Test Paper : **II**

Test Subject : **CHEMICAL SCIENCE**

Test Subject Code : **K-2714**

Test Booklet Serial No. : _____

OMR Sheet No. : _____

Roll No. | | | | | | | | |

(Figures as per admission card)

Name & Signature of Invigilator/s

Signature : _____ Signature : _____

Name : _____ Name : _____

Paper : II

Subject : CHEMICAL SCIENCE

Time : 1 Hour 15 Minutes Maximum Marks : 100

Number of Pages in this Booklet : **8** Number of Questions in this Booklet : **50**

ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು

1. ಈ ಪುಟದ ಮೇಲ್ತುದಿಯಲ್ಲಿ ಒದಗಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ನಿಮ್ಮ ರೋಲ್ ನಂಬರನ್ನು ಬರೆಯಿರಿ.
2. ಈ ಪತ್ರಿಕೆಯು ಬಹು ಆಯ್ಕೆ ವಿಧದ ಐವತ್ತು ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ.
3. ಪರೀಕ್ಷೆಯ ಪ್ರಾರಂಭದಲ್ಲಿ, ಪ್ರಶ್ನೆಪುಸ್ತಿಕೆಯನ್ನು ನಿಮಗೆ ನೀಡಲಾಗುವುದು. ಮೊದಲ 5 ನಿಮಿಷಗಳಲ್ಲಿ ನೀವು ಪುಸ್ತಿಕೆಯನ್ನು ತೆರೆಯಲು ಮತ್ತು ಕೆಳಗಿನಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಪರೀಕ್ಷಿಸಲು ಕೋರಲಾಗಿದೆ.
   (i) ಪ್ರಶ್ನೆ ಪುಸ್ತಿಕೆಗೆ ಪ್ರವೇಶಾವಕಾಶ ಪಡೆಯಲು, ಈ ಹೊದಿಕೆ ಪುಟದ ಅಂಚಿನ ಮೇಲಿರುವ ಪೇಪರ್ ಸೀಲನ್ನು ಹರಿಯಿರಿ. ಸ್ಟಿಕ್ಕರ್ ಸೀಲ್ ಇಲ್ಲದ ಪ್ರಶ್ನೆಪುಸ್ತಿಕೆ ಸ್ವೀಕರಿಸಬೇಡಿ. ತೆರೆದ ಪುಸ್ತಿಕೆಯನ್ನು ಸ್ವೀಕರಿಸಬೇಡಿ.
   (ii) **ಪುಸ್ತಿಕೆಯಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ ಮತ್ತು ಪುಟಗಳ ಸಂಖ್ಯೆಯನ್ನು ಮುಖಪುಟದ ಮೇಲೆ ಮುದ್ರಿಸಿದ ಮಾಹಿತಿಯೊಂದಿಗೆ ತಾಳೆ ನೋಡಿರಿ. ಪುಟಗಳು/ ಪ್ರಶ್ನೆಗಳು ಕಾಣೆಯಾದ, ಅಥವಾ ದ್ವಿಪ್ರತಿ ಅಥವಾ ಅನುಕ್ರಮವಾಗಿಲ್ಲದ ಅಥವಾ ಇತರ ಯಾವುದೇ ವ್ಯತ್ಯಾಸದ ದೋಷಪೂರಿತ ಪುಸ್ತಿಕೆಯನ್ನು ಕೂಡಲೆ 5 ನಿಮಿಷದ ಅವಧಿ ಒಳಗೆ, ಸಂವೀಕ್ಷಕರಿಂದ ಸರಿ ಇರುವ ಪುಸ್ತಿಕೆಗೆ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬೇಕು. ಆ ಬಳಿಕ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಬದಲಾಯಿಸಲಾಗುವುದಿಲ್ಲ, ಯಾವುದೇ ಹೆಚ್ಚು ಸಮಯವನ್ನೂ ಕೊಡಲಾಗುವುದಿಲ್ಲ.**
4. ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೂ (A), (B), (C) ಮತ್ತು (D) ಎಂದು ಗುರುತಿಸಿದ ನಾಲ್ಕು ಪರ್ಯಾಯ ಉತ್ತರಗಳಿವೆ. ನೀವು ಪ್ರಶ್ನೆಯ ಎದುರು ಸರಿಯಾದ ಉತ್ತರದ ಮೇಲೆ, ಕೆಳಗೆ ಕಾಣಿಸಿದಂತೆ ಅಂಡಾಕೃತಿಯನ್ನು ಕಪ್ಪಾಗಿಸಬೇಕು.
   ಉದಾಹರಣೆ: (A) (B) ● (D)
   (C) ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದಾಗ.
5. ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ರಲ್ಲಿ ಕೊಟ್ಟಿರುವ OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ, **ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ಮತ್ತು ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ II ರಲ್ಲಿ ಇರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ನಿಮ್ಮ ಉತ್ತರಗಳನ್ನು ಸೂಚಿಸತಕ್ಕದ್ದು.** OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಅಂಡಾಕೃತಿಯಲ್ಲದೆ ಬೇರೆ ಯಾವುದೇ ಸ್ಥಳದಲ್ಲಿ ಉತ್ತರವನ್ನು ಗುರುತಿಸಿದರೆ, ಅದರ ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುವುದಿಲ್ಲ.
6. OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಕೊಟ್ಟ ಸೂಚನೆಗಳನ್ನು ಜಾಗರೂಕತೆಯಿಂದ ಓದಿರಿ.
7. ಎಲ್ಲಾ ಕರಡು ಕೆಲಸವನ್ನು ಪುಸ್ತಿಕೆಯ ಕೊನೆಯಲ್ಲಿ ಮಾಡತಕ್ಕದ್ದು.
8. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಬಹುದಾದ ನಿಮ್ಮ ಹೆಸರು ಅಥವಾ ಯಾವುದೇ ಚಿಹ್ನೆಯನ್ನು, ಸಂಗತವಾದ ಸ್ಥಳ ಹೊರತು ಪಡಿಸಿ, OMR ಉತ್ತರ ಹಾಳೆಯ ಯಾವುದೇ ಭಾಗದಲ್ಲಿ ಬರೆದರೆ, ನೀವು ಅನರ್ಹತೆಗೆ ಬಾಧ್ಯರಾಗಿರುತ್ತೀರಿ.
9. ಪರೀಕ್ಷೆಯು ಮುಗಿದನಂತರ, ಕಡ್ಡಾಯವಾಗಿ OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ಸಂವೀಕ್ಷಕರಿಗೆ ನೀವು ಹಿಂತಿರುಗಿಸಬೇಕು ಮತ್ತು ಪರೀಕ್ಷಾ ಕೊಠಡಿಯ ಹೊರಗೆ OMR ನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ಕೊಂಡೊಯ್ಯ ಕೂಡದು.
10. ಪರೀಕ್ಷೆಯ ನಂತರ, ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
11. **ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್‌ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.**
12. **ಕ್ಯಾಲ್ಕುಲೇಟರ್ ಅಥವಾ ಲಾಗ್ ಟೇಬಲ್ ಇತ್ಯಾದಿಯ ಉಪಯೋಗವನ್ನು ನಿಷೇಧಿಸಲಾಗಿದೆ.**
13. **ಸರಿ ಅಲ್ಲದ ಉತ್ತರಗಳಿಗೆ ಋಣ ಅಂಕ ಇರುವುದಿಲ್ಲ.**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
   (i) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
   (ii) **Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.
   Example : (A) (B) ● (D)
   where (C) is the correct response.
5. Your responses to the questions are to be indicated in the **OMR Sheet kept inside the Paper I Booklet only**. If you mark at any place other than in the ovals in the Answer Sheet, it will not be evaluated.
6. Read the instructions given in OMR carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the test OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must NOT carry it with you outside the Examination Hall.
10. You can take away question booklet and carbon copy of OMR Answer Sheet soon after the examination.
11. **Use only Blue/Black Ball point pen.**
12. **Use of any calculator or log table etc., is prohibited.**
13. **There is no negative marks for incorrect answers.**

CHEMICAL SCIENCE
Paper – II

Note : This paper contains **fifty (50)** objective type questions. **Each** question carries **two (2)** marks. **All** questions are **compulsory**.

