**Reg. NO:**

**TIME: 45 MIN**

**DATE: 29.4.20**

**EQUILIBRIUM -KEY- AND SOLUTIONS**

**SUBJECT: CHEMISTRY**

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| EQUILIBRIUM -ANSWER KEY | | | | | | | |
| 1 | **b** | **2** | **c** | **3** | **b** | **4** | **c** |
| 5 | **a** | **6** | **b** | **7** | **a** | **8** | **d** |
| 9 | **d** | **10** | **a** | **11** | **d** | **12** | **c** |
| 13 | **a** | **14** | **d** | **15** | **a** | **16** | **d** |
| 17 | **d** | **18** | **d** | **19** | **a** | **20** | **d** |
| 21 | **b** | **22** | **b** | **23** | **a** | **24** | **a** |
| 25 | **b** | **26** | **c** | **27** | **c** | **28** | **a** |
| 29 | **a** | **30** | **b** | **31** | **a** | **32** | **d** |
| 33 | **b** | **34** | **c** | **35** | **b** | **36** | **b** |
| 37 | **a** | **38** | **a** | **39** | **c** | **40** | **c** |
| 41 | **c** | **42** | **d** | **43** | **b** | **44** | **a** |
| 45 | **a** | **46** | **c** | **47** | **b** | **48** | **a** |
| 49 | **d** | **50** | **a** | **51** | **b** | **52** | **a** |
| 53 | **c** | **54** | **b** | **55** | **c** | **56** | **b** |
| 57 | **a** | **58** | **b** | **59** | **b** | **60** | **c** |
| EQUILIBRIUM-HINTS AND SOLUTIONS TO SELECTIVE QUESTIONS |  |  |  |  |  |  |  |
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| 1. | **(b)**  Total pressure = = P |
| 2. | **(c)** |
| 3. | **(b)**  Due to back bonding ( shows maximum tendency due to small size of ). |
| 4. | **(c)**  For precipitate to be dissolved,  or  So, |
| 5. | **(a)**  is a salt of weak acid and strong base hence, on being dissolved in water gives basic solution ., . |
| 6. | **(b)**  is acidic due to hydrolysis of  . |
| 7. | **(a)**  When the number of moles of gaseous reactants and products is same, then equilibrium is not affected by pressure and hence, the equilibrium constant is unaffected. |
| 8. | **(d)**  Glycine, the simplest amino acid has the tendency to donate by gp. and the tendency to donate lone pair by -atom of . and also exists as **Zwitter ion.** |
| 9. | **(d)** |
| 10. | **(a)** |
| 11. | **(d)**  Thus, 10 m mole of are formed. The product of is therefore  which is more than of . Now, solubility of can be derived by |
| 12. | **(c)**  At chemical equilibrium, rate of forward reaction is equal to the rate of backward reaction. |
| 13. | **(a)**  Acidic nature is  Stronger is acid, weaker is its conjugate base. |
| 14. | **(d)**  In the expression for equilibrium constant species in solid state are not written (., their molar concentrations are taken as 1)  Thus, |
| 15. | **(a)**  Reversible reaction always attains equilibrium and never go for completion. |
| 16. | **(d)** |
| 17. | **(d)**  Initial 0.4 0.4 0  At eq. 0.4-0.25 0.4-0.25 0.05  =0.15 =0.15 |
| 18. | **(d)**  We know that,  Percentage ionisation = |
| 19. | **(a)**  More is more basic is solution. |
| 20. | **(d)**  Both Arrhenius and Bronsted bases are source of Arrhenius base ( furnish) may not be capable of accepting proton ( Bronsted based). exists as . |
|  |  |

**21. (b)**

Given,

Now,

**Note:** Since is of the order of and thus, it is not advisable to use Because is not equal to 1 since is not small.

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| 22. | **(b)**  For oxoacids of the same element, the acidic strength increases with increase in the oxidation number of the element |
| 23.  24. | **(a)**  (nitric acid) is generally not an amphoteric substance. It is a strong acid (proton-donating) though sometimes, in presence of stronger acid, it also acts as a base (*e.g*., in nitration of atomic compounds, it acts as a base and accept proton from ). However and frequently act both as an acid as well as a base (*i.e*., amphoteric in nature).   1. Conceptual. |
| 25. | **(b)**  ∵ |
| 26. | **(c)**  Le-Chatelier’s principle is not valid for solid-solid equilibrium. |
| 87. | **(c)**  Let the solubility of mol/L  or solubility of  mol/L |
| 28. | **(a)**  Addition of sodium acetate in acetic acid solution, due to common ion the ionisation of acetic acid is supressed so concentration of decreases. Hence, pH of solution increases. |
| 29. | **(a)** |
| 30. | **(b)** |
| 31. | **(a)**    Formation of fromand is accompanied by decrease in volume. So, increase in pressure favours formation (also due to Le-Chatelier’s principle). |
| 32. | **(d)**  ∴  = 0.11 atm |
| 33. | **(b)** |
| 34. | **(c)**  It is condition for chemical equilibrium. |
| 35.  36. | **(b)**  Solution of is acidic due to hydrolysis of ion  (b) Conceptual. |
| **37.** | **(a)**  **Thus, increase in .** |
| **38.** | **(a)**  **According to Lewis acid is any species (molecule, radial or ion) that can accept an electron pair to form a coordinate covalent bond. Thus, acid is an electron deficient species *e.g*., and all cations etc.**    **Or** |
| **39.** | **(c)**  **Suppose its solubility in 0.1 M**  **0.1M 0.1M**  **M**  **Higher power of are neglecated**  **M** |
| 40. | **(c)**  For reaction,  Here, , thus, is more than |
| 41. | **(c)**  . |
| 42. | **(d)**  where ionic product of water  degree of dissociation of |
| 43. | **(b)**  Let of be mixed to of .  . |
| 44. | **(a)**  H*A* (a weak acid) ionises as  1 0 0  = |
| 45. | **(a)**  Total number of moles at equilibrium |
| 46. | **(c)**  log ,  +ve for the reaction, |
| 47. | **(b)**  and thus, will decrease, as increases. |
| 48. | **(a)**  Carbon cannot expand its octet. |
| 49. | **(d)**  of possesses lone pair of electron available for donation. |
| 50. | **(a)**  Initial moles  At equilibrium  Initial pressure of of ‘’. The pressure of ’’ mole of  At constant volume and at ,  mole pressure  (before equilibrium)  (after equilibrium)  decomposed |
| 51. | **(b)**  Equilibrium constant for the reaction,  is |
| 52. | **(a)**  or |
| 53. | **(c)** |
| 54. | **(b)**  = 1 + α  For, NH­4Cl ⇌ NH3 + HCl;  ∵ α = 1  ∴ Exp. Mol.wt. = |
| 55. | **(c)**  is weak base than Hydroxides of I and II group metals are strong base, stronger is base, weaker is its conjugate acid. |
| 56. | **(b)**  and values do not change with catalyst. |
| 57. | **(a)**  (in absence of catalyst)  (in presence of catalyst)  Catalyst’s have no influence on |
| 58. | **(b)**  Hence, decrease of pressure shifts the equilibrium in forward direction and increase of pressure shift the equilibrium in backward (reverse) direction. |
| 59. | **(b)**  20% mixture reacts to form 10% ;  Thus, 80% mixture and 10% left or total pressure left = 90 atm, since 100% mixture has 100 atm. |
| 60. | **(c)**  is conjugate strong base of . |