Test Booklet No.

Subject : CHEMISTRY
Code : 306 E (New)
Medium : English

Test Booklet Code

A

(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 **A**. 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. What product is obtained when chloroform reacts with oxygen in presence of light ?

(1) Phosgene gas (2) Phosphine gas

(3) Chlorine gas (4) Hydrogen gas

2. Which among the following is a trihydric alcohol ?

(1) Ethanol (2) Glycerol

(3) Ethylene Glycol (4) Phenol

3. Aspirin is also known as :

(1) Salicylic acid (2) Ethyl Salicylic acid

(3) Methyl Salicylic acid (4) Acetyl Salicylic acid

4. What is the IUPAC name of picric acid ?

(1) 2-Nitrophenol (2) 2,4,6-Trinitrophenol

(3) Ethyl Salicylic acid (4) 2 aminophenol

5. Why does Fluorine exhibit only –1 oxidation state ?

(1) It is a halogen. (2) It is a non-metal.

(3) It is small in size. (4) It has no d orbitals.

6. Which among the following halogen exists in liquid state at room temperature ?

(1) Fluorine (2) Chlorine

(3) Bromine (4) Iodine

7. The central atoms/ions in the coordination compounds are referred as _____.

(1) Lewis base (2) Lewis acid

(3) Bronsted acid (4) Bronsted base

8. What is the IUPAC name of $[Pt(NH_3)_2Cl(NO_2)]$?

(1) Diamminechloridonitrito-N-platinum(II)

(2) Diamminechloridenitrito-N-platinum(III)

(3) Diamminechloridonitrito-O-platinum(II)

(4) Diammonia chloridonitrito-N-platinum(II)

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9. What is the product when glucose reacts with bromine water ?

(1) Gluconic acid (2) Glyceraldehyde

(3) Saccharic acid (4) Oxime

10. Match **List I** with **List II** for the oxidation state of central atoms :

List-I	**List-II**
(A) $Cr_2O_7^{2-}$	(I) +3
(B) MnO_4^-	(II) +5
(C) VO_3^-	(III) +7
(D) FeF_6^{3-}	(IV) +6

Choose the correct answer from the options given below :

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

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

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

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

11. What is the colour of copper compound formed in Fehling's test for aliphatic aldehydes ?

(1) Green (2) Blue

(3) Yellow (4) Red brown

12. What is the major product formed when diazonium salt undergoes Gatterman reaction ?

(1) Haloarene (2) Aryl amine

(3) Phenol (4) Diphenyl ether

13. What is the major product of Carbylamine reaction ?

(1) Cyanide (2) Isocyanide

(3) Nitrile (4) Alkane

14. Which among the following is an essential amino acid ?

(1) Glycine (2) Alanine

(3) Valine (4) Serine

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15. Arrange the following in increasing order of their pH values :

(A) p-Nitrophenol (B) m-Cresol

(C) m-Nitrophenol (D) Phenol

Choose the correct answer from the options given below :

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

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

16. Which among the following is a biodegradable polymer ?

(1) PVC (2) Freon

(3) Nylon (4) PHBV

17. Which among the following is an antacid ?

(1) Aspirin (2) Zantac

(3) Equanil (4) Noradrenaline

18. What is the numerical value of one Faraday in Coloumbs ?

(1) 96587 (2) 96487

(3) 99500 (4) 6.023

19. A first order reaction has a half-life of 693 sec. What will be its rate constant ?

(1) $0.01\ sec^{-1}$ (2) $1\ sec^{-1}$

(3) $0.001\ sec^{-1}$ (4) $0.1\ sec^{-1}$

20. 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)

21. Which among the following is a strong field ligand ?

(1) I^- (2) Cl^-

(3) NH_3 (4) SCN^-

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22. Arrange the following in increasing order of their osmotic pressure generation at 298 K :

(The cell wall is permeable to water and not to the solute molecules)

(A) If a cell containing 0.5 moles of solute dissolved in 1 L of water is immersed in pure water.

(B) If a cell containing 0.25 moles of solute dissolved in 1 L of water is immersed in pure water.

(C) If a cell containing 0.1 moles of solute dissolved in 0.01 L of water is immersed in pure water.

(D) If a cell containing 0.2 moles of solute dissolved in 0.05 L of water is immersed in pure water.

