction,
	$R \xrightarrow{\begin{array}{c} O \\ \end{array}} \begin{array}{c} \begin{array}{c} i) Br_2, P \\ \hline ii) H_2O \end{array} \begin{array}{c} X' \end{array}$
	'X' is:
	(1) $R \downarrow 0$ COOH
	(2) $R \downarrow C_6H_5$ Br
	(3) R COOH
	$(4) \qquad \begin{matrix} O \\ R \end{matrix} \qquad \begin{matrix} O \\ \\ Br \end{matrix}$
97.	In the IR spectrum, primary amines show two bands around the region:
	(1) 1670cm^{-1} (2) 2850cm^{-1} (3) 3350cm^{-1} (4) 2200cm^{-1}

uestion No.	Quan	long	
08.	Match the list-I and list-II and se below:	lect the correct answer using codes given	
	List-I	List-II	
	(i) Grignard reagents (n) Ethylene oxide	
	(ii) C ₀ H ₆ Mg Br	b) 1-Ethoxy-2-propanol	
	(iii) Oxirane	e) C ₆ H ₆ CH ₂ CH CH ₃	
-	(iv) Methyl oxirane	d) very strong bases	
li	(1) i-d, ii-c, iii-a, iv-b		
	(2) i-c, ii-b, iii-d, iv-a		
	(3) i-b, ii-a, iii-d, iv-c		
	(4) i-a, ii-d, iii-b, iv-d		
99.	Halogenation of alkanes is an example of :		
, ea	(1) Nucleophilic substitution		
· 18	(2) Electrophilic substitution		
	(3) Elimination		
	(4) Free radical substitution		
100.	Which of the following reagents i	s used to convert nitrobenzene into anilin	
	(4) 7770	(2) PPA	
	(3) PCl ₈	(4) SN/HC <i>l</i>	

SET-"X" (Total No. of printed pages : 25)

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PG-EE-July, 2025 (Chemistry)

Code	C
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Sr. No 10099

Time : 1¼ Hours	Total Questions: 100		Max. Marks: 100	
Roll No	(in figure)		(in words)	
Name :		Date of Birth:		
Father's Name :		Mother's Name:		
Date of Examination :			٠	

(Signature of the candidate)

(Signature of the Invigilator)

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1. All questions are compulsory.

2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.

3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by

the candidate.

4. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.

5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers

MUST NOT be ticked in the Question book-let.

6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.

7. Use only Black or Blue **BALL POINT PEN** of good quality in the OMR Answer-

Sheet

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Quantions
Million (Million Co. 1) of Million (Million Co. 1)
Which of the following is the law of helplessness of mankind:
(1) 1st law of thermodynamics
(2) 2nd law of thermodynamics
(3) 3rd law of thermodynamics
(4) all of these
A catalyst and photosensitizer are
(1) Different substances
(2) Same substances
(3) Both true
(4) Both false
For an elementary reaction,
(1) Order and molecularity are always the same
(2) Order and molecularity may or may not be the same
(3) Order and molecularity are always different
(4) All false
With respect to the reactant taken in excess,
1) Order becomes zero but molecularity remains uninfluenced
2) Order and molecularity both become zero
3) Molecularity becomes zero but order remains uninfluenced
4) None of these

Question No.	Questions		
5.	Mixture of ethyl alcohol and water is an example of :		
	(1) Non-ideal solution with positive deviation		
	(2) Non-ideal solution with negative deviation		
	(3) Ideal solution		
	(4) None of these		
6.	Which is true:		
	(1) Dilute solutions produce no heat on addition of more solvent		
	(2) Dilute solutions absorb no heat on addition of more solvent		
	(3) Dilute solutions are ideal solutions		
	(4) All correct		
7.	When a positive catalyst is added to a reversible reaction, it effect on rate		
	of forward reaction (Rf) and backward reaction (Rb) is given by:		
	(1) An increase in Rf and decrease in Rb		
	(2) An increase in Rf and Rb both		
	(3) An increase in Rb and decrease in Rf		
	(4) A decrease in Ff and Rb both		
8.	In the theory of absolute reaction rates, which of the following terms		
	represents the complexity of reactants and the steric factor?		
	(1) $\Delta S^{\#}$ (2) $\Delta H^{\#}$		
	(3) $\Delta G''$ (4) $\Delta A''$		

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[a	Joue C			
Question No.	Questions			
9.	Osmotic pressure is used for the determination of:			
	(1) Weight average molecular weight			
	(2) Number average molecular weight			
	(3) Both			
	(4) None			
10.	Which is a necessary requirement for the salt used in salt bridge?			
	(1) It should react with agar-agar gel			
	(2) Transport numbers of its anion and cation should be nearly the same			
	(3) Transport numbers of its anion and cation should be different			
	(4) It should not be water soluble			
11.	Considering H_2O as a weak field ligand, the number of unpaired electron in			
	$[Mn(H_2O)_6]^{2+}$ will be			
	(1) three (2) five			
	(3) two (4) four			
12.	The expected spin-only magnetic moments for [Fe(CN) ₆] ⁴⁻ and [FeF ₆] ³⁻			
	respectively are			
	(1) 1.73 and 1.73 B.M.			
	(2) 1.73 and 5.92 B.M.			
	(3) 0.0 and 1.73 B.M.			
	(4) 0.0 and 5.92 B.M.			

Question No.	Questions		
13.	The lowest energy transition in Orgel diagram of octahedral Ni ^{II} complex is		
	(1) ${}^{3}A_{2}g \rightarrow {}^{3}T_{1}g(F)$ (2) ${}^{3}A_{2}g \rightarrow {}^{3}T_{1}g(P)$		
	(3) ${}^{3}A_{2}g \rightarrow {}^{3}T_{2}g(F)$ (4) None of these		
14.	General Electronic Configuration of lanthanides is		
	$(1) (n{-}2) \ f^{1{-}14} \ (n{-}1) \ s^2 p^6 d^{0{-}1} n s^2$		
	(2) $(n-2) f^{0-14} (n-1) d^{0-1} ns^2$		
	(3) $(n-2) f^{0-14} (n-1) d^{10} ns^2$		
	(4) $(n-2) d^{0-1} (n-1) f^{0-14} ns^1$		
15.	The brown ring test for NO_3^- is due to the formation of the complex is with formula		
	(1) $[Fe(H_2O)_6]^{2+}$		
	(2) Fe[NO(CN) ₅] ²⁻		
	(3) $[Fe(H_2O)_5 NO]^{2+}$		
	(4) $[\text{Fe}(\text{H}_2\text{O}) (\text{NO})_5]^{2+}$		
16.	3. Nessler's reagent is used to detect		
	(1) $\operatorname{CrO}_{4}^{2-}$ (2) $\operatorname{PO}_{4}^{3-}$		
	(3) MnO_4^- (4) NH_4^+		
17.	Actinides are		
	(1) oxidising agents (2) weak reducing agents		
	(3) strong reducing agents (4) none of these		

