

<b>SUBJECT CODE</b>	<b>SUBJECT</b>	<b>PAPER</b>																
<b>A-02-02</b>	<b>CHEMICAL SCIENCES</b>	<b>II</b>																
<b>HALL TICKET NUMBER</b>		<b>QUESTION BOOKLET NUMBER</b>																
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<b>OMR SHEET NUMBER</b>																		
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<b>DURATION</b>	<b>MAXIMUM MARKS</b>	<b>NUMBER OF PAGES</b>	<b>NUMBER OF QUESTIONS</b>															
<b>1 HOUR 15 MINUTES</b>	<b>100</b>	<b>16</b>	<b>50</b>															

This is to certify that, the entries made in the above portion are correctly written and verified.

**Candidates Signature**

**Name and Signature of Invigilator**

**Instructions for the Candidates**

**అభ్యర్థులకు సూచనలు**

- Write your Hall Ticket Number in the space provided on the top of this page.
- This paper consists of fifty multiple-choice type of questions.
- 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** :
  - 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.
  - 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.**
  - After this verification is over, the Test Booklet Number should be entered in the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
- 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) (C) (D)  
 where (C) is the correct response.
- Your responses to the items are to be indicated in the **OMR Answer Sheet given to you**. If you mark at any place other than in the circle in the Answer Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done in the end of this booklet.
- 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.
- The candidate must handover the OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.** The candidate is allowed to take away the carbon copy of OMR Sheet and used Question paper booklet at the end of the examination.
- Use only Blue/Black Ball point pen.**
- Use of any calculator or log table etc., is prohibited.**
- There is no negative marks for incorrect answers.**

