Sri Chaitanya IIT Academy, India

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A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr.IPLCO **JEE–ADVANCE** **Date: 20-12-15**
Time: 3 Hours **2011-P1-Model** **Max Marks: 240**

PAPER-I

KEY & SOLUTIONS

CHEMISTRY

1	**B**	2	**A**	3	**D**	4	**A**	5	**A**	6	**B**
7	**D**	8	**ACD**	9	**BC**	10	**BC**	11	**ABC**	12	**B**
13	**C**	14	**A**	15	**B**	16	**C**	17	**4**	18	**7**
19	**5**	20	**9**	21	**2**	22	**0**	23	**6**		

PHYSICS

24	**B**	25	**A**	26	**B**	27	**C**	28	**B**	29	**D**
30	**D**	31	**B**	32	**CD**	33	**C**	34	**AD**	35	**B**
36	**A**	37	**A**	38	**A**	39	**C**	40	**0**	41	**0**
42	**1**	43	**2**	44	**2**	45	**6**	46	**3**		

MATHS

47	**A**	48	**D**	49	**D**	50	**A**	51	**B**	52	**D**
53	**A**	54	**ABC**	55	**AC**	56	**ABCD**	57	**ABC**	58	**B**
59	**C**	60	**A**	61	**B**	62	**A**	63	**1**	64	**2**
65	**5**	66	**2**	67	**9**	68	**5**	69	**5**		

MATHS

47. $27 = 7(3)+6$ at least one car has to accomodate 4 or more passenger.

48. Strictly descending $\rightarrow {}^{10}C_5$

Strictly ascending $\rightarrow {}^{9}C_5$

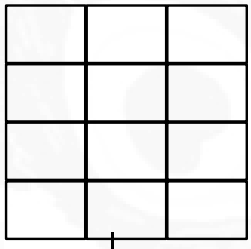
${}^{10}C_5 + {}^{9}C_5$

$= 2.{}^{9}C_4 + {}^{9}C_4$

$= 3.{}^{9}C_4$

$= 3.{}^{9}C_5$

49. $\underline{|2} \times \frac{\underline{|5}}{(\underline{|2})^2 \underline{|2}} \times \underline{|3} \times (\underline{|2})^2$



50. ${}^{4+5-2}C_3 = {}^{7}C_3 = 35$

51. Product of all division of N= $N^{\frac{T.N.D}{2}}$

$1440 = 2^5.3^2.5$

$T.N.D = 6.3.2 = 36$

$= \left(2^5.3^2.5\right)^{\frac{36}{2}}$

$= \left(2^{90}.3^{36}.5^{18}\right)$

$= \left(2^3.3\right)^{30}.3^6.5^{18} = 24^{30}.3^6.5^{18}$ $= 24^{30}.3^6.5^{18}$

52. $D_6 - D_4$

53. $\frac{10}{4} \times {}^{5}C_3$

54. Let a, b are selected numbers and x_1, x_2, x_3 are the number of numbers before a, between a & b, after b respectively and $x_1 + x_2 + x_3 = 198, x_1 \geq 0, x_3 \geq 0, 0 \leq x_2 \leq 19$.

55. The given sequence contains n terms, given that sum is zero, means sequence contains half of the terms are 1and remaining half of the terms are -1. Hence n must be even and it is also divisible by 4.

56. A) ${}^6C_3.{}^4C_2.5!.5! = (5!)^3$

B) $6C_1.9!$

C) $(6+1)!4!$

D) ${}^{10}P_4 =$

57. A) $a_{11} + a_{22} + a_{33} = 0$ remaining '6' elements can be filled in 7^6 ways

$$\left.\begin{matrix}(-3,0,3),(-2,0,2),(-1,0,1)\\(-3,1,2),(3,-1,-2)\end{matrix}\right\} \rightarrow 3!.5 = 30$$

$$(-2,1,1)(2,-1,-1) \rightarrow 3.2 = 6$$

$$(0,0,0) \qquad \rightarrow \frac{1}{37}$$

B) Each of 9 elements can be filled in 7 ways

C) 3 elements can be filled 7^3 ways

D) 6 elements can be filled 7^6 ways

PASSAGE 58 TO 59

58,59. The ten digit number formed with all the given digits is divisible by 11111 means the required numbers are divisible by 99999.

Let 1 of the number be

$$x_1x_2x_3x_4x_5x_6x_7x_8x_9x_{10} = 99999.x_1x_2x_3x_4x_5 + x_1x_2x_3x_4x_5 + x_6x_7x_8x_9x_{10}$$

It is divisible by 99999 means $x_1x_2x_3x_4x_5 + x_6x_7x_8x_9x_{10}$ is divisible by 99999

$$\Rightarrow x_1 + x_{10} = 9, x_2 + x_9 = 9, x_3 + x_8 = 9, x_4 + x_7 = 9, x_5 + x_6 = 9$$

PASSAGE 60 TO 62

$10 = 2 \cdot 5 \Rightarrow A = 2^4 \cdot 3 = 48$

$12 = 2 \cdot 2 \cdot 3 \Rightarrow B = 2^2 \cdot 3 \cdot 5 = 60$

$15 = 3 \cdot 5 \Rightarrow C = 2^4 \cdot 3^2 = 144$

$16 = 2 \cdot 2 \cdot 2 \cdot 2 \Rightarrow D = 2 \cdot 3 \cdot 5 \cdot 7 = 210$

$20 = 2 \cdot 2 \cdot 5 \Rightarrow E = 2^4 \cdot 3 \cdot 5 = 240$

60. A + B = 48 + 60 = 108

61. C + D = 144 + 210 = 354

62. A + E = 48+240 = 288

63. $\underline{|4} - 3\underline{|3} + 3\underline{|2} - 1$

64. L.C.M (p,q) $= 2^2 3^4 .5^2$

$P = 2^{a_4} 3^{b_1} .5^{c_1}$ $q = 2^{a_2} 3^{b_2} 5^{c_2}$

max $\{a_1, a_2\} = 2$ $\Rightarrow$5 ways

max $\{b_1, b_2\} = 4$ $\Rightarrow$9 ways

max $\{c_1, c_2\} = 2$ $\Rightarrow$5 ways

$\therefore K = 3^2 .5^2$ can be express as $1.3^2 5^2$ $3^2 .5^2$

65. $(n-2)^2 \times 6 = (n-2)^3$

67. (x + y) 2013 = xy

(x – 2013) (y – 2013) = 2013^2

$= 3^2 X 11^2 \times 61^2$

68. $10 = 2 \times 5$ & $n! = 1.2.3..... n$

Each multiple of 5 contributes one zero

Each multiple of 25 contributes one more zero etc

100! has 24 zeroes at the end $\therefore n = 105,106,....,109$

69.

$$(x-1)(x-2)...(x-10) = x^{10} - (\Sigma 1)x^9 + (\Sigma 1.2)x^8 + ... + 1.2.3...10.$$

take x = -1

$$11! = 1 + \frac{10.11}{2} + (\Sigma 1.2 + \Sigma 1.23 + ...)$$

$$\Rightarrow \Sigma 1.2 + \Sigma 1.2.3 + ... = 11! - 56 \qquad \therefore K = 56$$