INSTRUCTIONS TO CANDIDATES

(Use only blue/black ball-point pen in the space above and on both sides of the Answer Sheet)

1. Within 30 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing. In case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.

2. Do not bring any loose paper, written or blank, inside the Examination Hall except the Admit Card without its envelope.

3. A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.

4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.

5. On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.

6. No overwriting is allowed in the entries of Roll No., Question Booklet no. and Set no. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Question Booklet.

7. Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.

8. Each question in this Booklet is followed by four alternative answers. For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet.

9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.

10. Note that the answer once filled in in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks).

11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.

12. Deposit only OMR Answer Sheet at the end of the Test.

13. You are not permitted to leave the Examination Hall until the end of the Test.

14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 40
ROUGH WORK
एफ कार्य
01. Which of the following sets of quantum numbers is possible for an electron in a 4f orbital:

(1) $n = 4, l = 3, m = 4, s = +\frac{1}{2}$  
(2) $n = 4, l = 4, m = +4, s = +\frac{1}{2}$

(3) $n = 4, l = 3, m = +1, s = -\frac{1}{2}$  
(4) $n = 4, l = 2, m = 2, s = +\frac{1}{2}$

02. In a three component system of phase equilibria the maximum number of degree of freedom can be:

(1) 4  
(2) 3  
(3) 2  
(4) 1
03. The total change in entropy 'ds' for an irreversible process is given by:

1. \( ds = d_e s - d_i s \)
2. \( ds = d_e s + d_i s \)
3. \( ds = 0 \)
4. \( ds = -d_e s - d_i s \)

Where \( d_e s \) = entropy exchanged with surroundings
\( d_i s \) = entropy generated by irreversible process irr the system.

04. The maximum probability distribution in Fermi - Dirac statistics is equal is:

1. \( a = \frac{1}{e^{(a+\beta e i)}} \)
2. \( a = \frac{1}{e^{(a+\beta e i)} + 1} \)
3. \( a = \frac{1}{e^{(a+\beta e i)} - 1} \)
4. \( a = \frac{1}{e^{(a-\beta e i)} + 1} \)

05. If velocity constant of a reaction is \( 2.0 \times 10^{-4} \) sec\(^{-1} \) and rate of reaction is \( 8.0 \times 10^{-4} \) moles lit\(^{-1} \) sec\(^{-1} \), then the concentration of reactant will be:

1. \( 2.0 \times 10^{-4} \) moles lit\(^{-1} \)
2. 1.0 mole lit\(^{-1} \)
3. 4.0 moles lit\(^{-1} \)
4. 8.0 moles lit\(^{-1} \)

06. The half-time period of a second order reaction is 90 minutes. Calculate the time required for completion for completion of 60% of the reaction:

1. 270 minutes
2. 135 minutes
3. 180 minutes
4. 90 minutes

07. The activation energy of a reaction can be calculated from the slope of the following graph:

1. \( \ln k \) vs \( T \)
2. \( \ln k \) vs \( \frac{1}{T} \)
3. \( \frac{\ln k}{T} \) vs \( \frac{1}{T} \)
4. \( \frac{T}{\ln k} \) vs \( \frac{1}{T} \)
08. In any crystal ratio of Weiss indices of the face is 2:4:3, then the
Miller indices would be:
(1) 6 3 4       (2) 3 4 6       (3) 4 3 6       (4) 6 4 3

09. At constant temperature, the change of chemical potential with change
in pressure is equal to:
(1) entropy       (2) partial molar enthalpy
(3) partial molar volume       (4) Free energy

10. Absolute entropy of a substance can be calculated using:
(1) Zeroth Law of thermodynamics
(2) First Law of thermodynamics
(3) Second Law of thermodynamics
(4) Third Law of thermodynamics

11. Which of the following partition function has largest value:
(1) Vibrational       (2) Translational
(3) electronic       (4) rotational

12. Which of the following is correct expression for Helmholtz free energy
(A) in terms of partition function:
(1) \[ A = -k \ln \theta \]
(2) \[ A = kT \ln \theta \]
(3) \[ A = -kT^2 \ln \theta \]
(4) \[ A = -kT \ln \theta \]

13. Which of the following is correct for most of the glasses?
(1) \[ T_g = T_m \]
(2) \[ T_g = \frac{1}{2} T_m \]
(3) \[ T_g < T_m \]
(4) \[ T_g > T_m \]

P.T.O.
14. Ziegler Natta catalyst is used in ......................... polymerisation:
   (1) Free radical                                   (2) Auionic
   (3) Cationic                                      (4) Coordination

15. Canonical ensembles have same:
   (1) T, P, N                                       (2) T, μ, N
   (3) T, V, N                                       (4) E, V, N

16. Electro-osmotic flux is the mass flux due to difference of:
   (1) Potential                                     (2) Temperature
   (3) Concentration                                 (4) Pressure

17. The wave mechanical model of atom depends on:
   (1) deBroglie equation
   (2) Heisenberg, uncertainty principle
   (3) Schrodinger's wave equation
   (4) All of the above

18. The energy of an atom is the first Bohr orbit of hydrogen is 13.6 eV. The possible energy value in the excited state for electron in the Bohr orbit of hydrogen atom is:
   (1) -3.4 eV                                      (2) -4.2 eV
   (3) -6.8 eV                                      (4) 6.8 eV
19. The energy of a rigid rotator is:

\[ E = \frac{n^2 \hbar^2}{2m} J \]  \hspace{1cm} \[ E = \frac{\hbar^2}{2 \pi l} J(J+1) \]

\[ E = \frac{n^2 \hbar^2}{2m a^2} \]  \hspace{1cm} \[ E = \frac{\hbar^2}{\pi l} J(J+1) \]

20. The decrease in free energy is equal to:

(1) mechanical work \hspace{1cm} (2) Maximum work

(3) net work \hspace{1cm} (4) zero

21. If Weiss indices of a face of a crystal are 1, \( \infty \), \( \infty \), then its Miller indices will be:

(1) 1, 0, 0 \hspace{1cm} (2) 0, 1, 1 \hspace{1cm} (3) 0, 1, 0 \hspace{1cm} (4) 1, 0, 1

22. Maximum number of \( \alpha \) and \( \beta \) particles emitted when \( ^{238}U \) changes to \( ^{206}Pb \) are:

(1) 6\( \alpha \) and 8\( \beta \) \hspace{1cm} (2) 8\( \alpha \) and 8\( \beta \)

