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NEET

Practice Test-3

Solution

Physics

1. (a) α has dimension T^{-2}, β has T^{-1} and γ dimension less.

2. (d) $s = \frac{1}{2} a_1 t_1^2 = \frac{1}{2} a_2 (t_1 + t)^2$

$\Rightarrow \sqrt{a_1}\, t_1 = \sqrt{a_2}\,(t_1 + t)$ ----- (1)

$v_1 = a_1 t_1$

$v_1 - v = a_2 (t_1 + t)$

Subtracting $v = a_1 t_1 - a_2 (t_1 + t) ---(2)$

eliminating t_1

$v = \sqrt{a_1 a_2}\, t.$

3. (b) $a = \frac{P}{mv} \Rightarrow \frac{dv}{dt} = \frac{P}{mv} \Rightarrow \frac{dv}{dx}\frac{dx}{dt} = \frac{P}{mv}$

$\Rightarrow$

$$\frac{dv}{dx}.v = \frac{P}{mv} \Rightarrow v^2 dv = \frac{P}{m} dx \Rightarrow \int_{v_1}^{v_2} v^2 dv = \frac{P}{m}\int_0^{x_0} dx$$

$$\Rightarrow \frac{v_2^3 - v_1^3}{3} = \frac{p}{m} x_0$$

4. d $\tan\alpha = \frac{v_y}{v_x} = \frac{v\sin\theta - gt}{v\cos\theta}$ $\alpha = \tan^{-1}\left(\frac{v\sin\theta - gt}{v\cos\theta}\right)$

5. (a) $F \geq f_1 + f_2$

$F_{min} = \mu_1 m_1 g + \mu_2 (m_1 + m_2) g$

$= 0.25 \times 200 \times 10 + 0.2 \times 500 \times 10$

$= 1500$ N.

6. (d) $w = \frac{1}{2} k x^2 = \frac{1}{2}\frac{(kx)^2}{k}$

as $k_1 > k_2$ so more work is done in second spring.

7. (c) $a_c = k^2 r t^2$

$\frac{v^2}{r} = k^2 r t^2$

$v^2 = k^2 r^2 t^2$

$v = krt$

Power = F v

$= mav = m\frac{dv}{dt}.v$

$= mk^2 r^2 t$.

8. (a) $e = \frac{v}{u} \Rightarrow v = eu$ [coefficient of restitution]

$v'^2 = v^2 - 2gH \Rightarrow \frac{v^2}{2g} = \frac{e^2 n^2}{2g} = e^2 h = H$

Total distance

$= h + 2e^2 h + 2e^4 h + ...$

$= h\left[1 + 2e^2 + 2e^4 + ...\right]$

$= h\left[1 + \frac{2.e^2}{1 - e^2}\right] = h\left[\frac{1 + e^2}{1 - e^2}\right]$

9. (c) $F = 9 - x^2 \Rightarrow \frac{mdv}{dt} = 9 - x^2$

$\Rightarrow \frac{mdv}{dx}\frac{dx}{dt} = 9 - x^2 \Rightarrow \int mv dv = \int (9 - x^2)\, dx$

$\frac{mv^2}{2} = 9x - \frac{x^3}{3} + c$, obviously kinetic energy is maximum for x = 3 m. when $9 - x^2 = 0$

Thus, $K.E_{max} = 9 \times 3 - \frac{3^3}{3} = 27 - 9 = 18$ J

10. (c) $m_1 > m_2$

$m_1 g - T = m_1 a$

$T - m_2 g = m_2 a$

$a = \frac{(m_1 - m_2)g}{m_1 + m_2}$

$a_c = \frac{m_1 a_1 + m_2 a_2}{m_1 + m_2}$ =

$\left(\frac{m_1 - m_2}{m_1 + m_2}\right).a = \left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2 g$

11. (b) The body will move down so friction will be in upward direction.

$mg \sin\theta - \mu mg \cos\theta = ma$

$mg \sin\theta - f = ma$

$\tau = fr$

Rolling is without slipping

$a = r\alpha = r\frac{\tau}{I} = \frac{r.fr}{\frac{1}{2}mr^2} = \frac{2f}{m}$

$\Rightarrow mg\sin\theta - f = 2f$ $\qquad f = \frac{mg\sin\theta}{3} = mg/6$

12. (d) $\left(\frac{\omega_0}{2}\right)^2 = \omega_0^2 - 2\alpha n.2\pi \qquad \alpha = \frac{3}{4}.\frac{\omega_0^2}{2n.2\pi}$

$0 = \omega_0^2 - 2\alpha.\theta \Rightarrow \theta = \frac{\omega_0^2}{2\alpha} = \frac{\omega_0^2}{2.\frac{3}{4}\frac{\omega_0^2}{2n.2\pi}} = \frac{8n\pi}{3}$

No of rotation = $\frac{\frac{8n\pi}{3} - 2\pi n}{2\pi} = \frac{n}{3}$

13. (b) As there is no external torque total angular momentum and total energy is conserved.