1. The cyclopentadienyl groups in $C_{P_4}T_i$ are

(A) all η^5

(B) two η^1 and two η^5

(C) all η^1

(D) one η^1 and three η^5

2. Identify the species isolobal to CH

(A) $Co(CO)_3$ (B) $Cr(CO)_4$

(C) $Mn(CO)_5$ (D) $Co(CO)_4$

3. The coordination number and geometry of $[Ce(NO_3)_6]^{2-}$ are

(A) 6 and octahedral

(B) 12 and icosahedron

(C) 8 and decahedron

(D) 10 and dodecahedron

4. ^{19}F NMR spectrum of PF_5 gives

(A) Two singlets

(B) A doublet and a triplet

(C) Two doublets and three singlets

(D) A doublet

5. The metal present in carboxypeptidase is

(A) Fe (B) Cu

(C) Zn (D) Ni

6. The styx numbers of B_5H_9 are

(A) 4012 (B) 4120

(C) 4210 (D) 2410

7. Which among the following is planar ?

(A) $(PNF_2)_4$ (B) $(PNCl_2)_4$

(C) $(PNBr_2)_4$ (D) $(PNMe_2)_4$

8. Identify the strongest acid

(A) HClO (B) $HClO_2$

(C) $HClO_3$ (D) $HClO_4$

9. Identify the non-aromatic species among the following

(A) S_4N_4 (B) S_2N_2

(C) $S_3N_3^-$ (D) $S_4N_4^{2-}$

10. When back-donation from metal to CO in metal carbonyl increases, then

(A) Both M – C and $C \equiv O$ bonds become stronger

(B) Both M – C and $C \equiv O$ bond lengths become shorter

(C) M – C bond becomes stronger and $C \equiv O$ bond becomes weaker

(D) Both M – C and $C \equiv O$ bond lengths become longer

11. The number of signals expected for $[Cu(NH_3)]^{2+}$ in (Nuclear spin (I) of Cu = $3/2$ and N = 1)

(A) 12 (B) 15
(C) 30 (D) 36

12. The temperature levels of nuclear reactors are maintained primarily by the use of

(A) Shielding
(B) Moderators
(C) Coolants
(D) Control rods

13. The oxidation state of iron in met-haemoglobin is

(A) Three (B) Two
(C) Four (D) Zero

14. Spin-orbit coupling is shown by which d electron configuration ?

(A) $t_{2g}^6\ eg^2$ (B) $t_{2g}^6\ eg^0$
(C) $t_{2g}^4\ eg^0$ (D) $t_{2g}^3\ eg^2$

15. Cerium shows oxidation states of

(A) 2 and 4 (B) 3 and 4
(C) 4 and 5 (D) 2 and 3

16. The zero point energy of an electron is equal to

(A) $\frac{h^2}{2ma^2}$ (B) $\frac{h^2}{4ma^2}$
(C) $\frac{h^2}{8ma^2}$ (D) $\frac{h^2}{16ma^2}$

17. An acceptable wave function must be

(A) Continuous, have a continuous first derivative, be single valued and be square integrable
(B) Discontinuous, have a discontinuous first derivative, be single valued and be square integrable
(C) Continuous, have a continuous first derivative, be of any value and no restrictions in square integrability
(D) Both (B) and (C)

18. The molecular orbitals formed from two 1S atomic orbitals by symmetric mode of linear combination is called

(A) σ (1s) (B) π (1s)
(C) σ^* (1s) (D) π^* (1s)

