SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

SR MPC	**Jee Main**	**Date: 02-09-20**
Time: 3 hrs	**GT-19**	**Max.Marks:360**

KEY SHEET

MATHS

1	**4**	2	**1**	3	**2**	4	**1**	5	**3**
6	**4**	7	**1**	8	**2**	9	**2**	10	**2**
11	**2**	12	**1**	13	**1**	14	**2**	15	**3**
16	**4**	17	**2**	18	**1**	19	**2**	20	**4**
21	**8**	22	**229.7**	23	**3**	24	**6**	25	**25**

PHYSICS

26	**3**	27	**4**	28	**2**	29	**2**	30	**4**
31	**4**	32	**4**	33	**3**	34	**2**	35	**1**
36	**2**	37	**3**	38	**4**	39	**1**	40	**1**
41	**4**	42	**1**	43	**3**	44	**3**	45	**4**
46	**2450**	47	**7**	48	**8.66**	49	**500**	50	**4**

CHEMISTRY

51	**3**	52	**1**	53	**4**	54	**4**	55	**4**
56	**1**	57	**1**	58	**3**	59	**1**	60	**2**
61	**1**	62	**2**	63	**4**	64	**2**	65	**1**
66	**3**	67	**4**	68	**1**	69	**4**	70	**1**
71	**8**	72	**4**	73	**0.556**	74	**36**	75	**0.8**

SOLUTIONS
MATHS

1. $\left(COS\frac{\pi}{4}+i\sin\frac{\pi}{4}\right)^6+\left(COS\frac{\pi}{4}-i\sin\frac{\pi}{4}\right)^6=0$

   Re Z = 0, I_m Z=0

2. Let $n=1, a_1=e, a_2=e^2, a_3=e^3$

   Given $\det=\begin{vmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 7 & 8 & 9\end{vmatrix}=0$

3. $r=\frac{np}{p+q}$ find k

4. $G.E=\frac{\sin\left(2^{n+1}\theta\right)}{2^{n+1}\sin\theta}$

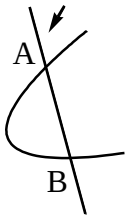
5. $I=\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}}\left[2\sin x\right]dx$

   $I=\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}}\left[-2\sin x\right]dx$

   $2I=\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}}(-1)\,dx=(-1)(\pi)$

   $I=-\frac{\pi}{2}$

6. $S_1 = S_{11}$

   $AB=2\sqrt{5}$

7. $R_2\to R_2-R_1$

   $R_3\to R_3-R_1$

   $f(x)=\begin{vmatrix}1+\sin^2 x & \cos^2 x & 4\sin 2x\\ -1 & 1 & 0\\ -1 & 0 & 1\end{vmatrix}$

   $=\left(1+\sin^2 x\right)(1)+\cos^2 x(1)+4sin2x$

   $= 2 + 4\sin 2x$

   Max of f(x) = 6

8. $\det A = \theta \Rightarrow \theta = n\pi, n\pi + (-1)^n \frac{\pi}{6}$

9. $\frac{\left(f(x)\right)^3}{3} = x^3 + x^2$

$x = 2 \Rightarrow f(2) = \sqrt[3]{36}$

10. For $r > 1$ it is not ellipse & hyperbola

11. $\frac{dy}{dx} = \cos x \left(\frac{dy}{dx}\right)_{(x_1, y_1)} = \cos x_1$

$y - y_1 = \cos x_1 (x - x_1)$

$y_1 = \cos x_1 x_1$

$\cos x_1 = \frac{y_1}{x_1}$

$y_1 = \sin x_1, \; y_1 = \sqrt{1 - \frac{y_1^2}{x_1^2}}$

$x_1^2 y_1^2 = x_1^2 - y_1^2$

12. f(1) = f(3) = 0 $\Rightarrow$ not 1 – 1, f is onto

13. $s = \alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$

$s^1 = 0 \Rightarrow \lambda = 2$

14. The orthocenter of (3, - 2) (- 2, 3) and (- 6, 1) is the 3rd vertex

15. $\frac{\frac{a}{2}}{2\sqrt{2}} = \frac{\frac{b}{\sqrt{6}}}{2\sqrt{2}} = \frac{\frac{c}{\sqrt{3}+1}}{2\sqrt{2}}$

$\frac{a}{\left(\frac{1}{2\sqrt{2}}\right)} = \frac{b}{\left(\frac{\sqrt{3}}{2}\right)} = \frac{c}{\left(\frac{\sqrt{3}+1}{2\sqrt{2}}\right)}$

