Sri Chaitanya IIT Academy.,India.

A.P T.S KARNATAKA TAMILNADU MAHARASTRA DELHI RANCHI

A right Choice for the Real Aspirant

ICON Central Office - Madhapur - Hyderabad

SEC: Sr.S60_Elite, Target & LIIT-BTs **JEE-MAIN** **Date: 10-01-2025**
Time: 09.00Am to 12.00Pm **GTM-16/11** **Max. Marks: 300**

KEY SHEET

MATHEMATICS

1	**1**	2	**3**	3	**1**	4	**1**	5	**1**
6	**3**	7	**2**	8	**1**	9	**2**	10	**1**
11	**4**	12	**2**	13	**2**	14	**3**	15	**2**
16	**1**	17	**1**	18	**3**	19	**1**	20	**4**
21	**3**	22	**8**	23	**9**	24	**7**	25	**4**

PHYSICS

26	**2**	27	**2**	28	**3**	29	**1**	30	**3**
31	**1**	32	**3**	33	**3**	34	**3**	35	**1**
36	**3**	37	**4**	38	**2**	39	**1**	40	**2**
41	**1**	42	**4**	43	**1**	44	**1**	45	**4**
46	**20**	47	**7**	48	**9**	49	**25**	50	**10**

CHEMISTRY

51	**4**	52	**1**	53	**2**	54	**4**	55	**2**
56	**2**	57	**2**	58	**4**	59	**1**	60	**3**
61	**4**	62	**1**	63	**3**	64	**1**	65	**4**
66	**1**	67	**3**	68	**4**	69	**3**	70	**3**
71	**4**	72	**1**	73	**1**	74	**2**	75	**2**

SOLUTION
MATHEMATICS

1. $r=\dfrac{np}{p+q}$ $n=10$ $p=2$ $q=3$

2. $P(E)=\dfrac{6\times5}{6\times6}=\dfrac{5}{6}$

3. $A^{-1}=\dfrac{1}{8-18}\begin{bmatrix}4 & -2\\ -9 & 2\end{bmatrix}$, $10A^{-1}=\begin{bmatrix}-4 & 2\\ 9 & -2\end{bmatrix}$

4. $2-2\sin^2\theta+3\sin\theta=0,$

5. $3-x\geq0$ $2+x\geq0, x-3\leq0$ $x\geq-2, x\leq3$

6. $\lim\limits_{x\to0}\dfrac{\dfrac{x\tan4x}{4x}4x}{\left(\dfrac{\sin x}{x}\right)^2x^2}$

7. L. H rule

8. $f^1(x)<0$

9. $\int\limits_0^1\sqrt{2+x}-\sqrt{1+x}\,dx$

10. $\lim\limits_{n\to\infty}\sum\limits_{r=1}^{n}\dfrac{1}{r+n}, \int\limits_0^1\dfrac{1}{1+x}dx$

11. Area $=\int\limits_0^1 x-x^2dx$

12. Use variable seperable

13. Midpoint of AC = midpoint of BD find D

14. Circle $x^2+y^2-x-y=0$

15. 4a = 4(distance from (2,-1) to $4x-3y=21$)

16. 2b = 5 2ae – 13 , $4b^2=25, 4\left(a^2e^2-a^2\right)=25$

17. $\alpha^{12}-6\alpha^{11}-2\alpha^{10}=0,$ $\alpha^{12}-2\alpha^{10}=6\alpha^{11}$ $\beta^{12}-2\beta^{10}=6\beta^{11}$

18. in 1st ,25th term is = 124 in 2nd ,35th term is = 105
Common terms are 9,24,39,54 ,69,84,99 , Common difference is L.C. M of 5,3

19. Real part = 0 $1-2\sin^2\theta=0$. $\sin\theta=\pm\dfrac{1}{\sqrt{2}}, \theta=\dfrac{\pi}{4},\dfrac{3\pi}{4}$

20. $\boxed{7}\square\square\square\square\longrightarrow4!$
$\boxed{8}\square\square\square\square\longrightarrow4!$

21. $\bar{a}.\bar{b}=0$

22. $\left|\dfrac{\left[\bar{a}-\bar{c}\quad\bar{b}\quad\bar{d}\right]}{|\bar{b}\times\bar{d}|}\right|=\dfrac{6}{\sqrt{5}}$

