SOLUTION

FINAL TEST SERIES NEET XI (TYM) TEST-01 Date :19-01-2020

[PHYSICS]

1. (D) velocity of light in vacuum $c = \dfrac{1}{\sqrt{\mu_0 \varepsilon_0}} = \dfrac{E_0}{B_0}$

velocity of light in medium $v = \dfrac{1}{\sqrt{\mu\varepsilon}} = \dfrac{E}{B}$

2. (C) All except longitudinal strain are having dimensional formula

$$E = \frac{MLT^{-2}}{L^2} = \left[ML^{-1}T^{-2}\right]$$

Dimensional formula of strain $= [M^0L^0T^0]$

3. (D) Significant figures do not change while converting from one system of unit into another so it will remain same

4. (A) $1J = [ML^2T^{-2}]$

$$= \frac{kg\,m^2}{s^2}$$

1J = Force × displacement

= m × acceleration × displacement

$= m \times (a)^2\, t^2$

$= 1\,kg\,(10)^2 \times (60)^2$

$= 10^2 \times 36 \times 10^2$

$= 3.6 \times 10^5$

5. (A) $F = P^aV^bT^c$

$F = K\,[P^a]\,[V^b]\,[T^c]$

$$[MLT^{-2}] = \left[\frac{F}{A}\right]^a \left[LT^{-1}\right]^b [T]^c$$

$$= \left[\frac{MLT^{-2}}{L^2}\right]^a \left[L^bT^{-b+c}\right]$$

$$= \left[M^aL^{-a}T^{-2a}\right]\left[L^bT^{-b+c}\right]$$

$$\left[M^aL^{-a+b}T^{-2a-b+c}\right]$$

by comparing LHS & RHS

$a = 1$

$-a + b = 1, \quad b = 2$

$-2a - b + c = -2$

$-2 - 2 + c = -2$

$c = 2$

$F = PV^2T^2$

Alternative Solution

$$P = \frac{F}{A}$$

Units of A : m^2, V : m/s

$F = PA$

$= P(VT)^2 \qquad VT : m$

$F = PV^2T^2$

6. (B) $y = ab$

By simple definition of

Percentage error

$$\frac{\Delta Y}{Y} \times 100 = \frac{\Delta a}{a} \times 100 + \frac{\Delta b}{a} \times 100$$

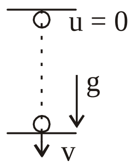
7. (B) As per the definition

8. B

9. (A) As per the formula $V_{av} = \dfrac{\int v\,dt}{\int dt} = \dfrac{g}{2}$

$$\int_0^T gt\,dt = \frac{g}{2}\int_0^T dt$$

$$g\frac{T^2}{2} = \frac{g}{2}T$$



$T^2 - T = 0$

$T = 1, T = 0$

Consider $T = 1$

$\because v = u + at$

$-v = 0 - gT$

$v = g(1) = g$

10. (D) Velocity keeps decreasing with uniform rate and then its magnitude starts increasing with same rate

[uniform retardation could also be the answer]

Here (d) is correct answer.

11. (A) $V_{b\to g} = 3i + 4j$

$V_{r\to e} = -3i - 4j$

$V_{b\to r} = V_b - V_r$

$= V_{b-g} - V_{r-g}$

$= 3i + 4j - (-3i - 4j)$

$= 6i + 8j$

12. (B) $t = \frac{u}{q}$ = time of ascent

$\frac{u}{g} = 2$

$u = 2g = 2 \times 9.8$ m/s

= 19.6 m/s

13. (B) $y = Ax - bx^2$

$R = \frac{\text{coefficient of } x}{\text{coefficient of } (-x^2)} = \frac{A}{B}$

or

$y = x \tan\phi\left(1 - \frac{x}{R}\right)$

$y = Ax\left(1 - \frac{x}{A/B}\right)$

comparing above equations R = A/B

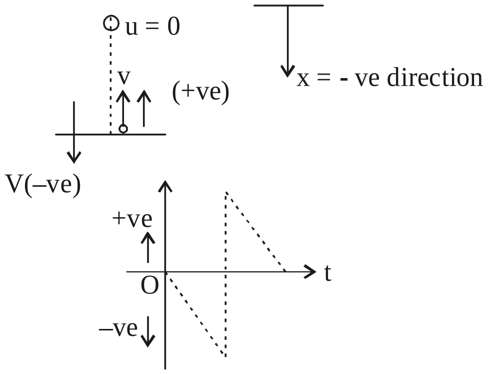
14. (A) R = 4H tan θ

(R = range, H = Maximum height)

