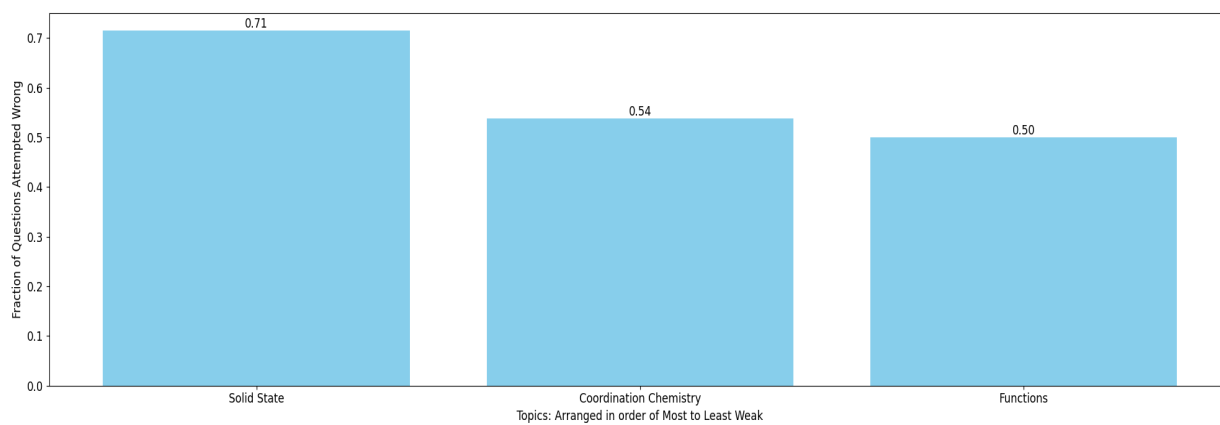


# Muskan prashar Total MLAssist - Personalised DPP

## Question Paper Analysis:



## Weak Topic Analysis:



## Practice Questions:

### Solid State:

5. In a binary compound, atoms of element A form a hcp structure and those of element M occupy  $\frac{2}{3}$  of the tetrahedral voids of the hcp structure. The formula of the binary compound is: **[JEE Main, March 2021]**

(A)  $M_2A_3$                       (B)  $M_4A_3$                       (C)  $M_4A$                       (D)  $MA_3$

25. At  $912^\circ\text{C}$  and  $10^5$  Pa,  $\alpha$ -Iron (bcc form) may be transformed into  $\gamma$ -iron (fcc form). If density of  $\alpha$ -iron is  $\rho$  then what is density of  $\gamma$ -iron (assume no change in radius of iron atom )-

(A)  $\rho/0.74$                       (B)  $\rho \times 0.68$                       (C)  $\frac{4\rho}{3}$                       (D)  $\frac{3 \times \rho \sqrt{1.5}}{4}$

25. The figures given below show the location of atoms in three crystallographic planes in FCC lattice. Draw the unit cell for the corresponding structure and identify these planes in your diagram. **[JEE-2000]**



2. How many Bravais lattices are possible in 3D ?

42. F-centers are
- (A) the electrons trapped in anionic vacancies
- (B) the electrons trapped in cation vacancies
- (C) presence of cations in the interstitial sites
- (D) presence of anions in the interstitial sites

## Coordination Chemistry:

17. Which of the following is not considered as an organometallic compound ?  
 (A) Ferrocene (B) Cis-platin (C) Ziese's salt (D) Grignard reagent
39. The formula for the compound tris (ethane-1, 2-diamine)cobalt(III) sulphate is  
 (A)  $[\text{Co}(\text{en})_3]\text{SO}_4$  (B)  $[\text{Co}(\text{SO})_4(\text{en})_3]$  (C)  $[\text{Co}(\text{en})_3](\text{SO}_4)_2$  (D)  $[\text{Co}(\text{en})_3]_2(\text{SO}_4)_3$

### Isomerism

12. For octahedral complex, the value of the 'spin only' magnetic moment for one of the following configurations is 2.84 BM. The correct one is [AIEEE-2005]  
 (1)  $d^4$  (in strong ligand field) (2)  $d^4$  (in weak ligand field)  
 (3)  $d^3$  (in weak as well as in strong field) (4)  $d^5$  (in strong ligand field)
7. Which of the following statement(s) is/are **incorrect**?  
 (A) The state of hybridisation of central atom of anionic part of solid  $\text{PBr}_5$  is  $sp^3d^2$ .  
 (B)  $[\text{Co}(\text{NH}_3)_6]^{2+}$  ion is easily oxidisable while  $[\text{Co}(\text{NO}_2)_6]^{4-}$  is not.  
 (C) Bis(glycinato)zinc(II) is optically active.  
 (D)  $d_{x^2}$  orbital of central metal atom / ion is used in  $dsp^2$  hybridisation.
62. The magnitude of crystal field stabilisation energy in octahedral field depends on  
 I : the nature of the ligand  
 II : the charge on the metal ion  
 III : whether the metal is in the first, second or third row of the transition elements.  
 (A) I, II, III are correct. (B) I, II are correct  
 (C) II, III are correct (D) III is only correct