SET-X Code-C

		Cou c- C
Questions		
$\mathrm{CH_3}$ HgOH is class	sified as	
(1) Soft - Soft	(2)	Hard - Hard
(3) Soft - Hard	(4)	Hard - Soft
Heme is a Porphy	nich metal ion?	
(1) Fe(II)	(2)	Fe(III)
(3) Mg(II)	(4)	Zn(II)
Which one of the	following is the w	eakest Lewis base?
(1) NH ₂	(2)	CH_3^-
(3) OH	(4)	\mathbf{F}^-
21. The electrons present in K-shell of the atom will differ in (1) Principal quantum number		
(3) Magnetic quantum number		
(4) Spin quantu	m number	
22. Wave nature of electron was demonstrated by		
(1) Schrodinger	(2)	de-Broglie
(3) Davisson	(4)	Heisenberg
23. Which of the following does not have any unit?		
(1) Electronega	tivity (2)	Electron affinity
		Atomic radii
	(1) Soft - Soft (3) Soft - Hard Heme is a Porphy (1) Fe(II) (3) Mg(II) Which one of the (1) NH ₂ (3) OH The electrons pre (1) Principal quantum (2) Azimuthal quantum (3) Magnetic quantum (4) Spin quantum Wave nature of example (1) Schrodinger (3) Davisson Which of the following and the context of the context	CH ₃ HgOH is classified as (1) Soft - Soft (2) (3) Soft - Hard (4) Heme is a Porphyrin complex of what (1) Fe(II) (2) (3) Mg(II) (4) Which one of the following is the was (1) NH ₂ (2) (3) OH (4) The electrons present in K-shell of (1) Principal quantum number (2) Azimuthal quantum number (3) Magnetic quantum number (4) Spin quantum number Wave nature of electron was demonstrated (2) (3) Davisson (4) Which of the following does not had (1) Electronegativity (2)

Question No.	Questions		
24.	The orbital diagram in which Aufbau principle is violated is		
	$\begin{array}{c c} \hline \\ \hline $		
	$(2) \qquad \uparrow \qquad \uparrow \qquad \uparrow$		
	(3)		
	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		
25.	According of VSEPR theory, the molecular geometry of the water molecule is		
	(1) octahedral (2) distorted tetrahedral		
	(3) planar triangle (4) linear		
26.	NaC l crystal belongs to the crystal system		
	(1) hexagonal (2) cubic		
	(3) tetragonal (4) orthorhombic		
27.	H-bonding is not present in		
	(1) Glycerine (2) Water		
	(3) Hydrogen Sulphide (4) Hydrogen Fluoride		
	L.L. 9095 (Chomistry) Codo C		

Question	Code-C		
No.	Questions		
28.	According to Fazan's rule, covalent bond is favoured by		
	(1) Large cation and small anion		
	(2) Large cation and large anion		
	(3) Small cation and small anion		
	(4) Small cation and large anion		
29.	Lithium shows diagonal relationship with		
	(1) Magnesium (2) Beryllium		
	(3) Aluminium (4) Boron		
30.	Which of the following metal is present in chlorophyll?		
	(1) Chromium (2) Cobalt		
	(3) Magnesium (4) Iron		
31.	The product formed in the reaction of primary amine with nitrous acid is		
	(1) Alcohol (2) Nitroalkene		
	(3) Tert. amine (4) Alkyl nitrile		
32.	Which of the following reactions is used for the synthesis of Azo dyes?		
	(1) Perkin reaction		
	(2) Azo coupling reaction		
	(3) Diels-Alder reaction		
	(4) Wittig reaction		

Questio No.	Questions				
33.	The oxidation of acetylene by KMnO ₄ give :				
	(1) Oxalic acid (2) Propanoic acid				
	(3) Ethyl alcohol (4) Formaldehyde				
34.	Which of the following is least reactive towards a nucleophilic attack?				
	(1) Propanone				
	(2) Di-isopropyl ketone				
	(3) Di-tertbutyl ketone				
	(4) Propanaldehyde				
35.	The reaction of benzaldehyde with acetic anhydride in presence of sodium				
	acetate and sodium hydroxide will give :				
	$(1) \qquad O \qquad $				
	(3) CH, CH,				
36.	An organic reaction where an enolizable carbonyl compound react with				
	formaldehyde and a secondary amine to form β -aminocarbonyl compound				
	is known as:				
	(1) Cannizzaro reaction (2) Peckmann Condensation				
	(3) Mannich reaction (4) Aldol Condensation				

	Code-C
Question No.	Questions
37.	In the following reaction,
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	'X' is:
	(1) OH OH
	(3) CH ₁ (4) C ₂ H ₁
38.	What is the wavelength range for UV spectrum?
	(1) 400 nm – 800 nm
	(2) 10 nm – 400 nm
	(3) $800 \text{ nm} - 1 \text{ nm}$
	(4) 0.01 nm – 400 nm
39.	What type of signals does chloroethane (CH_3CH_2Cl) have in HNMR spectrum?
	(1) A triplet and a quartet
	(2) A doublet and a triplet
	(3) A singlet and doublet
,	(4) A doublet and quartet

Question No.	Questions					
40.	Which of the following alkylhalide has the highest reactivity towards Sl					
	reaction?					
	(1) $CH_3 - I$ (2) $CH_3 - Br$					
	(3) $CH_3 - Cl$ (4) $CH_3 - F$					
41.	On increasing the temperature, the rate of a reaction increases by:					
	(1) 2 to 3 times					
	(2) 2 times					
	(3) 3 times					
	(4) Can not be predicted as the data are unavailable					
42.	Common feature of Galvanic and electrolytic cells is:					
	(1) Cathode is positive					
	(2) Anode is negative					
	(3) Both produce current					
	(4) Oxidation takes place at anode					
43.	Conductivity is:					
	(1) Specific conductance (2) Molar conductance					
	(3) Equivalent conductance (4) All of these					
44.	The normality of 0.1 M solution of $K_2Cr_2O_7$ in acidic medium shall be:					
	(1) 0.6 (2) 0.0166					
	(3) 0.5 (4) 0.1					

Question	Code-C				
No.	Questions				
45.	On doubling initial concentration of reactant, the half-life period doubles. The order of reaction is:				
	(1) 1 (2) 2				
	(3) 0 (4) 3				
46.	A substance is named as 'A'. At absolute zero temperature, the entropy of this substance is Y. What are X and Y?				
	(1) X = Crystalline, Y = 0				
	(2) X = Perfectly Crystalline, Y = 0				
	(3) X = Perfectly Crystalline, Y > 0				
	(4) $X = Crystalline, Y > 0$				
47.	Hyper conjugation is also known as:				
	(1) Baker - Nathan - effect				
	(2) Mesomeric - effect				
	(3) Inductive - effect				
	(4) Resonance - effect				
48.	α -D- glucose and β -D- glucose are :				
	(1) Anomers				
	(2) Keto - aldopairs				
	(3) Epimer				
	(4) Stereoisomers				

