Test Booklet No.

Subject : CHEMISTRY
Code : 306 E
Medium : English

Test Booklet Code

B

(Do not open this Test Booklet until you are asked to do so)

*Time Allowed : **60** minutes*	*Maximum Marks : **200***	*Total Questions : **50***	*Number of questions to be answered : **40***

Kindly read the Instructions given on this Page and Back Page carefully before attempting this Question Paper.

Important Instructions for the Candidates :

1. This Test Booklet contains **50** questions printed in English. Out of these, the candidate is required to answer any **40** questions. If a candidate answers more than 40 questions, the first 40 answered questions will be considered for evaluation.
2. When you are given the OMR Answer Sheet, fill in your particulars on it carefully with **blue/black** ball point pen only.
3. Use only Blue/Black Ball Point Pen for marking responses.
4. The CODE for this Test Booklet is **B**. Make sure that the CODE printed on the OMR Answer Sheet is the same as that on this Test Booklet. Also ensure that your Test Booklet No. and OMR Answer Sheet No. are exactly the same. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the OMR Answer Sheet. No claim in this regard will be entertained after five minutes from the start of the examination.
5. Before attempting the question paper kindly check that this Test Booklet has total **16** pages and OMR Answer Sheet consists of one sheet. At the start of the examination within first five minutes, candidates are advised to ensure that all pages of Test Booklet and OMR Answer Sheet are properly printed and they are not damaged in any manner.
6. Each question has four answer options. Out of these four options choose the **MOST APPROPRIATE OPTION** and darken/blacken the corresponding circle on the OMR Answer Sheet with a Blue/Black Ball Point Pen.
7. Five (5) marks will be given for each correct answer. One (1) mark will be deducted for each incorrect answer. If more than one circle is found darkened/blackened for a question, then it will be considered as an incorrect answer. Unanswered questions will be given no mark.

P.T.O.

Name of the Candidate (in Capital Letters) : _____

Application Number (in figures) : _____

Roll Number (in figures) : _____

Centre of Examination (in Capital Letters) : _____

Candidate's Signature : _____ Invigilator's Signature : _____

Facsimile signature stamp of Centre Superintendent : _____

1. Camphor in nitrogen gas is a type of solution

(1) Gas – Gas
(2) Solid – Gas
(3) Liquid – Gas
(4) Solid – Liquid

2. Identify the correct order of organic compounds in the following chemical reaction :

$$\underline{?} + Mg \xrightarrow{\text{Dry Ether}} \underline{?} \xrightarrow{H_2O} \underline{?} \xrightarrow{Cl_2,\ \triangle} \underline{?}$$

(A) CH_3MgBr

(B) CH_3Br

(C) CH_3Cl

(D) CH_4

Choose the correct answer from the options given below :

(1) (B), (A), (D), (C)
(2) (A), (C), (B), (D)
(3) (B), (A), (C), (D)
(4) (C), (B), (D), (A)

3. Consider the following statements regarding osmotic pressure :

(A) Molar mass of a protein can be determined using osmotic pressure method.

(B) The osmotic pressure is proportional to the molarity.

(C) Reverse osmosis occurs when a pressure larger than osmotic pressure is applied to the concentrated solution side.

(D) Edema occurs due to retention of water in tissue cells as a result of osmosis.

Choose the correct statements with reference to osmotic pressure :

(1) (A), (B) and (D) only
(2) (A), (B) and (C) only
(3) (A), (B), (C) and (D)
(4) (B), (C) and (D) only

4. Vapour pressures of pure liquids 'A' and 'D' at 50°C are 500 mm Hg and 800 mm Hg respectively. The binary solution of 'A' and 'D' boils at 50°C and 700 mm Hg pressure. The mole percentage of 'D' in the solution is :

(1) 33.33 mole percent
(2) 66.67 mole percent
(3) 25.75 mole percent
(4) 75.25 mole percent

SPACE FOR ROUGH WORK

5. For the following reaction :

$$2A_2\,(g) + \frac{1}{4}X\,(g) \rightarrow 2A_2X\,(g)$$

volume is increased to double its value by decreasing the pressure on it. If the reaction is first order with respect to X and second order with respect to A_2, the rate of reaction will :

(1) Decrease by eight times of its initial value

(2) Increase by eight times of its initial value

(3) Increase by four times of its initial value

(4) Remain unchanged

6. The total number of sigma bonds present in P_4O_{10} are :

(1) 6 (2) 7

(3) 16 (4) 17

7. In the electrolysis of alumina to obtain Aluminium metal, the cryolite is added mainly to

(1) lower the melting point of alumina.

