DPP–1 (Oxidation Number & Oxidation State) — Solutions

Chapter: Redox Reactions

"Your goals need your time — not your excuses."

1. **Of the following elements, which one has the same oxidation state in all of its compounds?**

Rule yaad rakho: Fluorine sabse zyada electronegative hai, isliye apne saare compounds me hamesha –1 oxidation state show karta hai.

Hydrogen: +1 (mostly), –1 (metal hydrides)
Oxygen: –2 (mostly), –1 (peroxide), +2 (OF_2)
Carbon: multiple oxidation states
Fluorine: always –1

Correct Option: (2) Fluorine

2. **Oxidation number of carbon in graphite is:**

Free element / elemental form ka oxidation number hamesha zero hota hai.

Graphite carbon ka elemental allotrope hai. Isliye oxidation number = 0.

Correct Option: (1) Zero

3. **The process in which oxidation number increases is :-**

Oxidation = increase in oxidation number. Reduction = decrease.

Definition based question hai. Oxidation ka matlab directly O.N. increase hona.

Correct Option: (3) Oxidation

4. **Positive oxidation state of an element indicates that it is –**

Positive O.N. matlab electron loss hua hai.

Electron loss = oxidation. Isliye element oxidised state me hai.

Correct Option: (2) Oxidised

5. **Which statement is wrong:**

Oxygen ke special cases yaad rakho: peroxide, superoxide, OF_2.

Peroxide: O = –1 (not +1)
OF_2: O = +2
Superoxide: O = –1/2
Most compounds: O = –2

Correct Option: (1)

6. **Oxidation state of oxygen in hydrogen peroxide is:**

H_2O_2 ek peroxide hai.

Peroxide me oxygen ka O.N. = –1 hota hai.

Correct Option: (1) –1

7. **Select the compound in which the oxidation number of oxygen is –1:**

Peroxide identify karo.

BaO_2 ek peroxide hai → O = –1.

Correct Option: (4) BaO_2

8. **Oxidation number of fluorine in OF_2 is:**

Fluorine hamesha –1 hota hai (exception nahi).

OF_2 me oxygen +2 hota hai, fluorine –1 hi rahega.

Correct Option: (3) –1

9. **Oxidation state of oxygen in H_2O_2 and OF_2 is :-**

Pehle compound identify karo, phir rule apply karo.

H_2O_2 → peroxide → O = –1
OF_2 → O = +2

Correct Option: (4)

10. **The oxidation state of oxygen atom in potassium superoxide is –**

Superoxide me oxygen ka average O.N. –1/2 hota hai.

KO_2 → superoxide ion (O_2^-) → each O = –1/2

Correct Option: (2) –1/2

11. **Oxidation number of oxygen atom in O_3 molecule is :-**

Free elemental form ka O.N. zero hota hai.

Ozone me sirf oxygen atoms hain → elemental form.

Correct Option: (1) 0

12. **The oxidation number of C in CH_4, CH_3Cl, CH_2Cl_2, $CHCl_3$ and CCl_4 are respectively:**

Hydrogen = +1, Chlorine = –1. Carbon ka O.N. balance se niklega.

CH_4 → –4
CH_3Cl → –2
CH_2Cl_2 → 0
$CHCl_3$ → +2
CCl_4 → +4

Correct Option: (3)

13. **The sum of oxidation states of all the carbon atoms present in C_6H_5CHO is:**

Total O.N. sum nikalna hota hai, individual carbon nahi.

Hydrogen = +1 (6 H) → +6
Oxygen = –2
Compound neutral → sum of C = –(+6 –2) = –4

Correct Option: (1) –4

14. **The oxidation number of C marked as (1) and (2) in O=C=C=C=O are respectively:**

Symmetry ka use karo, terminal aur central carbon alag behave karte hain.

Terminal C (double bonded to O) → +2
Central C → 0

Correct Option: (1)

15. **The oxidation number of nitrogen in NH_2OH is:**

H = +1, O = –2 leke nitrogen ka O.N. nikalo.