19. The molecule of H_2O belongs to the point group of

(A) D_4 (B) C_{3V}
(C) C_2 (D) C_{2V}

20. Which of the molecule does not show vibrational absorption spectra ?

(A) CO_2 (B) H_2O
(C) C_6H_6 (D) N_2

21. The property which is not intensive variable

(A) Temperature
(B) Pressure
(C) Dielectric constant
(D) Enthalpy

22. Stirling's approximation is

(A) $\ln x! \simeq x \ln x - x$

(B) $\ln x \simeq x \ln x - x$

(C) $\ln x ! \simeq \ln x - x$

(D) $\ln x ! \simeq x \ln x$

23. When one ampere current flows for one second through a conductor this quantity of electricity is called

(A) Faraday (B) Coulomb

(C) EMF (D) Ohm

24. The standard potential of Cu/Cu^{2+} electrode is 0.337 V. It corresponds to the reaction

(A) $Cu \rightarrow Cu^{2+} + 2e^-$

(B) $\frac{1}{2}Cu^{2+} + e^- \rightarrow \frac{1}{2}Cu$

(C) $Cu^{2+} + 2e^- \rightarrow Cu$

(D) $Cu^{2+} + e^- \rightarrow Cu^+$

25. The conversion of molecules of A and B follows a second order Kinetics, doubling the concentration of A will increase the rate of formation of B by a factor of

(A) 2 (B) 4

(C) $\frac{1}{2}$ (D) $\frac{1}{4}$

26. Which one of the reaction is unimolecular

(A) $2HI \rightarrow H_2 + I_2$

(B) $N_2O_5 \rightarrow N_2O_4 + \frac{1}{2}O_2$

(C) $H_2 + Cl_2 \rightarrow 2HCl$

(D) $PCl_3 + Cl_2 + PCl_5$

27. Which of the statement is true ?

(A) For n = 1, BET isotherm gives the Langmuir isotherm

(B) For n = 1, BET isotherm gives the Fruendlich isotherm

(C) For n = 0, BET isotherm gives the Langmuir isotherm

(D) For n = 2 BET isotherm gives the Langmuir isotherm

28. In a crystal, the atoms are located at the position of

(A) Maximum P.E.

(B) Minimum P.E.

(C) Zero P.E.

(D) Indefinite P.E.

29. Polydispersity Index (PDI) is the ratio of

(A) $\frac{\overline{M}_w}{\overline{M}_n}$ (B) $\frac{\overline{M}_n}{\overline{M}_w}$

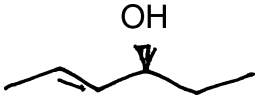
(C) $\frac{M_w}{M_n}$ (D) $\frac{M_n}{M_w}$

30. An analysis gave a result of 38.42 g against the supposedly true value of 38.00 g. The absolute error will be

(A) – 0.42 (B) 0.42

(C) 4.2 (D) 42

31. IUPAC name of the following compound is



(A) (E, 4S) – Hept – 5 – en – 4 – ol

(B) (E, 4S) – Hept – 2 – en – 4 – ol

(C) (E, 4R) – Hept – 5 – en – 4 – ol

(D) (E, 4R) – Hept – 2 – en – 4 – ol

32. Which is a meso compound ?

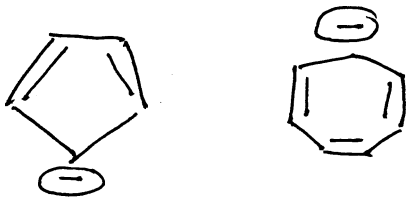
(A) (2R, 3R) – 2, 3 – Dibromobutane

(B) (2R, 3S) – 2, 3 – Dibromopentane

(C) (2R, 4S) – 2, 4 – Dibromopentane

(D) (2R, 4R) – 2, 4 – Dibromopentane

33. Which of the following statement is correct ?



I II

I and II are

(A) Both aromatic

(B) Antiaromatic and aromatic

(C) Aromatic and antiaromatic

(D) Both antiaromatic

34. Which of the following carbenes are electrophilic in character ?

i) $:CH_2$ ii) $:CBr_2$

iii) $:CCl_2$ iv) $:CHOCH_3$

(A) only i

(B) i and ii

(C) i, ii and iv

(D) i, ii and iii

35. Hydrolysis of an ester is an example of

(A) Elimination

(B) Addition

(C) Oxidation

(D) Substitution

36. The conversion of $-COCH_2-$ to $-CH_2-CH_2-$ rising Zn/Hg and HCl is known as Clemmensen reduction an alternative for the same conversion is known as