14. (b) $V = \frac{-Gm}{r}(0 < r < R) \qquad V = -\frac{Gm}{R}(R \le r)$

15. (c) $Y = \frac{\text{stress}}{\text{strain}} = \frac{\text{stress}}{\alpha\Delta\theta} \qquad \frac{Y_1}{Y_2} = \frac{\alpha_2}{\alpha_1} = \frac{3}{2}$

16. (d) $\theta = \tan^{-1}\frac{a}{g}$

$p_1 - p_2 = ma$

$\rho g\ h_1 - \rho g h_2 = ma$

$\Rightarrow h_1 > h_2 \Rightarrow$ d is correct option as water will put some pressure at right end also.

17. (b) $\frac{d\theta}{dt} \alpha (\theta - \theta_0)$

$\theta_0 =$ average temperature

$\theta_{0_1}, = \frac{75+70}{2}, \theta_{0_2} = \frac{70+65}{2}, \theta_{03} = \frac{65+60}{2}$

$\theta_{01} > \theta_{02} > \theta_{03}$ thus temperature difference will be in reverse order thus time of cooling order is $T_1 < T_2 < T_3$

18. (b) steepness for curve 1 is less than 2. Thus υ for l is less than 2. Thus option (b) is correct.

19. (d) $pv^{1/2} = \text{constant} \Rightarrow \frac{T}{v}.v^{1/2} = k \Rightarrow \frac{T}{\sqrt{v}} = k$

$\Rightarrow \frac{T}{\sqrt{v}} = \frac{T^1}{\sqrt{2v}} \Rightarrow T^1 = \sqrt{2}\ T$

20. (b) $v_{rms} = \sqrt{\frac{3P}{\rho}}$

$v_{rms}\ \alpha\sqrt{p}$, keeping volume or ρ constant.

21. (d) Total K.E. = $\frac{\Sigma nf}{2}RT$

$= n_1\frac{f_1}{2}RT + n_2\frac{f_2}{2}RT$ [f_1 is degree of freedom

of oxygen and f_2 is of argon]

$= 2\times\frac{5}{2}RT + 4\times\frac{3}{2}RT$

= 11 RT

22. (a) x = A sin wt

When x = $\frac{A}{2}$

$\frac{1}{2} = \sin\omega t \Rightarrow \omega t = \frac{\pi}{6} \Rightarrow T_1 = \frac{\pi}{6\omega}$

When x = A

$\sin\omega t = 1 \Rightarrow T_2 = \frac{\pi}{2\omega} \Rightarrow T_2 > T_1$

23. (c) KA – f = ma (for Q)

f = ma (for P)

$\Rightarrow$ KA - f = f

$\Rightarrow f = \frac{KA}{2}$

24. (b) particle velocity = $\frac{dy}{dt}/_{x=0} = y_0 2\pi f$

Wave velocity = $\frac{2\pi f}{\frac{2\pi}{\lambda}} = \lambda f$

$\therefore\ y_0 2\pi f = 4\lambda f \Rightarrow \lambda = \frac{y_0\pi}{2}$

25. (a) as $v = \frac{s}{t}, s = vt$

So after 2 second both pulses will cancel their amplitude and node will be formed. Thus energy will be kinetic only.

26. (a) $E = -\frac{\partial v}{\partial r} = -8x$

At point $(1m, 2m)\ \vec{E} = -8\hat{i}$

27. (b) $q = q_0\ e^{-t/RC}$

$I = \frac{q_0}{RC}e^{-t/RC} = \frac{\varepsilon}{R}e^{-t/RC}$

$\log I = \log\frac{\varepsilon}{R} - \frac{t}{RC}$

As graph is starting from same point R is constant. Since graph 2 is more bend thus slope value decreased thus C increased.

28. (b) As electric field will exert force in direction across plates, thus momentum or velocity along the plate will be same throughout motion of the particle.

