

# JEE EXPERT

## ANSWER KEY

### REGULAR TEST SERIES - (RTS-01)

Batch : 12<sup>TH</sup> Pass (Desire A02)

Date 14.07.2019

### PHYSICS

1	(D)	2	(A)	3	(B)	4	(B)	5	(B)
6	(C)	7	(D)	8	(B)	9	(A)	10	(C)
11	(B)	12	(A)	13	(B)	14	(C)	15	(A)
16	(D)	17	(A)	18	(B)	19	(A)	20	(B)
21	(B)	22	(B)	23	(B)	24	(C)	25	(B)
26	(B)	27	(A)	28	(B)	29	(D)	30	(A)

### CHEMISTRY

31	(B)	32	(C)	33	(A)	34	(D)	35	(A)
36	(B)	37	(B)	38	(B)	39	(A)	40	(B)
41	(C)	42	(B)	43	(A)	44	(C)	45	(B)
46	(D)	47	(B)	48	(B)	49	(C)	50	(C)
51	(D)	52	(B)	53	(A)	54	(A)	55	(B)
56	(C)	57	(C)	58	(B)	59	(C)	60	(A)

### MATHEMATICS

61	(D)	62	(B)	63	(C)	64	(B)	65	(B)
66	(B)	67	(B)	68	(B)	69	(B)	70	(D)
71	(A)	72	(D)	73	(B)	74	(C)	75	(C)
76	(D)	77	(D)	78	(A)	79	(A)	80	(C)
81	(C)	82	(C)	83	(B)	84	(D)	85	(B)
86	(B)	87	(B)	88	(B)	89	(B)	90	(D)

# JEE EXPERT

## SOLUTIONS

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## CHEMISTRY

31. (B)  $2.8 = \frac{Z \times 27}{(400 \times 10^{-10} \text{ cm})^3 \times (6.023 \times 10^{23})}$

$$Z \approx 4.0$$

∴ The unit cell of aluminium is face-centred.

32. (C) The distance between nearest  $\text{Na}^+$  and  $\text{Cl}^-$  is given by

$$r_{\text{Na}^+} + r_{\text{Cl}^-} = \frac{a}{2}.$$

33. (A) Number of oxide ions per unit cell = 4.

$$\text{Number of metal ions per unit cell} = \frac{2}{3} \times 4 = \frac{8}{3}.$$

∴ Formula of metal oxide is  $\text{M}_{\frac{8}{3}}\text{O}_4$  or  $\text{M}_2\text{O}_3$ .

34. (D) Packing fraction in one layer of square close packing =  $\frac{\left(\frac{4}{3}\pi r^3\right)}{(2r)^3} = \frac{\pi}{6}$

$$\text{Percentage of occupied space in one layer} = \frac{\pi}{6} \times 100$$

$$\therefore \text{Percentage of vacant space in one layer} = 100 - \frac{\pi}{6} \times 100.$$

35. (A)

36. (B)

37. (B)

38. (B) In ZnS lattice,  $S^{2-}$  ions are present as FCC with  $Zn^{2+}$  ions occupying alternate tetrahedral voids.

$$\therefore \frac{\sqrt{3} a}{4} = (r_{Zn^{2+}} + r_{S^{2-}})$$

$$a = \frac{4}{\sqrt{3}} (0.83 + 1.74) = 5.94 \text{ \AA}.$$

39. (A) Closest distance =  $\frac{\sqrt{2}a}{2} = \frac{\sqrt{2}}{2} \times 4.07 = 2.87 \text{ \AA}$

40. (B) One  $Fe^{3+}$  ion replaces three  $Na^+$  ions. As  $Na^+$  ions occupy all octahedral voids of NaCl crystal, due to replacement few octahedral voids fall vacant. So, one  $Fe^{3+}$  ion creates two vacant octahedral voids.  $10^{-3}$  mole  $FeCl_3$  creates unoccupied octahedral voids =  $2 \times 6.02 \times 10^{23} \times 10^{-3} = 12.04 \times 10^{20}$

Hence, 100 mole of doped NaCl crystals create  $12.04 \times 10^{20}$  vacant octahedral voids. Hence, 1 mole of doped NaCl crystals create  $12.04 \times 10^{18}$  vacant octahedral voids.

41. (C) Number of A atoms = 7

$$\text{Contribution of each} = \frac{1}{8}$$

$$\therefore \text{Net contribution of A atoms} = \frac{7}{8}$$

B atoms at the face centres

$$\therefore \text{Net contribution} = \frac{6}{2} = 3$$

$$\text{Formula} = A_{7/8}B_3 = A_7B_{24}.$$

42 (B)      43 (A)      44 (C)      45 (B)      46 (D)

47 (B)      48 (B)      49 (C)      50 (C)      51 (D)

52 (B)      53 (A)      54 (A)      55 (B)      56 (C)

57 (C)      58 (B)      59 (C)      60 (A)