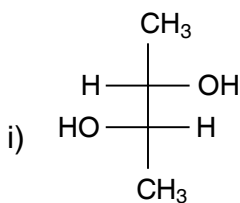
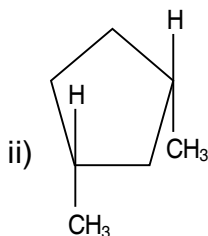
- ఈ పుట పై భాగంలో ఇవ్వబడిన స్థలంలో మీ హాల్ టికెట్ నంబరు రాయండి.
- ఈ ప్రశ్న పత్రము యాభై బహుళైచ్ఛిక ప్రశ్నలను కలిగి ఉంది.
- పరీక్ష ప్రారంభమైన ఈ ప్రశ్నపత్రము మీకు ఇవ్వబడుతుంది. మొదటి ఐదు నిమిషములలో ఈ ప్రశ్నపత్రమును తెరిచి కింద తెలిపిన అంశాలను తప్పనిసరిగా సరిచూసుకోండి.
  - ఈ ప్రశ్న పత్రమును చూడడానికి కవర్ పేజీ అంచున ఉన్న కాగితపు సీలును చించండి. స్టికర్ సీలులేని మరియు ఇదివరకే తెరిచి ఉన్న ప్రశ్నపత్రమును మీరు అంగీకరించవద్దు.
  - కవర్ పేజీ పై ముద్రించిన సమాచారం ప్రకారం ఈ ప్రశ్నపత్రములోని పేజీల సంఖ్యను మరియు ప్రశ్నల సంఖ్యను సరిచూసుకోండి. పేజీల సంఖ్యకు సంబంధించి గానీ లేదా సూచించిన సంఖ్యలో ప్రశ్నలు లేకపోవుట లేదా నిజప్రతి కాకపోవుట లేదా ప్రశ్నలు క్రమసర్దుతిలో లేకపోవుట లేదా ఏదైనా తేడాలుండటం వంటి దోషపూరితమైన ప్రశ్న పత్రాన్ని వెంటనే మొదటి ఐదు నిమిషాల్లో పరీక్షా పర్యవేక్షకునికి తిరిగి ఇచ్చివేసి దానికి బదులుగా సరిగా ఉన్న ప్రశ్నపత్రాన్ని తీసుకోండి. తదనంతరం ప్రశ్నపత్రము మార్చబడదు అదనపు సమయం ఇవ్వబడదు.
  - పై విధంగా సరిచూసుకొన్న తర్వాత ప్రశ్నపత్రం సంఖ్యను OMR పత్రము పై అదేవిధంగా OMR పత్రము సంఖ్యను ఈ ప్రశ్నపత్రము పై నిర్దిష్టస్థలంలో రాయవలెను.
- ప్రతి ప్రశ్నకు నాలుగు ప్రత్యామ్నాయ ప్రతిస్పందనలు (A), (B), (C) మరియు (D) లుగా ఇవ్వబడ్డాయి. ప్రతి ప్రశ్నకు సరైన ప్రతిస్పందనను ఎన్నుకొని కింద తెలిపిన విధంగా OMR పత్రములో ప్రతి ప్రశ్నా సంఖ్యకు ఇవ్వబడిన నాలుగు వృత్తాల్లో సరైన ప్రతిస్పందనను సూచించే వృత్తాన్ని బాల్ పాయింట్ పెన్ తో కింద తెలిపిన విధంగా పూరించాలి.  
**ఉదాహరణ :** (A) (B) (C) (D)  
 (C) సరైన ప్రతిస్పందన అయితే
- ప్రశ్నలకు ప్రతిస్పందనలను ఈ ప్రశ్నపత్రముతో ఇవ్వబడిన OMR పత్రము పైన ఇవ్వబడిన వృత్తాల్లోనే పూరించి గుర్తించాలి. అలాకాక సమాధాన పత్రంపై చేరక చోట గుర్తిస్తే మీ ప్రతిస్పందన మూల్యాంకనం చేయబడదు.
- ప్రశ్న పత్రము లోపల ఇచ్చిన సూచనలను జాగ్రత్తగా చదవండి.
- చిత్తుపనిని ప్రశ్నపత్రము చివర ఇచ్చిన ఖాళీస్థలములో చేయాలి.
- OMR పత్రము పై నిర్ణీత స్థలంలో సూచించవలసిన వివరాల తప్పించి ఇతర స్థలంలో మీ గుర్తింపును తెలిపే విధంగా మీ పేరు రాయడం గానీ లేదా ఇతర చిహ్నాలను పెట్టడం గానీ చేసినట్లయితే మీ అనర్హతకు మీరే బాధ్యులవుతారు.
- పరీక్ష పూర్తయిన తర్వాత మీ OMR పత్రాన్ని తప్పనిసరిగా పరీక్ష పర్యవేక్షకుడికి ఇవ్వాలి. వాటిని పరీక్ష గది బయటకు తీసుకువెళ్లకూడదు. పరీక్ష పూర్తయిన తరువాత అభ్యర్థులు ప్రశ్న పత్రాన్ని, OMR పత్రం యొక్క కార్బన్ కాపీని తీసుకువెళ్లవచ్చు.
- సీలి/సల్ల రంగు బాల్ పాయింట్ పెన్ మాత్రమే ఉపయోగించాలి.
- లాగ్ రిఫ్లెక్స్ చేబర్ల్స్, క్యాలిక్యులేటర్లు, ఎలక్ట్రానిక్ పరికరాలు మొదలగునవి పరీక్షగదిలో ఉపయోగించడం నిషేధం.
- తప్పు సమాధానాలకు మార్కుల తగ్గింపు లేదు.



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**CHEMICAL SCIENCE**  
**Paper – II**