Let N = x
$x + 3(+1) + (-2) = 0 \Rightarrow x = -1$

Correct Option: (3) –1

16. **–1/3 oxidation state of nitrogen will be obtained in case of:**

Average oxidation state concept use hota hai.

Hydrazoic acid (HN_3) me 3 N atoms hain → average O.N. –1/3.

Correct Option: (2)

17. **Oxidation number of 'N' in N_3H (hydrazoic acid) is:**

Average oxidation state pucha gaya hai.

HN_3: total O.N. of N = –1 → average = –1/3

Correct Option: (1)

18. **The oxidation number of N in $(NH_4)_2SO_4$ is:**

NH_4^+ ion ka O.N. yaad rakho.

NH_4^+ me N = –3.

Correct Option: (2) –3

19. **Oxidation state of nitrogen is incorrectly given for:**

Har option ka nitrogen O.N. verify karo.

$(NH_4)_2SO_4$ me N = –3, not +3. Baaki sab correct.

Correct Option: (3)

20. **Match List–I (compound) with List–II (oxidation state of N):**

Har compound ka nitrogen oxidation number calculate karo.

$KNO_3 \rightarrow +5$
$HNO_2 \rightarrow +3$
$NH_4Cl \rightarrow -3$
$NaN_3 \rightarrow -1/3$

Correct Option: (1)

21. **The correct order of N–compounds in its decreasing order of oxidation states is :-**

Sab compounds me nitrogen ka oxidation number nikaal ke compare karna hai.

$HNO_3 \rightarrow +5$
$NO \rightarrow +2$
$N_2 \rightarrow 0$
$NH_4Cl \rightarrow -3$
Decreasing order: +5 ¿ +2 ¿ 0 ¿ –3

Correct Option: (1)

22. **In which of the following compounds, nitrogen exhibits highest oxidation state?**

Highest oxidation state matlab sabse zyada positive value.

$N_3H \rightarrow -1/3$
$NH_2OH \rightarrow -1$
$N_2H_4 \rightarrow -2$
$NH_3 \rightarrow -3$
Highest among these = $-1/3$

Correct Option: (1)

23. **The oxidation states of phosphorus vary from :-**

Phosphorus ke known oxidation states yaad rakho.

Phosphorus –3 se +5 tak oxidation states show karta hai.

Correct Option: (1)

24. **The oxidation number of phosphorus in PH_4^+, PO_3^{2-} and PO_4^{3-} are respectively:**

Charge balance method use karo.

PH_4^+: $x + 4(+1) = +1 \Rightarrow x = -3$
PO_3^{2-}: $x + 3(-2) = -2 \Rightarrow x = +1$
PO_4^{3-}: $x + 4(-2) = -3 \Rightarrow x = +5$

Correct Option: (4)

25. **Oxidation number of P in KH_2PO_3 is:**

Salt ko ionic form me tod ke calculation karo.

$KH_2PO_3 \rightarrow H_2PO_3^-$
$x + 2(+1) + 3(-2) = -1 \Rightarrow x = +3$

Correct Option: (4)

26. **The oxidation number of phosphorus in $Ba(H_2PO_2)_2$ is :-**

Hypophosphite ion yaad rakho.

$H_2PO_2^-$:
$x + 2(+1) + 2(-2) = -1 \Rightarrow x = +1$

Correct Option: (3)

27. **Oxidation states of P in $H_4P_2O_5$, $H_4P_2O_8$, $H_4P_2O_7$ are respectively :-**

Average oxidation state method use karo.

$H_4P_2O_5$: P = +3
$H_4P_2O_8$: P = +5
$H_4P_2O_7$: P = +4

Correct Option: (1)

28. **The oxidation number of arsenic atom in H_3AsO_4 is:**

Phosphoric acid jaisa hi structure hai.

$x + 3(+1) + 4(-2) = 0 \Rightarrow x = +5$

Correct Option: (4)

29. **In substance $Mg(HXO_3)$ the oxidation number of X is:**

Total compound neutral hona chahiye.

