

d-Block Elements

Level - 1		DTS 1 - 5
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	A	C	D	D	A	D	D	D	B	C	A	C	C	A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
C	C	D	D	C	D	D	C	B	A	A	B	B	C	A
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
D	D	C	A	C	D	C	C	C	C	D	B	C	A	C
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
C	A	A	C	D	A	A	A	B	D	B	B	D	B	C
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
D	D	A	C	A	D	D	D	C	B	B	A	D	D	B

Level - 2		DTS 6 - 10
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76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
A	C	B	B	A	ABD	B	ABD	ACD	A	C	C	BD	C	C
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
D	AD	ABC	CD	BCD	B	B	B	B	C	C	A	AC	BC	ABCD
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
A	B	D	C	C	B	D	D	BC	CD	A	B	D	A	C
121		122		123		124		125						
C		B		D		D		B						

Numerical Value Type		DTS - 11
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126	127	128	129	130	131	132	133	134	135
4	4	2	6	3	3	4	2	5	3

JEE Main (Archive)	DTS 1 - 4
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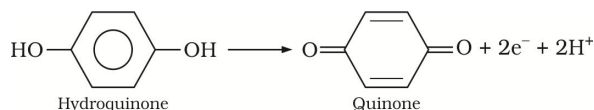
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	D	A	C	A	A	D	D	B	D	B	C	B	A	C
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	B	C	A	D	A	A	B	A	A	A	B	C	B	C
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
B	D	D	C	B	A	C	D	A	CD	D	B	B		A
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
D	C	D	C	D	A	B	C	A	B	B	A	A	A	A
61														
D														

JEE Advanced (Archive)	DTS 1 - 7
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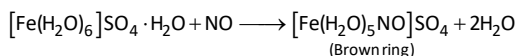
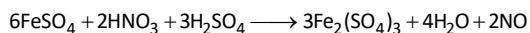
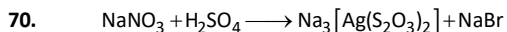
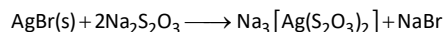
1. A = ZnCO_3 , B = CO_2 , C = ZnO , D = ZnS , E = Zn(OH)_2
- 2.(D)
- 3.(B)
- 4.(B)
5. 1.338 g
6. A = $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$; B = SO_2 ; C = SO_3 ; D = Fe_2O_3 ; E = Fe
- 7.(C)
- 8.(B)
9. NaOH & ZnSO_4
10. $\text{SO}_2 + \text{MnO}_4^- + \text{H}^+ \longrightarrow \text{SO}_4^{2-} + \text{Mn}^{2+} + \text{H}_2\text{O}$
- 11.(A)
- 12.(D)
13. $2\text{CuSO}_4 + \text{SO}_2 + 2\text{H}_2\text{O} + 2\text{KCNS} \longrightarrow 2\text{Cu(CNS)} + \text{K}_2\text{SO}_4 + 2\text{H}_2\text{SO}_4$
Cuprous thiocyanate
14. $2\text{MnO}_2 + 4\text{KOH} + \text{O}_2 \longrightarrow 2\text{K}_2\text{MnO}_4 + 2\text{H}_2\text{O}$
15. Silver bromide is used in photography because of its sensitivity to sunlight. In light AgBr reduces to metallic silver.
- 16.(B)
17. $\text{Fe}_2(\text{SO}_4)_3 + 2\text{KI} \longrightarrow 2\text{FeSO}_4 + \text{K}_2\text{SO}_4 + \text{I}_2$
18. $3\text{K}_2\text{CrO}_4 + 4\text{H}^+ \longrightarrow \text{MnO}_2 + 2\text{KMnO}_4 + 2\text{H}_2\text{O} + 4\text{K}^+$
19. $2\text{K}_2\text{CrO}_4 + 2\text{H}^+ \longrightarrow \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{O} + 2\text{K}^+$
(yellow)
20. $\text{CuSO}_4 + 4\text{NH}_4\text{OH} \longrightarrow [\text{Cu}(\text{NH}_3)_4]\text{SO}_4 + 4\text{H}_2\text{O}$
21. $\text{H}_2\text{O}_2 \longrightarrow \text{H}_2\text{O} + [\text{O}] \times 3$
 $2\text{CrCl}_3 + 10\text{NaOH} + 3[\text{O}] \longrightarrow 2\text{Na}_2\text{CrO}_4 + 6\text{NaCl} + 5\text{H}_2\text{O}$
(green) (yellow)
 $2\text{CrCl}_3 + 10\text{NaOH} + 3\text{H}_2\text{O}_2 \longrightarrow 2\text{Na}_2\text{CrO}_4 + 6\text{NaCl} + 8\text{H}_2\text{O}$
(green) (yellow)
22. $2\text{KMnO}_4 + 4\text{KOH} + \text{MnO}_2 \longrightarrow 3\text{K}_2\text{MnO}_4 + 2\text{H}_2\text{O}$
23. $\text{K}_4[\text{Fe}(\text{CN})_6] + 6\text{H}_2\text{SO}_4 + 6\text{H}_2\text{O} \longrightarrow 2\text{K}_2\text{SO}_4 + \text{FeSO}_4 + 3(\text{NH}_4)_2\text{SO}_4 + 6\text{CO}$
24. $\text{Na}_2\text{ZnO}_2 + \text{H}_2\text{O}$