1. In an isolated system in the course of a spontaneous change
- (A) The entropy increases
  - (B) The entropy decreases
  - (C) The entropy remains the same
  - (D) The internal energy becomes zero
2. The bond order,  $b$ , of a diatomic molecule which has  $n$  electrons in bonding orbital and  $n^*$  electrons in anti bonding orbital is
- (A)  $\frac{1}{2}(n \times n^*)$
  - (B)  $\frac{1}{2}(n + n^*)$
  - (C)  $\frac{1}{2}(n - n^*)$
  - (D)  $\frac{1}{2}(n / n^*)$
3. In a micro canonical ensemble all the systems are individually isolated and have the same
- (A) Energy
  - (B) Temperature
  - (C) Chemical potential
  - (D) All of the above
4. Correct order of Nephelauxetic effect of ligands
- (A)  $\text{NH}_3 < \text{CN}^- < \text{I}^- < \text{F}^-$
  - (B)  $\text{I}^- < \text{NH}_3 < \text{F}^- < \text{CN}^-$
  - (C)  $\text{F}^- < \text{NH}_3 < \text{CN}^- < \text{I}^-$
  - (D)  $\text{I}^- < \text{F}^- < \text{NH}_3 < \text{CN}^-$
5. Which are the correct combinations of ground state energy symbol and molecule/ion
- 1)  $\text{V}^{3+} - 3\text{F}$
  - 2)  $[\text{Co}(\text{en})_3]^{3+} - 1\text{A}_{1g}$
  - 3)  $[\text{CoBr}_4]^{2-} - 5\text{T}_2$
- (A) 1 and 3 are correct
  - (B) 1 and 2 are correct
  - (C) 2 and 3 are correct
  - (D) All are correct
6. Identify the following
- i) 
- ii) 
- (A) (i) Meso ; (ii) Enantiomer
  - (B) (i) Meso ; (ii) Diastereomer
  - (C) (i) Enantiomer ; (ii) Enantiomer
  - (D) (i) Enantiomer ; (ii) Meso



7. Match the following IR spectral data

- I)  $\text{>C}=\text{C}=\text{C}<$  1)  $2150 - 2300 \text{ cm}^{-1}$   
II)  $-\text{C}\equiv\text{N}$  2)  $1000 - 1300 \text{ cm}^{-1}$   
III)  $\text{O}=\text{C}=\text{O}$  3)  $1900 - 2000 \text{ cm}^{-1}$   
IV)  $\text{>C}=\text{S}$  4)  $2400 \text{ cm}^{-1}$

	I	II	III	IV
(A)	3	4	1	2
(B)	2	1	4	3
(C)	3	2	4	1
(D)	3	1	4	2

8. The number of metal-metal bonds and

bridged carbonyls in  $\text{Fe}_3(\text{CO})_{12}$  are

- (A) 3 and 0  
(B) 3 and 2  
(C) 1 and 3  
(D) 2 and 2

9. The molecular orbital configuration of

$[\text{Mo}_2(\text{SO}_4)_4]^{3-}$  is

- (A)  $\sigma^2 \pi^4 \delta^1$   
(B)  $\sigma^2 \pi^4 \delta^2$   
(C)  $\sigma^2 \pi^4 \delta^1 \delta^{*1}$   
(D)  $\sigma^2 \pi^2 \delta^2$

10. The molecule *trans*  $\text{ClHC}=\text{CHCl}$

belongs to \_\_\_\_\_ point group.

- (A)  $\text{C}_2\text{V}$   
(B)  $\text{C}_{2h}$   
(C)  $\text{D}_2$   
(D)  $\text{D}_{2h}$

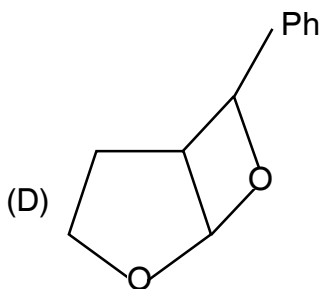
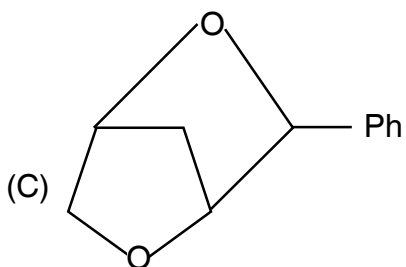
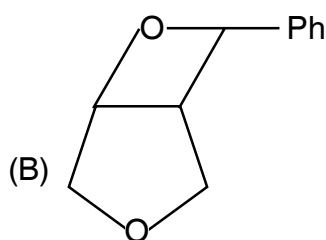
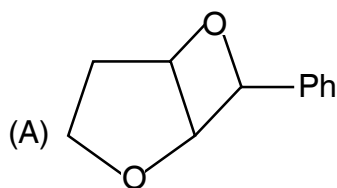
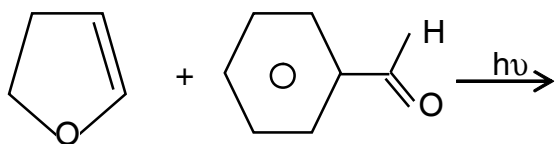
11. The essential symmetry in a monoclinic