(2) dissolve the alumina in the molten cryolite.

(3) remove the impurities of alumina.

(4) increase the electrical conductivity.

8. Identify the order of reaction if its rate constant is $k = 2 \times 10^{-2}\ s^{-1}$.

(1) Zero order

(2) First order

(3) Second order

(4) Half order

9. For a complex reaction, the order of reaction is equal to

(1) Sum of stoichiometric coefficients in balanced chemical reaction

(2) The molecularity of overall reaction

(3) Order of fastest step of the reaction

(4) The molecularity of slowest step of reaction

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10. A molecule X associates in a given solvent as per the following equation :

$$X \rightleftharpoons (X)_n$$

For a given concentration of X, the van't Hoff factor was found to be 0.80 and the fraction of associated molecules was 0.3. The correct value of 'n' is :

(1) 2 (2) 3

(3) 1 (4) 5

11. The oxidation number of Co in complex $[Co(H_2NCH_2CH_2NH_2)_3]_2(SO_4)_3$ is

(1) 3 (2) 4

(3) 2 (4) 5

12. The correct structure of dipeptide, Gly-Ala (glycyl alanine) is

(1) $H_2N - CH_2 - CO - NH - CH(CH_3) - COOH$

(2) $HOOC - CH_2 - NH - CO - CH(CH_3) - NH_2$

(3) $HOOC - CH(CH_3) - NH - CO - CH_2 - NH_2$

(4) $H_2N - CH(CH_3) - CO - NH - CH_2 - COOH$

13. The total number of ions produced from the complex $[Cr(NH_3)_6]Cl_3$ in aqueous solution will be _____.

(1) 2 (2) 3

(3) 4 (4) 5

14. Arrange the following in decreasing order of number of molecules contained in :

(A) 16 g of O_2

(B) 16 g of CO_2

(C) 16 g of CO

(D) 16 g of H_2

Choose the correct order from the options given below :

(1) (A), (B), (C), (D)

(2) (D), (C), (A), (B)

(3) (B), (A), (D), (C)

(4) (C), (B), (D), (A)

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15. The Cu metal crystallises into *fcc* lattice with a unit cell edge length of 361 pm. The radius of Cu atom is :

(1) 127 pm (2) 181 pm

(3) 157 pm (4) 108 pm

16. If 75% of a first order reaction gets completed in 32 minutes, time taken for 50% completion of this reaction is

(1) 16 minutes (2) 78 minutes

(3) 8 minutes (4) 4 minutes

17. Which of the following compounds will be repelled when placed in an external magnetic field ?

(1) $Na_2[CuCl_4]$ (2) $Na_2[CdCl_4]$

(3) $K_4[Fe(CN)_6]$ (4) $K_3[Fe(CN)_6]$

18. The spin only magnetic moment of Hexacyanidomanganate(II) ion is _____ BM.

(1) 5.90 (2) 1.73

(3) 4.90 (4) 3.87

19. The correct order of increasing boiling points of the following compounds is :

Pentan-1-ol, n-Butane, Pentanal, Ethoxyethane

(1) Ethoxyethane, Pentanal, n-Butane, Pentan-1-ol

(2) Pentanal, n-Butane, Ethoxyethane, Pentan-1-ol

(3) n-Butane, Pentanal, Ethoxyethane, Pentan-1-ol

(4) n-Butane, Ethoxyethane, Pentanal, Pentan-1-ol

20. In the following reaction, identify the product D.

$$C_6H_5 - OH \xrightarrow{Zn\ dust} A \xrightarrow{CH_3Cl + anhy.\ AlCl_3} B \xrightarrow{K_2Cr_2O_7 + H_2SO_4} C \xrightarrow{H_2SO_4 + HNO_3} D$$

(1) o-Nitrobenzoic acid

(2) p-Nitrobenzoic acid

(3) o,p-Dinitrobenzoic acid

(4) m-Nitrobenzoic acid

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21. The gold number range of some of the lyophilic colloids is given below :

A : 0.005 – 0.01, B : 0.15 – 0.25, C : 0.04 – 1.0 and D : 15 – 25.

Which among these can be used as a better protective colloid ?

