Test Paper : **II**

Test Subject : **CHEMICAL SCIENCE**

Test Subject Code : **K-2716**

Test Booklet Serial No. : _____

OMR Sheet No. : _____

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

(Figures as per admission card)

Name & Signature of Invigilator/s

Signature : _____

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 ನಿಮಗೆನೀಡಲಾಗುವುದು. ಮೊದಲ5 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 ಅಥವಾ 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 ಕೂಡಲೆ5 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 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 ಹೊರತುಪಡಿಸಿ, 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 ಕೊಂಡೊಯ್ಯಕೂಡದು.
10. ಪರೀಕ್ಷೆಯ ನಂತರ, ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
11. **ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್‌ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.**
12. **ಕ್ಯಾಲ್ಕುಲೇಟರ್, ವಿದ್ಯುನ್ಮಾನ ಉಪಕರಣ ಅಥವಾ ಲಾಗ್ ಟೇಬಲ್ ಇತ್ಯಾದಿಯ ಉಪಯೋಗವನ್ನು ನಿಷೇಧಿಸಲಾಗಿದೆ.**
13. **ಸರಿ ಅಲ್ಲದ ಉತ್ತರಗಳಿಗೆ ಋಣ ಅಂಕ ಇರುವುದಿಲ್ಲ.**
14. **ಕನ್ನಡ ಮತ್ತು ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಗಳಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ವ್ಯತ್ಯಾಸಗಳು ಕಂಡುಬಂದಲ್ಲಿ, ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳಲ್ಲಿರುವುದೇ ಅಂತಿಮವೆಂದು ಪರಿಗಣಿಸಬೇಕು.**

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 the cover page. Do not accept a booklet without sticker seal or 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 circle 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 circles in the OMR 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 after the examination.
11. **Use only Blue/Black Ball point pen.**
12. **Use of any calculator, Electronic gadgets or log table etc., is prohibited.**
13. **There is no negative marks for incorrect answers.**
14. **In case of any discrepancy found in the Kannada translation of a question booklet the question in English version shall be taken as final.**

CHEMICAL SCIENCE
Paper – II

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

1. The electronegativity difference is the highest for the pair

(A) Na, Cl (B) Li, F

(C) Li, Cl (D) K, F

2. The hybridisation of orbitals of N atom in NO_3^-, NO_2^+ and NH_4^+ are respectively

(A) sp^2, sp, sp^3 (B) sp, sp^2, sp^3

(C) sp^3, sp^3, sp (D) sp^2, sp^3, sp^3

3. Based on the principle of HSAB, which of the following is best suited for Li^+ and Hg^{2+} ?

(A) O and S (B) S and O

(C) N and O (D) O and N

4. The most symmetrical isomer/isomers of closo – $B_{10}C_2H_{12}$ is/are

(A) 1, 2 – isomer

(B) 1, 7 – isomer

(C) 1, 12 – isomer

(D) 1, 2 – and 1, 12 isomers

5. The pre requisite for stability of square planar Ni^{2+}, Pt^{2+} and Pd^{2+} complexes is

(A) Presence of nonbulky, strong ligands with π bond sufficiently

(B) Presence of bulky and strong ligands

(C) Presence of nonbulky and weak ligands which σ bond sufficiently

(D) Presence of bulky and weak ligands which σ bond sufficiently

6. The complexes $[Ag\ L_4]^{2+}$, $[Ag\ L_4]^{3+}$ and $[Ag\ L_6]^{2+}$ where L is a neutral monodentate ligand expected to be

(A) Paramagnetic

(B) Paramagnetic, diamagnetic and paramagnetic

(C) Diamagnetic, paramagnetic and diamagnetic

(D) Paramagnetic, Paramagnetic and diamagnetic

7. Consider the following statements with respect to lanthanides.

a. The basic strength of hydroxides of lanthanides increases from $La(OH)_3$ to $Lu(OH)_3$

b. The lanthanide ions, Lu^{3+}, Yb^{2+} and Ce^{4+} are diamagnetic.

Which of the following is/are correct ?