$\frac{a}{\sin 45^\circ} = \frac{b}{\sin 60^\circ} = \frac{c}{\sin 75^\circ}$

$c = 75^\circ$

16. Write down the truth table

17. $\frac{x-1}{2} = \frac{y-1}{-3} = \frac{z-2}{-1} = t$

(x, y, z) in 3x + 2y + z = 6

18. $\frac{dy}{dx} + \frac{3}{4}\frac{y}{x} = 7$

$f(x) = 4x + C.x^{\frac{3}{4}} = 8$

19. Put x^3 = t & use byparts

20. $\int \frac{y}{\sqrt{1-y^2}} dy = \int dx$

21. $P(x \geq 2) = 1 - \{P(x = 0) + P(x = 1)\} \geq 0.96$

n = 8, 9, 10, ….

Least value of n > 8

22. $\sigma^2 = \frac{\sum x_i^2}{n} - \left(\frac{x_i}{n}\right)^2$

23. Draw the graph and f is non differentiable at 3 points

24. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

25. $3\left(\frac{1}{2}r^2 \sin 120°\right) = 27\sqrt{3}$

Radius = $\sqrt{25+36-C} = \sqrt{36}$

C = 25

PHYSICS

26. Use parallelogram law $R = \sqrt{P^2 + Q^2 + 2PQ\cos\theta}$

27. Heat loss = Heat gain use principle of calormietry

28. $p = i^2R \,\&\, p^1 = \frac{V^2}{R}$

29. $d = \frac{M}{V} \Rightarrow \frac{dp}{d} = \frac{dm}{m} + \frac{dv}{v}$

30. $\frac{25}{100} f_c = 600 \Rightarrow f_c = 2400, \Delta f_c = \Delta f_m$

$\Delta f = (f_c + f_m) - (f_c - f_m)$

31. $T = 2\pi\sqrt{\frac{I}{MB_H}}$

32. $C = \frac{E}{B}$

33. $2A\cos\left(\frac{\theta}{2}\right) = 3.2A\sin\left(\frac{\theta}{2}\right) \Rightarrow \theta = 2\tan^{-1}\left(\frac{1}{3}\right)$

34. $W = \sqrt{A^2 - Y^2} = W^2Y \Rightarrow W^2Y^2 = A^2 - Y^2$

$\Rightarrow W^2\frac{64}{36} \Rightarrow W = \frac{8}{6} = 2\pi n = \frac{8}{6} = n = \frac{2}{3\pi}$

35. $\sqrt{d^2 + 9d^2} - 3d = \lambda \Rightarrow d = \frac{\lambda}{\sqrt{10} - 3}$

36. $\frac{\mu_2}{V} - \frac{\mu_1}{U} = \frac{\mu_2 - \mu_1}{R}$

37. $I = \frac{NE}{At}$

38. $Apply L.C.E - \frac{GM_1M}{r_1} + \frac{1}{2}mv^2 - \frac{GM_2M}{r_2} = 0 \,\&\, r_1 = \frac{M_2 r}{M_1 + M_2} \,\&\, r_1 = \frac{M_1 r}{M_1 + M_2}$

39. All harmonics are present in open pipe

$n(2000) = 20000 \Rightarrow n = 10$, overtones = 9

40. $T = 6mg(2l) - 2mg(2l) = 8mgl \,\&\, I = 6m(4l^2) + 2m(4l^2)$

$I\alpha = 8mgl \Rightarrow \alpha = \frac{8mgl}{I} = \frac{8mgl}{32ml^2} = \frac{g}{4l}$

41. $I_L = \dfrac{40}{20\times10^{-3}} = 2mA \,\&\, I = \dfrac{80-40}{2\times10^{-3}} = 20mA$

$\therefore\ I_2 = I - I_L = 18mA$

42. $w = V_0(q) = \left(\dfrac{KQ}{a} + \dfrac{KQ}{a} + \dfrac{KQ}{a}\right)q = \dfrac{3KQ}{a}$

43. $E = \dfrac{f}{2}nRT = \dfrac{5}{2}nRT = \dfrac{5}{2}PV = \dfrac{5}{2}.P\left(\dfrac{m}{d}\right)$

44. $\dfrac{R_1}{R_2} = \dfrac{R_3}{R_4} \Rightarrow R_4 = 26\Omega$

45. $I = I_{Rod} + I_{H.sphare}$

$I = \dfrac{4M(4R)^2}{12} + 2\left(\dfrac{2}{3}MR^2 + M(2R)^2\right) = \dfrac{44MR^2}{3}$

