



Alpha Waves Coaching Centre

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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

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

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

$$= 6.98$$

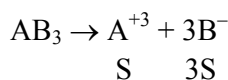
12. Answer: (2)

If [acid] = [salt] then

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

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

13. Answer: (4)



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

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

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

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

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)

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

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

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

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

18. Answer: (3)

According to law of conservation of angular momentum

$$I_1 \omega_1 = I_2 \omega_2$$

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

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

19. Answer: (1)

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

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

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

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

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

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

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

20. Answer: (2)

$$m_1 = 10 \text{ kg}, m_2 = 2 \text{ kg}$$

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

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

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

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