(1) A (2) B

(3) C (4) D

22. Reaction of aniline with conc. HNO_3 and conc. H_2SO_4 at 298 K will produce 47% of

(1) p-Nitroaniline

(2) o-Nitroaniline

(3) m-Nitroaniline

(4) 2,4-Dinitroaniline

23. What will be increasing order of basic strength of the following compounds ?

$C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$, $C_6H_5NH_2$

(1) $C_2H_5NH_2 < (C_2H_5)_2NH < (C_2H_5)_3N < C_6H_5NH_2$

(2) $C_6H_5NH_2 < C_2H_5NH_2 < (C_2H_5)_3N < (C_2H_5)_2NH$

(3) $(C_2H_5)_3N < (C_2H_5)_2NH < C_6H_5NH_2 < C_2H_5NH_2$

(4) $(C_2H_5)_2NH < (C_2H_5)_3N < C_2H_5NH_2 < C_6H_5NH_2$

24. Which of the following compounds will give Hell-Volhard-Zelinsky reaction ?

(1) $R - CH_2 - COOH$ (2) $R_3C - CHO$

(3) R_2CO (4) $H - COOH$

25. Arrange the following acids in increasing order of their acidic strengths :

HCOOH, FCH_2COOH, NO_2CH_2COOH, $ClCH_2COOH$

(1) $HCOOH < FCH_2COOH < NO_2CH_2COOH < ClCH_2COOH$

(2) $HCOOH < NO_2CH_2COOH < ClCH_2COOH < FCH_2COOH$

(3) $NO_2CH_2COOH < HCOOH < ClCH_2COOH < FCH_2COOH$

(4) $HCOOH < ClCH_2COOH < FCH_2COOH < NO_2CH_2COOH$

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26. In the following compounds, what is the increasing order of their reactivity towards nucleophilic addition reactions ?

Benzaldehyde, p-Tolualdehyde, p-Nitrobenzaldehyde, Acetophenone

(1) Benzaldehyde < p-Tolualdehyde < p-Nitrobenzaldehyde < Acetophenone

(2) Acetophenone < Benzaldehyde < p-Tolualdehyde < p-Nitrobenzaldehyde

(3) Acetophenone < p-Tolualdehyde < Benzaldehyde < p-Nitrobenzaldehyde

(4) Benzaldehyde < Acetophenone < p-Tolualdehyde < p-Nitrobenzaldehyde

27. The Gatterman-Koch reaction is used in the industrial preparation of benzaldehyde. The electrophile involved in this reaction is

(1) CO^+

(2) $HCl + CO_2$ + anhydrous $AlCl_3$

(3) HCO^+

(4) CO + anhydrous $AlCl_3$

28. Formaldehyde undergoes Cannizzaro reaction because

(A) It has alpha-hydrogen atom.

(B) It does not have alpha-hydrogen atom.

(C) It does not undergo self-oxidation and reduction on heating with concentrated alkali.

(D) It undergo self-oxidation and reduction on heating with concentrated alkali.

Choose the correct answer from the options given below :

(1) (B) and (D) only

(2) (A) and (C) only

(3) (B) and (C) only

(4) (A) and (D) only

29. In the reaction, $(CH_3)_3C - O - CH_3 + HI \rightarrow$ Products

CH_3OH and $(CH_3)_3CI$ are the products and not CH_3I and $(CH_3)_3C - OH$. It is because,

(A) in step 2 of the reaction the departure of leaving group ($HO - CH_3$) creates less stable carbocation.

(B) in step 2 of the reaction the departure of leaving group ($HO - CH_3$) creates more stable carbocation.

(C) the reaction follows S_N1 mechanism.

(D) the reaction follows S_N2 mechanism.

Choose the correct answer from the options given below :

(1) (B) and (D) only

(2) (B) and (C) only

(3) (A) and (D) only

(4) (A) and (C) only

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30. Aniline does not undergo Friedel-Crafts reaction because

(A) It forms salt with the Lewis acid catalyst, $AlCl_3$.

(B) Nitrogen of aniline acquires negative charge.

(C) Nitrogen of aniline acquires positive charge.

(D) Nitrogen acts as a strong deactivating group in the further reaction.

Choose the correct answer from the options given below :

(1) (A), (B) and (D) only

(2) (A), (B) and (C) only

(3) (A), (C) and (D) only

(4) (B), (C) and (D) only

31. Although chlorine is an electron withdrawing group, yet it is ortho- and para-directing in electrophilic aromatic substitution reaction because

(A) Chlorine withdraws electrons through inductive effect.