Thus, $v_1\cos\alpha = v_2\cos\beta$

$\frac{\frac{1}{2}mv_1^2}{\frac{1}{2}mv_2^2} = \left(\frac{\cos\beta}{\cos\alpha}\right)^2$

29. (c) $v_A - v_B = v_B - v_C$

$\Rightarrow \frac{q}{4\pi\in 0r_1} - \frac{q}{4\pi\in 0r_2} = \frac{q}{4\pi\in 0r_2} - \frac{q}{4\pi\in 0r_3}$

(Assuming surfaces are metallic)

$\Rightarrow \frac{r_2 - r_1}{r_1 r_2} = \frac{r_3 - r_2}{r_3 r_2}$

as $r_3 r_2 > r_1 r_2\ t_2 > t_1$

30. (c) Appling condition of balanced wheat stone bridge

$\frac{R_1}{R_3}=\frac{R_2}{R_4}$

$\Rightarrow R_1R_4=R_2R_3$

31. (c) For steady current

Av = constant

$A_Q > A_p$ so $v_p > v_Q$.

32. (a) For Galvanometer $I=\frac{v}{R+G}=\frac{12}{R+2}$,

$0.1=\frac{12}{R+2}\Rightarrow R=118\,\Omega.$

33. (a) Due to magnetic field torque will be applied on both coils in same plane.

34. (d) using Biot - Savart law

B = B_1+B_2 [direction into plane]

$=\frac{\mu_0 I}{2\pi r}\left(\sqrt{2}+1\right)$

35. (a) $\phi=LI$

$[L]=\left[\frac{\phi}{I}\right]=\left[\frac{BA}{I}\right]$ = $ML^2T^{-2}A^{-2}$

36. (a) initially inductor will become short circuit.

So, $i_1=\frac{\varepsilon}{R_1+R_2}, i_2=\frac{\frac{\varepsilon}{R_1R_2}}{R_1+R_2}$, $i_3=\frac{\varepsilon}{R_2}$

$\Rightarrow i_2 > i_3 > i_1$

37. (a) $\frac{\mu_2}{v}-\frac{\mu_1}{u}=\frac{\mu_2-\mu_1}{R}$

$v=\frac{\mu_2}{\frac{\mu_1}{u}+\frac{\mu_2-\mu_1}{R}}=\frac{4/3}{\frac{3/2}{-30}+\frac{4/3-3/2}{-100}}=-27.6\,cm$

So image is in first medium.

38. (c)

Condition of total internal refraction occurs at second refraction.

So for first refraction

$\frac{\sin 45}{\sin r}=\mu$ --------(1)

$\frac{\sin(90-r)}{1}=\frac{1}{\mu}$ -------(2)

$\frac{1}{\sqrt{2}.\sin r}=\frac{1}{\cos r}$

$\Rightarrow \tan r = \frac{1}{\sqrt{2}}$

$\Rightarrow \sin r =$

$\frac{1}{5}\Rightarrow$ from (1) $\frac{1}{\sqrt{2}.\frac{1}{\sqrt{5}}}=\mu\Rightarrow\mu=\sqrt{5/2}$

39. (a) $n\alpha\frac{1}{r^2}$ as $r_1=0.5m$, $r_2=1m$,

$\frac{n_1}{n_2}=\frac{r_2^2}{r_1^2}=4$

40. (c) $\lambda=\frac{1}{T}$ so mean life = t = $\frac{1}{\lambda}$

N = $N0e^{-\lambda t}$

= $N0e^{-1}=\frac{N0}{e}=0.37N0$

So percentage decay = $\frac{-N+N_0}{N_0}\times100$

$\frac{-\frac{N_0}{e}+N_0}{N_0}\times100$

= 63%

41. (c) $\lambda_{min}=\frac{hc}{ev}$

$\Delta\lambda=\frac{hc}{ev}$

$\Delta\lambda=\frac{hc}{e\frac{v}{3}}=3\Delta\lambda$

42. (c) $\overline{(\vec{A}+\vec{B})}=AB\Rightarrow$AND gate

43. (c) $E\alpha\frac{1}{n^2}$

$E=h\upsilon$

$\Rightarrow \upsilon\propto\frac{1}{n^2}$

44. (a) Light rays goes away after refraction through air bubble inside water so it behaves as concave lense.

45. (c) Amplitude will be halved

$I\alpha A^2$

$I=\frac{K.A^2}{4}=\frac{I_0}{4}$.

Chemistry

46. Higher periorty group attached opposite to double bonds. So both are E.
So option (d) is correct

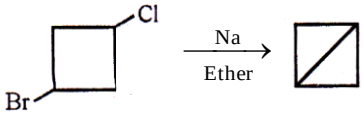
47. Let suppose that change in temperature is ΔT on supplying 280 J of heat

$P\Delta V = nR\Delta T$

$\Delta U = nC_V\Delta T$

So, $\frac{\text{Work done}}{\text{Change in internal energy}} = \frac{R}{C_V} = \frac{2}{5}$ $\left[C_V = \frac{5}{2}R \text{ for diatomic gas}\right]$

So correct answer is (b).