Question	n Questions					
No.	Questions					
49.	In the given reaction,					
	+ Na NH ₂ NH ₃ , Heat 'X'					
	'X' is:					
	СООН					
	$(1) \qquad \qquad (2) \qquad \qquad NH_2$					
	(3) (4) (4) pH					
50.	Which of the following is incorrect Statements?					
	(1) Pyrrole and furan, each have 6 Pi electrons					
	(2) Pyrrole and furan satisfied Huckel's rule					
	(3) Both Pyrrole and furan have a planar, five membered ring structure					
	(4) Pyrrole is considered less aromatic than furan					
51.	Which one of the following compounds will behave as ammono base in					
	ammonia?					
	(1) NH ₄ OH (2) NaNH ₂					
	(3) $(NH_4)_2 SO_2$ (4) $(NH_4)_2 CO_3$					
52.	Formula of Zeise's salt is					
	(1) $[PtCl_3 (\eta^2 - C_2H_4)^-]$ (2) $[PtCl_4]^{2-}$					
	(3) H_2PtCl_6 (4) $[ZnCl_4]^{2-}$					

Question	Coue-C				
No.	Questions				
53.	Silicon is an important constituent of				
	(1) Rocks (2) Minerals				
	(3) Alloys (4) Vegetables				
54.	In Schrodinger's equation, ∇^2 is,				
	(1) Hermitian operator (2) Laplacian operator				
	(3) Reciprocal of Δ (4) None of the above				
55.	De broglie's concept of duality applies,				
	(1) only to the electrons in an atom				
	(2) only to a moving car				
	(3) only to a ball in speed				
	(4) all of above				
56.	Ka X Kb = 10^{-14} , relation is valid for conjugate acid-base pair at,				
	(1) 25° C only				
	(2) 90° C only				
	(3) At every temperature as Kw is a constant for water				
	(4) At 37°C only				
57.	'The lattice energy of FeO is less than that of Fe ₂ O ₃ ' - This statement is,				
	(1) True (2) False				
	(3) Sometimes true (4) Unpredictable				

Questic No.	Questions					
58.	A catalyst is:					
	(1) Specific to the reaction					
	(2) Specific to temperature					
	(3) Specific to the factory in which it is produced					
	(4) Specific to the country in which it is produced					
59.	Suppose, H_2S gas is introduced into an industrial chamber to decrease the efficiency of an unwanted catalyst, H_2S shall be termed as:					
	(1) Catalytic inhibitor (2) Catalytic poison					
	(3) Catalytic promotor (4) All correct					
60.	"In Thermodynamically spontaneous processes, the entropy increases" - This statement is:					
	(1) Always true (2) Always false					
	(3) Sometimes true (4) All wrong					
61.	Which of the following carbohydrates does not have any chiral carbon atoms?					
	(1) Glyceraldehyde (2) Erythrose					
	(3) Dihydroxyacetone (4) Erythrulose					
62.	The number of peaks observed in the 'HNMR of CHD, OD are:					
	(1) Triplet (2) Doublet					
	(3) Pentet (4) Septet					
	1 2007 (61					

Question No.	Questions			
63.	How many stereoisomers does have 2, 3- dichloropentane?			
	(1)	2 (2) 3		
	(3)	4 (4) 5		
64.	Which of the following will have higher λ max?			
	(1)	CN		
	(2)	CN		
	(3)	ph CN		
	(4)	CN		
65.	Which of the following statements is correct?			
	(1)	All alcohols are much stronger acids than terminal alkynes		
	(2)	Most alkoxide ions are weaker bases than hydroxidation		
	(3)	Hydroxylation of epoxides gives 1, 2-cyclohexanediol		
	(4)	Ethane -1 , $2-$ diol is obtained by the biomolecular reaction of carbonyl compounds.		

Question No.	Questions					
66.	Which of the following structures assigned S-configuration?					
	СОСН, СНО					
	(1) HO ———————————————————————————————————					
	(3) $HO \longrightarrow Cl$ (4) $H_5C_2 \longrightarrow H$ OH					
67.	Ziegler-Natta Catalyst is used in polymerization of:					
	(1) Epoxy resins					
	(2) Polyurathanes					
	(3) Polyamide					
2	(4) Alpha-Olifins Polymers					
68.	The correct IUPAC Name for thiol is:					
	(1) Butane-1-ol (2) Butanol					
	(3) Butyl mercaptan (4) Butanethiol					
69.	Unfolding of protein can be termed as					
	(1) Reduction (2) Oxidation					
	(3) Denaturation (4) Renaturation					
DC FF	July-2025 (Chemistry) Code-C					

2 11	Ouc-C					
Question No.	Questions					
70.	Choose the correct statement about chromophore					
	(1) A group that shifts the absorption to longer wavelength					
	(2) A group that increases the intensity of absorption					
	(3) A group that has no effect on absorption					
	(4) A group that absorbs UV or visible light					
71.	Which of the following is involved in E ₁ reaction mechanism?					
	(1) Carbene (2) Nitrene					
	(3) Carbocation (4) Carbanion					
72.	The equation $\log I_0/I = \in .c.x$ is an expression of:					
	(1) Beer's Law (2) Lambert's Law					
.**	(3) Beer-Lambert's Law (4) Hess's Law					
73.	When two esters having α -hydroxy atoms is treated with strong base, the product will be :					
	(1) O O O O O O O O O O O O O O O O O O O					
	(3) (4) O CH ₂					

Question No.	Questions				
74.	Which of the following carboxylic acid is more acidic?				
	(1) p-nitrobenzoic acid (2) p-aminobenzoic	acid			
	(3) p-methoxybenzoic acid (4) p-fluorobenzoic	acid			
75.	Finger print region in IR spectroscopy consists:				
	(1) $1660-1730 \text{ cm}^{-1}$ (2) $600-1400 \text{ cm}^{-1}$				
	(3) $100-400 \mathrm{cm^{-1}}$ (4) $2800-3200 \mathrm{cm^{-1}}$				
76.	In the given reaction,				
	$ \begin{array}{ccc} O & & i) Br_2, P \\ \hline OH & & ii) H_2O \end{array} $ 'X'				
	'X' is :				
	(1) $R \downarrow O$ (2) $R \downarrow C_6H_5$				
	(1) $R \downarrow O$ $COOH$ (2) $R \downarrow O$ C_6H_5 (3) $R \downarrow O$ $COOH$ (4) $R \downarrow O$ OH OH				

