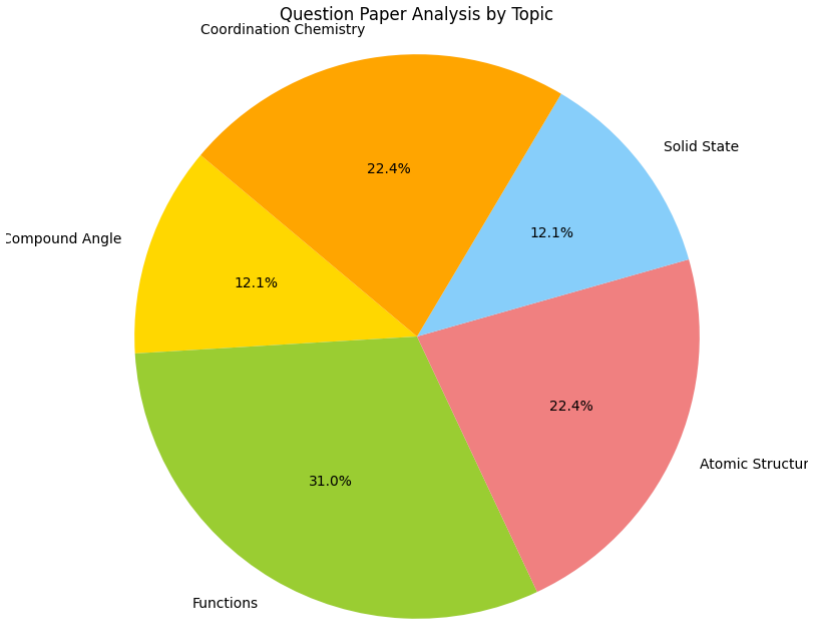
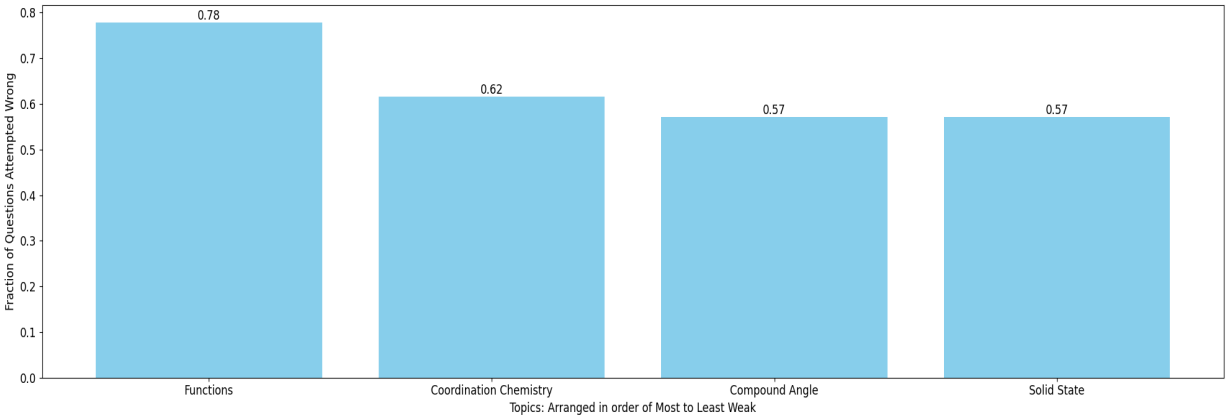
Rajat jindal Total
MLAssist - Personalised DPP

Question Paper Analysis:



Weak Topic Analysis:



Practice Questions:

Functions:

20. Let N be the set of natural numbers and two functions f and g be defined as f, g: N $\longrightarrow$ N such that $f(n) = \begin{cases} \frac{n+1}{2}; & \text{if n is odd} \\ \frac{n}{2}; & \text{if n is even} \end{cases}$ and $g(n) = n - (-1)^n$. Then, fog is **[JEE - Main 2019]**

(A) one-one but not onto (B) onto but not one-one

(C) both one-one and onto (D) neither one-one nor onto

8. Let $f(x) = \ln x$ and $g(x) = x^2 - 1$

Column-I contains composite functions and column-II contains their domain. Match the entries of column-I with their corresponding answer is column-II.

Column-I	**Column-II**
(A) fog	(P) $(1, \infty)$
(B) gof	(Q) $(-\infty, \infty)$
(C) fof	(R) $(-\infty, -1) \cup (1, \infty)$
(D) gog	(S) $(0, \infty)$

INTEGER TYPE

13. Let $\sum_{k=1}^{10} f(a + k) = 16(2^{10} - 1)$, where the function f satisfies $f(x + y) = f(x)f(y)$ for all natural numbers x, y and $f(1) = 2$. Then, the natural number ' a ' is **[JEE - Main 2019]**

(A) 2 (B) 4 (C) 3 (D) 16

33. For $\alpha \in N$, consider a relation R on N given by $R = \{(x, y) : 3x + \alpha, y \text{ is a multiple of } 7\}$. The relation R is an equivalence relation if and only if: **[JEE - Main 2022]**

(A) $\alpha = 14$ (B) α is a multiple of 4

(C) 4 is the remainder when α is divided by 10 (D) 4 is the remainder when α is divided by 7

16. If the function f: $\mathbf{R} - \{1, -1\} \to A$ defined by $f(x) = \frac{x}{1-x^2}$, is surjective, then A is equal to

