Date :-15/01/2022 **Time :-25 Minutes** **Exam Name :-MHTCET-1to1Guru-2** **Mark :- 30**

1.	**d**	External work done $dw = \text{P.Dv} = 10^5 \times 2.1 \times 10^{-3} = 210\,\text{J} \therefore \text{dQ} = \frac{\text{dU} + \text{dw}}{\text{J}}$ $\therefore 0.2 = \frac{\text{d}\cup + \text{dw}}{4200} \Rightarrow \text{dU} = 4200 \times 0.2 - 210 = 840 - 210 = 630\,\text{J}$
2.	**d**	(D) Kinetic energy of the electron $K = E - \omega_0$ Momentum $P = \sqrt{2mk} = \sqrt{2m(E - \omega_0)}$ Radius of the circular path $\text{r} = \frac{\text{P}}{\text{eB}} = \frac{\sqrt{2\,\text{m}(\text{E}-\omega_0)}}{\text{eB}}$
3.	**d**	(d) If final image is formed at least distance of distinct vision, magnification $= 1 + \frac{D}{f}$ Or magnification $= 1 + \left(\frac{25}{5}\right) = 6$
4.	**b**	(B) For adiabatic process $\text{P}_1\,\text{V}_1^{\gamma} = \text{P}_2\,\text{V}_2^{\gamma}$ $\therefore \frac{P_2}{P_2} = \left(\frac{V_1}{V_2}\right)^{\gamma} = (4)^{\frac{3}{2}} = 8$
5.	**d**	(d) Magnetic field at the centre of primary coil $B = \mu_0 i_1 / 2R_1$. Considering it to be uniform, magnetic flux passing through secondary coil is $\phi = BA = \frac{\mu_0 i_1}{2R_1}(\pi R_2^2)$ Now, $M = \frac{\phi_2}{i_1} = \frac{\mu_0 \pi R_2^2}{2R_1}$ $\therefore \quad M \propto \frac{R_2^2}{R_1}$
6.	**b**	(b) Spheres have same potential *i.e.* $k\frac{Q_1}{R_1} = k\frac{Q_2}{R_2} \quad \frac{Q_1}{Q_2} = \frac{R_1}{R_2}$
7.	**a**	
8.	**b**	
9.	**c**	Li Pb alloy.
10.	**c**	(c)
11.	**a**	
12.	**b**	(b) Rate of diffusion $\propto \frac{1}{\sqrt{\text{molecular mass}}}$ $\therefore$ Order of diffusion : $\text{H}_2 > \text{CH}_4 > \text{SO}_2$ and amount left is in the order $\text{SO}_2 > \text{CH}_4 > \text{H}_2$ Hence, order of partial pressure is $p\text{SO}_2 > p\text{CH}_4 > p\text{H}_2$
13.	**d**	**d) Among these, only V^{2+} contains unpaired electron.**

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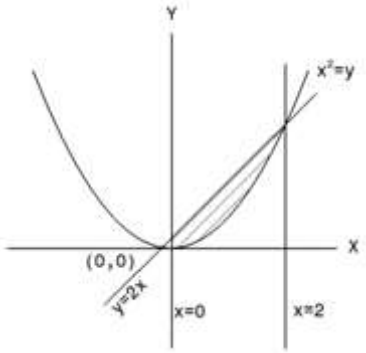
14.	**b**	
15.	**c**	(c) Volume $= \pi \int_0^2 (4x^2 - x^4)dx$ Volume $= \pi \left\{ \frac{4}{3}x^3 - \frac{x^5}{5} \right\} 2\ 0$ Volume $= \pi \left(\frac{32}{3} - \frac{32}{5} \right)$ Volume $= \frac{64\pi}{15}$ cu. units 
16.	**b**	(B) Here $\lvert x-2 \rvert = x-2$, if $x > 2 \Rightarrow \lim_{x\to 2^-} f(x) = \lim_{x\to 2^+} f(x) = 0 = -(x-2)$, if $x < 2$ But $f(2) = 1 \neq 0$ So $f(x)$ is discontinuous at $x = 2$
17.	**b**	
18.	**c**	(c) $L = \lim_{x\to a} \left(\frac{x^2 - (a+1)x + a}{x^3 - a^3} \right)$ $\left[\frac{0}{0} \text{from} \right]$ By L' Hospital Rule we get $L = \lim_{x\to a} \left(\frac{2x - (a+1)}{3x^2} \right)$ $L = \frac{2a - a - 1}{3a^2}$ $L = \frac{a-1}{3a^2}$
19.	**d**	D) 5.15 Sol: Here $n_1 = 60, n_2 = 120, \bar{x}_1 = 35.4, \bar{x}_2 = 30.9$, $\sigma_1 = 4,\ \sigma_2 = 5$ Combined mean is $\bar{x}_c = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2} = \frac{60 \times 35.4 + 120 \times 30.9}{60 + 120}$ $= \frac{2124 + 3708}{180} = \frac{5832}{180} = 32.4$ $d_1 = \bar{x}_1 - \bar{x}_c$ and $d_2 = \bar{x}_2 - \bar{x}_c$ $\therefore d_1 = 35.4 - 32.4 = 3$ and $d_2 = 30.9 - 32.4 = -1.5$

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		Therefore, combined S.D. is $\sigma_c = \sqrt{\frac{n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2)}{n_1 + n_2}}$ $= \sqrt{\frac{60(16+9) + 120(25+2.25)}{60+120}}$ $= \sqrt{\frac{60(25) + 120(27.25)}{180}} = \sqrt{\frac{150+327}{18}} = \sqrt{\frac{477}{18}}$ $= \sqrt{26.5} = 5.15$
20.	**d**	(d) $\frac{e^{dy}}{dx} = 1 + \left(\frac{dy}{dx}\right) + \frac{1}{2!}\left(\frac{dy}{dx}\right)^2 + \cdots$. So degree is not defined
21.	**b**	(b) In a word ARTICLE, there are 7 letters. Out of 7 places, 4 places are odd and 3 even. Therefore 3 vowels can be arranged in 4 odd places in ${}^4P_3$ ways and remaining 4 consonants can be arranged in ${}^4P_4$ ways. Hence, required number of ways $= {}^4P_3 \times {}^4P_4 = 576$
22.	**b**	$\theta = \sin^{-1}x + \cos^{-1}x - \tan^{-1}x = \frac{\pi}{2} - \tan^{-1}x$ We know, $-\frac{\pi}{2} < \tan^{-1}x < \frac{\pi}{2}$ $\Rightarrow \frac{\pi}{2} > -\tan^{-1}x > -\frac{\pi}{2}$ $\therefore \quad 0 < \frac{\pi}{2} - \tan^{-1}x < \pi$

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