(A) b only

(B) a only

(C) Both a and b

(D) Neither a nor b

8. The catalytic species involved in the conversion of ethylene to acetaldehyde in the Wacker process is

(A) $Ti\ Cl_4 / Et_3\ Al$

(B) $[Rh\ Cl\ (PPh_3)_3]$

(C) <u>trans</u> – $[Ir\ Cl(CO)\ (PPh_3)_2]$

(D) $[Pd\ Cl_4]^{2-}$

9. In Ziegler-Natta catalysis, the following catalyst system is used

(A) $TiCl_4$ $Al(OEt)_3$

(B) $TiCl_4$, Pd

(C) $TiCl_4$, $AlCl_3$

(D) $TiCl_4$, $Al(C_2H_5)_3$

10. Choose the correct statements on ZSM – 5 from the following.

(i) It is a shape selective catalyst

(ii) It can be used to convert methanol to gasoline

(iii) It can be used to manufacture p-xylene from toluene and methanol

(A) (i) and (ii) only

(B) (i) and (iii) only

(C) All of (i) (ii) and (iii)

(D) (ii) and (iii) only

11. A solute 'X' has a distribution ratio (K_D) between H_2O and $CHCl_3$ of 5.0. A 50.0 mL sample of a 0.05 M aqueous solution of the solute is extracted with 15 mL of $CHCl_3$. What is the extraction efficiency for this separation ?

(A) 94.34% (B) 50.0%

(C) 75.0% (D) 60.0%

12. One of the basic conditions of cyclic voltammetry experiment is

(A) Two electrodes system, inert atmosphere, supporting electrolytie, stirring condition

(B) Three electrodes system, inert atmosphere, supporting electrolyte, stirring condition

(C) Three electrodes system, inert atmosphere, supporting electrolyte, rest condition

(D) Two electrodes system, inert atmosphere, support electrolyte high temperature

13. Which of the following is known as a detoxifying agent ?

(A) Cytochrome – C

(B) Superoxide dismutase

(C) Cytochrome P_{450}

(D) Peroxidase

14. Cytochromes, ferredoxins and hemerythrin contain the following active sites respectively

(A) Heme, nonheme and heme

(B) Nonheme, nonheme and nonheme

(C) Heme, nonheme and nonheme

(D) Heme, heme and nonheme

15. Which of the following techniques is suitable to know whether a compound is a monomer, dimer or trimer ?

(A) NMR spectroscopy

(B) Absorption spectroscopy

(C) ESI-MS

(D) IR-spectroscopy

16. Among ^{57}Fe, ^{119}Sn, ^{60}Co and ^{197}Au, which can act as Mössbauer nuclei/ nucleus ?

(A) ^{57}Fe, ^{119}Sn and ^{60}Co

(B) ^{57}Fe, ^{119}Sn and ^{197}Au

(C) ^{57}Fe and ^{119}Sn

(D) ^{57}Fe only

17. In the analysis of an element by neutron activation, the favorable characteristics of both the target and the product are from the following :

i. Long half-life of the product

ii. High neutron cross-section area of target

iii. Low neutron cross-section area of target

(A) (i) and (iii) (B) (i) and (ii)

(C) (i) only (D) (ii) only

18. In the analysis of a iron compound, the amount of Fe^{3+} is found to be 122.5 mg by a gravimetric method. But, the true value as per the official method is 120.2 mg. The relative error in this analysis is

(A) 2.3% (B) –2.3%

(C) 1.91% (D) –1.91%

19. Staggered ethane and eclipsed ethane belong to the following point groups :

(A) D_{3d} and D_{3h} (B) D_{3h} and D_{3d}

(C) D_{2h} and D_{3d} (D) D_{3h} and C_{3v}

20. Arrange the following Russell-Saunders terms in increasing order of their energies : ^3P, ^1G, ^1D, ^3F, ^1S.

(A) $^3P < {}^3F < {}^1G < {}^1S < {}^1D$

(B) $^3F < {}^3P < {}^1G < {}^1D < {}^1S$

(C) $^1S < {}^1D < {}^1G < {}^3F < {}^3P$

(D) $^3P < {}^3F < {}^1S < {}^1D < {}^1G$

21. The rate law for a termolecular reaction $A + A + B \rightarrow P$, is

(A) $K(A)^2(B)$ (B) $K(A)(B)(P)$

(C) $K(A)^2(B)(P)$ (D) $K(A)^{1/2}(B)^{1/2}$

22. The model which treats the Gibbs free energy of solvation as the critical work of transferring an ion from a vacuum into a solvent treated as a continuous dielectric is

(A) Helmholtz model

(B) Guoy model

(C) Volmer model

(D) Born model

23. In chemical reaction, $X_{(s)} + Y_{(g)} \rightleftharpoons Z_{(g)}$, the total pressure at equilibrium is 6 atm. The value of equilibrium constant is

(A) $3/2$ (B) $1/2$

(C) 9 (D) 1

24. Frank – Condon principle governs

(A) Rotational transitions

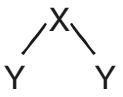
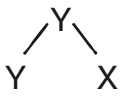
(B) Translational motions

(C) Electronic transitions

(D) Vibrational transitions

25. A triatomic molecule of the type XY_2 shows two IR absorption lines and one IR-Raman line. The correct structure of the molecule is