(B) Chlorine destabilises the intermediate carbocation formed during electrophilic substitution.

(C) Chlorine accepts electrons through resonance.

(D) Chlorine releases electrons through resonance.

Choose the correct answer from the options given below :

(1) (A), (B) and (D) only

(2) (A), (B) and (C) only

(3) (A), (C) and (D) only

(4) (B), (C) and (D) only

32. In Etard reaction, the final product is

(1) Aromatic aldehyde

(2) Aromatic chloride

(3) Aromatic amine

(4) Aromatic alcohol

SPACE FOR ROUGH WORK

33. Match **List-I** with **List-II** :

List-I	**List-II**
(A) Amino acids linked in a specific sequence	(I) Primary structure of proteins
(B) Regular folding of a specific sequence of amino acids due to H-bonding	(II) Secondary structure of proteins
(C) Fibrous proteins	(III) Quaternary structure of proteins
(D) Spatial arrangement of two or more polypeptide chains	(IV) Tertiary structure of proteins

Choose the correct answer from the options given below :

(1) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(2) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

(3) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

(4) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

34. Match **List-I** with **List-II** :

List-I	**List-II**
(A) Tollen's reagent	(I) Rochelle salt
(B) Jones reagent	(II) Conc. HCl and $ZnCl_2$
(C) Lucas reagent	(III) Ammoniacal silver nitrate
(D) Fehling solution	(IV) Chromium trioxide-sulphuric acid

Choose the correct answer from the options given below :

(1) (A) - (III), (B) - (IV), (C) - (II), (D) - (I)

(2) (A) - (IV), (B) - (III), (C) - (I), (D) - (II)

(3) (A) - (I), (B) - (IV), (C) - (II), (D) - (III)

(4) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

SPACE FOR ROUGH WORK

35. Match **List-I** with **List-II** :

List-I	**List-II**
(A) Swarts Reaction	(I) $C_6H_5NH_2 + NaNO_2 + HX + Cu_2X_2 \rightarrow C_6H_5X + N_2$
(B) Finkelstein reaction	(II) $2RX + 2Na \rightarrow R - R + 2NaX$
(C) Sandmeyer's reaction	(III) $RX + AgF \rightarrow R - F + AgX$
(D) Wurtz reaction	(IV) $RX + NaI \rightarrow R - I + NaX$

Choose the correct answer from the options given below :

(1) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(2) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

(3) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

(4) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

36. Match **List-I** with **List-II** :

List-I (Biomolecule)	**List-II (Function/Diseases)**
(A) Vitamin A	(I) Menstrual cycle
(B) Thiamine	(II) Xerophthalmia
(C) Glucocorticoids	(III) Beri-Beri
(D) Estradiol	(IV) Addison's disease

Choose the correct answer from the options given below :

(1) (A) - (III), (B) - (II), (C) - (I), (D) - (IV)

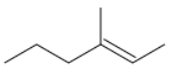
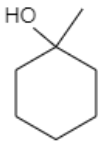
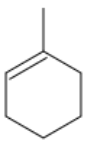
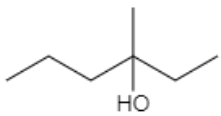
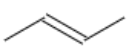
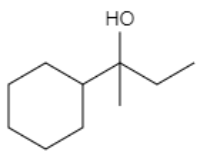
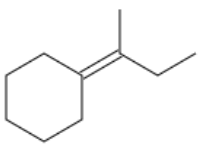
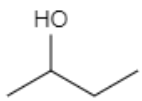
(2) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)

(3) (A) - (III), (B) - (II), (C) - (IV), (D) - (I)

(4) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

SPACE FOR ROUGH WORK

37. In the following table, match the reactants given in **List-I** with the correct product in **List-II** as per the reaction of hydration of alkene under acidic condition.