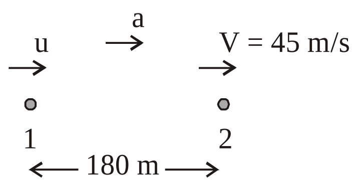
$R = \frac{u^2}{q} = \frac{20 \times 20}{10}$

R = 40 m

15. (D)



16. (B)



V = u + at

45 = u + 6a .....(1)

s = ut + 1/2at²

$180 = u(6) + \frac{1}{2}a(6)^2$

180 = 6u + 18 a

60 = 2u + 6a .....(2)

45 = u + 6a

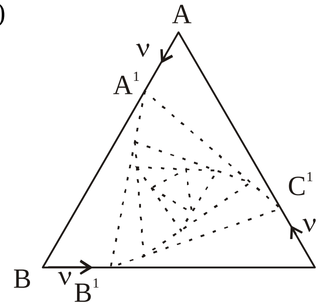
15 = u

17. (B) Time of ascent = time of descent

(in case of no air resistance)

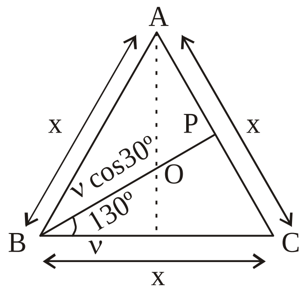
t = 10 s

18. (A)



The motion of all three persons will be as above. They will always be at the vertices of an equilateral triangle and finally meet at centroid.

The above problem can be solved by assuming that a person has to reach at centroid

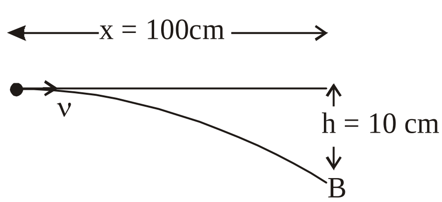


$BP = x\cos 30^\circ = x\frac{\sqrt{3}}{2}$

$BO = \frac{2}{3}BP = \frac{2}{3}\left(x\frac{\sqrt{3}}{2}\right) = \frac{x}{\sqrt{3}}$

$t_{BO} = \frac{BO}{\nu\cos 30^\circ} = \frac{x/\sqrt{3}}{\nu\frac{\sqrt{3}}{2}} = \frac{2x}{3\nu}$

19. (B)



$h = \frac{1}{2}gt^2$ $x = \nu t$

$= \frac{1}{2}g\left(\frac{x}{\nu}\right)^2$ $t = \frac{x}{\nu}$

$\frac{10}{100} = \frac{1}{2} \times 19.8 \times \frac{1}{\nu^2}$

$v^2 = 4.9 \times 10$

v = 7 m/s = 700 cm/s

20. (C) Check option (c)

$$R_{max} = 2H + \frac{R^2}{8H} = \frac{2u^2 \sin\theta}{2g} + \frac{u^4 \sin^2 2\theta . 2g}{g^2 8u^2 \sin^2\theta}$$

$$= \frac{u^2 \sin^2\theta}{g} + \frac{u^4 4 \sin^2\theta \cos^2\theta\ 2g}{g^2 8u^2 \sin^2\theta}$$

$$= \frac{u^2 \sin^2\theta}{g} + \frac{u^2 \cos^2\theta}{g} \quad = \frac{u^2}{g}$$

Maximum range is obtained at 45º

∴ Option (c) correct

21. (D) $AB\cos\theta = \frac{\sqrt{3}}{2}AB$

$\cos\theta = \frac{\sqrt{3}}{2}$ ∴ $\phi = \frac{\pi}{6}$ rad

22. (A) For the physical quantitiy to be a vector it must obey the law of vector addition hence reason is correct explanation of assertion.

23. (B) $\overrightarrow{PQ} = (5\hat{i} - 2\hat{j} + 4\hat{k}) - (\hat{i} + 3\hat{j} - 7\hat{k})$

$= 4\hat{i} - 5\hat{j} + 11\hat{k}$

$|\overrightarrow{PQ}| = \sqrt{4^2 + 5^2 + 11^2} = \sqrt{162}$

24. (D) Since the point of application of force does not moves hence work done is zero.