Mg^{2+} → so HXO_3^-
$x + (+1) + 3(-2) = -1 \Rightarrow x = +4$

Correct Option: (4)

30. **Oxidation number of sulphur in $Na_2S_2O_3$ would be:**

Thiosulphate me average oxidation state pucha gaya hai.

$2x + 3(-2) = -2 \Rightarrow 2x = +4 \Rightarrow x = +2$

Correct Option: (1)

31. **Which of the following compounds are arranged in increasing oxidation number of S:**

Har compound ka sulphur O.N. nikaalo.

$H_2S \rightarrow -2$
$H_2SO_3 \rightarrow +4$
$H_2S_2O_3 \rightarrow +2$ (avg)
$H_2SO_4 \rightarrow +6$
Increasing: -2 ¡ $+2$ ¡ $+4$ ¡ $+6$

Correct Option: (4)

32. **The sum of oxidation states of sulphur in $H_2S_2O_8$ is:**

Total oxidation number sum nikalna hai.

$2(+1) + 2x + 8(-2) = 0 \Rightarrow 2x = +14$
Sum = $+14$

Correct Option: (4)

33. **The oxidation states of sulphur in SO_3^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follow the order:**

Average oxidation state method.

$SO_3^{2-} \rightarrow +4$
$S_2O_4^{2-} \rightarrow +3$
$S_2O_6^{2-} \rightarrow +5$
Order: $+3$ ¡ $+4$ ¡ $+5$

Correct Option: (1)

34. **In the conversion of Br_2 to BrO_3^- the oxidation state of bromine changes from:**

Br_2 me Br ka O.N. zero hota hai.

$Br_2 \rightarrow 0$
BrO_3^-: $x + 3(-2) = -1 \Rightarrow x = +5$

Correct Option: (1)

35. **Chlorine is in +3 oxidation state in :-**

Har compound me chlorine ka O.N. check karo.

$HCl \rightarrow -1$
$HClO_4 \rightarrow +7$
$ICl \rightarrow -1$
ClF_3: $x + 3(-1) = 0 \Rightarrow x = +3$

Correct Option: (4)

36. **Iodine shows the highest oxidation state in the compound:**

Highest oxidation state identify karo.

$KI \rightarrow -1$
$KI_3 \rightarrow -1$
$IF_5 \rightarrow +5$
$KIO_4 \rightarrow +7$

Correct Option: (4)

37. **The oxidation state of iodine in H_4IO_6 is:**

Periodic acid type compound hai.

$x + 4(+1) + 6(-2) = 0 \Rightarrow x = +7$

Correct Option: (1)

38. **In which of the following compounds of Cr, the oxidation number of Cr is not +6:**

Chromium ke common compounds yaad rakho.

$CrO_3 \rightarrow +6$
$CrO_2Cl_2 \rightarrow +6$
$Cr_2O_3 \rightarrow +3$
$K_2Cr_2O_7 \rightarrow +6$

Correct Option: (3)

39. **Each chromium in $K_2Cr_2O_7 \rightarrow Cr_2O_3$ is changing from :-**

Initial aur final oxidation states compare karo.

$K_2Cr_2O_7 \rightarrow Cr = +6$
$Cr_2O_3 \rightarrow Cr = +3$

Correct Option: (3)

40. **Amongst the following, identify the species with an atom in +6 oxidation state:**

Har species me metal ka O.N. calculate karo.

$MnO_4^- \rightarrow Mn = +7$
$Cr(CN)_6^{3-} \rightarrow Cr = +3$
$NiF_6^{4-} \rightarrow Ni = +2$
$CrO_2Cl_2 \rightarrow Cr = +6$

Correct Option: (4)

41. **In $[Ni(CO)_4]$, the oxidation state of Ni is:**

CO ek neutral ligand hota hai.

$[Ni(CO)_4]$ overall neutral hai aur CO neutral ligand hai $\rightarrow$ Ni = 0.

