JEE EXPERT

ANSWER KEY

REGULAR TEST SERIES - (RTS-03)

11^{TH} A02 (Zenith)

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	(B)	28	(B)	29	(D)	30	(A)

CHEMISTRY

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

MATHEMATICS

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

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SOLUTIONS

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CHEMISTRY

31. **(B)** $K\overset{+7}{M}nO_4 + \overset{+2}{Fe}\overset{+3}{C_2}O_4 \xrightarrow{H^+} \overset{2+}{Mn} + \overset{3+}{Fe} + \overset{+4}{C}O_2$

(n = 5) (n = 3)

Molar ratio of ($KMnO_4 : FeC_2O_4$) = 3 : 5

$\therefore$ Moles of $KMnO_4$ required to react with one mole of FeC_2O_4 = $\mathbf{\frac{3}{5}}$.

32. **(B)**

33. **(C)**

34. **(B)** X : 50% Y : 50%

X : Y = 5 : 2.5 = 2 : 1.

Hence the formula of the compound is $\mathbf{X_2Y}$.

35. **(B)**

36. **(D)** $4e + \overset{+1}{P} \rightarrow \overset{-3}{P}$

$$\frac{[\overset{+1}{P} \rightarrow \overset{+3}{P} + 2e] \times 2}{3\overset{+1}{P} \rightarrow 2\overset{+3}{P} + \overset{-3}{P}}.$$

So the total electrons lost or gained is 4 for 3 moles of H_3PO_2 so *n* factor = $\frac{4}{3}$.

So eq. wt. $= \frac{M}{4/3} = \frac{3M}{4}$.

37. **(B)** 2 × moles of $KMnO_4$ = 5 × moles of oxalic acid

mmol of $KMnO_4$ = 0.1 × 20 = 2 mmol

so mmol of $H_2C_2O_4$ = $\frac{5}{2} \times 2 = 5$ mmol.

38. **(C)**

39. **(B)** $1s^2, 2s^2, 2p_x^2, 2p_y^2, 2p_z^2, 3s^2, 3p_x^1, 3p_y^1, 3p_z^1$

40. **(D)**

41. **(B)** $V_n \propto \frac{Z}{n}$

42. **(C)**

43. **(C)** $KE_1 = h\nu_1 - h\nu_0$

$KE_2 = h\nu_2 - h\nu_0$

$$\frac{KE_1}{KE_2} = \frac{h(\nu_1 - \nu_0)}{h(\nu_2 - \nu_0)} \;;\; \frac{2}{1} = \frac{\nu_1 - \nu_0}{\nu_2 - \nu_0} \;;\; \nu_0 = \frac{\mathbf{2\nu_2 - \nu_1}}{\mathbf{2-1}}.$$

44. **(A)** For the same orbit radius $\propto \frac{1}{\text{atomic number}}$

45. **(C)** $E_2 - E_1 = \left[\frac{-E_1}{4} + E_1\right] = \frac{+3E_1}{4}$, $E_4 - E_3 = \frac{-E_1}{16} + \frac{E_1}{9} = \frac{7E_1}{16 \times 9}$

$$\frac{E_2 - E_1}{E_4 - E_3} = \frac{3}{4} \times \frac{144}{7} = \frac{108}{7} = \frac{108}{7} \simeq \mathbf{15}.$$

46. **(D)** $\lambda = \frac{h}{\sqrt{2\,m\,KE}}$; (K.E. = e·V); $\lambda = \left[\frac{h}{\sqrt{2\,m\,e\cdot V}}\right] = \left[\frac{h^2}{2m\cdot eV} \times 10^{20}\right]^{\frac{1}{2}} A^o$

$$= \left[\frac{150}{V}\right]^{\frac{1}{2}} A^o = \frac{12.27}{\sqrt{V}} A^o$$

47. **(D)** Magnetic moment = $\sqrt{n(n+2)}$ B.M where n is the number of unpaired electrons.

For Fe^{3+} ion n = 5 so, $\mu = \sqrt{5(5+2)} = \sqrt{35}$ B.M

48. **(A)**

49. **(D)** $\frac{\lambda_1}{\lambda_2} = \sqrt{\frac{E_2}{E_1}}$ where 'E' is the K.E. of a particle.

As per the above relation, when K.E. is doubled, its wavelength becomes $\frac{1}{\sqrt{2}}$ times.

50. **(D)** Energy of single electron system is only depend on the principle quantum number, so that energy of different orbitals of same principle quantum number is same.

51. **(B)** Atomic number 20 $\longrightarrow$ $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

52. **(C)** $r_n = 0.529 \dfrac{n^2}{Z}$ Å

$r_2 = 0.529 \times \dfrac{4}{Z} = R$ (for n = 2)

$r_3 = 0.529 \times \dfrac{9}{Z} = 9 \times \dfrac{R}{4}$ (for n = 3)

53. **(C)** ns^2np^5

54. **(D)** $\dfrac{hc}{\lambda} = w_0 + KE$ (but KE = 0) ; $\lambda = \dfrac{6.626\times10^{-34}\times3\times10^{8}}{4\times1.6\times10^{-19}} = 3.1 \times 10^{-7}$ m = **3100 Å**.

55. **(D)** For (d), the value of n + *l* = 3 + 2 = 5. In other cases the value of (n + *l*) is less than 5. The orbital having higher (n + *l*) value has higher energy.

56. **(A)** $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2HCl$

	$BaCl_2$	H_2SO_4	$BaSO_4$	$2HCl$
Moles taken initially	0.5 mol	1 mol	0	0
	0	0.5 mol	0.5 mol	1 mol

The limiting reagent is $BaCl_2$. Hence, a maximum of 0.5 mole of $BaSO_4$ will be obtained.

57. **(A)** $\dfrac{1}{\lambda} = RZ^2\left[\dfrac{1}{n_1^2} - \dfrac{1}{n_2^2}\right]$ $n_1 = 2, n_2 = 3, Z = 1$

$\dfrac{1}{\lambda} = R\left[\dfrac{1}{4} - \dfrac{1}{9}\right]$ $\dfrac{1}{\lambda} = \dfrac{5R}{36}\ cm^{-1}$

58. **(A)** $\dfrac{1}{\lambda} = R_H Z^2\left(\dfrac{1}{n_1^2} - \dfrac{1}{n_2^2}\right) = 109670\left(\dfrac{1}{1} - \dfrac{1}{4}\right) = \dfrac{3}{4}(109670)\ cm^{-1}$

$\lambda = 1215.8 \times 10^{-8}$ cm i.e., $\lambda =$ **1215.8 Å**

59. **(B)**

60. **(C)**