Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr. IPLCO **Date: 31-10-15**

Time: 9:00 AM to 12:00 Noon **RPTM-10** **Max.Marks: 360**

KEY SHEET

MATHS		PHYSICS		CHEMISTRY	
Q.NO	ANSWER	Q.NO	ANSWER	Q.NO	ANSWER
1	3	31	1	61	1
2	3	32	3	62	1
3	4	33	4	63	3
4	1	34	3	64	2
5	4	35	1	65	2
6	4	36	3	66	3
7	4	37	4	67	2
8	1	38	3	68	3
9	1	39	1	69	3
10	4	40	2	70	3
11	4	41	2	71	2
12	1	42	3	72	3
13	2	43	2	73	2
14	2	44	2	74	3
15	2	45	1	75	3
16	3	46	2	76	3
17	4	47	4	77	2
18	1	48	2	78	2
19	4	49	1	79	2
20	1	50	4	80	4
21	3	51	3	81	1
22	2	52	3	82	2
23	2	53	1	83	4
24	3	54	1	84	4
25	1	55	2	85	3
26	3	56	3	86	1
27	3	57	2	87	4
28	4	58	2	88	2
29	4	59	2	89	2
30	3	60	2	90	3

MATHS

1. $A \cap B \Rightarrow n^3 + 2n + 1 = 3n^2 + 7 \Rightarrow n^3 - 3n^2 + 2n - 6 = 0$

   $\Rightarrow n = 3$ then x = 34 which is 7 (5) -1

2. $X = \{(1,2,7),(1,3,6),(1,4,5),(2,3,5)\}$

   then $(1,4,5),(2,3,5)$ belongs to Y

3. for each x in N we have three choices

   $x \in Y,\ x \notin Z;\ x \notin Y, x \in Z;\ x \notin Y,\ x \notin Z$

   $\therefore$ The required number of ordered pairs is 3^5

4. $4^n - 3n - 1$ is always, divisible by 9 for every $n \in N$

   $\therefore A \subset B \therefore A \cup B = B$

5. Since R and S are symmetric so $R^{-1} = R$ and $S^{-1} = S$ but $(ROS)^{-1} = S^{-1}OR^{-1} = SOR$. Thus ROS is symmetric if and only if ROS = SOR

7. number of symmetric relation on a set of a n elements is $2^{\frac{n(n+1)}{2}}$.

8. $(5, 3) \in R$ $\left(3, \frac{-1}{4}\right) \in R$ but $\left(5, \frac{-1}{4}\right) \notin R$

9. $(A \cup B \cup C) \cap \left(A \cap B^C \cap C^C\right)^C \cap C^C$

   $= (A \cup B \cup C) \cap \left(A^C \cup B \cup C\right) \cap C^C$

   $= \left(A \cup A^C\right) \cup (B \cup C) \cap C^C$

   $= (B \cup C) \cap C^C = \left(B \cap C^C\right) \cup \left(C \cap C^C\right) = B \cap C^C$

10. $n(M \cup P \cup C) = 50$, n (M) = 37, n (P) = 24, n (C) = 43

    $n(M \cap P) \le 19,\ n(M \cap C) \le 29$ & $n(P \cap C) \le 20$

    $n(M \cup P \cup C) = n(M) + n(P) + n(C) - n(M \cap P) - n(M \cap C) - n(P \cap C) + N(M \cap P \cap C)$

    $\Rightarrow 50 = 37 + 24 + 43 - n(M \cap P) - n(P \cap C) - n(M \cap P) + n(M \cap P \cap C)$

    $\Rightarrow n(M \cap P \cap C) \le n(M \cap P) + n(M \cap C) + n(P \cap C) - 54$