46. $0.98R = \dfrac{RR_0}{R+R_0} \Rightarrow R_0 = 2450\Omega$

47. S = area of V – t graph

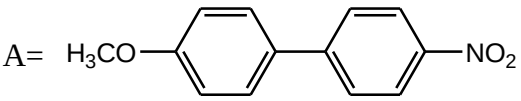
48. $F.l\cos\theta = MB\sin\theta \Rightarrow F = 2MB\tan\theta$

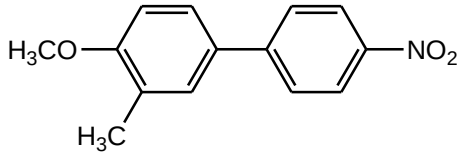
49. $w = pdv = nRdT$

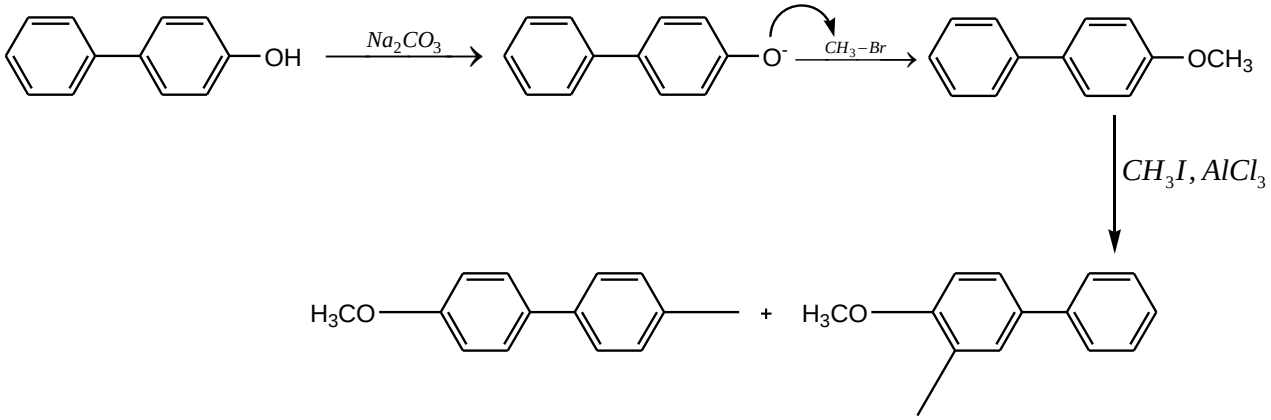
50. $F = E_{axial}(q) = \dfrac{1}{4\pi\lambda_0}.\dfrac{2p}{r^3}.q$

$F^1 = E_{eq}(q) = \dfrac{1}{4\pi\lambda_0}.\dfrac{p}{(r/2)^3}.q$

CHEMISTRY

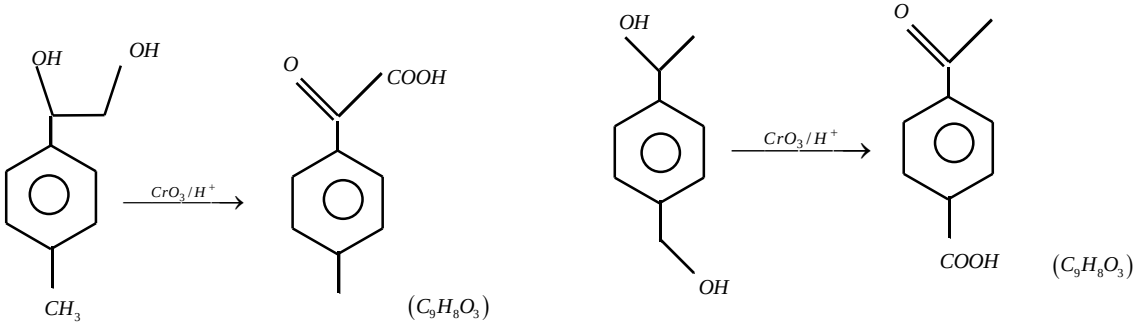
51. A= 

B= 

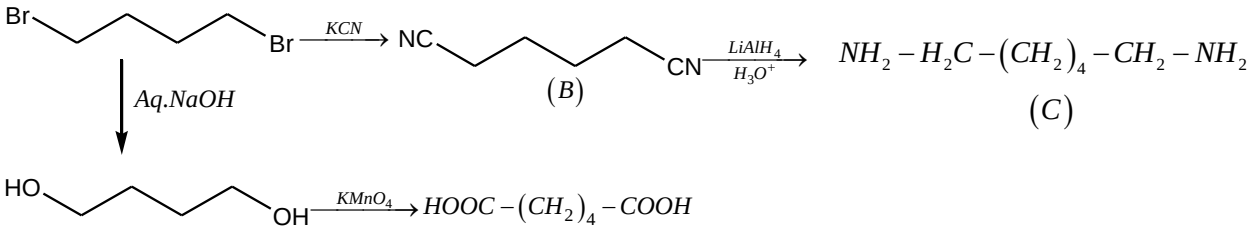
52. 