Correct Option: (2) 0

42. **The oxidation number of Pt in $[Pt(C_2H_4)Cl_3]^-$ is:**

Ethylene (C_2H_4) neutral ligand hai, $Cl^- = -1$.

Let Pt = x
$x + 3(-1) = -1 \Rightarrow x = +2$

Correct Option: (2)

43. **Oxidation state of cobalt in $[Co(NH_3)_4(H_2O)Cl]SO_4$ is:**

SO_4^{2-} counter ion hai, complex cation ka charge +2 hoga.

Let Co = x
$x + (-1) = +2 \Rightarrow x = +3$

Correct Option: (4)

44. **The oxidation number of iron in potassium ferricyanide $K_3[Fe(CN)_6]$ is:**

CN^- = –1 ligand hota hai.

Let Fe = x
$x + 6(-1) = -3 \Rightarrow x = +3$

Correct Option: (3)

45. **In which of the following compounds iron has lowest oxidation state:**

Sab compounds me Fe ka oxidation state compare karo.

$FeSO_4(NH_4)_2SO_4 \cdot 6H_2O \rightarrow$ Fe = +2
$K_4[Fe(CN)_6] \rightarrow$ Fe = +2
$Fe(CO)_5 \rightarrow$ Fe = 0
$Fe_{0.94}O \rightarrow$ Fe $\approx$ +2.13
Lowest = 0

Correct Option: (3)

46. **The correct code for the O.N. of asterisked atom would be:**

Har asterisked atom ka oxidation number individually find karo.

(A) $KMnO_4 \rightarrow$ Mn = +7
(B) $Ni(CO)_4 \rightarrow$ Ni = 0
(C) $[Pt(NH_3)Cl_2]Cl_2 \rightarrow$ Pt = +4
(D) $Na_2O_2 \rightarrow$ O = –1

Correct Option: (2)

47. **Oxidation number of Fe in $Fe_{0.94}O$ is:**

Non-stoichiometric compound hai, average O.N. nikalna hota hai.

$$0.94x + (-2) = 0 \Rightarrow x = \frac{2}{0.94} = \frac{200}{94}$$

Correct Option: (2)

48. **Oxidation number of Fe in Fe_3O_4 are:**

$Fe_3O_4 = FeO + Fe_2O_3$.

Isme Fe +2 aur Fe +3 dono present rehte hain.

Correct Option: (1)

49. **Oxidation number of Fe in Fe_3O_4 is :-**

Average oxidation number pucha gaya hai.

Total O.N. of O = $4(-2) = -8$
Total Fe = $+8 \rightarrow$ average = $8/3$

Correct Option: (4)

50. **In which of the following pair oxidation number of Fe is same:**

Fe ka O.N. dono compounds me same hona chahiye.

$K_3[Fe(CN)_6] \rightarrow +3$
$Fe_2O_3 \rightarrow +3$

Correct Option: (1)

51. **Compound $YBa_2Cu_3O_7$ is a superconductor. The O.N. of the copper in the compound will be:**

Average oxidation number nikalna hai.

Y = +3, Ba = +2, O = –2
$3 + 2(2) + 3x + 7(-2) = 0 \Rightarrow x = +7/3$

Correct Option: (1)

52. **Oxidation number of sodium in sodium amalgam is:**

Amalgam me metal free state jaisa behave karta hai.

Sodium amalgam me Na ka oxidation number = 0.

Correct Option: (4)

53. **Oxidation number of Xe in XeF_5 is :-**

Fluorine ka O.N. hamesha –1 hota hai.

$x + 5(-1) = 0 \Rightarrow x = +5$

Correct Option: (4)

54. **Oxidation numbers of P in PO_4^{3-}, of S in SO_4^{2-} and that of Cr in $Cr_2O_7^{2-}$ are respectively:**

Direct standard ions hain.

$PO_4^{3-} \rightarrow P = +5$
$SO_4^{2-} \rightarrow S = +6$
$Cr_2O_7^{2-} \rightarrow Cr = +6$

Correct Option: (4)

55. **Which one of the following statements is not correct?**

Galat oxidation state identify karo.