48. 

So option (d) is correct.

49. $pH = -\log[H^+]$

So option (b) is correct.

50. All of them will show geometrical isomerism
So correct option is (d)

51. Rate = k' [X] [C]

X = k_{eq} [A] [B]

So, Rate = k [A] [B] [C]

52. Reactivity $\propto \left(\frac{1}{\text{Steric hindrance}}\right)$

So correct option is (a)

53. $-\frac{\Delta[N_2]}{\Delta t} = -\frac{1}{3}\frac{\Delta[H_2]}{\Delta t} = \frac{1}{2}\frac{\Delta[NH_3]}{\Delta t}$

So option (b) is correct

54. CN^- first attack at carbon atom of carbonyl group, so it is a nucleophilic addition reaction
So correct option is (b)

55. $Fe^{3+} + 3e^- \longrightarrow Fe;\ E_1 = -0.036$ volt ….. (i)

$Fe^{2+} + 2e^- \longrightarrow Fe; E_2 = -0.44$ V ……(ii)

$Fe^{3+} + 3e^- \longrightarrow Fe^{2+};\ E_3 = ?$ …..(iii)

(i) – (ii) = (iii)

So, $\Delta G_1 - \Delta G_2 = \Delta G_3 \quad \Rightarrow \quad -n_1E_1 + n_2E_2 = -n_3E_3$

$3 \times 0.036 - 2 \times 0.44 = 1 \times E_3$

$E_3 = 0.88 - 0.108$

= 0.772 V

So option (d) is correct

56. 

In Lone pair of Nitrogen are delocalized in entire ring and form an aromatic compound. So it will be least basic because on donating electrons (lone pair) ring will lose its aromaticity.
So correct option is (d)

57. $C_6H_5 - CH_2Br + Mg \xrightarrow{\text{Ether}} C_6H_5 - \overset{\bullet\bullet}{C}H_2\,\overset{+}{M}gBr \xrightarrow{CH_3CHO} C_6H_5 - CH_2 - \underset{\displaystyle -O-\overset{+}{M}gBr}{\overset{|}{C}} - CH_3$

$\xrightarrow{H_3O^+} MgBr(OH) + C_6H_5 - CH_2 - \underset{\displaystyle OH}{\overset{|}{C}} - CH_3$

So option (b) is correct

58. (i) In $CH_3-CH_2-\overset{+}{C}H_2$ is more stable than $CH_2=CH-CH_2-\overset{+}{C}H_2$ because of hyperconjugation.

(ii) In $CH_3-NH-\overset{+}{C}H_2$ and $\overset{+}{C}H_2-OH$, $CH_3-NH-\overset{+}{C}H_2$ is more stable because resonating structure of this is more stable

(iii) $CH_3-O-\vec{C}H_2$ is more stable because of resonance.

(iv) $CH_3-\overset{+}{C}H-C_3H_7$ is more stable because of hyperconjugating structures.

So correct option is (b)

59. $$CH\equiv CH \xrightarrow[HgSO_4]{30\%\,H_2SO_4} \underset{\text{(Hydration)}}{H_3C-\overset{O}{\overset{\|}{C}}-H} \xrightarrow[10^oC]{\text{dil NaOH}} \underset{\text{(Aldol Reaction)}}{CH_3-\underset{OH}{\underset{|}{C}}H-CH_2-CHO}$$

So option (d) is correct

60. On ozonolysis of benzene

$H-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-H$ formed

So correct answer is (a)

61. Option (a) is correct

62. Ammonical $AgNO_3$ will give positive test with terminal alkynes.

So correct option is (d)

63. Option (b) is correct.

64. Lindlor's catalyst yields cis-alkene on hydrogenation of alkyne.

So correct option is (b)

65. Co-ordination number is FCC is 12

So (d) is correct option.