(A) Y – X – Y (B) Y – Y – A

(C)  (D) 

26. Hamiltonian operator (H) in $H\psi = E\psi$ is the operator for the kinetic energy of the system

(A) Potential energy of the system

(B) Kinetic energy of the system

(C) Total energy of the system

(D) Zero point energy of the system

27. According to the 3rd law of thermodynamics at zero degree Kelvin the entropy is zero for

(A) Perfectly crystalline solids

(B) Covalent solids at 25 atm pressure

(C) Elements in their stable form

(D) Any compounds in their liquid form

28. According to the corrosion theory

(A) Chemical reaction occurs with every collision

(B) Rate is directly proportional to the number of collisions per second

(C) Reactions in the gas phase have zero order

(D) Reactions rates are of the order of molecular speeds

29. For an aqueous solution at 25°C, the Debye – Huckel limiting law is given by the equation

(A) $\log\gamma_{\pm} = 0.509 \left| Z_+ Z_- \right| \sqrt{\mu}$

(B) $\log\gamma_{\pm} = 0.509 \left| Z_+ Z_- \right| \mu$

(C) $\log\gamma_{\pm} = -0.509 \left| Z_+ Z_- \right| \mu^2$

(D) $\log\gamma_{\pm} = -0.509 \left| Z_+ Z_- \right| \sqrt{\mu}$

30. In Gibbs absorption isotherm, the surface excess concentration is given by (γ = surface energy)

(A) $-\frac{1}{RT}\left(\frac{\delta\gamma}{\delta \ln C_2}\right)_T$

(B) $-\frac{1}{T}\left(\frac{\delta\gamma}{\delta \ln C_2}\right)_T$

(C) $-\frac{R}{T}\left(\frac{\delta\gamma}{\delta \ln C_2}\right)_T$

(D) $-\frac{T}{R}\left(\frac{\delta\gamma}{\delta \ln C_2}\right)_T$

31. Auto catalysis is the catalysis of a reaction catalyzed by

(A) Reactant (B) Intermediate

(C) Product (D) Solvent

32. The triple point for water is

(A) Depends on T but is independent of P

(B) Depends on P but is independent of T

(C) Independent of both P and T

(D) Unique

33. Which one of the following compounds has lowest bond energy ?

(A) I – H (B) I – Cl

(C) I – Br (D) I – F

34. The conversion of acetophenone to phenyl acetate is best accomplished by

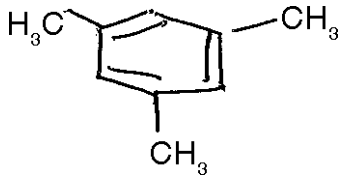
(A) Curtius rearrangement

(B) Hofmann rearrangement

(C) Bayer – Villiger rearrangement

(D) Fries rearrangement

35. The expected ^1H NMR signals for the following compound is



(A) a doublet and a singlet

(B) two singlets

(C) a quartet and a singlet

(D) a triplet and a singlet

36. The internucleotide bond type in DNA is

(A) 3′, 5′ - phospho ester bond

(B) 3′, 5′ - phospho diester bond

(C) 2′, 5′ - phospho ester bond

(D) 2′, 5′ - phospho diester bond

37. Among the terpinoids given below, which one do not follow special isoprene rule ?

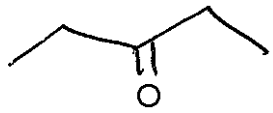
(A) Ermophilone

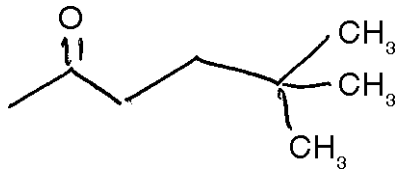
(B) Santonin

(C) Caryophyllene

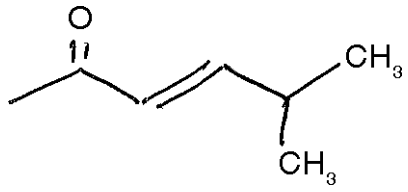
(D) α -pinene

38. In the mass spectrum of compounds given below, which one undergo β-cleavage (McLafforty rearrangement) easily ?

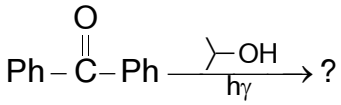
(A) 

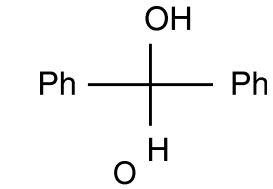
(B) 