crystal system is

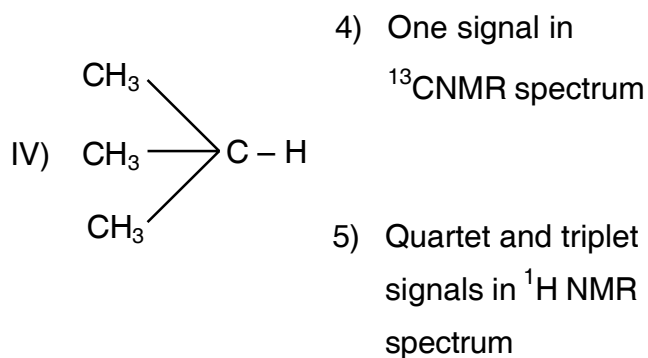
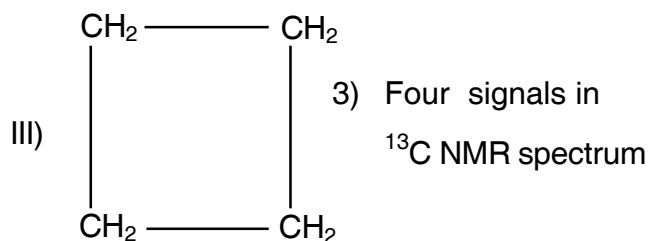
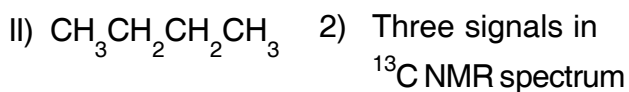
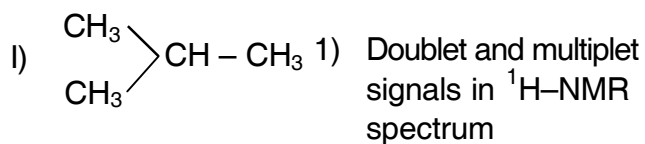
- (A) One  $\text{C}_3$  axis  
(B) One  $\text{C}_2$  axis  
(C) None  
(D) One  $\text{C}_6$  axis



12. Indicate the major product of the following reaction



13. Match the following



	I	II	III	IV
(A)	2	5	3	1
(B)	3	5	1	2
(C)	3	5	4	1
(D)	2	5	4	1

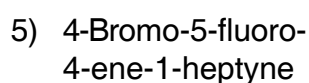
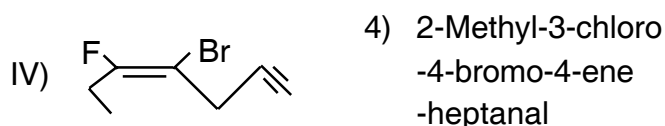
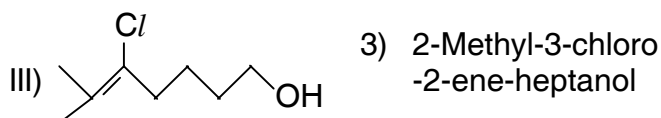
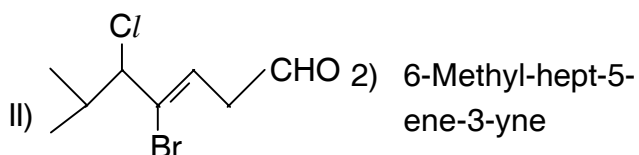
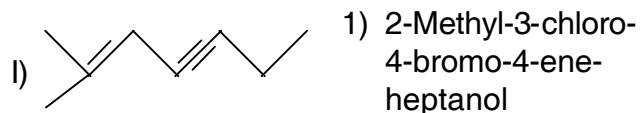


#### 14. Substituted isoquinoline compounds

can be prepared by

- (A) Skraup synthesis
- (B) Bischler-Napieralski synthesis
- (C) Haworth synthesis
- (D) Bogert-Cook synthesis

