


3. Increasing Thermal stability?

- (a)  $H_2O$
- (b)  $H_2S$
- (c)  $H_2Te$
- (d)  $H_2Po$

4. Magnetic Moment straight

$\frac{P}{m}$  → poles strength

$m = \frac{2P_0}{\pi}$



$\pi r = l$   
 $r = \frac{l}{\pi}$

चुम्बक =  $2r \times \frac{P_0}{l} = 2 \times \frac{l}{\pi} \times \frac{P_0}{l} = \frac{2P_0}{\pi}$

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B.  $\lambda_1, \lambda_2, \lambda_3$  — 3 Balmer series  
 $\frac{\lambda_1}{\lambda_3} = ?$

① Heat and work

Ⓐ Extensive

Ⓑ Intensive

Ⓒ Path fun

Ⓓ Point funct

Answer A

2. Sulphur can be  
Remove from ore

- (a) Roasting
- (b) Smelting
- (c) Calcination

Answer A

$81^{\cos^2 x} + 81^{\sin^2 x} = 30$  No. of solutions of in  $x \in (0, \pi)$

Answer D

- (A) 0
- (B) 2
- (C) 8
- (D) 4

$\frac{dy}{dx} + 2y \tan x = \sin x$ ,  $y\left(\frac{\pi}{3}\right) = 0$ , Maximum value of  $y(x)$  is

Answer A

- (A)  $\frac{1}{8}$
- (B)  $\frac{1}{16}$
- (C)  $-\frac{15}{4}$
- (D)  $\frac{3}{8}$

$$A = \begin{bmatrix} i & -i \\ -i & i \end{bmatrix}, A^8 \begin{bmatrix} x \\ 8 \end{bmatrix} = \begin{bmatrix} 8 \\ 64 \end{bmatrix} \text{ has}$$

Answer B

- A unique solution
- B no solutions
- C Infinite solutions
- D 2 solutions

A  $3 \times 3$  matrix is formed from  $\{0, 1, 2, 3\}$  & sum of diagonal elements of  $AA^T$  is 9. Find number of such matrices.

Answer 766

In a pack of 52 cards, a card is missing. If  $\frac{1}{4}$  cards are drawn randomly & found to be of spades. Then probability that missing card is not of spades?

If  $x = \int_0^y \frac{dt}{\sqrt{1+t^2}}$ , then  $\frac{d^2y}{dx^2}$  is:

Answer is Y

Sum of values of x and y satisfying  $3^x - 4^y = 77$ ;  $3^{\frac{x}{2}} - 2^y = 7$

$$\begin{aligned} x+y \\ = 5 \end{aligned}$$

$$a^2 - b^2 = 77$$

$$a - b = 7$$

$$a + b = 11$$

$$a = 9, b = 2$$

$$3^a = a, 2^b = b$$

$$3^2 = 9 = 3^2, 2^1 = 2$$

$$x = 4, y = 1$$

If  $f(x) = \prod_{i=1}^3 (x - a_i) + \sum_{i=1}^3 a_i - 3x$   
where  $a_i < a_{i+1} \forall i = 1, 2, \dots$ , then  $f(x) = 0$  has

**Answer C**

- A One distinct real root
- B 2 distinct real roots
- C 3 distinct real roots
- D 3 equal roots

Match the following

a. Hypophosphorous acid	(i) 1
b. Orthophosphorous acid	(ii) 2
c. Hypophosphoric acid	(iii) 3
d. Orthophosphoric acid	(iv) 4
	(v) 5

**Ans.** a  $\rightarrow$  (i), b  $\rightarrow$  (iii), c  $\rightarrow$  (iv), d  $\rightarrow$  (v)

For BCC unit cell the edge length = 27 Å. Find the length of the same unit cell in FCC arrangement.

Ans. 33 Å

$$K_1 = 10^{-3} \text{ sec}^{-1} \quad E_a = 11.48 \text{ kJ/mol}$$

$$R = 8.314 \text{ J/mole K}$$

$$T = 200 \text{ K}$$

Then K at 300 K

Ans. 10



6.5 molal solution KOH,  $d = 1.89 \text{ g/cm}^3$ ,  $M = ?$

$$\left[ \frac{1}{m} + \frac{M}{1000} \right]$$

**Ans.** 10.9 mol/litre

Name of vitamin B<sub>12</sub>

- A.** cyanocobalamin
- B.** niacin
- C.** riboflavin
- D.** thiamine

**Ans.** A