53. Solution is strong reducing agent due to the solvated electron.

54. Electronic configuration of lawrencium (103) is $[Rn]5f^{14}6d^17s^2$

55. 

56. Molisch is for identification of carbohydrates

57. 

$C+E \xrightarrow{\text{polymerisation}}$ polyamide

58. $OHCH_2CH_2OH$ forms cyclic acetal with keto grap and protect the keto group form the action of CH_3MgBr

59. CN group is preferred over OH group

60. Tollen's reagent does not oxides C=C

61. Neutral $FeCl_3 \Rightarrow$ test for phenol

$I_2/OH^- \Rightarrow$ Iodoform test

$Br_2/KOH \Rightarrow$ Hoffman bromamide degradation

ceric ammonium nitrate $\Rightarrow$ alcohol test.

62. $H_2+F_2 \rightarrow 2HF$

63. $A \rightarrow ccp(or)\ fcc \rightarrow 4A \rightarrow A_4B_3$

$B \rightarrow \frac{3}{4}\times 4 \rightarrow 3B$

64. A, B, D are correct

65. $\Delta S = (+)ve,\ for \Rightarrow 1$

$\Delta S = (-)ve,\ for \Rightarrow 2,3,4 \because (n_g)_{\text{products}} < (n_g)_{\text{Reactants}}$

66. $K_2Cr_2O_7+7H_2SO_4+6FeSO_4 \rightarrow 1K_2SO_4+1Cr_2(SO_4)_3+3Fe_2(SO_4)_3+7H_2O$

6 moles of e^- for 3 moles of $Fe_2(SO_4)_3$

67. $NH_4COONH_{2(s)} \rightleftharpoons 2NH_{3(g)}+CO_{2(g)}$

	2P	P
At eq.	0. 6	0.3

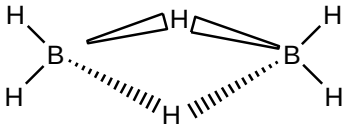
$$K_p = \frac{P_{NH_3}^2 . P_{CO_2}^1}{1} = \frac{(0.6)^2(0.3)^1}{1} = 0.108\,atm^3$$

68. $$\frac{\Delta T_f}{\Delta T_b} = \frac{i\times K_f \times 3}{i\times K_b \times 2}$$

$\Rightarrow \quad K_f = \frac{2}{3} \times K_b$

69. $\frac{d[C]}{dt} = \left[3K_1[A][B]^2 - 3K_2[C]^3\right]$

70. Blood and Arsenic sulphide are negatively charged sols

71. 

$2(B) + 4(H_t) = 6\,\text{planor}$

$2(H_b) = 2\,\text{bridge atoms}$

72. $\left[Fe(H_2O)_6\right]^{+2}; t_{2g}^4 eg^2; n = 4$

$\left[Fe(CN)_6\right]^{-4}; t_{2g}^6 eg^0; n = 0$

73. $w = -P_{ert}(V_2 - V_1) = -6(10-15) = +30\,Joul$

For isothermal process, $\Delta u = 0$, so,

Q = - w = - 30 Joul

$Q = n \times C_v \times \Delta T$

$30 = 3 \times 18 \times \Delta T$

$\Delta T = \left(\frac{30}{3\times 18}\right) = \left(\frac{5}{9}\right) Kelvin$

74. $M = \left[\frac{W}{GMW} \times \frac{1000}{V(mL)}\right]$

$0.04 = \left[\frac{W}{180} \times \frac{1000}{5\times 1000}\right]$

W = 0.04 × 180 × 5 = 36 gm

75. $Anode: H_{2(g)} \rightarrow 2H^+_{(aq)} + 2e^-$

Cathode : $2AgX_{(s)} + 2e^- \rightarrow 2Ag(s) + 2X^-_{(aq)}$

$H_2 + 2AgX_{(s)} \rightarrow 2H^+_{(aq)} + 2Ag(s) + 2X^-_{(aq)}$

$E_{cell} = E^0_{cell} - \frac{0.06}{2}\log_{10}\left|H^+\right|^2\left|X^-\right|^2$

$= 0.2 - \frac{0.06}{2}\log_{10} - 20$

= 0.2 – 0.03 × (- 20)

= 0.2 + 0.6 = 0.8 V