    $\therefore$ The number of students is at most

    19 + 29 + 20 – 54 = 14

11. $m(m-1)(m-2) = m^3 - 3m^2 + 2m$

12. minimum value of x = 100 – (30 + 20 + 25 + 15) = 10

13. B has some number of element, as in c

14. $(P-Q)\cup(Q-P)=\phi \Rightarrow$ both P – Q and Q – P must be empty sets. $\Rightarrow$ P = Q

    The number of ways Q = ${}^nC_0 + {}^nC_1 + {}^nC_2 + {}^nC_3 + {}^nC_4 + \ldots\ldots {}^nC_n = 2^n$

15. An element, say , $a_1 \in A \cup B \cup C$ but not in $A \cap B \cap C$ can be possible in 6 ways.

16. The total number of ways $= \frac{1}{\angle 2}\left(2^5 - {}^2C_1 1^5\right) = 15$

17. Required number of relation

    = no.of relations – no.of reflexive relation

    $= 2^{n^2} - 2^{n(n-1)}$

18. Number of ways = $\frac{\angle 12}{\angle 3(\angle 4)^3}$

19. Clear, (a, b) R (a, b) reflexive

    (a, b) R (c, d) $\Rightarrow$ ad (b + c) = bc (a + d)

    $\Rightarrow$ da (c + b) = cb (d + a) $\Rightarrow$ (c, d) R (a, b)

    $\therefore$ symmetric

    Let (a, b) R (c, d) and (c, d) R (e, f)

    $\therefore$ ad (b + c) = bc (a + d) -------- 1

    c f(d + e) = de (c +f) ---------- 2

    multiple, (1) with ef and (2) with ab and add both

    ad cf (b + e) = bc de (a + f) $\Rightarrow$ af (b + e) = be (a + f)

    $\Rightarrow$ (a, b) R (e, f) $\therefore$ transitive

    $\therefore$ R is equivalence

20. (12, 6) $\notin$ R not symmetric

21. n^{th} bracket = $2^{n-1} + \left(2^{n-1}+1\right) + \ldots\ldots + \left(2^n - 1\right) = 2^{n-2}\left(2^n + 2^{n-1} - 1\right)$

22. $4^n - 3n - 1$ is divisible by 9 $\forall n \in N$

23. The inverse of p $\Rightarrow$ q is $\sim p \Rightarrow \sim q$

24. The contra positive of $p \Rightarrow q$ is $\sim q \Rightarrow \sim p$

25. verify truth tables

27. $\sim(\sim p \wedge q) \wedge (p \vee q) \equiv (\sim(\sim p) \vee \sim q) \wedge (p \vee q)$

$\equiv (p \vee (\sim q)) \wedge (p \vee q)$

$\equiv p \vee (\sim q \wedge q) = p$

28. Median a, 2a, 3a, …….. 50a is $\frac{1}{2}(25a + 26a) = 25.5a$

$\therefore$ Mean deviation of given number from (25. 5) a is

$\frac{1}{50}\left(|a - (25.5)a| + |2a - (25.5)a| + ... + |50a - (25.5)a|\right)$

$= \frac{1}{50}\left(\frac{25}{2}(1+49)a\right) = \frac{25}{2}|a| = 50$ (given)

$\therefore |a| = 4$

29. n = 10, $\bar{x} = 6$, also $n_1 = 4$, $\bar{x}_1 = 7.5$

Let the remaining 6 items n_2 mean $\bar{x}_2$

$\therefore \bar{x} = \frac{n_1\bar{x_1} + n_2\bar{x_2}}{n_1 + n_2} \Rightarrow 6 = \frac{4(7.5) + 6\bar{x_2}}{10}$

$\Rightarrow \bar{x_2} = 5$

30. For the population A, n = 100 mean x_A now $V_A = \frac{1}{n}\sum_{i=1}^{n}(x_i - x_A)^2$

Now for B, is obtained by adding 50 to each observations in A.

$V_B = \frac{1}{n}\sum((x_i + 50) - (x_A + 50))^2 = V_A$

$\therefore V_A = V_B$.