### Functions:

1. Let  $f: \mathbb{R} - \left\{\frac{-4}{3}\right\} \rightarrow \mathbb{R} - \left\{\frac{4}{3}\right\}$  be a function defined as  $f(x) = \frac{4x}{3x+4}$ . The inverse of  $f$  is the map

$g: \mathbb{R} - \left\{\frac{4}{3}\right\} \rightarrow \mathbb{R} - \left\{\frac{-4}{3}\right\}$  is given by

(A)  $g(y) = \frac{3y}{3-4y}$

(B)  $g(y) = \frac{4y}{4-3y}$

(C)  $g(y) = \frac{4y}{3-4y}$

(D)  $g(y) = \frac{3y}{4-3y}$

2. Find the domain & range of the following functions. (Read the symbols  $[*]$  and  $\{*\}$  as greatest integers and fractional part functions respectively.)

(i)  $y = \log_{\sqrt{5}} (\sqrt{2}(\sin x - \cos x) + 3)$

(ii)  $y = \frac{2x}{1+x^2}$

(iii)  $f(x) = \frac{x^2-3x+2}{x^2+x-6}$

(iv)  $f(x) = \frac{x}{1+|x|}$

(v)  $y = \sqrt{2-x} + \sqrt{1+x}$

(vi)  $f(x) = \frac{\sqrt{x+4}-3}{x-5}$

19. Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  be defined by  $f(x) = \frac{x}{1+x^2}$   $x \in \mathbb{R}$ . Then, the range of  $f$  is **[JEE - Main 2019]**

(A)  $\left[-\frac{1}{2}, \frac{1}{2}\right]$

(B)  $(-1, 1) - \{0\}$

(C)  $\mathbb{R} - \left[-\frac{1}{2}, \frac{1}{2}\right]$

(D)  $\mathbb{R} - [-1, 1]$

5. Solve the following problems from (a) to (e) on functional equation.

- (a) The function  $f(x)$  defined on the real numbers has the property that  $f(f(x)) \cdot (1 + f(x)) = -f(x)$  for all  $x$  in the domain of  $f$ . If the number 3 is in the domain and range of  $f$ , compute the value of  $f(3)$ .
- (b) Suppose  $f$  is a real function satisfying  $f(x + f(x)) = 4f(x)$  and  $f(1) = 4$ . Find the value of  $f(21)$ .
- (c) Let ' $f$ ' be a function defined from  $\mathbb{R}^+ \rightarrow \mathbb{R}^+$ . If  $[f(xy)]^2 = x(f(y))^2$  for all positive numbers  $x$  and  $y$  and  $f(2) = 6$ , find the value of  $f(50)$ .
- (d) Let  $f$  be a function such that  $f(3) = 1$  and  $f(3x) = x + f(3x - 3)$  for all  $x$ . Then find the value of  $f(300)$ .

1. Find the domains of definitions of the following functions :

(Read the symbols  $[*]$  and  $\{^*\}$  as greatest integers and fractional part functions respectively.)

$$(i) f(x) = \sqrt{\cos 2x} + \sqrt{16 - x^2}$$

$$(ii) f(x) = \log_7 \log_5 \log_3 \log_2 (2x^3 + 5x^2 - 14x)$$

$$(iii) f(x) = \ln (\sqrt{x^2 - 5x - 24} - x - 2)$$

$$(iv) f(x) = \sqrt{\frac{1-5^x}{7^{-x}-7}}$$

$$(v) y = \log_{10} \sin (x - 3) + \sqrt{16 - x^2}$$

$$(vi) f(x) = \log_{100x} \left( \frac{2\log_{10} x + 1}{-x} \right)$$

$$(vii) f(x) = \sqrt{x^2 - |x|} + \frac{1}{\sqrt{9-x^2}}$$

$$(viii) f(x) = \sqrt{(x^2 - 3x - 10) \cdot \ln^2 (x - 3)} \quad (ix) f(x) = \sqrt{(5x - 6 - x^2)[\{\ln \{x\}\}]} +$$

$$\sqrt{(7x - 5 - 2x^2)} + \left( \ln \left( \frac{7}{2} - x \right) \right)^{-1}$$

$$(x) f(x) = \log_{\left[x + \frac{1}{x}\right]} |x^2 - x - 6| + {}^{16-x}C_{2x-1} + {}^{20-3x}P_{2x-5}$$


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