(3) 6\( \alpha \) and 6\( \beta \) \hspace{1cm} (4) 8\( \alpha \) and 6\( \beta \)

23. The relation between e.m.f. and concentration for a cell is:

(1) Linear \hspace{1cm} (2) Exponential

(3) Logarithmic \hspace{1cm} (4) no relation
24. The spin only magnetic moment is given by:

\[
\begin{align*}
(1) & \quad \sqrt{45|S+1|} \\
(2) & \quad \sqrt{5|S+1|} \\
(3) & \quad \sqrt{25|S+1|} \\
(4) & \quad \sqrt{5|S+3|}
\end{align*}
\]

25. The pH of a solution by mixing 50 cc of 0.2 M HCl and 50 cc of 0.1 M NaOH will be:

\[
\begin{align*}
(1) & \quad 1.8 \\
(2) & \quad 2.4 \\
(3) & \quad 1.3 \\
(4) & \quad 4.2
\end{align*}
\]

26. If the value of \(\frac{r_c}{r_a}\) (radius ratio of cation and anion) is equal to 0.213 then coordination number of cation is:

\[
\begin{align*}
(1) & \quad 2 \\
(2) & \quad 4 \\
(3) & \quad 3 \\
(4) & \quad 6
\end{align*}
\]

27. How many normal modes are possible for water molecule?

\[
\begin{align*}
(1) & \quad 1 \\
(2) & \quad 2 \\
(3) & \quad 3 \\
(4) & \quad 4
\end{align*}
\]

28. What will be the ESR frequency of a free electron in a magnetic field of 0.34 T. Given that \(g = 2.0023\) and \(\beta = 9.273 \times 10^{-24} \text{ JT}^{-1}\), \(\hbar = 6.626 \times 10^{-34} \text{ JS}:

\[
\begin{align*}
(1) & \quad 20.0 \text{ GHz} \\
(2) & \quad 09.50 \text{ GHz} \\
(3) & \quad 19.0 \text{ GHz} \\
(4) & \quad 09.50 \text{ MHz}
\end{align*}
\]

29. The selection rule for transition in rotational energy levels in Raman spectrum is:

\[
\begin{align*}
(1) & \quad \Delta J = \pm 1 \\
(2) & \quad \Delta J = +1 \\
(3) & \quad \Delta J = +2 \\
(4) & \quad \Delta J = \pm 2
\end{align*}
\]
30. The difference between the incident and scattered frequencies in the Raman spectrum is called:

(1) Stoke's line  (2) Anti Stoke's line
(3) Raman frequency  (4) p - branch

31. The law which relates the solubility of a gas to its pressure is called:

(1) Roult's Law  (2) Distribution Law
(3) Henry's Law  (4) Ostwald's Law

32. Which of the following has a bond order 2.5:

(1) HCl  (2) CO  (3) NO  (4) N₂

33. The equivalent conductance of a IN solution of an electrolyte is nearly:

(1) 10³ times more than specific conductance
(2) 10⁻³ times its specific conductance
(3) 100 times its specific conductance
(4) 110 times its specific conductance

34. The term symbols for Mₙ and Tₙ atoms are:

(1) ⁶S₃/₂ and ³F₂  (2) ⁶S₅/₂ and ³F₂
(3) ⁶S₁/₂ and ³F₃/₂  (4) ⁶S₃/₂ and ³F₁/₂

P.T.O.
35. The energy of a particle in a 1-dimensional box is given by:

\[
\begin{align*}
(1) & \quad \frac{n^2 \hbar^2}{m L^2} \\
(2) & \quad \frac{n \hbar^2}{4 m L^2} \\
(3) & \quad \frac{n^2 \hbar^2}{8 m^2 L^2} \\
(4) & \quad \frac{n^2 \hbar^2}{8 m L^2}
\end{align*}
\]

36. Radius of orbit in Bohr’s hydrogen atom is:

\[
\begin{align*}
(1) & \quad r = \frac{n^2 \hbar^2}{4 \pi e^2 m} \\
(2) & \quad r = \frac{n^2 \hbar^2}{4 n e m^2} \\
(3) & \quad r = \frac{n^2 \hbar^2}{8 n^2 e^2 m^2} \\
(4) & \quad r = \frac{n^2 \hbar^2}{4 n^2 e^2 m}
\end{align*}
\]

37. Assuming that the force constant for \( c = c, c = c, c = c \) are in ratio 3:2:1 and normal range of \( c = c \) sketch absorption is 1630 - 1690 cm\(^{-1}\), what range would you expect for \( c = c \) stretch vibration?

\[
\begin{align*}
(1) & \quad 1152 - 1195 \text{ cm}^{-1} \\
(2) & \quad 1195 - 2005 \text{ cm}^{-1} \\
(3) & \quad 2005 - 2080 \text{ cm}^{-1} \\
(4) & \quad 3260 - 3380 \text{ cm}^{-1}
\end{align*}
\]

38. The number of NMR signals in the spectrum of

\[
\begin{array}{c}
\text{CH}_3\text{CH}_3
\end{array}
\]

are:

\[
\begin{align*}
(1) & \quad 4 \\
(2) & \quad 3 \\
(3) & \quad 2 \\
(4) & \quad 1
\end{align*}
\]

39. A what field would methyl radical come into resonance in spectrometer operating at 9.5 GHz (\( g = 2.0026 \))?

\[
\begin{align*}
(1) & \quad 0.34 \text{ T} \\
(2) & \quad 0.68 \text{ T} \\
(3) & \quad 1.02 \text{ T} \\
(4) & \quad 0.17 \text{ T}
\end{align*}
\]
40. Which of the following molecule will show pure rotational spectrum?