Question No.	Questions				
77.	In the IR spectrum, primary amines show two bands around the region :				
	(1)	$1670~\mathrm{cm^{-1}}$	(2)	$2850 \ { m cm^{-1}}$	
	(3)	$3350~\mathrm{cm}^{-1}$	(4)	$2200\ { m cm^{-1}}$	
78.	Match the list-I and list-II and select the correct answer using codes given below:				
		List-I		List-II	
	(i)	Grignard reagents	(a)	Ethylene oxide	
	(ii)	$\mathrm{C_6H_5MgBr}$	(b)	1-Ethoxy-2-propanol	
	(iii)	Oxirane	(c)	C ₆ H ₅ CH ₂ CH CH ₃	
	(iv)	Methyl oxirane	(d)	very strong bases	
	(1)	i–d, ii–c, iii–a, iv–b			
	(2)	i-c, ii-b, iii-d, iv-a	ń		
	(3)	i-b, ii-a, iii-d, iv-c			
	(4)	i–a, ii–d, iii–b, iv–d			
79.	Halogenation of alkanes is an example of :				
,	(1)	Nucleophilic substitution	ı		
,	(2)	Electrophilic substitution	n		
	(3)	Elimination			
	(4)	Free radical substitution	ı		

Question No.	Questions
80.	Which of the following reagents is used to convert nitrobenzene into aniline?
	(1) DDQ (2) PPA
	(3) PCl_5 (4) SN/HCl
81.	The type of hybridisation of boron in diborane is
	(1) Sp-hybridisation
	(2) Sp ² -hybridisation
	(3) Sp ³ -hybridisation
	(4) Sp ³ d ² -hybridisation
82.	The silicates which contain extended anions are
	(1) Pyro silicates
	(2) Three dimensional silicates
	(3) Chains silicates
	(4) Cyclic silicates
83.	Orthophosphoric acid is
	(1) Monobasic (2) Dibasic
	(3) Tribasic (4) Tetrabasic
84.	Oleum is chemically known as
	$(1) \mathbf{H_2SO_3} \qquad \qquad (2) \mathbf{H_2SO_5}$
	(3) $H_2 S_2 O_7$ (4) $H_2 S_2 O_8$

Question	oue o
No.	Questions
85.	The correct order of the increasing acidic strengths of HClO, HClO $_2$, HClO $_3$ and HClO $_4$ is
	(1) $HClO > HClO_2 > HClO_3 > HClO_4$
	(2) $HClO_3 > HClO_4 > HClO_2 > HClO$
	(3) $HClO_4 > HClO_3 > HClO_2 > HClO$
	(4) $HClO_2 > HClO > HClO_3 > HClO_4$
86.	The shape of XeF_4 is
	(1) Square planar (2) Tetrahedral
	(3) Octahedral (4) Trigonal planar
87.	Which of the following atoms in the given oxidation state has partially filled d-orbitals
	(1) V(I) (2) Ti (IV)
	(3) Zn (II) (4) Cu (I)
88.	Which of the two have almost similar size
	(1) $_{22}$ Ii and $_{40}$ Zr (2) $_{41}$ Nb and $_{73}$ Ta
	(1) $_{22}$ Ii and $_{40}$ Zr
	$[CO(NH_3)_5 Br] SO_4$ and $[CO(NH_3)_5 SO_4] Br$ are example of which type of isomersim?
	(1) Linkage (2) Geometrical
	(3) Ionisation (4) Optical

Question No.	Questions	
90.	The Crystal Field Stabilisation Energy (CFSE) will be highest for	
	(1) $[COF_6]^{3-}$ (2) $[CO(CNS)_4]^{2-}$	
	(3) $[Mn(H_2O)_6]^{2+}$ (4) $[CO(NH_3)_6]^{3+}$	
91.	One of the methods used for determination of lowering of vapor pressure was given by:	
	(1) Rast	
	(2) Beckmann	
	(3) Cottrell	
	(4) Smith and Menzie	
92.	Which of the following is successfully explained by First Law of Thermodynamics:	
	(1) The direction of all spontaneous processes	
	(2) The condition required for all spontaneous processes	
	(3) The extent of all spontaneous processes	
	(4) The growth of a child	
93.	Which of the points of kinetic molecular theory of gases was found to be wrong especially at low temperature and high pressure?	
	(1) Particles are point masses	
	(2) Particles undergo elastic collisions	
	(3) Gravitational force is absent in gases	
	(4) Particles undergo zigzag motion	

Questio	Code-C
No.	Questions
94.	The temperature above which a gas cannot be liquified by applying and pressure, is called as:
	(1) Critical temperature
	(2) Inversion temperature
	(3) Boyle's temperature
	(4) Absolute temperature
95.	Thermodynamic equilibrium is a mix of the following:
	(1) Thermal equilibrium and chemical equilibrium
	(2) Mechanical equilibrium and thermal equilibrium
	(3) Mechanical equilibrium and chemical equilibrium
	(4) All of these
96.	pH of 1M HC l is :
	(1) 0 (2) -0
	(3) 1 (4) None of these
97.	The Na ⁺ present in 1 M NaCl or 2 M CH ₃ COONa, or 5 M Na ₂ SO ₄ (all at
	infinite dilution), shows:
	(1) Same ionic conductance at constant temperature
	(2) Same ionic conductance at different temperatures
	(3) Different ionic conductances at constant temperature
	(4) None of these

PG-EE-July-2025 (Chemistry) Code-C (23)

Questions	
When a gas is passed from high pressure area into low pressure area through a minor aperture adiabatically, it warms up if the temperature before the start of the process was above:	
(1) Inversion temperature (2) Boyle's temperature	
(3) Critical temperature (4) All of these	
At high pressures, the compressibility factor of a real gas is:	
(1) > 1 $(2) < 1$	
$(3) \leq 1 \tag{4}$	
Which of the following is true at thermodynamic equilibrium?	
(1) $\Delta G = 0$ (2) $\Delta G > 0$	
(3) $\Delta G^{\circ} = 0$ (4) $\Delta G^{\circ} < 0$	

SET-"X" (Total No. of printed pages : 25)

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

PG-EE-July, 2025 (Chemistry)

Code	D
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Soute D	•		
Time: 1¼ Hours	Total Questi	ons: 100	Max. Marks: 100
Roll No	(in figure)	Ÿ	(in words)
Name :		Date of Birth :	
Father's Name:	· · · · · · · · · · · · · · · · · · ·	Mother's Name:	
Date of Examination:	<u> </u>		
(Signature of the candida	te)	(Signat	ure of the Invigilator

CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

All questions are compulsory.

The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.

Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by

- Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
- The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers

MUST NOT be ticked in the Question book-let.

There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.

Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-Sheet.

BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD 8. ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions
1.	Which of the following carbohydrates does not have any chiral carbon atoms? (1) Glyceraldehyde (2) Erythrose
	(3) Dihydroxyacetone (4) Erythrulose
2.	The number of peaks observed in the 'HNMR of CHD_2 OD are :
	(1) Triplet (2) Doublet
	(3) Pentet (4) Septet
3.	How many stereoisomers does have 2, 3- dichloropentane?
	(1) 2 (2) 3
,	(3) 4 (4) 5
4.	Which of the following will have higher λ max?
	$(1) \qquad \qquad (2) \qquad CN$
	$(3) \qquad ph \qquad CN \qquad (4) \qquad CN$
5.	Which of the following statements is correct?
	(1) All alcohols are much stronger acids than terminal alkynes
	(2) Most alkoxide ions are weaker bases than hydroxidation
	(3) Hydroxylation of epoxides gives 1, 2-cyclohexanediol
	(4) Ethane -1 , $2-$ diol is obtained by the biomolecular reaction of carbony
	compounds.

Question No.	Questions
6.	Which of the following structures assigned S-configuration?
	COCH ₃ $HO \longrightarrow SH$ CH_3 $(2) H \longrightarrow NH_2$ CH_3
	CH=CH ₂ $HO \longrightarrow Cl$ CH_2CH_3 $(4) H_5C_2 H$ OH
7.	Ziegler-Natta Catalyst is used in polymerization of:
	(1) Epoxy resins (2) Polyurathanes
	(3) Polyamide (4) Alpha-Olifins Polymers
8.	The correct IUPAC Name for thiol is:
	(1) Butane-1-ol (2) Butanol
	(3) Butyl mercaptan (4) Butanethiol
9.	Unfolding of protein can be termed as
	(1) Reduction (2) Oxidation
	(3) Denaturation (4) Renaturation

Question No.	Questions
10.	Choose the correct statement about chromophore
	(1) A group that shifts the absorption to longer wavelength
	(2) A group that increases the intensity of absorption
; 4	(3) A group that has no effect on absorption
	(4) A group that absorbs UV or visible light
11.	One of the methods used for determination of lowering of vapor pressure was given by:
	(1) Rast (2) Beckmann
	(3) Cottrell (4) Smith and Menzie
12.	Which of the following is successfully explained by First Law of Thermodynamics:
	(1) The direction of all spontaneous processes
	(2) The condition required for all spontaneous processes
	(3) The extent of all spontaneous processes
	(4) The growth of a child
13.	Which of the points of kinetic molecular theory of gases was found to be wrong especially at low temperature and high pressure?
	(1) Particles are point masses
	(2) Particles undergo elastic collisions
,	(3) Gravitational force is absent in gases
	(4) Particles undergo zigzag motion

Question No.	Questions
14.	The temperature above which a gas cannot be liquified by applying and pressure, is called as:
	(1) Critical temperature
	(2) Inversion temperature
	(3) Boyle's temperature
	(4) Absolute temperature
15.	Thermodynamic equilibrium is a mix of the following:
	(1) Thermal equilibrium and chemical equilibrium
	(2) Mechanical equilibrium and thermal equilibrium
	(3) Mechanical equilibrium and chemical equilibrium
	(4) All of these
16.	pH of 1M HC l is :
	(1) 0 (2) -0
	(3) 1 (4) None of these
1	The Na $^+$ present in 1 M NaC l or 2 M CH $_3$ COONa, or 5 M Na $_2$ SO $_4$ (all at infinite dilution), shows:
	(1) Same ionic conductance at constant temperature
	(2) Same ionic conductance at different temperatures
	(3) Different ionic conductances at constant temperature
	(4) None of these

PG-EE-July-2025 (Chemistry) Code-D (4)

0 (1)		
Question No.	Questions	
18.	When a gas is passed from high pressure area into low pressure area through a minor aperture adiabatically, it warms up if the temperature before start of the process was above:	
	(1) Inversion temperature (2) Boyle's temperature	
	(3) Critical temperature (4) All of these	
19.	At high pressures, the compressibility factor of a real gas is:	
	$(1) > 1$ $(2) < 1$ $(3) \le 1$ $(4) = 1$	
20.	Which of the following is true at thermodynamic equilibrium?	
	$(1) \Delta G = 0 \qquad (2) \Delta G > 0$	
	$(3) \Delta G^{\circ} = 0 \qquad (4) \Delta G^{\circ} < 0$	
21.	Which one of the following compounds will behave as ammono base in ammonia?	
	(1) NH ₄ OH (2) NaNH ₂	
	(3) $(NH_4)_2 SO_2$ (4) $(NH_4)_2 CO_3$	
22.	Formula of Zeise's salt is	
	(1) $[PtCl_3 (\eta^2 - C_2H_4)^-]$ (2) $[PtCl_4]^{2-}$	
	(3) $H_2 PtC l_6$ (4) $[ZnC l_4]^{2-}$	
23.	Silicon is an important constituent of	
	(1) Rocks (2) Minerals	
	(3) Alloys (4) Vegetables	

PG-EE-July-2025 (Chemistry) Code-D
(5)

25. D (3) (4) (4) (4) (4) (4) (4) (5) (6) (7) (7) (8) (9) (1) (9) (1) (1) (2) (3)	In Schrodinger's equation, ∇² is, 1) Hermitian operator (2) Laplacian operator 3) Reciprocal of Δ (4) None of the above De broglie's concept of duality applies, 1) only to the electrons in an atom 2) only to a moving car 3) only to a ball in speed 4) all of above 3a X Kb = 10 ⁻¹⁴ , relation is valid for conjugate acid-base pair at,
25. D (3) (4) (4) (4) (4) (4) (4) (4) (4) (5) (6) (7) (7) (8) (9) (1) (9) (1) (1) (2) (3)	Reciprocal of \(\Delta \) (4) None of the above De broglie's concept of duality applies, 1) only to the electrons in an atom 2) only to a moving car 3) only to a ball in speed 4) all of above
25. D (1) (2) (3) (4) 26. K (1) (2) (3)	De broglie's concept of duality applies, 1) only to the electrons in an atom 2) only to a moving car 3) only to a ball in speed 4) all of above
26. K (2) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	1) only to the electrons in an atom 2) only to a moving car 3) only to a ball in speed 4) all of above
26. K (1) (2) (3)	2) only to a moving car 3) only to a ball in speed 4) all of above
26. K (1) (2) (3)	3) only to a ball in speed 4) all of above
26. K (1) (2) (3)	4) all of above
26. K (1) (2) (3)	
(1) (2) (3)	$Xa \ X \ Kb = 10^{-14}$, relation is valid for conjugate acid-base pair at
(1) (2) (3)	
(3	1) 25° C only
	2) 90° C only
1/4	B) At every temperature as Kw is a constant for water
(4	4) At 37°C only
27. T	The lattice energy of FeO is less than that of Fe ₂ O ₃ ' - This statement is,
(1)	. <u> </u>
(3)) Sometimes true (4) Unpredictable
28. A	catalyst is:
(1)) Specific to the reaction
(2)) Specific to temperature
(3)) Specific to the factory in which it is produced
(4)) Specific to the country in which it is produced