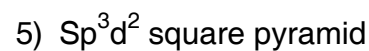
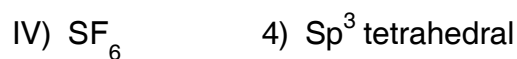
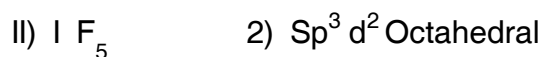
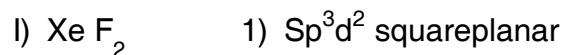
#### 15. Match the following



	I	II	III	IV
(A)	2	3	4	5
(B)	5	4	3	2
(C)	2	4	3	5
(D)	5	4	2	3

#### 16. Match the following

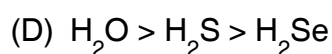
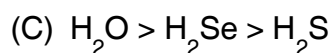
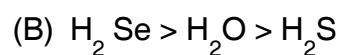
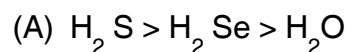
Molecule	Hybridization and Geometry
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	I	II	III	IV
(A)	1	2	3	4
(B)	2	3	4	5
(C)	3	1	5	4
(D)	3	5	1	2

#### 17. Correct order of bond angles in given

molecules





18. Aspirin exhibits antiinflammatory activity by the inhibition of
- (A) Carbonic anhydrase
  - (B) Angiotensin converting enzyme
  - (C) Cyclooxygenase
  - (D) Xanthine oxidase
19. Deficiency of insulin causes
- (A) Hypertension
  - (B) Diabetes mellitus
  - (C) Asthma
  - (D) Cancer
20. Which of the following solvent does not create environmental pollution ?
- (A)  $\text{CF}_2\text{Cl}_2$
  - (B)  $\text{C}_6\text{H}_6$
  - (C)  $(\text{CH}_3\text{CH}_2)_2\text{O}$
  - (D)  $\text{H}_2\text{O}$
21. Alkaloid Morphine belongs to
- (A) Phenanthrene group
  - (B) Phenyl ethyl amine group
  - (C) Quinoline group
  - (D) Pyrrolidine-pyridine group
22. The hybridization  $\text{Sp}^3\text{d}$  gives rise to the following arrangement
- (A) Linear
  - (B) Octahedral
  - (C) Trigonal bipyramidal
  - (D) Trigonal planar
23. When the label of any two identical fermions are exchanged, the total wave function changes sign, when the labels of any two identical Bosons are exchanged the total wave function retains the same sign. This statement is
- (A) Pauli principle
  - (B) Heisenberg uncertainty principle
  - (C) Variation principle
  - (D) Perturbation theory



24. The basic unit present in pyrosilicates is

- (A)  $\text{SiO}_4^{4-}$
- (B)  $\text{SiO}_2$
- (C)  $\text{Si}_2\text{O}_7^{6-}$
- (D)  $\text{Si}_3\text{O}_9^{6-}$

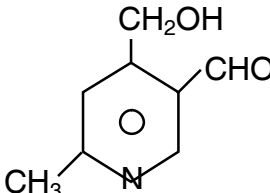
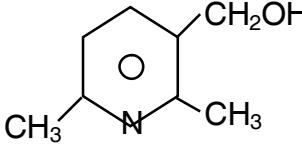
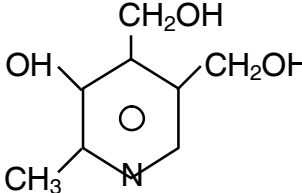
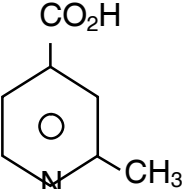
25. Which of the following pair are the most stabilized cations ?

- (A)  $\text{Eu}^{2+}$  and  $\text{Yb}^{2+}$
- (B)  $\text{Sm}^{2+}$  and  $\text{Gd}^{2+}$
- (C)  $\text{Dy}^{2+}$  and  $\text{Yb}^{2+}$
- (D)  $\text{Eu}^{2+}$  and  $\text{Gd}^{2+}$

26. The side chain present in Histidine is

- (A) Pyrazole
- (B) Pyrimidine
- (C) Imidazole
- (D) Thiophene

27. Identify pyridoxin from the following structures

- (A)   
Cc1cc(C=O)c(CO)cn1
- (B)   
Cc1cc(C)nc(CO)c1=O
- (C)   
Cc1cc(O)c(CO)cn1
- (D)   
Cc1cc(C(=O)O)cn1

