NEET MICRO TEST 6 (16.11.2024) **20x4=80 MARKS**

Botany: Cell: The Unit of Life, **Zoology:** Excretory products & their elimination
Chemistry: Equilibrium, **Physics:** System of Particles & Rotational Motion

Solution

1. Answer: **(3)**
2. Answer: **(2)**
3. Answer: **(1)**
4. Answer: **(4)**
5. Answer: **(2)**
6. Answer: **(1)**
7. Answer: **(4)**
8. Answer: **(2)**
9. Answer: **(2)**
10. Answer: **(4)**

11. Answer: **(3)**

$[H^+] = 10^{-8}$ M HCl given mass total $[H^+]$ ion aq

HCl = $[H^+]$ of water + $[H^+]$ of HCl

$= 10^{-7} + 10^{-8} = 10^{-7}\,[1 + 0.01]$

$[H^+] = 10^{-7} \times 1.1 \Rightarrow pH = -\log 1.1 \times 10^{-7}$

$= 6.98$

12. Answer: **(2)**

If [acid] = [salt] then

$$pH = pKa + \log \frac{[salt]}{[acid]}$$

$\Rightarrow$ pH = pKa then it has maximum buffer capacity

13. Answer: **(4)**

$AB_3 \rightarrow A^{+3} + 3B^-$

S 3S

$K_{sp} = (S)\,(3S)^3 = 27\,S^4$

Given $S = 1 \times 10^{-5}$

$K_{sp} = 27 \times (10^{-5})^4 = 27 \times 10^{-20}$

$= 2.7 \times 10^{-19}$

14. Answer: **(1)**

In CCl_4 C does not have vacant d-orbitals and it cannot accept ℓp and hence CCl_4 is not a Lewis acid

15. Answer: **(2)**

Order of acidic strength is $CH_4 < NH_3 < H_2O < HF$

As the electronegativity of central atom increases, the strength of the acid also increases

16. Answer: **(3)**

As no external force acts on the system, therefore centre of mass will not shift.

17. Answer: **(3)**

Kinetic energy of rotation $= \frac{1}{2} I\omega^2$

$$= \frac{1}{2} \times \frac{2}{5} MR^2 \times (2\pi\nu)^2$$

$$= \frac{1}{5} \times 4\pi^2\nu^2 MR^2 = 0.8\pi^2 \left(\frac{600}{60}\right)^2 MR^2$$

$= 80\,\pi^2 MR^2$

18. Answer: **(3)**

According to law of conservation of angular momentum

$I_1\omega_1 = I_2\omega_2$

$$\frac{2}{5} MR^2 \left(\frac{2\pi}{T_1}\right) = \frac{2}{5} M\left(\frac{R}{n}\right)^2 \frac{2\pi}{T_2}$$

$$T_2 = \frac{T_1}{n^2} = \frac{24}{n^2} \text{ hr} \quad (\because T_1 = 24 \text{ hours})$$

19. Answer: **(1)**

Acceleration of the solid sphere slipping down the incline without rolling is

$a_{slipping} = g \sin\theta$ --- (i)

Acceleration of the solid sphere rolling down the incline without slipping is

$$a_{rolling} = \frac{g\sin\theta}{1 + \frac{k^2}{R^2}} = \frac{g\sin\theta}{1 + \frac{2}{5}} = \frac{5}{7} g \sin\theta \quad \text{--- (ii)}$$

$$\left(\because \text{For solid sphere, } \frac{k^2}{R^2} = \frac{2}{5}\right)$$

Divide eqn.(ii) by eqn.(i) we get

$$\frac{a_{rolling}}{a_{slipping}} = \frac{5}{7}$$

20. Answer: **(2)**

$m_1 = 10$ kg, $m_2 = 2$ kg

$\vec{v}_1 = 2\hat{i} - 7\hat{j} + 3\hat{k}$ and $\vec{v}_2 = -10\hat{i} + 35\hat{j} - 3\hat{k}$

$$\therefore \ \vec{v}_{CM} = \frac{m_1\vec{v}_1 + m_2\vec{v}_2}{m_1 + m_2}$$

$$= \frac{10(2\hat{i} - 7\hat{j} + 3\hat{k}) + 2(-10\hat{i} + 35\hat{j} - 3\hat{k})}{10 + 2}$$

$= 2\hat{k}$ m/s