25. (B) Velocity will interchange.

Change in momentum of the particle at rest initially is mu

$\Delta P = P_{final} - P_{initial} = mu - o = mu$

ΔP = Impulse

$mu = \frac{1}{2}TF_0$

$F_0 = \frac{2mu}{T}$

26. (B) $F = N\frac{\Delta P}{\Delta t} = N\frac{mv}{\Delta t}$ $\left[\frac{N}{\Delta t} = 200\right]$

$= 200 \times 0.03 \times 30$ = 180 Newton

27. (D) $a = \frac{mg}{m+m} = \frac{g}{2} = 5 m/s^2$ $(\because m = 1kg)$

For the hanging mass

$1a = 1g - T$

T = 5 Newton

28. (B) To lift block up T = Mg

For boy $ma = T - mg$

$ma = Mg - mg$

$a = \left(\frac{M}{m} - 1\right)g$

29. (B) $I = \int_0^4 (10 + 2t)dt = 10t + t^2 \Big|_0^4 = 56$ Ns

30. (B) Action & reaction forces are always equal and opposite. Therefore the reaction force should also be gravitational

31. (A) $\vec{P} = m\vec{V}$

∴ Momentum is always along its velocity

32. (B) Option (b)

(A) Electrons revolving in orbit posses both KE and P.E

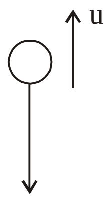
(B) Bent Bow has elastic P.E. stored in it.

(C) Flowing water has K.E.

(D) Freely suspended massless spring has no extension hence has no energy.

33. (A) F = resistive force

$H = \frac{u^2}{2g_{eff}}$



$H_x = \frac{u^2}{2\left(g + \frac{F}{m_x}\right)}$ $H_y = \frac{u^2}{2\left(g + \frac{F}{m_y}\right)}$

$H_x > H_y$

34. (C) When the man jumps he exerts force on the platform over and above his own weight

35. (C) (A) Apparent weight = m(g + a)

True weight = mg

(B) Apparent weight = m(g – a)

(C) Apparent weight = True weight

(d) Apparent weight = m(g – g) = 0

36. (C) Retardation remains same

$v - u^2 = 2as$

$0 - 10^2 = 2 \times a \times 5$

$0 - 20^2 = 2aS$

Dividing both equations

S = 20 m

37. (D) $P = \frac{mgh}{\Delta t} = \frac{1200 \times 200}{4 \times 60} = 1000W$

38. (A) $Ma_0 = F - Kx$

$ma = Kx$

$Ma_0 = F - ma$

$a_0 = \frac{F - ma}{M}$

39. (A) $\frac{80}{100}mgh_1 = mgh_2$

$\frac{4}{5} \times 100 = h_2$

$h_2 = 80\,m$

40. (B) W.d = ΔKE

$$\vec{F}.\vec{S} = \frac{1}{2}mv^2 - \frac{1}{2}mu^2$$

$$8 + 3 - 10 = \frac{1}{2}2V^2$$

V = 1m/s

41. (C) At highest point the kinetic energy is zero hence total energy is only potential

42. (D) $\frac{du}{dx} = -F$

It represents force that is weight. The given quantity should have limit of force.

43. (C) $U = \frac{1}{2}Kx^2$

$$2 = \frac{1}{2}K(4\times10^{-2})^2$$

K = 2500N / m

$F = Kx = 2500 \times 8 \times 10^{-2} = 200\,N$

44. (A) $P = \vec{F}.\vec{V}$

= 50 + 30 + 120 = 200 W

45. (C) $V = \sqrt{KS}$

$$\int \frac{ds}{\sqrt{s}} = \int \sqrt{K}dt$$

$$2\sqrt{s} = \sqrt{K}t$$

$$s = \frac{kt^2}{4} \Rightarrow v = \frac{Kt}{2}$$

W = ΔKE

$$= \frac{1}{2}mv^2 - \frac{1}{2}mu^2$$

$$= \frac{mK^2t^2}{8}$$

[CHEMISTRY]