28. Because the nuclei are so much more massive than the electrons, an electronic transition takes place very much faster than the nuclei can respond. This is the

- (A) Heisenberg uncertainty principle
- (B) Franck Condon principle
- (C) Pauli principle
- (D) Born-Oppenheimer approximation





29. The electronic ground state of  $O_2$  is

- (A)  $^1\Delta_g$
- (B)  $^1\Sigma_g^+$
- (C)  $^3\Sigma_g^-$
- (D)  $^3\Delta_u$

30. The square of the standard deviation is known as

- (A) The coefficient of variance
- (B) The variance
- (C) The absolute deviation
- (D) The relative standard deviation

31. The correct combination of hard acid and soft base is

- (A)  $Li^+$  and  $H_2O$
- (B)  $La^{3+}$  and  $NH_3$
- (C)  $Hg^{2+}$  and  $F^-$
- (D)  $La^{3+}$  and  $CN^-$

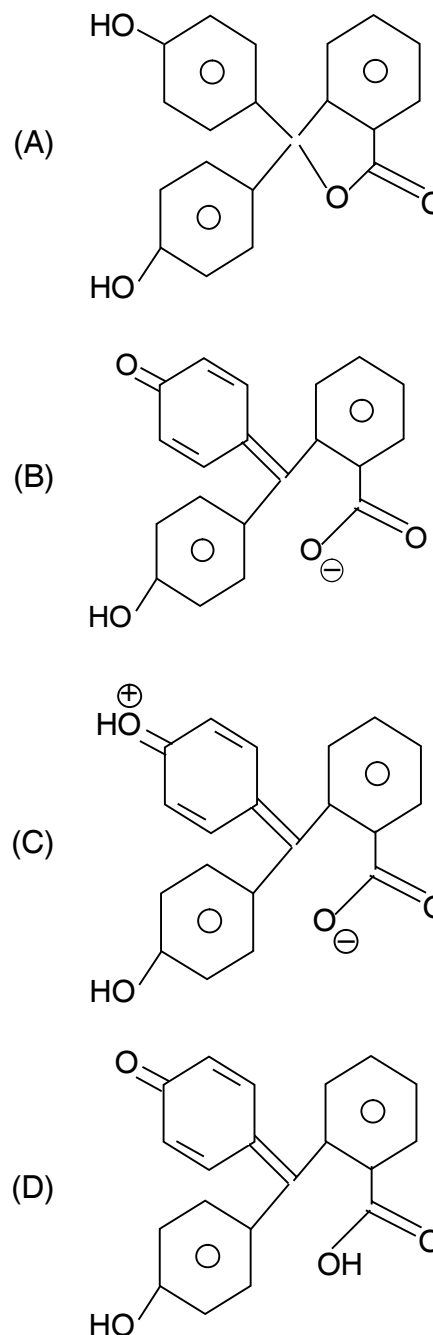
32. In haemoglobin the oxidation state of iron is