23. $\dfrac{30+x+y}{5}=30, x=12$

24. $R=\{(a,b)(b,c)(a,a)(b,b)(c,c)(b,a)(c,b)(a,c)(c,a)\}$

25. $|adj(adjA)|=|A|^{(n-1)^2}$

PHYSICS

26. Torque - ML^2T^{-2}

Impulse- MLT^{-1}

Tension- MLT^{-2}

Surface tension - MT^{-2}

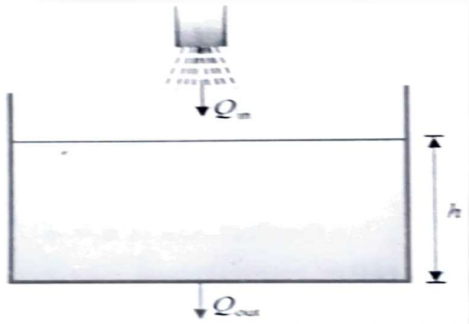
27. $V=\sqrt{\frac{VRT}{M}} \Rightarrow V \propto \sqrt{T}$,

$f=\frac{V}{4l} \Rightarrow l \propto V$,

$l_1=18cm \Rightarrow l_2=54cm$

$l_1^1>18cm \Rightarrow l_2^1>54cm$

28.



Since height of water column is constant therefore,

Water inflow rate (Q_m) = water outflow rate

$Q_{in}=10^{-4}m^3s^{-1}$

$Q_{out}=Au=10^{-4}\times\sqrt{2gh}$

$10^{-4}=10^{-4}\sqrt{20\times h}$

$h=\frac{1}{20}m \; h=5cm$

29. Conceptual

30. Average K.E/molecule $=\frac{f}{2}kT$, So, $\frac{K_{Ar}}{K_{o_2}}=\frac{\frac{3}{2}kT}{\frac{5}{2}kT}=\frac{3}{5}$

Note: ratio of average translational kinetic energy per molecule= 1:1

31. $I=I_0\cos^2\theta$

32. Conceptual

33. $B=\frac{\mu_0 l}{2\pi r}$,

$B_{net}=B_1-B_2$

34. $Q = cv$

35. $i_d = c.\dfrac{dv}{dt}$

36. $MR^2 + \dfrac{MR^2}{2} = \dfrac{3MR^2}{2}$

37. $\omega = Area = \dfrac{1}{2}mv^2$

38. Work = area of graph

39. $e = BlV$

40. Conceptual

41. $a = -\omega^2 y \Rightarrow \dfrac{y}{a} = \dfrac{1}{\omega^2}$, $V = r\omega \Rightarrow \omega = \dfrac{V}{r}$

42. $n = \dfrac{10^{-3}}{200\times10^{6}\times1.6\times10^{-19}} = 3.125\times10^{7}$

43. Conceptual

44. Surface tension of a liquid decreases with the rise in temperature. At the boiling point of liquid, surface tension is zero

Capillary rise $h = \dfrac{2T\cos\theta}{rdg}$

45. Conceptual

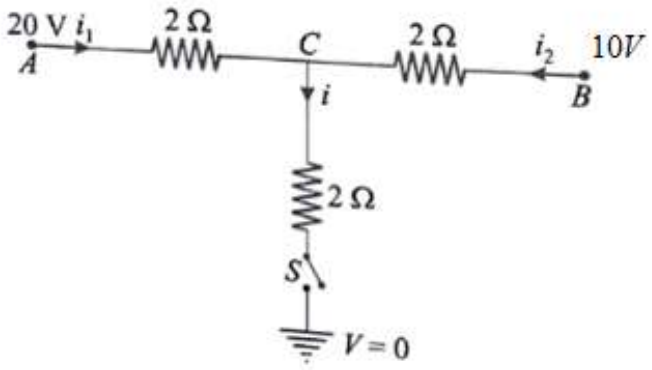
46. $V = u\cos\theta$

47. $x_{cm} = \dfrac{m_1x_1 + m_2x_2 + m_3x_3}{m_1 + m_2 + m_3}$

48. $\dfrac{1}{f} = (\mu - 1)\left(\dfrac{1}{R_1} - \dfrac{1}{R_2}\right)$

49. $P = V_{rms}I_{rms}\cos\phi$

50. Let voltage at $C = xV$



KCL: $i_1 + i_2 = i$ $\dfrac{10-x}{2} + \dfrac{20-x}{2} = \dfrac{x-0}{2}$

CHEMISTRY

51. $\lambda = \frac{1240ev}{300nm} = 4.134\,e.v$

$\phi < 4.134$ will show photo electric effects

52. $\overset{+7}{MnO_4^-} + \overset{+n}{X^{+n}} \rightarrow \overset{+2}{Mn^{+2}} + \overset{+5}{XO_3^-}$