   (1) CH₄   (2) H₂O   (3) C₆H₆   (4) Cl₂

41. Which one of the following compounds forms (3c - 2e) bond?

   (1) XeF₂   (2) Al₂Cl₆   (3) Mg(CH₃)₂   (4) Be(NO₃)₂

42. Hot aqueous solution of (NH₄)NO₂ decomposes to give N₂ gas and water. But a very small amount of two compounds (A) and (B) are also formed as impurities which are removed by passing the gas in water. Here (A) and (B) are:

   (1) NO and H₂N₂O₂   (2) NO and HNO₃
   (3) N₂O and NO₂   (4) NH₃ and N₂O

43. The laughing gas can be prepared from HNO₂ by adding:

   (1) SO₂   (2) NH₂OH   (3) H₂O₂   (4) Fe²⁺ salt

44. Out of the following diatomic molecules, the paramagnetic ones are

   (a) Be₂ (b) B₂ (c) C₂ (d) N₂ (e) O₂ (f) F₂ (g) C⁺₂, (h) C⁻₂

   (1) Be₂ B₂ and C₂, N₂   (2) B₂, C₂, N₂ and C⁻₂
   (3) C₂, N₂, O₂ and C⁺₂   (4) B₂, O₂, C⁺₂, C⁻₂

Pick the correct choice out the above four choices.
45. Which one of the following reactions saves us from the damaging effect of solar u.v. radiations?

1. \( O_2 + h\nu \rightleftharpoons 2O_2 \)
2. \( O_3 + h\nu = O_2 + O \)
   \( O + O_2 \rightleftharpoons O_3 \)
3. Chloro fluoro carbon + \( h\nu \rightleftharpoons Cl^* \)
   \( Cl^* + O_3 \rightarrow ClO + O_2 \)
4. \( HClO + h\nu \rightleftharpoons OH^* + Cl^* \)
   \( Cl^* + O_3 \rightleftharpoons ClO^* + O_2 \)

46. Iodine in (A) oxidation state is easily stabilized by complexation as in \([ICl_4]^*\) ion which is stable in concentrated HCl. In concentrated and strong acids \([I_2]^*\) is (B) cation dimerizing to (C) species \([I_4]^*\). Here (A), (B) and (C) are respectively:

1. -1, unstable, paramagnetic
2. +1, paramagnetic, diamagnetic
3. -1, diamagnetic, paramagnetic
4. +1, diamagnetic, stable

47. \( H_3PO_3 \) and \( H_3AsO_3 \) are:

1. both tribasic
2. \( H_3PO_3 \) dibasic and \( H_3AsO_3 \) tribasic
3. \( H_3PO_3 \) tribasic and \( H_3AsO_3 \), dibasic
4. Both are dibasic in which \( H^+ \) is bonded to P and As
48. It is possible to prepare a complex (Octahedral or tetrahedral) of $d^6$ metal ion with a magnetic moment of 2.6 B.M. under the following conditions. Which one of the following alternative is correct?

1. An Octahedral complex of $d^6$ metal ion with weak field legands.
2. A tetrahedral complex of $d^6$ metal ion with weak field legands.
3. An Octahedral complex of $d^6$ metal ion with strong field legands.
4. A tetrahedral complex of $d^6$ metal ion with strong field legands.

$(10 \ D_q^T \gg \text{Pairing energy})$

49. The structures of two forms of $N_2F_2$ out of the following four structures are:

(A) \[ \text{F} = \text{N} = \text{N} = \text{F} \]

(B) \[ \text{N} = \text{N} \]

(C) \[ \text{N} = \text{N} \]

(D) \[ \text{N} = \text{N} \]

(Planar)

(N-F bonds in different planes)

Pick the correct choice out of the following ones:

1. (A) and (B)
2. (A) and (C)
3. (B) and (C)
4. (C) and (D)

50. On hydrolysis $(\text{CH}_3 - \text{Li})_4$ gives:

1. $\text{Li OH} + \text{CH}_4$
2. $\text{C}_2 \text{H}_6 + \text{Li CH}_3 + \text{Li OH}$
3. $\text{CH}_3 \text{OH} + \text{Li OH} + \text{Li H}$
4. $\text{C}_2 \text{H}_6 \text{OH} + \text{Li OH} + \text{Li H}$
51. Uranium, Thorium and Plutonium dissolve in:
   (1) Conc. HNO$_3$
   (2) Conc. HNO$_3$ + F$^-$ ions
   (3) Conc. HNO$_3$ + NaCl
   (4) Dil. HNO$_3$

52. Transition metal ions form complexes with N$_2$ molecules in two modes of linkages. (1) M–N = N (end on) and (2) M $\leftrightarrow$ | | | (side on). The bond strengths of these M – (N$_2$) bonds are (Relative strengths):
   (1) Both weak
   (2) Both strong
   (3) End-on stronger than side-on
   (4) Side-on stronger than end-on

53. (Ln)$^{2+}$ ions are largely coloured while (Ln)$^{3+}$ are not. The colour of (Ln)$^{2+}$ is due to:
   (1) f $\rightarrow$ f transition
   (2) d $\rightarrow$ d transition
   (3) f $\rightarrow$ d transition
   (4) Charge transfer from anions or solvent to (Ln)$^{2+}$
54. The reason for (A) $P_2$ which is similar to $N_2$ molecule is not stable because (what is (A)):

1. The bond energy of three (P - P) bonds is more than (P - P) triple bond as opposed to N = N bond energy which is more than three (N - N) bond energy (A - gaseous)
2. Lattice energy of P - P is more than N - N bond energy
(A = Solid state)
3. Lone pairs of electrons in $\hat{p}_1 = \hat{p}$ is kinetically more reactive than those present on $N_2$ in $\hat{N} = \hat{N}$ (A - solid state)
4. Kinetically P - P bond is more reactive than N - N bond
(A = liquid)

55. The following three reactions give one common molecule (A). What is (A) ?

(a) $\text{[NH}_4\text{]}_2 \text{Cr}_2 \text{O}_7 \xrightarrow{\text{thermal decomposition}}$
(b) $\text{NH}_3 + \text{Br}_2 \xrightarrow{\text{}}$
(c) $\text{NH}_3 + \text{CuO} \xrightarrow{\text{High Temperature}}$

Pick the correct choice out of the following:
1. $\text{N}_2\text{O}$
2. $\text{NO}$
3. $\text{N}_2$ (nitrogen)
4. $\text{NH}_3$

56. The magnetic moment of $\text{Mn}^{2+}$ (d$^5$ case) complexes of weak field ligands (Octahedra and Tetrahedral) is:
1. Very close to spin only value
2. Spin only value plus a large orbital contribution
3. Spin only value plus variable orbital contribution
4. Spin only value of one electron
57. What is (A) in the following reaction:

\[ 4 \text{HNO}_3 + \text{P}_4 \text{O}_{10} \xrightarrow{-10^\circ\text{C}} 2\text{N}_2 \text{O}_5 + (A) \]