- ## Answer Key

45. $3[\text{Fe}(\text{H}_2\text{O})_6]^{2+} + \text{NO}_3^- + 4\text{H}^+ \longrightarrow \text{NO} + 3[\text{Fe}(\text{H}_2\text{O})_6]^{3+} + 2\text{H}_2\text{O}$; $[\text{Fe}(\text{H}_2\text{O})_6]^{2+} + \text{NO} \longrightarrow [\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^{2+} + \text{H}_2\text{O}$
(Brown)
46. $\text{AgBr} + 2\text{Na}_2\text{S}_2\text{O}_3 \longrightarrow \text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2] + \text{NaBr}$
Sodium argentothiosulphate
47. $(\text{NH}_4)_2\text{S}_2\text{O}_8 + 2\text{H}_2\text{O} + \text{MnSO}_4 \longrightarrow \text{MnO}_2 + 2\text{H}_2\text{SO}_4 + (\text{NH}_4)_2\text{SO}_4$
48. $3\text{MnO}_4^{2-} + 4\text{H}^+ \longrightarrow \text{MnO}_2 + 2\text{MnO}_4^- + 2\text{H}_2\text{O}$ 49. $3\text{SO}_2 + \text{Cr}_2\text{O}_7^{2-} + 2\text{H}^+ \longrightarrow 2\text{Cr}^{3+} + 3\text{SO}_4^{2-} + \text{H}_2\text{O}$
- 50.(A) 51.(C) 53.(A) 54. I.E.₁ : Zn > Cu, I.E.₂ : Cu > Zn
55. $\text{Ag}_2\text{S} + 4\text{KCN} \longrightarrow 4\text{K}[\text{Ag}(\text{CN})_2] + \text{K}_2\text{S}$ 56.(A) 57.(B)
(Argentite) Potassium argentocyanide potassium sulphide
58. (i) $\text{AgBr} + 2\text{Na}_2\text{S}_2\text{O}_3 \longrightarrow \text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2] + \text{NaBr}$
(Hypo) (Soluble)
- (ii) $\text{CoCl}_2 + 7\text{KNO}_2 + 2\text{CH}_3\text{COOK} \longrightarrow \text{K}_3[\text{Co}(\text{NO}_2)_6] + 2\text{CH}_3\text{COOK} + 2\text{KCl} + \text{NO} + \text{H}_2\text{O}$
(yellow ppt)
59. $2\text{KMnO}_4 + \text{Cu}_2\text{O} + 2\text{KOH} + \text{H}_2\text{O} \longrightarrow 2\text{Cu}(\text{OH})_2 + 2\text{K}_2\text{MnO}_4$ 60. $\text{Zn} + 2\text{OH}^- + \text{BrO}_4^- + \text{H}_2\text{O} \longrightarrow [\text{Zn}(\text{OH})_4]^{2-} + \text{BrO}_3^-$
61. $\text{Zn} + 2\text{HNO}_3(\text{dil.}) \longrightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{H} \times 4$ 62.(B) 63.(AC)
- $2\text{HNO}_3 + 8[\text{H}] \longrightarrow \text{N}_2\text{O} + 5\text{H}_2\text{O}$
 $4\text{Zn} + 10\text{HNO}_3 \longrightarrow 4\text{Zn}(\text{NO}_3)_2 + \text{N}_2\text{O} + \text{N}_2\text{O} + 5\text{H}_2\text{O}$
64. $2\text{Cu} + \text{H}_2\text{O} + \text{CO}_2 + \text{O}_2 \longrightarrow \text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$
Green basic copper carbonate
65. Following reactions occur when haematite is burnt with carbon (coke) and lime at 2000°C. 66.(B)
- $\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$
 $\text{CO}_2 + \text{C} \longrightarrow 2\text{CO}$
 $3\text{CO} + \text{Fe}_2\text{O}_3 \longrightarrow 2\text{Fe} + 3\text{CO}_2$ (Fe_2O_3 is reduced to Fe)
 $\text{SiO}_2 + \text{CaO} \longrightarrow \text{CaSiO}_3$
(silica) (lime) (slag)
(Calcium silicate)
67. CrO_3 is acid anhydride of H_2CrO_4 (chromic acid) 68.(C)
- $\text{H}_2\text{CrO}_4 \xrightarrow[-\text{H}_2\text{O}]{\text{dehydration}} \text{CrO}_3$
69. (i) Argentite (Ag_2S) ore is concentrated by froth floatation process.
The concentration ore is finely divided and dissolved in dilute solution of sodium cyanide (NaCN).
 $\text{Ag}_2\text{S} + 4\text{NaCN} \longrightarrow 2\text{Na}[\text{Ag}(\text{CN})_2] + \text{Na}_2\text{S}$
(soluble)
It is called leaching.
 Na_2S is oxidised by air to Na_2SO_4 and it prevents the backward reaction to occur.
Metallic silver (Ag) is then precipitated out from the solution by adding Zn (an electropositive metal).
 $2\text{Na}[\text{Ag}(\text{CN})_2] + \text{Zn} \longrightarrow \text{Na}_2[\text{Zn}(\text{CN})_4] + 2\text{Ag}$
Note : Zinc is more electropositive than Ag .
- (ii) During the process of development of the photographic film, the activated AgBr grains are preferentially reduced by mild reducing agent such as hydroquinone.