46. (B)

$$I_2 + Na_2S_2O_3 \longrightarrow 2NaI + Na_2S_4O_6$$

0.5 0 $\rightarrow$ –I

No. of e^- gained 2 × 1

= 2

$$Eq.wt = \frac{mol.wt}{n.factor}$$

n-factor $\rightarrow$ change in oxidation state

So. eq. wt of Iodine is $= \frac{M.W.}{2}$

47. (B) Atomic wt. of metal =

$$\frac{\text{no. of atom of oxygen} \times 16}{\text{no. of atom of oxygen atom} \times 16 + \text{no.of atom of metal} \times \text{atomic wt.}} \times 100 = \text{\% of oxygen in oxide}$$

$$= \frac{16\times2}{16\times2+x}\times100 = 50$$

$$= \frac{3200}{32+x} = 50 \Rightarrow 3200 = 1600 + 50x$$

50 x = 1600

x = 32

in 2nd oxide : 60% oxygen, 40% metal

moles of metal $= \frac{40}{32} = \frac{10}{8} = \frac{5}{4}$ x 0

Ratio = 5 : 15

mole of O $= \frac{60}{16} = \frac{15}{4}$ $\Rightarrow$ 1 : 3

so formula will be = XO_3

48. (B) Mass of 'S' in sample :

100 kg contain S = 1

1 ——— $\frac{1}{100}$

2×10^6 ——— $\frac{1}{100}\times2\times10^6 \Rightarrow 2\times10^4$

wt of SO_2 produced

S +	O_2 $\rightarrow$	SO_2
32	32	64
2×10^4 kg	2×10^4	4×10^4 kg

49. (C) Balance equation of nicotine

$2.C_{10}H_{14}N_2 + 27O_2 \rightarrow 20\,CO_2 + 14H_2O + 2N_2$

From above equation.

2 mole nicotine gives 20 mol of CO_2

.1 , , , 1 mole

Mass of CO_2 = 44 g

50. (B) Weight of HCl present in 2.5 litmus sol^n = 3 × 2.5 = 7.5 g

mole in 7.5 g HCl = $H^+ = \frac{7.5}{36.5} = 0.205$

1 mole $Al(OH)_3$ = 3 mole H^+

$\frac{0.205}{3}$ mol Al(OH) = 0.20 s mole H^+

1 tablet contain $= \frac{400\times10^{-3}}{77}$ moles

= 0.0051 moles

$= \frac{0.205}{3}$ moles contain $\simeq$ 14tablets

51. (A) $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

x 3x

$$C_4H_{10} + \frac{13}{2}O_2 \rightarrow 4CO_2 + 5H_2O$$

$(3-x)$ $4(3-x)$

$3x+4(3-x)=10$

$x=2$

ratio of $C_3H_8 : C_4H_{10} = 2:1$

52. (A) $CH_3OH = \frac{2.5\times0.25\times32\times10^{-3}}{0.793} = 0.025$
53. (C)
54. (B)
55. (B) Molecular weight 92 means N_2O_4

$\Rightarrow$ Total no. of electron in 1 N_2O_4 molecule = 46

$\Rightarrow$ 1g-atom = 1 mole N_2O_4 molecule contain 46 N electrons

56. (C)
57. (C) 0.0835 mole have 1g of hydrogen

1 mole have - $\frac{1}{0.0835} = 11.9$ of g = hydrogen

$11.9 \simeq 12$

So, $C_6H_{12}O_6$

58. (B) For energy we use (n + l) Rule

n + l for (b) is 5 maximum value.

59. (B) It's electronic configuration of chromium in ground state.
60. (A) Nodal plane in P_x is 1
61. (C) Diffraction is property of wave.
62. (D) Energy n = 2

$$E = \frac{13.6\times Z^2}{n^2}$$

$$= \frac{13.6}{4} ev$$

For n = 3 $\frac{13.6}{9} ev$

$$\Delta E_{3\to2} - \frac{13.6}{4} - \frac{13.6}{9} = 1.9 \text{ ev}$$

63. (A) Visible range means Balmer series. Transition would be $n_3 \to n_2$
64. (C)Energy emmited is 12.1 ev. It means transition's from