(1) $\text{H}_3\text{PO}_4$  
(2) $\text{H}_3\text{PO}_3$  
(3) $\text{HPO}_3$  
(4) $\text{P}_2\text{O}_3$

58. What is (A) in the following reaction:

\[ \text{Na NO}_3 + \text{Na}_2\text{O} \xrightarrow{\text{Silver crucible 300}^\circ\text{C for two days}} (A) \]

(1) $\text{N}_2\text{O}_5$ + Some Sodium Salt  
(2) No reaction  
(3) $\text{Na}_3\text{NO}_4$ (orthonitrate)  
(4) $\text{N}_2\text{O}_3 + \text{N}_2 + \text{Na}_2\text{NO}_2$

59. $(\text{N}_5)^+$ cationic species exists in compounds $[\text{N}_5]^+$ $[5\text{b}_2 \text{ F}_{11}]^-$ or in $(\text{N}_5)^+$ $[\text{A}_5\text{F}_6]^-$ . The structure of $(\text{N}_5)^+$ in these compounds is:

(1) linear  
(2) Angular  
(3) Cyclopentadienyl type  
(4) Square planar with N - N$^+$ side chain

60. HF in liquid state self-ionizes as:

(1) $\text{HF (liq)} \rightleftharpoons \text{H}^+ + \text{F}^-$  
(2) $2\text{HF (liq)} \rightleftharpoons (\text{H}_2\text{F})^+ + \text{F}^-$  
(3) $3\text{HF (liq)} \rightleftharpoons (\text{H}_2\text{F})^+ + (\text{HF}_2)^-(\text{Solvated})$  
(4) $4\text{HF (liq)} \rightleftharpoons (\text{H}_2\text{F}_2)^+ + (\text{HF}_2)^-$
61. Arrange the hydrides CH₄, H₂O, GeH₄, H₂Se in order of increasing acid strength. Which one is correct order in the following given orders:

(1) CH₄ < H₂ Se < H₂O < GeH₄
(2) CH₄ < GeH₄ < H₂O < H₂ Se
(3) GeH₄ < CH₄ < H₂ Se < H₂O
(4) GeH₄ < CH₄ < H₂ Se < H₂O

62. In octahedral complexes of d¹ metal ions, the net total energy of the d- electron in the complex as compared to that in the free ion:

(1) increases with respect to unbonded state
(2) varies with the nature of legands, sometimes increase and sometimes decreases
(3) remains the same
(4) Increases with respect to a state when only metal bond energy is considered with no electronic effects of the legands (i.e. repulsion due to legand electrons)

63. According to M.O. theory, the bond order of diatomic molecules can be (A) which is not so according to valence bond theory. Here (A) is:

(1) Integral
(2) Two
(3) Three
(4) Fractional
64. Lewis acidity of silicon tetrahalides $\text{[Si F}_4, \text{SiCl}_4, \text{SiBr}_4, \text{SiI}_4]$ decreases in the order:

(1) $\text{SiI}_4 > \text{SiBr}_4 > \text{SiCl}_4 > \text{SiF}_4$
(2) $\text{SiI}_4 > \text{SiCl}_4 > \text{SiBr}_4 > \text{SiF}_4$
(3) $\text{SiF}_4 > \text{SiCl}_4 > \text{SiBr}_4 > \text{SiI}_4$
(4) $\text{SiF}_4 > \text{SiBr}_4 > \text{SiI}_4 > \text{SiCl}_4$

65. Arrange the single bond energy of the following fluorides in increasing order: $\text{N - F, P - F, As - F, Sb - F}$.

(1) $\text{N - F < Sb - F < As - F < P - F}$
(2) $\text{Sb - F < As - F < P - F < N - F}$
(3) $\text{As - F < Sb - F < P - F < N - F}$
(4) $\text{As - F < N - F < P - F < Sb - F}$

66. The oxidizing and the reducing agent in the following redox reactions respectively are:

(a) $2\text{H CuCl} \rightleftharpoons \text{Cu} + \text{Cu}^{2+} + 4\text{Cl}^- + 2\text{H}^+$
(b) $\text{Cl}_2 + 2\text{OH}^- \rightarrow \text{ClO}^- + \text{Cl}^- + \text{H}_2\text{O}$
(c) $\text{Ca CO}_3 \rightarrow \text{CaO} + \text{CO}_2$

(1) ($\text{Cu}^+$, $\text{Cu}^{+1}$), ($\text{Cl}^-$, $\text{Cl}^-$), none
(2) ($\text{H}^+$, $\text{Cu}^+$), ($\text{Cl}^-$, $\text{OH}^-$), ($\text{Ca}^{2+}$, $\text{O}_3^{2-}$)
(3) ($\text{Cu}^+$, $\text{Cl}^-$), ($\text{Cl}^-$, $\text{OH}^-$), ($\text{Ca}^{2+}$, $\text{CO}_3^{2-}$)
(4) ($\text{Cu}^+$, $\text{Cl}^-$), ($\text{Cl}^-, \text{OH}^-$), ($\text{Ca}^{2+}$, $\text{O}^{2-}$)
67. In compounds containing X-H and X-D bonds, which one (X-H or X-D) will be stronger and why?

1. (X-D) because of higher contribution of covalency in X-H bond
2. (X-H) because of greater mobility of H compared to D
3. (X-H) because of its lower zero point energy compared to that of X-D
4. (X-D) because of its lower zero point energy compared to that of X-H

68. Which one of the following molecules will show optical isomerism?

1. [Co(en)₃]³⁺ (octahedral)
2. [Mn(CN)₂(NO₂)₂(H₂O)(NH₃)] (tetrahedral)
3. [Co(en)Cl₃Br]⁻ (octahedral)
4. Cis [Co(en)₂Cl₂] (octahedral) (trans)

69. What happens when in the absence of air B₂H₆ is heated to 100°C?

1. decomposes to B and H₂
2. explodes and gives a number of products
3. forms B₁₀H₁₄
4. forms (BH₄)⁻, B + H₂

70. Which one of the following M, O.'s of (HF)₂⁻ is correct?

(1) [Diagram]
(2) [Diagram]
(3) [Diagram]
(4) [Diagram]
71. What product one forms by absorbing nitrous acid fumes in \( \text{Na}_2 \text{CO}_3 \) aqueous solution?