SET-X Code-D

Question No.	Questions
29.	Suppose, H ₂ S gas is introduced into an industrial chamber to decrease the efficiency of an unwanted catalyst, H ₂ S shall be termed as: (1) Catalytic inhibitor (2) Catalytic poison (3) Catalytic promotor (4) All correct
30.	"In Thermodynamically spontaneous processes, the entropy increases" . This statement is:
	(1) Always true (2) Always false (3) Sometimes true (4) All wrong
31.	The type of hybridisation of boron in diborane is (1) Sp-hybridisation (2) Sp ² -hybridisation (3) Sp ³ -hybridisation (4) Sp ³ d ² -hybridisation
32.	The silicates which contain extended anions are (1) Pyro silicates (2) Three dimensional silicates (3) Chains silicates (4) Cyclic silicates
33.	Orthophosphoric acid is (1) Monobasic (2) Dibasic (3) Tribasic (4) Tetrabasic

Questions
Oleum is chemically known as
(1) H_2SO_3 (2) H_2SO_5
(3) $H_2 S_2 O_7$ (4) $H_2 S_2 O_8$
The correct order of the increasing acidic strengths of HClO, HClO, HClO, and HClO, is
(1) $HClO > HClO_2 > HClO_3 > HClO_4$
(2) $HClO_3 > HClO_4 > HClO_2 > HClO$
(3) $HClO_4 > HClO_3 > HClO_2 > HClO$
(4) $HClO_2 > HClO > HClO_3 > HClO_4$
The shape of XeF ₄ is
(1) Square planar (2) Tetrahedral
(3) Octahedral (4) Trigonal planar
Which of the following atoms in the given oxidation state has partially filled d-orbitals
(1) V(I) (2) Ti (IV)
(3) Zn (II) (4) Cu (I)
Which of the two have almost similar size
(1) $_{22}$ Ii and $_{40}$ Zr (2) $_{41}$ Nb and $_{73}$ Ta
(1) $_{22}$ Ii and $_{40}$ Zr

Question No.	Questions
39.	$[CO(NH_3)_5 Br] SO_4$ and $[CO(NH_3)_5 SO_4] Br$ are example of which type of isomersim?
	(1) Linkage (2) Geometrical
	(3) Ionisation (4) Optical
40.	The Crystal Field Stabilisation Energy (CFSE) will be highest for
	(1) $[COF_6]^{3-}$ (2) $[CO(CNS)_4]^{2-}$
	(3) $[Mn(H_2O)_6]^{2+}$ (4) $[CO(NH_3)_6]^{3+}$
41.	The product formed in the reaction of primary amine with nitrous acid is
	(1) Alcohol
	(2) Nitroalkene
	(3) Tert. amine
	(4) Alkyl nitrile
42.	Which of the following reactions is used for the synthesis of Azo dyes?
	(1) Perkin reaction
	(2) Azo coupling reaction
	(3) Diels-Alder reaction
	(4) Wittig reaction
43.	The oxidation of acetylene by KMnO ₄ give :
	(1) Oxalic acid (2) Propanoic acid
	(3) Ethyl alcohol (4) Formaldehyde

Question No.	Questions
44.	Which of the following is least reactive towards a nucleophilic attack?
	(1) Propanone (2) Di-isopropyl ketone
	(3) Di-tertbutyl ketone (4) Propanaldehyde
45.	The reaction of benzaldehyde with acetic anhydride in presence of sodium acetate and sodium hydroxide will give:
	(1) OH (2) H_3C $O O$ $O O$
,	(3) CH ₃ (4) CH ₃
	An organic reaction where an enolizable carbonyl compound react with formal dehyde and a secondary amine to form β -aminocarbonyl compound is known as:
	(1) Cannizzaro reaction
	(2) Peckmann Condensation
	(3) Mannich reaction
	(4) Aldol Condensation

		Code-D
Question No.	Questions	
47.	In the following reaction,	
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
	'X' is:	
	$(1) \qquad (2) \qquad OH$	
	(3) CH_3 (4) C_2H_5	
48.	What is the wavelength range for UV spectrum?	
	(1) $400 \text{ nm} - 800 \text{ nm}$	
	(2) $10 \text{ nm} - 400 \text{ nm}$	
	(3) $800 \text{ nm} - 1 \text{ nm}$	
	(4) $0.01 \text{ nm} - 400 \text{ nm}$	
49.	What type of signals does chloroethane ($\mathrm{CH_3CH_2C}l$) spectrum ?	have in HNMR
	(1) A triplet and a quartet	
	(2) A doublet and a triplet	
	(3) A singlet and doublet	
	(4) A doublet and quartet	

No.	Questions
50.	Which of the following alkylhalide has the highest reactivity towards SN reaction?
	(1) $CH_3 - I$ (2) $CH_3 - Br$
	$(3) CH_3 - Cl \qquad (4) CH_3 - F$
51.	On increasing the temperature, the rate of a reaction increases by:
	 (1) 2 to 3 times (2) 2 times (3) 3 times (4) Can not be predicted as the data are unavailable
52.	Common feature of Galvanic and electrolytic cells is:
	(1) Cathode is positive(2) Anode is negative(3) Both produce current
	(4) Oxidation takes place at anode
53.	Conductivity is: (1) Specific conductance (2) Molar conductance (3) Equivalent conductance (4) All of these
54.	The normality of 0.1 M solution of $K_2Cr_2O_7$ in acidic medium shall be: (1) 0.6 (2) 0.0166

PG-EE-July-2025 (Chemistry) Code-D

Question No.	Questions
55.	On doubling initial concentration of reactant, the half-life period doubles. The order of reaction is:
`	(1) 1 (2) 2
	(3) 0 (4) 3
56.	A substance is named as 'A'. At absolute zero temperature, the entropy of this substance is Y. What are X and Y?
	(1) $X = Crystalline, Y = 0$
	(2) X = Perfectly Crystalline, Y = 0
	(3) X = Perfectly Crystalline, Y > 0
	(4) $X = Crystalline, Y > 0$
57.	Hyper conjugation is also known as:
	(1) Baker - Nathan - effect
	(2) Mesomeric - effect
	(3) Inductive - effect
	(4) Resonance - effect
58.	α -D- glucose and β -D- glucose are :
•	(1) Anomers
	(2) Keto - aldopairs
	(3) Epimer
	(4) Stereoisomers