[JEE - Main 2019]

(A) $\mathbf{R} - \{-1\}$ (B) $[0, \infty)$ (C) $\mathbf{R} - [-1,0)$ (D) $\mathbf{R} - (-1,0)$

Coordination Chemistry:

28. Which one is the most likely structure of $CrCl_3 \cdot 6H_2O$ if 1/3 of total chlorine of the compound is precipitated by adding $AgNO_3$ to its aqueous solution:

(A) $CrCl_3 \cdot 6H_2O$ (B) $[CrCl_3(H_2O)_3] \cdot (H_2O)_3$

(C) $[CrCl_2(H_2O)_4] \cdot Cl \cdot 2H_2O$ (D) $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$

15. The IUPAC name of $[Ni(NH_3)_4]^{+2}[NiCl_4]^{-2}$ is **[JEE 2008]**

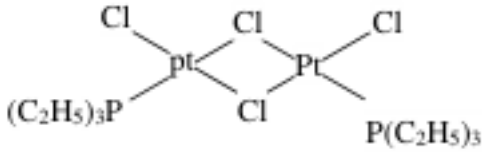
(A) Tetrachloronickel (II)-tetraamminenickel (II)

(B) Tetraamminenickel (II)-tetrachloronickel (II)

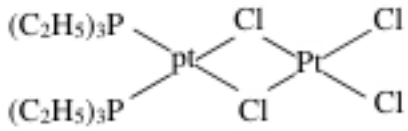
(C) Tetraamminenickel (II)-tetrachloronickelate (II)

(D) Tetrachloronickel (II)-tetraamminenickelate (0)

47. The complexes given below show:



and



(A) Optical isomerism (B) Co-ordination isomerism

(C) Geometrical isomerism (D) Co-ordination position isomerism

2. In the complexes $[Fe(H_2O)_6]^{3+}$, $[Fe(SCN)_6]^{3-}$, $[Fe(C_2O_4)_3]^{3-}$ and $[FeCl_6]^{3-}$, more stability is shown by - **[AIEEE-2002]**

(1) $[Fe(H_2O)_6]^{3+}$ (2) $[Fe(SCN)_6]^{-3}$ (3) $[Fe(C_2O_4)_3]^{3-}$ (4) $[FeCl_6]^{3-}$

67. $Mn_2(CO)_{10}$ is an is an organometallic compound due to the presence of : **[JEE MAIN 2019]**

(1) Mn – O bond (2) Mn – C bond (3) Mn – Mn bond (4) C – O bond

Compound Angle:

11. If $A = \sin^2 x + \cos^4 x$, then for all real x **[AIEEE 2011]**

(A) $\frac{3}{4} \le A \le \frac{13}{16}$ (B) $\frac{3}{4} \le A \le 1$ (C) $\frac{13}{16} \le A \le 1$ (D) $1 \le A \le 2$

17. Show that elliminating x & y from the equations, $\sin x + \sin y = a$; $\cos x + \cos y = b$ & $\tan x + \tan y = c$ gives $\frac{8ab}{(a^2+b^2)^2-4a^2} = c$

16. Calculate without using trigonometric tables:

(a) $4\cos 20^\circ - \sqrt{3}\cot 20^\circ$ (b) $\frac{2\cos 40^\circ - \cos 20^\circ}{\sin 20^\circ}$

(c) $\cos^6 \frac{\pi}{16} + \cos^6 \frac{3\pi}{16} + \cos^6 \frac{5\pi}{16} + \cos^6 \frac{7\pi}{16}$ (d) $\tan 10^\circ - \tan 50^\circ + \tan 70^\circ$

19. Let $A_1, A_2, \ldots \ldots, A_n$ be the vertices of an n-sided regular polygon such that;

$\frac{1}{A_1 A_2} = \frac{1}{A_1 A_3} + \frac{1}{A_1 A_4}$. Find the value of n.

2. If $T_n = (\sin^n \theta + \cos^n \theta)$, then $\frac{T_5 - T_3}{T_7 - T_5}$ is equal to

(A) $\frac{T_1}{T_3}$ (B) $\frac{T_2}{T_4}$ (C) $\frac{T_5}{T_7}$ (D) $\frac{T_3}{T_7}$

Solid State:

17. All of the following share the same crystal structure except :- **[Jee Main, 2018]**

(A) RbCl (B) CsCl (C) LiCl (D) NaCl

32. If x = radius of Na^+ & y = radius of Cl^- & a is the unit cell edge length for NaCl crystal, then which of the given relation is correct?

(A) x + y = a (B) 2x + 2y = a (C) x + y = 2a (D) $x + y = a\sqrt{2}$

31. If the anions (A) form hexagonal closest packing and cations (C) occupy only 2/3 octahedral voids in it, then the general formula of the compound is

(A) CA (B) CA_2 (C) C_2A_3 (D) C_3A_2

PROBLEMS BASED ON IONIC CRYSTAL

24. In a monoclinic unit cell, the relation of sides and angles are respectively

[Jee-Main (online)-14]

(A) $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90^\circ$

(B) $a \neq b \neq c$ and $\beta = \gamma = 90^\circ \neq \alpha$

(C) $a = b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$

(D) $a \neq b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$

38. An ionic compound AB has ZnS type structure. If the radius A^+ is 22.5 pm, then the ideal radius of B^- would be

(A) 54.35 pm (B) 100 pm (C) 145.16 pm (D) none of these