Choose the correct answer from the options given below :

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

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

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

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

23. Arrange the following rate constant units in increasing order of their order of reaction :

(A) sec^{-1}

(B) $mol\ L^{-1}\ sec^{-1}$

(C) $mol^{-1}\ L\ sec^{-1}$

(D) $mol^{-2}\ L^{2}\ sec^{-1}$

Choose the correct answer from the options given below :

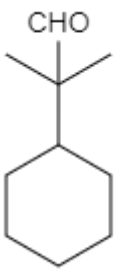
(1) (C) < (A) < (B) < (D)

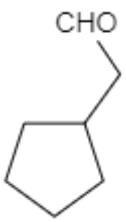
(2) (C) < (B) < (A) < (D)

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

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

24. Which of the following compounds will undergo Aldol condensation reaction ?

(A) 

(B) 

(C) $CH_3\text{-}CH_2\text{-}C(CH_3)_2\text{-}CH_2\text{-}CHO$

(D) HCHO

Choose the correct answer from the options given below :

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

(2) (B) and (C) only

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

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

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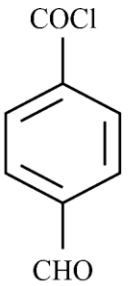
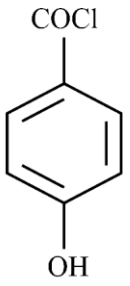
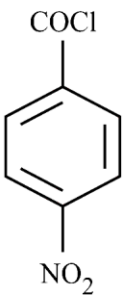
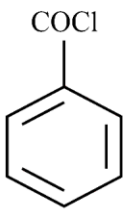
25. Consider the following compounds :

(A) 

(B) 

(C) 

(D) 

Arrange these compounds in the increasing order of rate of hydrolysis :

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

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

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

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

26. Which of the following ions will be coloured in the aqueous solution ?

(A) Ti^{3+} (B) Nb^{3+}

(C) Cu^{+} (D) Y^{3+}

Choose the correct answer from the options given below :

(1) (C) and (D) only

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

(3) (A) and (B) only

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

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27. The correct statement/statements from the options given below is/are :

(A) Diazonium salts of aromatic amines are less stable than diazonium salts of aliphatic amines.

(B) Ethylamine is insoluble in water.

(C) Gabriel phthalimide synthesis can be used to prepare primary amines.

(D) Beacuse of +R-effect of $-NH_2$ group, aniline will undergo Friedel-Crafts acylation reaction.

Choose the correct answer from the options given below :

(1) (A) and (B) only

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

(3) (A) and (C) only

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

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

List-I	**List-II**
(A) Mn^{2+}	(I) Pyrolusite ore
(B) Spin only Magnetic Moment	(II) An alloy of 4f metal, iron and traces of S, C, Al and Ca
(C) MnO_2	(III) $\mu_s = \sqrt{n(n+2)}$ BM
(D) Misch metal	(IV) Highest oxidation states

Choose the correct answer from the options given below :

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

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

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

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

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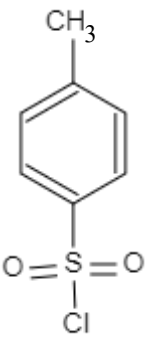
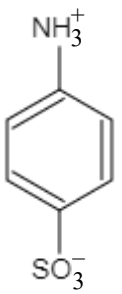
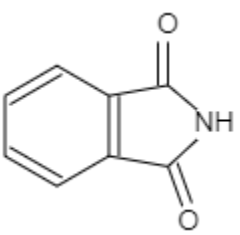
29. Match **List-I** with **List-II** :

List-I (Compound)	**List-II (Property)**
(A) $COCl_2$	(I) To distinguish between primary, secondary and tertiary amines
(B) 	(II) Poisonous gas
(C) 	(III) Synthesis of primary amines
(D) 	(IV) Zwitter ion

Choose the correct answer from the options given below :

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

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

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

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

SPACE FOR ROUGH WORK

30. Which of the following is/are the bases of DNA ?

(A) Adenine (B) Uracil

(C) Thymine (D) Cytosine

Choose the correct answer from the options given below :

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

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

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

List-I (Amino Acid)	**List-II (Nature of Amino Acid)**
(A) Valine	(I) Basic amino acid
(B) Glycine	(II) Neutral optically active amino acid
(C) Lysine	(III) Acidic amino acid
(D) Glutamic acid	(IV) Neutral optically inactive amino acid

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

32. Which of the following gases at 298 K and 1 atm pressure is having maximum solubility in water ?

(1) Methanal, $K_H = 0.000018$

(2) Argon, $K_H = 40.3$

(3) Methane, $K_H = 0.41$

(4) CO_2, $K_H = 1.6$

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33. Which of the following solvents is having its lowest Ebullioscopic constant ?