0 "	
Questic No.	Questions
59.	In the given reaction,
	+ Na NH ₂ - NH ₃ , Heat 'X'
	'X' is:
	(1) (2) NH_2
	(3) (4) (4) pH
60.	Which of the following is incorrect Statements?
	(1) Pyrrole and furan, each have 6 Pi electrons
	(2) Pyrrole and furan satisfied Huckel's rule
	(3) Both Pyrrole and furan have a planar, five membered ring structure
	(4) Pyrrole is considered less aromatic than furan
61.	Which of the following is involved in E ₁ reaction mechanism?
	(1) Carbene (2) Nitrene
	(3) Carbocation (4) Carbanion
62.	The equation $\log I_0/I = \in c.x$ is an expression of:
	(1) Beer's Law (2) Lambert's Law
	(3) Beer-Lambert's Law (4) Hess's Law

Question	Jour D
No.	Questions
63.	When two esters having α -hydroxy atoms is treated with strong base, the product will be :
	$(1) \qquad \begin{array}{c} O & O \\ \parallel & \parallel \\ O \in \mathfrak{t} \end{array} \qquad (2) \qquad \begin{array}{c} O \\ \downarrow \\ OH \end{array}$
	$(3) \qquad (4) \qquad O \\ H_3C \qquad CH_2$
64.	Which of the following carboxylic acid is more acidic?
	(1) p-nitrobenzoic acid
	(2) p-aminobenzoic acid
	(3) p-methoxybenzoic acid
	(4) p-fluorobenzoic acid
65.	Finger print region in IR spectroscopy consists:
	(1) $1660-1730 \text{ cm}^{-1}$
	(2) $600-1400 \text{ cm}^{-1}$
	(3) $100-400 \text{ cm}^{-1}$
	(4) 2800-3200 cm ⁻¹

Question No.	Questions
66.	In the given reaction,
	$R \xrightarrow{O \\ \text{OH}} \frac{\text{i) Br}_2, P}{\text{ii) H}_2O} 'X'$
	'X' is:
	(1) R COOH
	(2) $R \downarrow C_6H_5$ Br
	(3) $\stackrel{\text{O}}{\underset{\text{Br}}{\bigvee}}$ COOH
	$(4) \qquad \begin{matrix} O \\ R \end{matrix} \qquad OH \\ Br \end{matrix}$
67.	In the IR spectrum, primary amines show two bands around the region :
	(1) $1670 \mathrm{cm^{-1}}$ (2) $2850 \mathrm{cm^{-1}}$
	(3) $3350 \mathrm{cm^{-1}}$ (4) $2200 \mathrm{cm^{-1}}$

PG-EE-July-2025 (Chemistry) Code-D

Question No.	Questions	
68.	Match the list-I and list-II and select the correct answer using codes given	
	below:	
	List-II List-II	
	(i) Grignard reagents (a) Ethylene oxide	
	(ii) C ₆ H ₅ Mg Br (b) 1-Ethoxy-2-propanol	
	(iii) Oxirane (c) $C_6H_5 CH_2 CH CH_3$	
	(iv) Methyl oxirane (d) very strong bases	
	(1) i–d, ii–c, iii–a, iv–b	
	(2) i-c, ii-b, iii-d, iv-a	
	(3) i-b, ii-a, iii-d, iv-c	
	(4) i–a, ii–d, iii–b, iv–d	
69.	Halogenation of alkanes is an example of:	
	(1) Nucleophilic substitution	
	(2) Electrophilic substitution	
	(3) Elimination	
	(4) Free radical substitution	
70.	Which of the following reagents is used to convert nitrobenzene into aniline?	
	(1) DDQ (2) PPA	
00.77	$\frac{\text{(3) } \text{PC}l_{5}}{\text{July-2025 (Chamistan) C. I. P}}$	

Question No.	Questions
71.	Which of the following is the law of helplessness of mankind:
	(1) 1st law of thermodynamics
	(2) 2nd law of thermodynamics
	(3) 3rd law of thermodynamics
	(4) all of these
72.	A catalyst and photosensitizer are :
	(1) Different substances
	(2) Same substances
1	(3) Both true
	(4) Both false
73.	For an elementary reaction,
	(1) Order and molecularity are always the same
	(2) Order and molecularity may or may not be the same
	(3) Order and molecularity are always different
	(4) All false
74.	With respect to the reactant taken in excess,
	(1) Order becomes zero but molecularity remains uninfluenced
- 1	(2) Order and molecularity both become zero
	(3) Molecularity becomes zero but order remains uninfluenced
	(4) None of these
	La cook (Classicated) Code D

Question	Code-D
No.	Questions
75.	Mixture of ethyl alcohol and water is an example of :
	(1) Non-ideal solution with positive deviation
	(2) Non-ideal solution with negative deviation
	(3) Ideal solution
	(4) None of these
76.	Which is true:
	(1) Dilute solutions produce no heat on addition of more solvent
	(2) Dilute solutions absorb no heat on addition of more solvent
	(3) Dilute solutions are ideal solutions
	(4) All correct
77.	When a positive catalyst is added to a reversible reaction, it effect on rate
	of forward reaction (Rf) and backward reaction (Rb) is given by:
	(1) An increase in Rf and decrease in Rb
•	(2) An increase in Rf and Rb both
	(3) An increase in Rb and decrease in Rf
	(4) A decrease in Ff and Rb both
78.	In the theory of absolute reaction rates, which of the following terms
	represents the complexity of reactants and the steric factor?
	(1) $\Delta S^{\#}$ (2) $\Delta H^{\#}$
	(3) $\Delta G^{\#}$ (4). $\Delta A^{\#}$

PG-EE-July-2025 (Chemistry) Code-D
(19)

Question					
No.	Questions				
79.	Osmotic pressure is used for the determination of:				
	Weight average molecular weight				
	(2) Number average molecular weight				
	(3) Both				
	(4) None				
80.	Which is a necessary requirement for the salt used in salt bridge?				
	(1) It should react with agar-agar gel				
	(2) Transport numbers of its anion and cation should be nearly the same				
	(3) Transport numbers of its anion and cation should be different				
	(4) It should not be water soluble				
81.	Considering H_2O as a weak field ligand, the number of unpaired electron in $[Mn(H_2O)_6]^{2+}$ will be				
	(1) three (2) five				
	(3) two (4) four				
82.	The expected spin-only magnetic moments for $[Fe(CN)_6]^{4-}$ and $[FeF_6]^{4-}$ respectively are				
	(1) 1.73 and 1.73 B.M.				
	(2) 1.73 and 5.92 B.M.				
	(3) 0.0 and 1.73 B.M.				
	(4) 0.0 and 5.92 B.M.				

