Date :-04/02/2022

Time:-25 Minutes

Exam Name :-MHTCET-1to1Guru-4 Mark :- 30

		1to1Guru-4
		Then,
		$h_1 = \frac{2T}{r_1 dg}, h_2 = \frac{2T}{r_2 dg}$
1.	b	Let water rises to height h_1 and h_2 in the two $h_1 - h_2 = \frac{2T}{dg} \left[\frac{1}{r_1} - \frac{1}{r_2} \right]$ limbs.
		$= \frac{2 \times 7 \times 10^{-2}}{10^{-3} \times 10^{3} \times 10} \left[\frac{1}{1} - \frac{1}{2.5} \right]$
		= 8.4 mm
2.	a	
3.	a	
4.	c	(c) $\frac{\beta_1}{\beta_2} = \frac{\lambda_1}{\lambda_2}$ or $\frac{1.0}{\beta_2} = \frac{5000}{6000}$ or $\beta_2 = \frac{6000}{5000} = 1.2 \text{ mm}$.
5.	c	$g = \frac{GM_e}{R^2} = \frac{G}{R^2} \times \frac{4}{3} \pi R^3 \rho = \frac{4}{3} \pi GRp$ Hence $\rho = 3g/4 \pi GR$
6.	d	In P-N-P transistors, majority charge carriers are holes while in case of N-P-N transistors, majority charge carriers are electrons which have greater mobility.
7.	a	(a) Applying Newton's law on system along horizontal direction, we have $mc + m(c - b\cos\theta) = 0$ (i) $c = \frac{b\cos\theta}{2}$
8.	d	(4) Linkage isomerism is exhibited by ambidentate ligands (ligands having two coordination sites). <i>e.g.</i> , NO ₂ ⁻ . If the bonding is through N, the ligand is named as nitro and if it is through O, it is named as nitrito. NO ₂ ⁻ → nitro N ONO ⁻ → nitrito O
9.	b	(b) The structure of these molecules/species are as follows:
		Ä Ä
		cı l cı
		$(\sigma - bps + lps = 3 + 0 = 3)$ $\{\sigma - bps + lps = 3 + 1 = 4\}$ sp^2 -hybridisation trigonal planar sp^2 -hybridisation pyramidal
		sp-nyonusauon ingonai pianar sp-nyonusauon pyranutai
		$(\sigma - bps + lps = 3 + 0 = 3)$ $(\sigma - bps + lps = 3 + 0 = 3)$
		sp^2 -hybridisation trigonal planar sp^2 -hybridisation trigonal planar