List-I (Reactants)	**List-II (Products)**
(A) 	(I) 
(B) 	(II) 
(C) 	(III) 
(D) 	(IV) 

Choose the correct answer from the options given below :

(1) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(2) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

(3) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)

(4) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

38. Which among the following is ***not*** an Analgesic ?

(1) Morphene

(2) Heroin

(3) Codeine

(4) Ranitidine

39. The increasing order of acidity of the following compounds based on pKa values is

(A) $BrCH_2COOH$

(B) $ClCH_2COOH$

(C) FCH_2COOH

(D) $HCOOH$

Choose the correct answer from the options given below :

(1) (D) < (A) < (B) < (C)

(2) (A) < (D) < (C) < (B)

(3) (B) < (A) < (D) < (C)

(4) (C) < (B) < (D) < (A)

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40. For S_N2 reaction, the increasing order of the reactivity of the following alkyl halides is :

(A) $CH_3CH_2CH_2CH_2Br$

(B) $CH_3CH_2CH(Br)CH_3$

(C) $(CH_3)_3CBr$

(D) $(CH_3)_2CHCH_2Br$

Choose the correct answer from the options given below :

(1) (A) < (B) < (C) < (D) (2) (A) < (C) < (B) < (D)

(3) (B) < (A) < (D) < (C) (4) (C) < (B) < (D) < (A)

Read the following passage and answer the next five questions based on it.

Battery or cell converts chemical energy of the redox reaction to electrical energy. In fuel cell (a galvanic cell), the chemical energy of combustion of fuels like H_2, ethanol, etc. are directly converted to electrical energy. In a fuel cell, H_2 and O_2 react to produce electricity, where H_2 gas is oxidised at anode and oxygen is reduced at cathode and the reactions involved are

Anode reaction : $H_2 + 2OH^- \rightarrow 2H_2O + 2e^-$

Cathode reaction : $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$

67.2 L of H_2 at STP reacts in 15 minutes.

41. The number of moles of hydrogen oxidised is :

(1) 0.33 moles (2) 33.3 moles (3) 3.0 moles (4) 1.33 moles

42. The number of moles of electrons produced in the oxidation of 67.2 L of H_2 at STP is :

(1) 2 moles (2) 4 moles (3) 1 mole (4) 6 moles

43. The quantity of electricity produced in the oxidation of 67.2 L of H_2 at STP is :

(1) 96500 C (2) 579000 C (3) 193000 C (4) 48250 C

44. If the entire current produced is used for the electrodeposition of Silver (at.wt. 108 g mol^{-1}) from Silver (I) solution, the amount of silver deposited will be :

(1) 324 g (2) 648 g (3) 108 g (4) 216 g

SPACE FOR ROUGH WORK

45. The source of electrical energy on the Apollo moon flight was :

(1) Lead storage battery (2) A generator set

(3) Ni-Cd cells (4) H_2-O_2 Fuel cell

Read the following passage and answer the next five questions based on it.

Sc Ti V Cr Mn Fe Co Ni Cu Zn

Y Zr Nb Mo Tc Ru Rh Pd Ag Cd

La Hf Ta W Re Os Ir Pt Au Hg

In any transition series, as we move from left to right the d-orbitals are progressively filled and their properties vary accordingly.

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu

Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr

The above are the two series of f-block elements in which the chemical properties won't change much. The 5f-series elements are radioactive in nature and mostly are artificially synthesized in laboratories and thus much is not known about their chemical properties.

46. Identify the ***incorrect*** statement.

(1) Second ionisation enthalpy of Ag is greater than second ionisation enthalpy of Pd.

(2) Zr and Hf shares almost identical nuclear properties.

(3) Melting point of Mn is lower than that of Cr.

(4) Interstitial compounds are non-stoichiometric and neither ionic nor covalent in nature.

47. Which of the following is the correct order of second ionisation enthalpy ?

(1) V > Cr > Mn (2) V < Cr < Mn (3) V < Cr > Mn (4) V > Cr < Mn

48. Which of the following pair of compounds exhibits same colour in aqueous solution ?

(1) $FeCl_2$, $CuCl_2$ (2) $VOCl_2$, $CuCl_2$

(3) $VOCl_2$, $FeCl_2$ (4) $VOCl_2$, $MnCl_2$

49. Which metal has the highest oxidation state in the first row transition series ?

(1) Cr (2) Fe (3) Mn (4) V

50. Why do the actinoids exhibit higher number of oxidation states than lanthanoids ?

(1) 4f orbitals are more diffused than the 5f orbitals.

(2) Energy difference between 5f and 6d is less with respect to the energy difference between 4f and 5d.

(3) Energy difference between 5f and 6d is more with respect to the energy difference between 4f and 5d.

(4) Actinoids are more reactive in nature than the lanthanoids.

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SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

Read carefully the following instructions :

8. No candidate will be allowed to leave the OMR Answer Sheet blank. If any OMR Answer Sheet is found blank, it shall be crossed by the Invigilator with his/her signature, mentioning "Cancelled" on it.