66. Lone pair – Lone pair repulsion is stronger than lone pair – bond pair, and lone pair – bond pair is stronger than bond pair – bond pair

So correct answer is (b)

67. Option (b) is correct

68. I_3^-, central atom contain 3 lone pair and 2 bond pair

So correct answer is (a)

69. More electronegative central atom stronger will be acid.

70. Option (b) is correct

71. Deacon process

$$4HCl + O_2 \xrightarrow{CuCl_2} 2Cl_2 + 2H_2O$$

Option (b) is correct

72. Cobalt have co-ordination 6, so $[Co(NH_3)_5Cl]Cl_2$ so total number of ion on ionization will be 3.

Option (c) is correct

73. $\Delta H = E_{a_f} - E_{a_b}$

$= 19 - 9 = 10$ Kcal

So option (c) is correct

74. Complexes differ in number of unpaired electrons

So, option (c) is correct

75. For molecular orbital theory

Option (b) is correct

76. Energy of mono electronic species = $-2.18\times10^{-19}\times\dfrac{Z^2}{n^2}$ So correct option is (c)

77. Option (b) is correct because of inert pair effect

78. $Z=\dfrac{V\text{real}}{V\text{ideal}}$, so if $Z<1$ then $V_{real} < V_{ideal}$

So option (b) is correct

79. option (d) is correct

80. Relative lowering in vapour pressure = Mole fraction of solute

So, $\frac{\Delta P}{P^o} = x_B$

$$\frac{3000-2985}{3000} = \frac{5\times 18}{M_B \times 100}$$

$$M_B = \frac{5\times 18\times 30}{15} = 180$$

So correct option is (c)

81. On the basis of stability of carbocation generated on removal of Cl^-

Option (b) is correct

82. Equal number cation & anion are missing

So it is schottky effect

So correct option is (b)

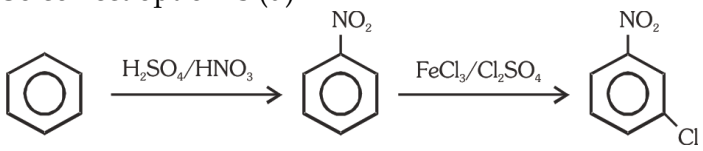
83.

$$CH_3-CH_2-CH(I)CH_3 \xrightarrow[H_2O]{KOH} CH_3CH_2CH(OH)CH_3 \xrightarrow{Al_2O_3} CH_3-C=C-CH_3 \xrightarrow{[O]} 2CH_3COOH$$

So option (a) is correct

84. $\frac{[B]}{[C]} = \frac{K_1}{K_2}$, So by putting value of K_1 & K_2 [B] = 76.83% [C] = 23.17%

So correct option is (d)

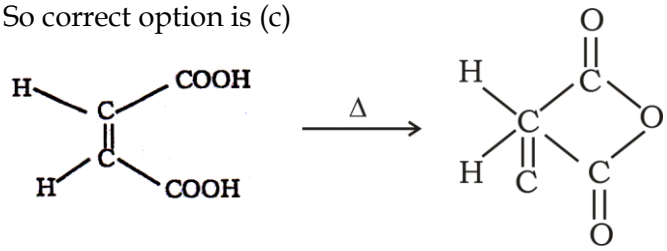
85. 

So option (c) is correct

86. $\Lambda^o_{CH_3COOH} = \Lambda^o_{CH_3COONa} + \Lambda^o_{HCl} - \Lambda^o_{NaCl}$

= 91 + 426.2 – 126.5 = 390.7

So correct option is (c)

87. 

Will decolorize bromine water and also form 5-membered ring cyclic anhydride.

So option (c) is correct

88. 2.63 g of CO_2 contain 0.717 g of carbon

1.28 g of H_2O contain 0.141 g of hydrogen

So calculating empirical formula

89. (a) satisfy octet rule

90. +M effect of $-NH_2$ increase reactivity. And $-M$ effect of $-NO_2$ decreases reactivity than benzene

So option (a) is correct

Biology

91.	b	106.	b	121.	a	136.	b	152.	c	168.	a
92.	c	107.	d	122.	a	137.	c	153.	b	169.	d
93.	b	108.	b	123.	c	138.	a	154.	c	170.	c
94.	c	109.	Bonus	124.	d	139.	c	155.	c	171.	b
95.	a	110.	c	125.	d	140.	Bonus	156.	d	172.	d
96.	c	111.	a	126.	d	141.	d	157.	d	173.	b
97.	d	112.	c	127.	b	142.	a	158.	d	174.	d
98.	d	113.	b	128.	b	143.	a	159.	d	175.	c
99.	b	114.	c	129.	d	144.	b	160.	b	176.	c
100.	d	115.	a	130.	d	145.	c	161.	d	177.	a
101.	d	116.	d	131.	a	146.	b	162.	c	178.	d
102.	d	117.	b	132.	b	147.	d	163.	d	179.	d
103.	c	118.	d	133.	d	148.	d	164.	b	180.	b
104.	d	119.	b	134.	d	149.	d	165.	c		
105.	c	120.	d	135.	c	150.	c	166.	d		
						151.	c	167.	d		

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