$n = 3 \to 1$. Angular momentum = $\frac{nh}{2\pi}$, n = 3 $\frac{3h}{2\pi}$

n = 1, $\frac{h}{2\pi}$

change $\frac{3h}{2\pi} - \frac{h}{2\pi} = \frac{h}{\pi}$

65. (C) X-ray are neutral
66. (B) Energy required to dissociated one I_2 molecule

$$= \frac{240\times10^3}{6.023\times10^{23}}$$

67. (A) work function of metal = $\frac{hc}{\lambda_0} = \frac{6.6\times10^{-34}\times3\times10^8}{310\times10^{-9}}$

K.E emmited = 36×10^{-20}

Total energy = ϕ + K.E

Total energy = $\frac{hc}{\lambda} = h\nu$

$\nu = 1.5\times10^{15}\ H_2$

68. (A) In Balmer series $\frac{1}{\lambda} = RZ^2\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$

$$\frac{1}{\lambda} = R\times4\left[\frac{1}{4} - \frac{1}{16}\right]$$

$$= R\times4\left[\frac{3}{16}\right] = \frac{3}{4}R$$

check option $\frac{1}{\lambda} = R\times1^2\left[1-\frac{1}{4}\right] = \frac{3}{4}R$

So, option (a) is correct

69. (B) $\frac{\lambda_1}{\lambda_2} = \sqrt{\frac{2m_2K.E_2}{2m_1K.E_1}}$
70. (B)
71. (A) energy of one photon = $\frac{hc}{\lambda} = \frac{6.6\times10^{-34}\times3\times10^8}{4500\times10^{-10}}$ J

4.4×10^{-19} J

Power of Bulb = 150 watt

150 watt = 150 J sec^{-1}

Actual energy emitted =

100 ———— 8

1———— $\frac{8}{100}\times150 = 12$ J

Total energy emmited = no. of photon × energy of one photon

$E = n\times h\nu$

$$n = \frac{12}{4.4\times10^{-14}} = 27.2\times10^{19}$$

72. (A) $\Delta x\times m\Delta v = \frac{h}{4\pi}$

100 _____ 0.005

1_____ $\frac{0.005}{100}\times600$

$=0.03$

$$\Delta x = \frac{6.6\times10^{-34}}{9.1\times10^{-31}\times0.3\times4\times3.14}$$

$= 1.96\times10^{-3}$

73. (B) metallic character $\propto \frac{1}{I.E.}$
74. (D) I.E of P is more than S due to half filled orbital of P
75. (B) I.E of N is more than oxygen due to half filled orbital.
76. (D) Diagonal relationship

$Li \to Mg$

$Be \to Al$

$B \to Si$

77. (A) I, II & III are correct

78. (B) In periodic table from left to right Acidic strength increases

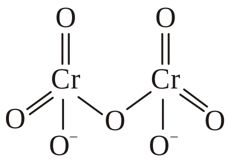
79. (D) Sn & Zn oxide are amphoteric oxide

80. (A) Factural

81. (D) Aluminium have 3 valence e^- after removal of $3e^-$. It got noble gas configuration.

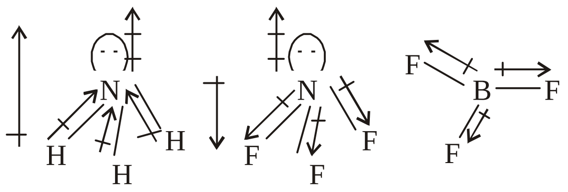
82. (C)

83. (B)



Terminal 3Cr–O bond from each side are in resonance due to which 6Cr–O bonds are equivalent

84. (D)

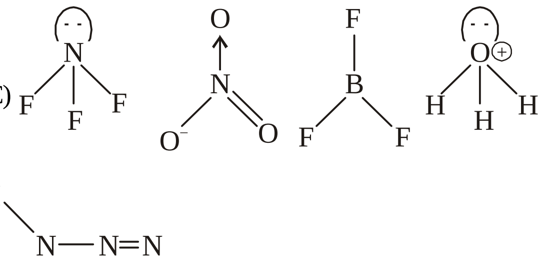


μ_1 μ_2 $\mu_3 = 0$

$= \mu_1 > \mu_2 > \mu_3$

85. (B)

86. (C)



87. (D) $N_2^{\oplus}$ is paramagnetic due to pressure of unpaired electron.

88. (B) Overlapping between d-orbital of phosphorous and p orbital of oxygen atom

89. (B) O_2^{2-} does not contain any unpaired electron

90. (C) Hydrogen is covolontly bonded with most electronegative atom