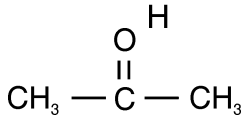
(C) 

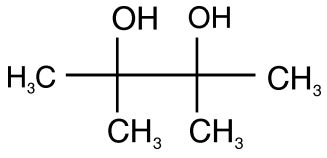
(D) 

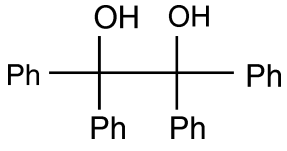
39. The major product formed in the following reaction is



(A) 

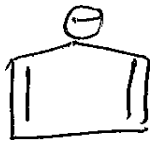
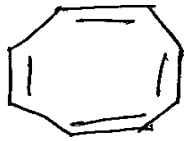
(B) 

(C) 

(D) 

40. Which of the following statement is correct with respect to the following structures ?

a.  b. 

c.  d. 

(A) b and d are aromatic; a and c are antiaromatic

(B) b and c are aromatic; a and d are antiaromatic

(C) a and d are aromatic; b and c are antiaromatic

(D) a and c are aromatic; b and d are antiaromatic

41. The characteristic u.v absorption of acetone at 190 nm and 280 nm respectively corresponds to the following transitions.

a. $\sigma \rightarrow \sigma^*$ b. $\eta \rightarrow \sigma^*$

c. $\pi \rightarrow \pi^*$ d. $\eta \rightarrow \pi^*$

(A) a and b (B) b and c

(C) c and d (D) a and d

42. The ^1H NMR spectrum of di isopropyl ether will exhibit

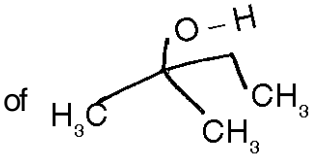
(A) a quartet at δ2.0 and a triplet at δ1.1

(B) a septet at δ2.0 and a doublet at δ1.1

(C) a quartet at δ4.0 and a triplet at δ1.1

(D) a septet at δ4.0 and a doublet at δ1.1

43. The starting material for the synthesis



of using Et Mg Br followed by acid hydrolysis is

(A) Ethyl acetate

(B) Ethyl aceto acetate

(C) acetone

(D) acetyl acetone

44. Nitration of aniline with nitrating mixture preferentially yields

(A) o-nitro aniline

(B) p-nitro aniline

(C) o-and p-dinitro aniline

(D) m-nitro aniline

45. Which of the following organometallic reagent used for Negashi coupling ?

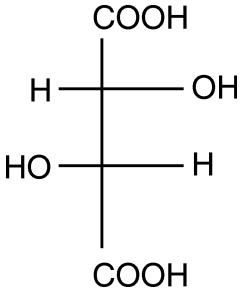
(A) Organo stannane

(B) Organo zinc

(C) Organo borane

(D) Organo aluminium

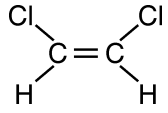
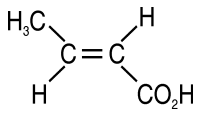
46. The configurational CIP notations of the following compound is

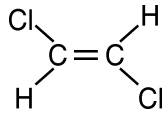
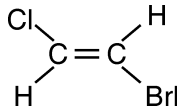


(A) R, R (B) R, S

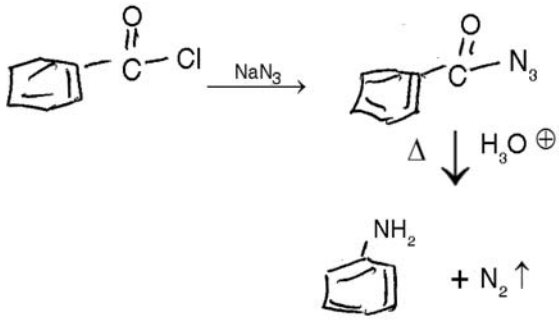
(C) S, R (D) S, S

47. Which of the following compounds give meso form product on addition of bromine in CCl_4 ?

(A)  (B) 

(C)  (D) 

48. Name the reaction and the intermediate for the following reaction.



(A) Curtius rearrangement and nitrene

(B) Hofmann rearrangement and nitrene

(C) Lossen rearrangement and nitrene

(D) Reimer – Tieman rearrangement and carbene

49. The spin state of hydrogen nucleus and carbon – 13 nucleus are respectively

(A) $\frac{1}{2}$ and 1 (B) $\frac{1}{2}$ and $\frac{1}{2}$

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

50. Oxidation of cyclohexanol to adipic acid is best achieved by

(A) SeO_2

(B) H_2O_2

(C) HNO_3 (conc.)

(D) MnO_2

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Space for Rough Work