- (A) +2
- (B) +3
- (C) +1
- (D) 0

33. EPR spectrum of  $MnSO_4$  shows

- (A) Five lines
- (B) Four lines
- (C) Two lines
- (D) Three lines

34. The red color of phenolphthalein solution is due to





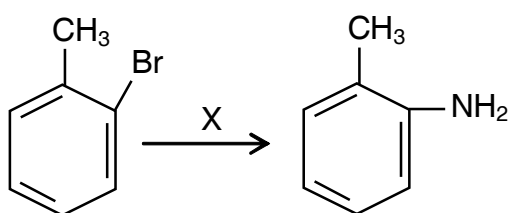
35. The binding of a drug molecule to DNA results in
- (A) Hypsochromic effect
  - (B) Decrease in the molar absorption coefficient
  - (C) Bathochronic effect
  - (D) Increase in the molar absorption coefficient
36. Phase transformation in a material can be detected by
- (A) TGA
  - (B) DSC
  - (C) DTA
  - (D) DTG
37. Which of the following statements are correct ?
- 1) No indicators are used in the titration of weak acid Vs weak base
  - 2)  $\text{KMnO}_4$  is a self indicator
  - 3)  $\text{Na}_2\text{C}_2\text{O}_4$  cannot be used as primary standard
  - 4) Starch is an acid-base indicator
- (A) 3 and 4 are correct
  - (B) 2 and 3 are correct
  - (C) 1 and 2 are correct
  - (D) 2 and 4 are correct
38. How many  $\text{Na}^+$  ions surround each  $\text{Cl}^-$  ion in the NaCl crystal system ?
- (A) 2
  - (B) 4
  - (C) 6
  - (D) 8
39. The Balmer series in the spectrum of atomic H arise from the transitions
- $$\left( \bar{\nu} = R_H \left( \frac{1}{n_1^2} - \frac{1}{n_2^2} \right) \right)$$
- (A)  $n_1 = 1$
  - (B)  $n_1 = 2$
  - (C)  $n_1 = 3$
  - (D) all of the above
40. In the orbital approximation where each electron occupies its own orbital
- $$\psi(r_1, r_2, r_3 \dots) =$$
- (A)  $\psi_1(r_1) + \psi_2(r_2) + \psi_3(r_3) + \dots$
  - (B)  $-\psi_1(r_1) - \psi_2(r_2) - \psi_3(r_3) \dots$
  - (C)  $\psi_1(r_1)\psi_2(r_2)\psi_3(r_3) \dots$
  - (D)  $\psi_1(r_1) + \psi_2(r_2) - \psi_3(r_3) \dots$



41. The number of isoprene units present in farnesol are

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

42. In the reaction



X is

- (A)  $TiCl_3$
- (B) Anhydrous  $AlCl_3$
- (C) Mg in anhydrous ether
- (D) Li in liquid ammonia

43. In XPS spectrum

- (A) 1S peak of N in NO is observed at higher energy than  $N_2$
- (B) S gives one 1S peak in  $S_2O_3^{2-}$
- (C) N gives three 1S peaks in  $N_3^-$
- (D) 1S peak of N in NO is observed at lower energy than  $N_2$

44.  $^1H$ -NMR spectrum of  $CHD_2F_2$  shows

- (A) Multiplet
- (B) Nine peaks
- (C) Two peaks
- (D) Four peaks

45. A debye is a unit of

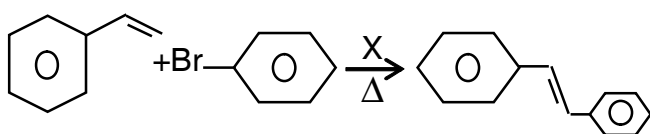
- (A) Conductance
- (B) Viscosity
- (C) Dipole moment
- (D) Ionic strength



46. Tyndall effect would be observed in

- (A) Solvent
- (B) Solution
- (C) Colloidal solution
- (D) Precipitate

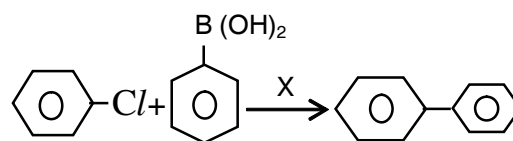
47. In the reaction



the catalyst 'X' is

- (A) Na in  $C_2H_5OH$
- (B)  $Pd(OAc)_2$
- (C) Zn in AcOH
- (D) n BuLi

48. In the reaction



the catalyst 'X' is

- (A) Cu I
- (B)  $AgNO_3$
- (C)  $FeCl_3$
- (D) Nano  $Pd^0$  over polystyrene

49. Median of the following set of results

0.124; 0.130; 0.128; 0.126 and 0.122 is

- (A) 0.124
- (B) 0.126
- (C) 0.129
- (D) 0.130

50. Match the following

- |             |              |
|-------------|--------------|
| I) Wood     | 1) Lyxose    |
| II) Milk    | 2) Cellulose |
| III) Corn   | 3) Starch    |
| IV) Cereals | 4) Lactose   |
|             | 5) Arabinose |

	I	II	III	IV
(A)	1	4	3	5
(B)	2	1	3	5
(C)	1	4	3	5
(D)	2	4	3	5



**Space for Rough Work**



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