Solvent	**Boiling Point (K)**
Chloroform	334.4
Diethyl Ether	307.8
Benzene	353.3
Carbon disulphide	319.4

(1) Chloroform (2) Diethyl Ether

(3) Benzene (4) Carbon disulphide

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

Aldehydes are generally more reactive than ketones in nucleophilic addition reactions due to steric and electronic reasons. Sterically, the presence of two large groups in ketones hinders the attack of nucleophile to carbonyl carbon than in aldehydes. Electronically, aldehydes are more reactive than ketones because two alkyl groups reduce the electrophilicity of the carbonyl carbon more effectively than in the former.

34. Which among the following compound is formed, when aldehyde reacts with HCN in presence of base ?

(1) Cyanide (2) Isocyanide

(3) Cyanohydrin (4) Hydrogen cyanide

35. The correct decreasing order of basic strength of following amines in aqueous solution is :

CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$, NH_3

(1) $CH_3NH_2 > (CH_3)_2NH > NH_3 > (CH_3)_3N$

(2) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N > NH_3$

(3) $NH_3 > (CH_3)_3N > (CH_3)_2NH > CH_3NH_2$

(4) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > NH_3$

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36. A new C-C bond formation is possible in :

(A) Cannizzaro reaction

(B) Friedel-Crafts alkylation

(C) Clemmensen reduction

(D) Riemer-Tiemann reaction

Choose the correct answer from the options given below :

(1) (B) and (D) only

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

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

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

37. Which of the following will respond to Tollen's test ?

(1) Ethanoic acid

(2) Methanoic acid

(3) Propanoic acid

(4) Butanoic acid

38. The order of reactivity of the given haloalkanes towards nucleophile is

(1) RI > RBr > RCl

(2) RCl > RBr > RI

(3) RBr > RCl > RI

(4) RBr > RI > RCl

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

The transition metals are very hard and have low volatility. Their melting and boiling points are high. In any row, the melting points of these metals rise to a maximum at d^5 and fall regularly as atomic number increases. The high melting points of these metals are attributed to the involvement of greater number of electrons from (n – 1)d in addition to ns electrons in the interatomic metallic bonding.

39. Which transition metal is liquid at room temperature ?

(1) Hg (2) Cu

(3) Ag (4) Au

40. Which is the hardest metal ?

(1) Zn (2) Cu

(3) Hg (4) Cd

41. In any row, melting points of these metals rise to a maximum at d^5. Which transition metal is an exception ?

(1) Ti (2) V

(3) Cr (4) Mn

42. Which transition metal has the highest melting point ?

(1) Hf (2) Ta

(3) W (4) Re

43. How many electrons are needed in reduction of $Cr_2O_7^{2-}$ to Cr^{3+} ?

(1) One (2) Six

(3) Five (4) Eight

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44. Which among the following compounds show metal excess defect due to anionic vacancy ?

(1) ZnO (2) NaCl

(3) FeO (4) CdO

45. Molal elevation constant is also known as :

(1) Ebullioscopic constant (2) Gas constant

(3) Henry's constant (4) Cryoscopic constant

46. What is the overall order of the reaction ?

Rate = $k[A]^{1/2}[B]^{3/2}$

(1) 2 (2) 0

(3) 1 (4) 0.5

47. Which term of molar conductivity is used when the concentration of electrolyte approaches to zero ?

(1) Infinite molar conductivity

(2) Zero molar conductivity

(3) Standard molar conductivity

(4) Limiting molar conductivity

48. Kohlrausch law is related to which of the following term ?

(1) Osmosis (2) Diffusion

(3) Effusion (4) Migration of ions

49. Which factor in Arrhenius equation, corresponds to fraction of molecules having kinetic energy greater than activation energy ?

(1) *ln* k (2) *ln* A

(3) RT (4) $e^{-Ea/RT}$

50. What is the another term used for probability factor (P) in collision theory ?

(1) Temperature factor (2) Compressibility factor

(3) Steric factor (4) Concentration factor

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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.