PCI ₃ has sp^3 -hybridisation but due to presence of a lone-pair, its shape is pyramidal ins of tetrahedral. (c) Ideal gas equation $pV = nRT$ is obeyed by ideal gas in both adiabatic process and isothermal process. 1. b 2. a 3. d 4. a $ \begin{bmatrix} A \\ A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A \\ A \end{bmatrix} $ $ \begin{bmatrix} A \\ A $	22, 9):42 A	M
Southermal process 1. b			PCl_3 has sp^3 -hybridisation but due to presence of a lone-pair, its shape is pyramidal instead of tetrahedral.
2. a 3. d 4. a A $\frac{(A)}{a} = 0.0112\Omega^{-1} \text{ cm}^{-1}, R = 55.0\Omega$ Cell constant, $b = k \times R$ $= 0.0112\Omega^{-1} \text{ cm}^{-1} \times 55.0\Omega$ $\therefore b = 0.616 \text{ cm}^{-1}$ 5. a $\tan \alpha \tan \beta = \min_{m_1 m_2} = \frac{a}{b} = -\frac{6}{7}$ (a) $I = \int x^{\alpha} (1 + \log x) dx$ Put $x^{\alpha} = t \Rightarrow x^{\alpha} (1 + \log x) dx = dt$ $1 = \int dt$ $1 = x^{\alpha} + c$ (b) Let LL be the latus rectum and $S(1,0)$ be the focus Of the parabola $y^2 = 4ax$ \therefore Eq of letus rectum is $x = 1$ \therefore Required area = $2 \times A$ rea of region OSLO 7. b A = $2 \int_{0}^{1} y dx$ A = $2 \int_{0}^{1} 2\sqrt{x} dx$ $\int_{0}^{1} \sqrt{y^{3/4} 4ax}$ A = $4 \int_{0}^{1} \frac{x^{\frac{3}{2}}}{2} dx$	10.	c	
3. d (A) $k = 0.0112\Omega^{-1} \text{ cm}^{-1}, R = 55.0\Omega$ cell constant, $b = k \times R$ $= 0.0112\Omega^{-1} \text{ cm}^{-1} \times 55.0\Omega$ $\therefore b = 0.616 \text{ cm}^{-1}$ 5. a $\tan \alpha \tan \beta = \min_{1} m_{1} = \frac{a}{b} = -\frac{6}{7}$ (a) $I = \int x^{x} (1 + \log x) dx$ Put $x^{x} = t \Rightarrow x^{x} (1 + \log x) dx = dt$ $I = \int dt$ $I = x^{x} + c$ (b) Let LL be the latus rectum and S(1,0) be the focus Of the parabola $y^{2} = 4ax$ \therefore Eq of letus rectum is $x = 1$ \therefore Required area $= 2 \times \text{Area of region OSLO}$ 7. b $A = 2 \int_{0}^{1} y dx$ $A = 4 \int_{0}^{1} \frac{x^{3}}{2} dx$ $A = 4 \cdot \left[\frac{x^{3}}{3} \right]_{0}^{1} 0$ $A = \frac{8}{3} \left[\frac{1}{2} - 0 \right]_{0}^{1} A = \frac{8}{3} \text{ sq. units}$ 8. b	11.	b	
4. a $A = \frac{A}{a} = \frac{A}{$	12.	a	
4. a $\frac{1}{a} = 0.0112\Omega^{-1} \text{cm}^{-1}, R = 55.0\Omega$ Cell constant, $b = k \times R$ = $0.0112\Omega^{-1} \text{cm}^{-1} \times 55.0\Omega$ $\therefore b = 0.616 \text{ cm}^{-1}$ 5. a $\tan \alpha \tan \beta = \min_{mm} = \frac{a}{b} = -\frac{6}{7}$ (a) $I = \int x^x (1 + \log x) dx$ Put $x^x = t \Rightarrow x^x (1 + \log x) dx = dt$ $I = \int dt$ $I = x^x + c$ (b) Let LL be the latus rectum and S(1,0) be the focus Of the parabola $y^2 = 4ax$ \therefore Eq of letus rectum is $x = 1$ \therefore Required area = $2 \times \text{Area}$ of region OSLO 7. b $A = 2 \int_0^1 y dx$ $A = 2 \int_0^1 2\sqrt{x} dx$ $A = 4 \int_0^1 \sqrt{x^2} dx$ $A = 4 \cdot \left(\frac{x^2}{3}\right) \frac{1}{2} \int_0^1 0$ $A = \frac{8}{3} \left[1\frac{x^2}{2} - 0\right]$ $A = \frac{8}{3} \sin_2 \sin t$ 8. b	13.	d	
(a) $I = \int x^x (1 + \log x) dx$ Put $x^x = t \Rightarrow x^x (1 + \log x) dx = dt$ $I = \int dt$ $I = x^x + c$ (b) Let LL be the latus rectum and S(1,0) be the focus Of the parabola $y^2 = 4ax$ \therefore Eq of letus rectum is $x = 1$ \therefore Required area = $2 \times A$ area of region OSLO (9,0) $x = x = x = x = x = x = x = x = x = x $	14.	a	$k = 0.0112\Omega^{-1} \text{ cm}^{-1}, R = 55.0\Omega$ Cell constant, $b = k \times R$ $= 0.0112\Omega^{-1} \text{ cm}^{-1} \times 55.0\Omega$
6. a Put $x^x = t \Rightarrow x^x(1 + \log x)dx = dt$ $I = \int dt$ $I = x^x + c$ (b) Let LL be the latus rectum and S(1,0) be the focus Of the parabola $y^2 = 4ax$ $\therefore \text{ Eq of letus rectum is } x = 1$ $\therefore \text{ Required area} = 2 \times \text{Area of region OSLO}$ 7. b $A = 2 \int_0^1 y dx$ $A = 2 \int_0^1 2\sqrt{x} dx$ $A = 4 \int_0^1 x^{\frac{3}{2}} dx$ $A = 4 \cdot \left[\frac{x^{\frac{3}{2}}}{2} \right]_0^1$ $A = \frac{8}{3} \left[\frac{1}{2} - 0 \right]$ $A = \frac{8}{3} \text{ sq. units}$ 8. b	15.	a	$\tan \alpha \tan \beta = m_1 m_2 = \frac{a}{b} = -\frac{6}{7}$
Of the parabola $y^2 = 4ax$ \therefore Eq of letus rectum is $x = 1$ \therefore Required area = 2 × Area of region OSLO $A = 2 \int_{0}^{1} y dx$ $A = 2 \int_{0}^{1} 2\sqrt{x} dx$ $A = 4 \int_{0}^{1} x^{\frac{3}{2}} dx$ $A = 4 \cdot \begin{bmatrix} x^{\frac{3}{2}} \\ \frac{3}{2} \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ A = \frac{8}{3} \begin{bmatrix} 1^{\frac{3}{2}} - 0 \end{bmatrix}$ $A = \frac{8}{3} \text{ sq. units}$ 8. b	16.	a	Put $x^x = t \Rightarrow x^x (1 + \log x) dx = dt$ $I = \int dt$ $I = x^x + c$
<u>'</u>	17.		Of the parabola $y^2 = 4ax$ \therefore Eq of letus rectum is $x = 1$ \therefore Required area = $2 \times$ Area of region OSLO $A = 2 \int_{0}^{1} y dx$ $A = 2 \int_{0}^{1} 2\sqrt{x} dx$ $A = 4 \int_{0}^{\frac{3}{2}} dx$ $A = 4 \cdot \left[\frac{x^{\frac{3}{2}}}{\frac{3}{2}} \right]_{0}^{1}$ $A = \frac{8}{3} \left[\frac{1}{2} - 0 \right]$
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$$\sqrt{2}\cos\left(\frac{\pi}{4} - A\right) = \sqrt{2}\left[\cos\frac{\pi}{4}\cos A + \sin\frac{\pi}{4}\sin A\right] = \sqrt{2}\left[\frac{1}{\sqrt{2}}\cos A + \frac{1}{\sqrt{2}}\sin A\right] \\
= \cos A + \sin A$$