(1) \( \text{Na NO}_3 \)  
(2) \( \text{Na NO}_2 \)  
(3) \( \text{H}_2 \text{N}_2 \text{O}_2 \)  
(4) \( \text{NO} + \text{N}_2\text{O} \)

72. \( \text{SO}_3 \) exists in three forms which have the molecular formula \( \text{SO}_3 \), \( \text{S}_3 \text{O}_9 \) and \( (\text{SO}_3)_n \). Their structures belong to three of the following ones. The structures of these forms respectively are.

(a) atomic, (b) molecular (c) oligomeric (linear, cyclic, cluster) (d) Polymer (one dimensional chain)

Which one out of the three you will expect to be a gas your choices are the following. Pick up the right choice?

(1) monomeric molecular, Oligomeric (Chain), polymer (linear) \( (\text{SO}_2) \)  
(2) atomic, polymeric (Cyclic), 3- dimensional polymeric \( (\text{S}_3\text{O}_9) \)  
(3) molecular, polymer (Cyclic), polymer (3 - dimensional) \( (\text{S}_3\text{O}_9) \)  
(4) molecular (monomeric), polymer (chain), polymer (3-dimensional). \( \text{SO}_3 \)

73. Out of C, Si, Sn, Pb and B, the element with the highest atomization energy and the element with the lowest atomization energy are:

(1) Carbon and Tin  
(2) B and Pb  
(3) C and Pb  
(4) B and Sn
74. Arrange the following oxygen molecular ions and the molecule in order of increasing bond energy or in decreasing order of (O-O) bond length. The molecular ions and the molecule are: \( O_2^{2+}, O_2^+, O_2, O_2, O_2^+ \) and \( O_2^- \). The possible orders are given below. Choose the correct one:

(1) \( O_2 < O_2^- < O_2 < O_2^{2+} < O_2^+ \)
(2) \( O_2^+ < O_2^- < O_2 < O_2^+ < O_2 \)
(3) \( O_2 < O_2 < O_2^- < O_2^+ < O_2 \)
(4) \( O_2^- < O_2^+ < O_2 < O_2^+ < O_2 \)

75. What is (A) in the following equation \((Ti_3N_4)_2 + H_2O \to (A) + TiO_2\)?

Here A is:

(1) \( NH_2OH \)
(2) \( NH_3 \)
(3) \( N_2O + NH_3 \)
(4) \( N_2H_4 + H_2O_2 \)

76. \( C_2, BN, Be, O \) and \( Li, F \) molecules are isoelectronic and their valence electron orbital energies are quite different. The difference between orbital energies of A and B of AB type molecules increases from carbon to Li - F. It implies that the degree of overlap of the parent orbitals (A and B):

(1) decreases
(2) Increases
(3) Zero in \( C_2 \) and infinite in LiF
(4) Zero in LiF and infinite in \( C_2 \)
77. For a given legand, the order of metal ions producing increasing 10Dq value for octahedral complexes is (A) and for a given metal ion, the order of legands producing increasing 10Dq for octahedral complexes is (B). Here (A) and (B) :

1. Both (A) and (B) constant
2. (A) - changes and B = constant
3. (A) - constant and B = changes
4. Both (A) and (B) = changes

78. In Li₃N, nitrogen is present as (A) and (B) than L₁⁺ ion. Pick up the correct alternative from the following alternatives. Here (A) and (B) respectively are :

1. N₂⁻, N⁻ is greater than N³⁻, N³⁻ is greater
2. N⁻, N⁻ is smaller
3. N³⁻, N³⁻ is smaller

79. The third ionization energy of the first transition series show a sharp drop at Fe²⁺, (3d⁶) ion. The reason for this drop is due to :

1. Increased electron-electron repulsion energy caused due to pairing of d- electrons
2. drop in effective nuclear change
3. the presence of large number of electrons
4. increased electronegativity of Fe²⁺ ion

80. The following two equations are given :

(a) Na (g) ⇌ Na⁺(g) + e⁻ ...... ΔH = + 495 KJ/mol
(b) Cl⁻(g) ⇌ Cl (g) + e⁻ ...... ΔH = 348.9 KJ/mol

The reactions (a) and (b) respectively are known as :

1. Electron affinity of sodium and electron affinity of Cl⁻ ion
2. Ionization energy of sodium and ionization energy of Cl⁻ ion
3. Ionization energy of sodium and electron affinity of Cl⁻ ion
4. Electron affinity of Na and ionization energy of Cl⁻(g)
81. Which of the following species is formed when both atoms / groups are eliminated from the same carbon?

1. carbocation
2. carbene
3. carbanion
4. ketene

82. The stereochemical outcome of the SN\(^2\) reaction on an optically active substrate will be:

1. Inversion in configuration
2. Retention in configuration
3. Partial racemization
4. Complete racemization

83. The designation D or L before the name of a monosaccharide indicates:

1. The length of the carbon chain in the sugar
2. The direction of rotation of polarized light
3. The position of the -OH group on the carbon chain next to the primary alcohol group
4. The position of the chiral carbon atoms in the carbohydrate

84. The S\(_n\)2 mechanism best applies to the reaction between:

1. cyclopropane and \(H_2\)
2. methane and \(Cl_2\)
3. 2-chloro-2-methylpropane and dilute \(OH^-\)
4. 1-chlorobutane and aqueous \(NaOH\)

85. List the following compounds in order of decreasing acidity:

\[
\begin{align*}
&\text{FCH_2CH_2OH} & \text{CH_3CH_2OH} & \text{CH_3CHOH} & \text{ClCH_2CH_2OH} \\
&(\text{I}) & (\text{II}) & (\text{III}) & (\text{IV}) \\
&(1) & I > III > IV > II & (2) & III > IV > I > II \\
&(3) & III > I > IV > II & (4) & I > IV > II > III \\
\end{align*}
\]
86. When heated with n- butyl lithium at 100° C pyridine forms:

(1) \[
\text{\begin{array}{c}
\text{N} \\
\text{Bu}
\end{array}}
\]

(2) \[
\text{\begin{array}{c}
\text{N} \\
\text{Bu}
\end{array}}
\]

(3) \[
\text{\begin{array}{c}
\text{Bu} \\
\text{N}
\end{array}}
\]