The photographic film is then permanently fixed by immediately washing any non-activated AgBr grains in hypo. (This is the process of fixing).



71.(B)

72.(A)

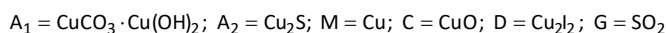
73.(A)

74.(A)

75.(A)

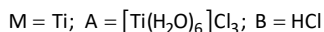
76.(C)

77.



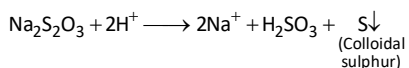
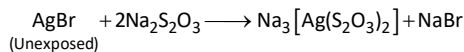
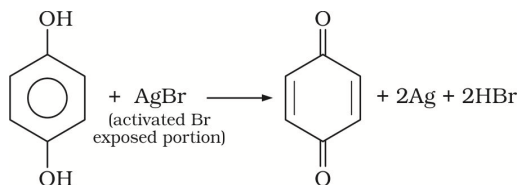
78.(B)

79.



80.

Following reaction occurs when a black and white photographic film is developed.



81.(B)

82.(A)

83.(B)

84.(A)

85.(6)

86.(D)

87.(C)

88.(B)

89.(B)

90.(D)

91.(C)

92.(ACD)

93.(B)

94.(A)

95.(C)

96.(A)

97.(ACD)

98.(ABC)

99.(6)

100.(B)

101.(ABC)

102.(BD)

103.(ABC)