H_2SO_5 (peroxomonosulphuric acid) me sulphur +6 hota hai, +8 nahi.

Correct Option: (3)

56. **Oxidation number of C in HNC is:**

Structure aur electronegativity rule use karke oxidation number assign karte hain.

HNC ka structure: H−N ≡ C
Nitrogen carbon aur hydrogen dono se zyada electronegative hai. Isliye H–N aur N≡C bonds ke electrons nitrogen ko assign kiye jaate hain.
Hydrogen ka oxidation number +1 hota hai. Nitrogen ka oxidation number –3 hota hai.
Let carbon ka oxidation number = x
$(+1) + (-3) + x = 0 \Rightarrow x = +2$

Correct Option: (1)

57. **Oxidation number of carbon in carbon suboxide (C_3O_2) is:**

Average oxidation number pucha gaya hai.

$3x + 2(-2) = 0 \Rightarrow x = +4/3$

Correct Option: (2)

58. **Two oxidation states for chlorine are found in the compound:**

Mixed oxidation state compound identify karo.

$CaOCl_2$ = bleaching powder → Cl in +1 and –1.

Correct Option: (1)

59. **Oxidation number of chlorine in perchloric acid is :-**

Perchloric acid = $HClO_4$.

Cl in $HClO_4$ = +7.

Correct Option: (4)

60. **Lowest oxidation state of phosphorous is in :-**

P ke hydrides / oxyacids compare karo.

H_3PO_2 me P = –1 (lowest).

Correct Option: (1)

61. **Predict the highest and lowest oxidation state of (a) Ti and (b) Tl in combined state.**

Periodic trends aur inert pair effect use karke oxidation states predict karte hain.

Titanium (Ti): Group–4 element hai, isliye apne 4 valence electrons bond me use kar sakta hai. Highest oxidation state +4 hoti hai (e.g., TiO_2). Metallic/combined state me lowest oxidation state 0 bhi possible hoti hai.
Thallium (Tl): Group–13 element hai. Highest oxidation state +3 hoti hai. Inert pair effect ke kaaran $6s^2$ electrons bond me participate nahi karte, isliye +1 oxidation state zyada stable hoti hai aur lowest hoti hai.

Correct Option: (4)

62. **The correct structure of tribromooctaoxide is :-**

Structure-based conceptual question hai.

NEET 2019 ke according correct structural option select hota hai.

Correct Option: (2)

63. **Oxidation number of Cr in CrO_5 is :-**

CrO_5 me peroxide bonds present hote hain.

Peroxide O = –1 consider karne par Cr = +6.

Correct Option: (2)

64. **Oxidation state of Cr in CrO_5 is :-**

Same concept as previous question.

Peroxo bonds ke kaaran Cr ka O.N. +6 hi hota hai.

Correct Option: (3)

65. **The oxidation state of Cr in CrO_6 is :-**

Maximum oxidation state check karo.

CrO_6 me Cr = +6.

Correct Option: (4)

66. **Oxidation state of iron in haemoglobin is :-**

Biomolecule based factual question.

Haemoglobin me iron ferrous state me hota hai.

Correct Option: (2)

67. **The brown ring complex compound is formulated as $[Fe(H_2O)_5NO]SO_4$. The oxidation state of iron is :-**

Brown ring complex me NO ligand neutral behave nahi karta, balki NO^+ (nitrosonium) ke form me act karta hai.

SO_4^{2-} hone ke kaaran complex cation ka charge +2 hai.
H_2O neutral ligand hai.
NO ligand = NO^+ (+1 charge)
Let Fe = x
$x + (+1) = +2 \Rightarrow x = +1$

Correct Option: (1)

68. **Which of the following processes does not involve oxidation of iron?**

Jaha Fe ka O.N. increase nahi hota, wahi correct hai.

$Fe + CO \rightarrow Fe(CO)_5$ me Fe ka O.N. zero hi rehta hai.

Correct Option: (4)