9. Do not tear or fold any page of the Test Booklet and OMR Answer Sheet.

10. Candidates are advised to ensure that they fill the correct particulars on the OMR Answer Sheet, i.e., Application No., Roll No., Test Booklet No., Name, Mother's Name, Father's Name and Signature.

11. Rough work is to be done in the space provided for this purpose in the Test Booklet only.

12. The answers will be evaluated through electronic scanning process. Incomplete or incorrect entries may render the OMR Answer Sheet invalid.

13. Candidates are advised not to fold or make any stray marks on the OMR Answer Sheet. Use of Eraser, Nail, Blade, White Fluid/Whitener, etc., to smudge, scratch or damage in any manner the OMR Answer Sheet during examination is strictly prohibited. Candidature and OMR Answer Sheet of candidates using Eraser, Nail, Blade or White Fluid/Whitener to smudge, scratch or damage in any manner shall be cancelled.

14. There will be one copy of OMR Answer Sheet i.e., the Original Copy. After the examination is over, the candidate shall hand over the OMR Answer Sheet to the Invigilator. The candidate can take away the Test Booklet after the examination is over. If the candidate does not hand over the OMR Answer Sheet to the Invigilator and goes away with the OMR Answer Sheet, his/her candidature shall be cancelled and criminal proceedings shall also be initiated against him/her.

15. Candidates are advised strictly not to carry handkerchief, any mobile phone, any type of watch, belt or wear ornaments like ring, chain, ear-ring, etc., electronic or communication device, pen, pencil, eraser, sharpener and correction fluid to the Examination Centre. If any candidate is found possessing any such item, he/she will not be allowed to enter the examination centre. Possession of a mobile phone or any other aiding material as mentioned above by the candidate in the examination room will be treated as a serious violation and it may lead to cancellation of the candidature and debarring him/her from future examinations.

16. If a candidate violates any instructions or shows any indiscipline or misbehaviour, appropriate action will be taken including cancellation of candidature and debarring from future examinations.

17. Use of electronic/manual calculator is **not** allowed.

NATIONAL TESTING AGENCY

CUET (UG) 2024 : Final Answer Keys

Exam Date : 15.05.2024 Subject :306 - Chemistry (English)

Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key
Book : A		Book : A		Book : B		Book : B		Book : C		Book : C		Book : D		Book : D	
1	3	46	1	1	2	46	2	1	1	46	4	1	1	46	1
2	2	47	3	2	1	47	3	2	1	47	3	2	3	47	3
3	2	48	1	3	3	48	2	3	3	48	3	3	4	48	1
4	1	49	2	4	2	49	3	4	3	49	1	4	4	49	4
5	1	50	4	5	1	50	2	5	1	50	2	5	3	50	4
6	1			6	3			6	4			6	4		
7	1			7	1			7	4			7	2		
8	2,3			8	2			8	3			8	2		
9	2			9	4			9	4			9	4		
10	4			10	2			10	1			10	2		
11	4			11	1			11	4			11	3		
12	1			12	1			12	3			12	2		
13	3			13	3			13	4			13	3		
14	2			14	2			14	2			14	2		
15	1			15	1			15	2			15	2		
16	4			16	1			16	4			16	1		
17	3			17	2,3			17	2			17	3		
18	3			18	2			18	3			18	2		
19	1			19	4			19	2			19	1		
20	2			20	4			20	3			20	3		
21	3			21	1			21	2			21	1		
22	1			22	3			22	2			22	2		
23	1			23	2			23	1			23	4		
24	3			24	1			24	3			24	2		
25	1			25	4			25	2			25	1		
26	4			26	3			26	1			26	1		
27	4			27	3			27	3			27	3		
28	3			28	1			28	1			28	2		
29	4			29	2			29	2			29	1		
30	1			30	3			30	4			30	1		
31	4			31	1			31	2			31	2,3		
32	3			32	1			32	1			32	2		
33	4			33	3			33	1			33	4		
34	2			34	1			34	3			34	4		
35	2			35	4			35	2			35	1		
36	4			36	4			36	1			36	3		
37	2			37	3			37	1			37	2		
38	3			38	4			38	2,3			38	1		
39	2			39	1			39	2			39	4		
40	3			40	4			40	4			40	3		
41	2			41	3			41	4			41	3		
42	2			42	4			42	1			42	1		
43	1			43	2			43	3			43	2		
44	3			44	2			44	2			44	3		
45	2			45	4			45	1			45	1		