(4) \[
\text{\begin{array}{c}
\text{N} \\
\text{Bu}
\end{array}}
\]

87. Conversion of cyclohexanone oxime to caprolactam can be effected by:

(1) Beckmann rearrangement
(2) Hofmann rearrangement
(3) Claisen rearrangement
(4) Claisen condensation

88. The decreasing order of stability of the following carbocations is:

\[
\begin{array}{c}
\text{CH}_3 \\
\text{I}
\end{array}, \quad \begin{array}{c}
\text{CH}_3 \\
\text{II}
\end{array}, \quad \begin{array}{c}
\text{CH}_3 \\
\text{III}
\end{array}, \quad \begin{array}{c}
\text{CH}_2 \\
\text{IV}
\end{array}
\]

(1) I > II > III > IV
(2) II > III > I > IV
(3) II > I > III > IV
(4) III > I > II > IV

89. Bimolecular reduction of acetone in the presence of Mg amalgam in ether gives:

(1) Isopropanol
(2) Propane -1, 2 - diol
(3) Pinacol
(4) Propane
90. Which of the following statements is wrong about citral?

(1) The molecule has two double bonds
(2) An aldehyde group is present
(3) One of the products obtained from ozonolysis of citral is acetone
(4) It is an optically active compound

91. Proteins on heating with conc. HNO₃ produce yellow colour. This is known as:

(1) Millon's test
(2) Hopkin's test
(3) Ninhydrin test
(4) Xanthoproteic test

92. The reagent 'X' in the following reaction is:

\[ \text{CH}_3\text{COCH}_3 \xrightarrow{X} \ \text{(CH}_3\text{)}_2\text{C}^\text{=CH}_2\text{COCH}_3 \]

(1) HCl
(2) \(\text{Ba(OH)}_2\)
(3) \(\text{H}_2\text{SO}_4\)
(4) \(\text{NaBH}_4\)

93. When heated with acetic anhydride in pyridine solution, \(\alpha\)-amino acids are converted into:

(1) \(\text{RCH}^\text{NHCOCH}_3\)
(2) \(\text{RCH}^\text{NH}_2\text{COCH}_3\)
(3) \(\text{RCH}^\text{NHCOCH}_3\)
(4) \(\text{RCH}^\text{NH}_\text{COCH}_3\)
94. Give the product of the following reaction:

\[
\text{CH}_2\text{CH}_3 + \text{CH}_2\text{Cl} \rightarrow ?
\]

(1) 2 - acetylpypyridine  (2) 3 - acetylpypyridine
(3) 4 - acetylpypyridine

95. The decreasing order of reaction rate of the following benzyl alcohols with HBr is:

(I) \(\text{C}_6\text{H}_5\text{CH}_2\text{OH}\)  (II) \(\text{p-NO}_2\text{C}_6\text{H}_4\text{CH}_2\text{OH}\)
(III) \(\text{p-CH}_3\text{O}\text{C}_6\text{H}_4\text{CH}_2\text{OH}\)  (IV) \(\text{p-ClC}_6\text{H}_4\text{CH}_2\text{OH}\)

(1) \(\text{III} > \text{IV} > \text{I} > \text{II}\)  (2) \(\text{III} > \text{I} > \text{IV} > \text{II}\)
(3) \(\text{III} > \text{I} > \text{II} > \text{IV}\)  (4) \(\text{I} > \text{III} > \text{IV} > \text{II}\)

96. In the following reaction:

\[
\text{CH}_2\text{CH}_2\text{CH}_3 + \text{NBS} \rightarrow ?
\]

the major product is:

(1)  
(2)  
(3)  
(4)  

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97. One of the following structures is that of \( \alpha \)-Terpineol. Which one?

(1) [Structure 1]  (2) [Structure 2]
(3) [Structure 3]  (4) [Structure 4]

98. The major product obtained on treatment of 2-bromobutane with alcoholic KOH is:

(1) 1-butane  (2) cis-2-butane
(3) trans-2-butane  (4) 2-butanol

99. Which of the following alkenes have \( \text{E} \) - configuration?

(1) [Structure I]  (2) [Structure II]
(3) [Structure III]  (4) [Structure IV]

(1) I and II  (2) I and III
(3) II and III  (4) All I, II and III

100. Rapid interconversion of \( \alpha \)-D-glucose and \( \beta \)-D-glucose in aqueous solution is known as:

(1) inversion  (2) epimerization
(3) racemization  (4) mutarotation
101. Which one of the following is most likely to undergo free-radical addition to an alkene?
   (1) HF  (2) HCl  (3) HBr  (4) HI

102. Which one of the following rearrangements involves an electron deficient oxygen atom?
   (1) Baeyer-villiger rearrangement
   (2) Pinacol-pinacolone rearrangement
   (3) Hofmann rearrangement
   (4) Wolff rearrangement

103. Ranks the basicities of the following compounds:
   (A) NH₃
   (B) CH₃NH₂
   (C) (CH₃)₄N⁺ NO₃⁻
   (1) B > C > A
   (2) C > A > B
   (3) C > B > A
   (4) B > A > C

104. Bakelite is formed by the condensation of:
   (1) Formaldehyde and urea
   (2) Phenol and formaldehyde
   (3) Phththalic anhydride and glycerol
   (4) Methyl terephthalate and ethylene glycol

105. What is the IUPAC name of the following compound?

F
(CH₃)₂C CO₂CH(CH₃)₂

(1) Isopropyl 2-fluoro-3-methylbutanoate
(2) 1-Methylethyl 2-fluorobutyrate
(3) 2-Fluoroisopropyl isopropanoate
(4) 1-Methylethyl 2-fluoro-2-methylpropanoate
106. Identify the compounds which fail to undergo Friedel-Crafts reaction:

<table>
<thead>
<tr>
<th>Naphthalene</th>
<th>Pyridine</th>
<th>Aniline</th>
<th>Phenanthrene</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I)</td>
<td>(II)</td>
<td>(III)</td>
<td>(IV)</td>
</tr>
<tr>
<td>(1) II and III</td>
<td>(2) II, III and IV</td>
<td>(3) I, II and IV</td>
<td>(4) II and IV</td>
</tr>
</tbody>
</table>