$1.5\times10^{-3}\times5 = 2.5\times10^{-3}\times(5-n)$

$n = 2$

53. Sucrose is dextrorotatory but after hydrolysis gives dextrorotatory glucose and laevorotatory fructose. Since the laevorotation of fructose (-92.4º)is, more than dextrorotation of glucose (+ 52.5º), the mixture is laevorotatory. Thus, hydrolysis of sucrose brings about a change in the sign of rotation, from dextro (+) to laevo (-) and the product is named as invert sugar.

54. $A \rightleftharpoons B, K_C = x, \quad B \rightleftharpoons A, K_C = \frac{1}{x}$

$$\frac{K_{P_1}}{K_{P_2}} = \frac{P_1\frac{\alpha^2}{(1-\alpha^2)}}{\frac{\left(P_2\frac{2\alpha}{1+\alpha}\right)^2}{\left(P_2\frac{1-\alpha}{1+\alpha}\right)}}, \quad \frac{9}{1} = \frac{1}{4}\times\frac{P_1}{P_2}$$

55. Acetone + ethanol is an example of solutions showing positive deviation from Raoult's law, since acetone ethanol attractions are weaker than acetone-acetone and ethanol-ethanol attractions. Others no deviation from Raoults law

56. $\Delta G^0 = \Delta H^0 - T\Delta S^0 = (+ve) - T(+ve)$ as $T\uparrow -\Delta G^0 = -Ve$

$\Delta S = +Ve$ and –Ve also for some spontaneous process

57. Radioactive disintegration follows first order kinetics

58. Inert pair effect : Stability: $Ge^{+2} < Sn^{+2} < Pb^{+2}$

59. Bond length increases – bond strength decreases

Fe^{3+} Cr^{3+} Ni^{2+} Cu^{2+}

60. $3d^5$ $3d^3$ $3d^8$ $3d^9$

$n=5$ $n=3$ $n=2$ $n=1$

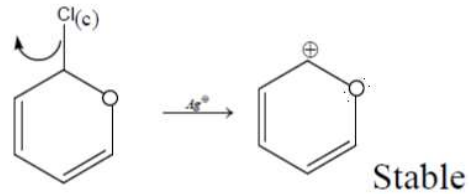
61. A solution with highest 'i' value has lowest F.P $T_f^s \propto \frac{1}{i}$

62. Ka: carboxylic acid > phenol > alcohol

$P^{Ka}: PhCOO < PhOH < C_2H_5OH$

63. $\underset{sp^3}{C}-H \rightarrow -\overset{O}{\overset{\|}{C}}-OH$

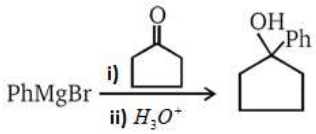
Alpha C – H is required

64. 

65. 1^0 amines only given carbyl amine reaction

66. $$CH_3COCH_3 + CH_3MgBr \rightarrow -\underset{\underset{CH_3}{|}}{\overset{\overset{OMgBr}{|}}{C}} - CH_3 \xrightarrow{H_3O^+} CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{C}} - CH_3$$

67. If Assertion is true but the reason is false

68. 

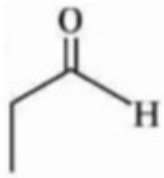
69. If Assertion is true but the reason is false

70. NH_3 - Trigonal pyramidal
BrF_5 - Square pyramid
PCl_5 - Trigonal bipyramidal
CH_4 - Tetrahedral

71. $NO_2, SO_2, Cl_2O_7, Mn_2O_7$ are acidic CaO basic

72. H_2O, – Non linear

73. Only



74. C.C = n =1, unsymmetrical, no.of stereo isomers $= 2^n \quad = 2^1 = 2$

75. a, d- A, b- AA, c - NA