Question	Coue-D						
No.	Questions						
83.	The lowest energy transition in Orgel diagram of octahedral Ni ^{II} complex is						
	(1) ${}^{3}A_{2}g \rightarrow {}^{3}T_{1}g(F)$ (2) ${}^{3}A_{2}g \rightarrow {}^{3}T_{1}g(P)$						
	(3) ${}^{3}A_{2}g \rightarrow {}^{3}T_{2}g(F)$ (4) None of these						
84.	General Electronic Configuration of lanthanides is						
,	(1) $(n-2) f^{1-14} (n-1) s^2 p^6 d^{0-1} ns^2$						
- I	(2) $(n-2) f^{0-14} (n-1) d^{0-1} ns^2$						
	(3) $(n-2) f^{0-14} (n-1) d^{10} ns^2$						
•	(4) $(n-2) d^{0-1} (n-1) f^{0-14} ns^1$						
85.	The brown ring test for NO_3^- is due to the formation of the complex ion with formula						
	(1) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$						
	(2) Fe[NO(CN) ₅] ²⁻						
	(3) $[Fe(H_2O)_5 NO]^{2+}$						
	(4) $[\text{Fe}(\text{H}_2\text{O}) (\text{NO})_5]^{2+}$						
86.	Nessler's reagent is used to detect						
	(1) CrO_4^{2-} (2) PO_4^{3-}						
	(3) MnO_4^- (4) NH_4^+						
87.	Actinides are						
	(1) oxidising agents (2) weak reducing agents						
	(3) strong reducing agents (4) none of these						
;							

Question No.	Que	estions				
88.	CH ₃ HgOH is classified as					
	(1) Soft - Soft	(2) Hard - Hard				
	(3) Soft - Hard	(4) Hard - Soft				
89.	Heme is a Porphyrin complex o	f which metal ion?				
	(1) Fe(II)	(2) Fe(III)				
	(3) Mg(II)	(4) Zn(II)				
90.	Which one of the following is the weakest Lewis base?					
		(2) CH ₃				
	(3) OH ⁻	(4) F				
91.	The electrons present in K-shell of the atom will differ in					
	(1) Principal quantum number	· · · · · · · · · · · · · · · · · · ·				
	(2) Azimuthal quantum numbe	r				
	(3) Magnetic quantum number					
	(4) Spin quantum number					
92.	Wave nature of electron was der	nonstrated by				
		2) de-Broglie				
	3) Davisson (4) Heisenberg				
3. V	Which of the following does not h	ave any unit?				
	1) Electronegativity (2	2) Electron affinity				
	3) Ionisation potential (4	1) Atomic radii				
(6	Chamistry) Code	n D				

PG-EE-July-2025 (Chemistry) Code-D (22)

Question	Code-D					
No.	Questions					
94.	The orbital diagram in which Aufbau principle is violated is					
	(1)					
	$\begin{array}{c c} (2) & \uparrow & \uparrow & \uparrow \\ \end{array}$					
	(3)					
	$\begin{array}{c c} \textbf{(4)} & \uparrow \downarrow & \uparrow \downarrow & \uparrow \end{array}$					
95.	According of VSEPR theory, the molecular geometry of the water molecule					
	is					
	(1) octahedral (2) distorted tetrahedral					
	(3) planar triangle (4) linear					
96.	$\mathrm{NaC}l$ crystal belongs to the crystal system					
,	(1) hexagonal (2) cubic					
	(3) tetragonal (4) orthorhombic					
97.	H-bonding is not present in					
	(1) Glycerine (2) Water					
	(3) Hydrogen Sulphide (4) Hydrogen Fluoride					

Question No.	1		Qu	estic	ons		
98.	According to Fazan's rule, covalent bond is favoured by						
	(1)	Large cation ar				, , ,	
	(2)	Large cation ar					
=	(3)	Small cation an					
	(4)	Small cation an				ī	· ·
99.	Litł	nium shows diago	onal relation	nshi	p with		, ,
	(1)	Magnesium		(2)	Beryllium	· ;	
	(3)	Aluminium	. P	(4)	Boron		
100.	Whi	ch of the followi	ng metal is	s pre	sent in chlore	ophyll?	
	(1)	Chromium		(2)	Cobalt		•
	(3)	Magnesium		(4)	Iron		•,
		•					
			e (e				· .
			•				

PG-EE-July-2025 (Chemistry) Code-D (24)

	Answer keys of M.Sc.	Chemistry) entrance	e exam dated 16.07.202	.5
Q. NO.	A	В	С	D
1	4	3	2	3
2	2	3	1	3
3	1	3	1	3
4	2	3	1	3
5	2	3	1	1
6	2	1	4	4
7	3	1	2	4
8	4	2	1	4
9	1	3	2	3
10	3	4	2	4
11	3	1	2	4
12	3	2	4	4
13	3	1	3	1
14	3	3	1 7	1
15	3	1	3	4
16	1	3	4	4
17	1	2	3	1
	2	2	3	1
18			1	1
19	3	1		
20	4	1	4	1
21	2	3	4	2
22	4	3	2	1
23	3	3	1	1
24	1	3	2	2
25	3	1	2	4
26	4	4	2	1
27	3	4	3	1
28	3	4	4	1
29	1 ***	3	1	1
30	4	4	3	3
31	2	4	1	3
32	1	4	2	3
33	1	1	. 1	3
34	2	1	3	3
35	4	4	1	3
36	1	4	3	1
37	1	1	2	1
38	1	1	2	2
39	1	1	1	3
40	3	1	1	4
41	2	2	4	1
42	1	1	4	2
43	1	1	1	1
44	1	2	1	3
45	1	4	3	1
46	4	1	2	3
47	2	1	1	2
48	1	1	1	2
48	2	1	2	1
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50	2	<i>s</i> ³	4	1

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Page 1 of 2

	Answer keys of M.Sc. (
Q. NO.	A	В	С	D
51	4	2	2	4
52	4	4	1	4
53	1	3	1	1
54	1	1	2	1
55	4	3	4	3
56	4	4	1	2
57	1	3	1	1
58	1	3	1	1
59	1	1	1	2
60	1	4	3	4
61	4	2	3	3
62	4	1	3	3
63	1	1	3	1
	1	1	3	1
64		1	1	2
65	3		4	4
66	2	4		3
67	1	2	4	
68	1	1	4	1
69	2	2	3	4
70	4	2	4	4
71	3	4	3	2
72	3	4	3	1
73	3	1	1	1
74	3	1	1	1
75	1	3	2	1
76	4	2	4	4
77	4	1	3	2
78	4	1	1	1
79	3	2	4	2
80	4	4	4	2
81	3	4	3	2
82	3	2	3	4
83	1	1	3	3
84	1	2	3	1
85	2	2	3	3
86	4	2	1	4
87	3	3	1	3
88	1	4	2	3
89	4	1	3	1
90	4	3	4	4
91	1	3	4	4
92	2	3	4	2
	1	1	1	1
93	3	1	1	2
94			4	2
95	1	2		2
96	3	4	4	3
97	2	3	11	
98	2	1	1	4
99	1	4	1	1
100	1	4	1	3

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