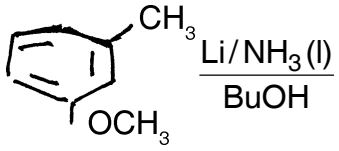
(A) Birch reduction

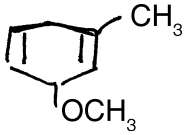
(B) Wolf. Kishner reduction

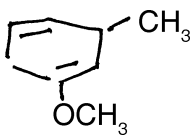
(C) MPV reduction

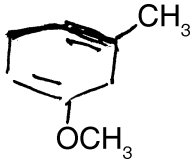
(D) Rosenmund reduction

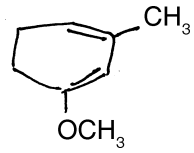
37. The major product of the following reaction is



(A) 

(B) 

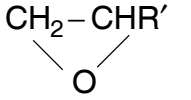
(C) 

(D) 

38. The synthetic equivalent of the synthon $O=\underset{(+)}{C}-OR'$ is

(A) $ClCO_2R'$ and $ROCOO\ R'$

(B) CH_3COCH_2R'

(C) 

(D) $R'COOEt$

39. Chiral auxiliary is

(A) Meso tartaric acid

(B) Glycine

(C) 1, 4 – Di bromobutane

(D) BINAP

40. The reaction of Hexa - 1, 3, 5 – triene to give cyclohexa – 1, 3 – diene is an example of

(A) Electrocyclic reaction

(B) Cyclo addition

(C) Sigmatropic reaction

(D) Cheleotropic reaction

41. The reagent used to convert pyrrole in to 2–Acylpyrrole is

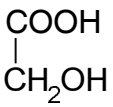
(A) CH_3COOH/HCl

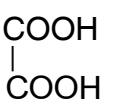
(B) Di Methyl acetamide / $POCl_3$

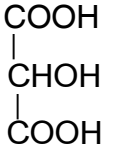
(C) CH_3COCH_3/HCl

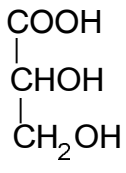
(D) Acetophenone/H_2SO_4

42. When Methyl 2 - D - Glucopyranoside is treated with HIO_4 followed by Br_2/H_2O and H_3O^+, the acid formed is

(A) 

(B) 

(C) 

(D) 

43. In the mass spectrum of dichlorobenzene the ratio of the peaks of $^{m}/_{2}$ 146, 148 and 150 is

(A) 1 : 1 : 1

(B) 3 : 3 : 1

(C) 1 : 2 : 1

(D) 9 : 6 : 1

44. The antimalarial among the following is

(A) Chloroquin

(B) Penicillin

(C) Streptomycin

(D) Paracetamol

45. Global warming is also called as

(A) BOD

(B) COD

(C) Green House Effect

(D) Ozone depletion

46. Food poisoning is caused by

(A) Clostridium Botulinum

(B) Salmonella Typhoid

(C) Clostridium Tetani

(D) Pencillium Notatum

47. An example of charge transfer complex is derived from

(A) Aniline and HCl

(B) Phenol and NaOH

(C) Benzaldehyde and Aniline

(D) Picric acid and Anthracene

48. Nanopalladium catalyst is excellent for Heck reaction because of

(A) Purple colour

(B) Dissolution character

(C) Increased surface area

(D) Heavy nature

49. Oct-4-ene shows C = C frequency in the range

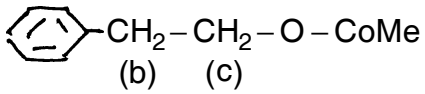
(A) No peak in this range

(B) 1680 – 1600 cm^{-1} (very weak)

(C) 1680 – 1600 cm^{-1} (strong)

(D) 1680 – 1600 cm^{-1} (medium)

50. The spin system of $-CH_2-CH_2-$ (The chemical shifts of b, (δ 3.0) and c (δ 4.2)).



(A) A_2X_2

(B) A_2B_2

(C) A_2M_2

(D) AA′BB′

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Space for Rough Work