$$\frac{(C)}{\sec \theta + \tan \theta = 4} \\
\therefore \frac{1 + \sin \theta}{\cos \theta} = 4 \Rightarrow 1 + \sin \theta = 4\cos \theta \\
\therefore \left(\cos\frac{\theta}{2} + \sin\frac{\theta}{2}\right)^2 = 4\left(\cos^2\frac{\theta}{2} - \sin^2\frac{\theta}{2}\right) \\
\therefore \cos\frac{\theta}{2} + \sin\frac{\theta}{2} = 4\left(\cos\frac{\theta}{2} - \sin\frac{\theta}{2}\right) \\
\therefore \sin\frac{\theta}{2} = 3\cos\frac{\theta}{2} \Rightarrow \tan\frac{\theta}{2} = \frac{3}{5}$$

$$\sin\theta = \frac{2\tan\frac{\theta}{2}}{1 + \tan^2\frac{\theta}{2}} = \frac{2\left(\frac{3}{5}\right)}{1 + \left(\frac{3}{5}\right)^2} = \frac{6}{5} \times \frac{25}{34} = \frac{15}{17}$$

$$\frac{(B)}{5}$$
Smaller number with 3 different digits is 201

Last number = 698

Now the digit we have 0,1,2,3,4,5,6,7,8,9

1st place can be filled in 5 ways (2,3,4,5,6)
2rd place in 9 ways and 3rd place in 8 ways.
$$\therefore \text{Total number of ways} = 5 \cdot 8 \cdot 9 = 360$$

$$(c) 1 = \int x^3 e^x dx$$

$$= x^3 e^x - 3 x^2 e^x dx$$

$$= x^3 e^x - 3 x^2 e^x + 6 \left[x e^x - \int 2x e^x dx\right]$$

$$= x^3 e^x - 3x^2 e^x + 6x e^x - 6e^x + c$$

$$= e^x (x^3 - 3x^2 + 6x - 6) + c$$

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