107. Which of the following is a false statement about the alkaloid piperine?

(1) This occurs in black pepper
(2) The molecule has a methylenedioxy group
(3) It is a secondary amide
(4) Piperine can be easily synthesized starting from catechol

108. Teflon is obtained by polymerization of the monomer:

(1) $\text{CH}_2 = \text{CF}_2$
(2) $\text{CF}_2 = \text{CF}_2$
(3) $\text{CH}_2 = \text{CHF}$
(4) $\text{CH}_2 = \text{C(CH}_3)_2\text{COOCH}_3$

109. Stereochemically controlled polymers can be made by polymerization process involving:

(1) Anionic mechanism
(2) Cationic mechanism
(3) Coordination mechanism
(4) Free - radical mechanism

110. Which one of the following is classified as a dye from xanthene group?

(1) Malachite green
(2) Methyl orange
(3) Indigo
(4) Fluorescein
111. Arrange the compounds in order of decreasing reactivity toward electrophilic substitution:

\[
\begin{align*}
A & : \quad \text{CCl}_3 \\
B & : \quad \text{CH}_3 \\
C & : \quad \text{CHCl}_2 \\
D & : \quad \text{CH}_2\text{Cl} \\
\end{align*}
\]

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

112. Which of the following groups are meta-directing in electrophilic aromatic substitution in benzene ring?

\[
\begin{align*}
-\text{CONH}_2 & \quad -\text{NHCH}_3 & \quad -\text{NHCOC}_3 & \quad -\text{N(CH}_3)_3 \\
\text{(a)} & \quad \text{(b)} & \quad \text{(c)} & \quad \text{(d)} \\
(1) & \quad \text{a, c} & \quad (2) & \quad \text{b, d}  \\
(3) & \quad \text{a, d} & \quad (4) & \quad \text{c, d} \\
\end{align*}
\]

113. In the reaction sequence,

\[
\text{Naphthalene} \xrightarrow{\text{air}} ? \xrightarrow{\text{NH}_3} ? \xrightarrow{\text{NaOCl}} \text{Q}
\]

the end product Q is:

\[
\begin{align*}
(1) & \quad \text{1}
(2) & \quad \text{2}
(3) & \quad \text{3}
(4) & \quad \text{4}
\end{align*}
\]
114. Which reactive intermediate is involved in the following reaction?

\[ 2\text{-Methylbutane} \xrightarrow{\text{Br}_2, \text{hv}} 2\text{-Bromo-3-methylbutane} \]

(not the major product)

(1) A secondary radical  (2) A tertiary radical
(3) A secondary carbocation  (4) A tertiary carbocation

115. The number of chiral carbon atoms present in the D-glucopyranose molecule is:

(1) three  (2) four  (3) five  (4) six

116. Naphthalene undergoes nitration with a mixture of conc. HNO₃ and H₂SO₄ at 50°C to give mainly:

(1) 1-Nitronaphthalene  (2) 2-Nitronaphthalene
(3) 1,3-Dinitronaphthalene  (4) 1,8-Dinitronaphthalene

117. Identify the most reactive compound toward dehydrohalogenation by a strong base:

(1) 1-Bromopentane  (2) 2-Bromopentane
(3) 3-Bromopentane  (4) 2-Bromo-2-methylbutane

118. When aniline is heated with glycerol in the presence of sulphuric acid and nitrobenzene, it gives quinoline. This reaction is called:

(1) Chichibabin reaction
(2) Skraup synthesis
(3) Fischer synthesis
(4) Bischler - Napieralski synthesis
119. Which of the following conjugated dienes would not react with a dienophile in Diels-Alder reaction?

(1)  

(2)  

(3)  

(4)  

120. Two of the following four compounds are more acidic than methanol. Which ones?

\[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \]

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

121. Serum is the fluid:

(1) Supernated from the blood
(2) Separated from the clotted blood
(3) Separated from the unclotted blood
(4) Separated from the mixture of clotted blood and unclotted blood

122. Standard addition calibration is used:

(1) to obtain precise result
(2) to obtain accurate result
(3) to overcome sample matrix effects
(4) to enhance sensitivity of the result
123. In the following operation

\[
\frac{35.63 \times 0.581 \times 0.05300}{1.1689} \times 100\% = 88.5470578\%
\]
the answer with significant figures is:

(1) 88.55%  
(2) 88.547%  
(3) 88.54705%  
(4) 88.5470578%

124. The results of an analysis is 36.97 g compared with the accepted value of 37.06 g. The relative error in parts per thousand (ppt) is:

(1) -2.0 ppt  
(2) -2.1 ppt  
(3) -2.3 ppt  
(4) -2.4 ppt

125. How many g/mL of NaCl are contained in a 0.250 M solution?

(1) 0.0146 g/mL  
(2) 0.146 g/mL  
(3) 14.6 g/mL  
(4) 0.00146 g/mL

126. The pH of 10⁻⁹ M HCl is:

(1) 9.00  
(2) 0.90  
(3) 6.00  
(4) 6.99

127. The pH of a solution prepared by adding 25 mL of 0.10 M sodium hydroxide to 30 mL of 0.20 M acetic acid (pK = 4.76) is:

(1) 4.68  
(2) 4.61  
(3) 4.90  
(4) 5.7
128. The correlation between distribution ratio (D) and distribution coefficient (K_d) can be represented as:

1. \( D = \frac{K_d}{1 + Ka/[H^+]} \)
2. \( K_d = D/(1 + Ka/[H^+]) \)
3. \( K_d = D/[Ka/[H^+]] \)
4. \( D = K_d/[Ka/[H^+] \]

129. Craig counter current distribution involves:

1. no extraction
2. single extraction
3. successive extractions
4. solute dissolution

130. The van Deemter equation is:

1. \( \text{HETP} = A + \frac{B}{\mu} + \frac{C}{\mu} \)
2. \( \text{HETP} = A \bar{\mu} + B + \frac{C}{\mu} \)
3. \( \text{HETP} = A + \frac{B}{\mu\bar{\mu}} + C\bar{\mu} \)
4. \( \text{HETP} = \frac{A}{B} + \frac{1}{\mu} + \frac{\bar{\mu}}{C} \)

131. The retention time in column chromatography can be defined as:

1. the time required for the mobile phase to traverse the column
2. the time required for the stationary phase to elute the analyte
3. the time required for the stationary phase to bind the analyte
4. the time required for the analyte peak to appear

132. The unit of specific absorptivity is:

1. \( \text{Cm}^{-1} \\text{mol}^{-1} \\text{L} \)
2. \( \text{Cm}^{-1} \text{g}^{-1} \text{L} \)
3. \( \text{Cm}^{-1} \text{mol L}^{-1} \)
4. \( \text{Cm}^{-1} \text{g L}^{-1} \)

133. In spectrophotometric analysis, the minimum relative error in the concentration occurs when percent transmittance measured is:

1. 20%
2. 80%
3. 37%
4. 50%
134. Which is main ingredient of ferroin?
   (1) oxine  (2) dithiozone
   (3) o-phenothroline  (4) ferrocene

135. Five mole of KBrO$_3$ in bromate - bromide reaction proceeds:
   (1) one mole Br$_2$  (2) four mole Br$_2$
   (3) fifteen mole Br$_2$  (4) no Br$_2$

136. Metal - EDTA complexation is a pH controlled process. Can you use an acid indicator if you do not have suitable metal indicator?
   (1) Yes  (2) No
   (3) Can not say  (4) wait till arrangement of metal ion indicator is made

137. Chloramine-T and Eriochrome Black-T are used in chemical analysis because:
   (1) both are indicators
   (2) both are redox reagents
   (3) one is redox reagent and other is an indicator
   (4) both are same but called by different names

138. Which one acts as a sink of CO$_2$ gas?
   (1) Ocean  (2) River  (3) Glaciers  (4) Land

139. Which reaction represents the process of respiration?
   (1) CO$_2$ + H$_2$O + h$\nu$ = (CH$_2$O) + O$_2$
   (2) (CH$_2$O) + O$_2$ = CO$_2$ + H$_2$O + CO$_2$
   (3) CH$_4$ + 2O$_2$ = CO$_2$ + 2H$_2$O
   (4) O$_2$ + 4FeO = 2Fe$_2$O$_3$

140. The altitude range of troposphere is:
   (1) 0 - 11 Km  (2) 11 - 50 Km
   (3) 50 - 85 Km  (4) 85 - 500 Km
141. Aitken particles are actually:
   (1) aerosols with diameter more than 0.2 μ
   (2) aerosols with diameter less than 0.2 μ
   (3) aerosols with diameter more than 2.0 μ
   (4) aerosols with diameter less than 2.0 μ

142. Van Allen belts are:
   (1) Consisted of two belts of ionizing particles encircling the earth
   (2) Consisted of two belts of ionizing particles encircling the moon
   (3) Consisted of more than two belts of ionizing particle encircling the sun
   (4) Consisted of a single belt of ionizing particle encircling the uncharged particulates

143. Which one does not affect the Ozone deterioration?
   (1) HO      (2) NO      (3) O      (4) H₂

144. Atmospheric window which do not allow to escape of infrared radiation emitting from the earth is in between:
   (1) 4000 — 8000 nm    (2) 8000 — 16000 nm
   (3) 16000 — 20000 nm  (4) 20000 — 24000 nm

145. Which one is man culprite to contribute greenhouse effect?
   (1) CH₄       (2) O₃       (3) CFC       (4) CO₂

146. El Nino is due to:
   (1) warming of waters of the Eastern Pacific ocean
   (2) cooling of waters of the Eastern Pacific ocean
   (3) warming of waters of the Western Pacific ocean
   (4) cooling of waters of the Western Pacific ocean

147. The pH of sea water is constant as:
   (1) 7.0        (2) 8.1        (3) 6.5        (4) 10.2
148. Which metal is responsible for the manifestation of itai itai diseases?
   (1) As      (2) Pb      (3) Hg      (4) Cd

149. Quadrivalent cerium is best oxidising reagent because:
   (1) it is easily available
   (2) its aqueous solution is highly stable at high temperature
   (3) it is cheaper
   (4) it does not require any primary standard for standardization

150. Oxine is a precipitating reagent. How can you easily determine this reagent quantitatively at trace level?
   (1) Precipitation method      (2) Spectrophotometric method
   (3) Conductometric method      (4) BrO₃⁻ - Br⁻ reaction method
ROUGH WORK
राफ़ कार्य
ROUGH WORK
एक कार्य
अध्यापियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर
केवल नीली-काली बाल-व्याप्त पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 30 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ और बंदूक प्रश्न पृष्ठ नहीं हैं। पुस्तिका दोषपूर्ण पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।

2. परीक्षा भवन में लिखका रहित प्रश्न-पत्र के अन्तरिक्ष, लिखा या सादा कोई भी सुचना कागज साथ में न लाये।

3. उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़े और न ही विकार करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही नूस्त झिका किया जायेगा।

4. अपना अनुकूलन तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।

5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुकूलन निर्धारित स्थान पर लिखें तथा नीचे दिखे बृत्तियों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का संख्या उचित स्थानों पर लिखें।

6. ओरो एप्स. आर. पत्र पर अनुकूलन संकेत, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुकूलन और ओरो एप्स. आर. पत्र संख्या की प्रविष्टियों में उपरीतेश्न की अनुमति नहीं है।

7. उपर्युक्त प्रविष्टियों में कोई भी अनिर्दिष्ट कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा वह एक अनुचित साधन का प्रयोग माना जायेगा।

8. प्रश्न-पुस्तिका में प्रयोक्त प्रश्न के बार वैकल्य उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्य उत्तर के लिए आपकी उत्तर-पत्र की संबंधित पंक्ति के सामने दिये गये बृत्तियों को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा कराना है।

9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही बृत्ति का गाढ़ा करें। एक से अधिक बृत्तियों को गाढ़ा करने पर अग्नि एक ही बृत्ति को अनूपल्य भरने पर वह उत्तर गलत माना जायेगा।

10. ध्यान दें कि एक बार त्वची ही अंकित उत्तर बदलना नहीं जा सकता है। चूंकि आप अनुकूल बृत्ति के उत्तर नहीं देने चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी बृत्तियों को हाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।

11. एक शाखा के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।

12. परीक्षा के उपरांत केवल ओरो एप्स. आर. पत्र पर परीक्षा भवन में जमा कर दें।

13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।

14. यदि कोई अवयवीय परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्लेषणालय द्वारा निर्धारित दंड का/की, भारी होगा/होगी।