SOLUTIONS

Mentors Eduserv

All India Test Series 2018

Unit Test-3

NEET PATTERN

Test Date: 09-09-2017

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PHYSICS

1. (4)

Common Potential

$$= \frac{\text{Total charge}}{\text{Total capacitance}} = \frac{CV + 3CV}{KC + 3C} = \frac{4V}{K+3}$$

2. (4)

Common potential, $V = \frac{\text{Total charge}}{\text{Total capacitance}}$

$$V = \frac{C_1V_1 + C_2V_2}{C_1 + C_2} \Rightarrow V = \frac{0 + CV_0}{KC + C} \; V = \frac{CV_0}{C(1+K)} \Rightarrow V = \frac{V_0}{1+K}$$

$$\Rightarrow K + 1 = \frac{V_0}{V} \quad \Rightarrow K = \frac{V_0}{V} - 1 = \frac{V_0 - V}{V}$$

The dielectric constant of the solid dielectric

$$K = \frac{V_0 - V}{V}$$

3. (3)

Plane conducting surface facing each other must have equal and opposite charge densities.

Herer as the plate areas are equal $Q_2 = -Q_3$

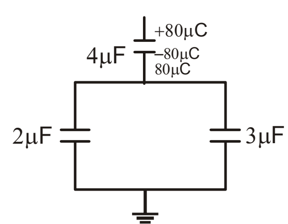
The charge on a capacitor means the charge on the inner surface of the positive plate (here it is Q_2)

Potential difference between the plates

$$= \frac{\text{charge}}{\text{capacitance}} = \frac{Q_2}{C} = \frac{2Q_2}{2C} = \frac{Q_2 - (-Q_2)}{2C} = \frac{Q_2 - Q_3}{2C}$$

4. (3)

In figure $2\mu F$ and $3\mu F$ are in parallel.



$\therefore$ Equivalence capacitance is

$$C_{eq} = 2 + 3 = 5\mu F$$

The charge in the arm containing $3\mu F$ capacitor is

$$q = \frac{3\mu F}{C_{eq}} \times 80 = \frac{3}{5} \times 80 = 3 \times 16 = 48\mu C$$

5. (3)

Initially potential difference across both the capacitor is same hence energy of the system is

$$U_1 = \frac{1}{2}CV^2 + \frac{1}{2}CV^2 = CV^2 \quad \text{...(i)}$$

In the second case when key K is opened and dielectric medium is filled between the plates, capacitance of both the capacitors becoems 3C, while potential difference across A is V and potential difference across B is $\frac{V}{3}$ hence energy of the system now is

$$U_2 = \frac{1}{2}(3C)V^2 + \frac{1}{2}(3c)\left(\frac{V}{3}\right)^2 = \frac{10}{6}CV^2 \quad \text{....(ii)}$$

so, $\frac{U_1}{U_2} = \frac{3}{5}$

6. (1)

The potential energy of a charged capacitor $U_i = \frac{q^2}{2C}$

where U_i is the initial potential energy.

If a dielectric slab is slowly introduced, the energy

$= \frac{q^2}{2KC}$

Once is taken out, again the energy increases to the old value.

Therefore after it is taken out, the potential energy come back to the old value. Total work done = zero.

7. (2)

The capacity in air, $C = \frac{\varepsilon_0 A}{d}$

$$C' = \frac{\varepsilon_0 A}{d - t + \frac{t}{5}}$$

$$\therefore \quad \frac{C}{C'} = \frac{d - t + \frac{t}{5}}{d} \Rightarrow C' = \frac{166}{100}C$$

$$\therefore \quad \frac{100}{166} = \frac{d - t + \frac{t}{5}}{d} = \frac{d - \frac{4t}{5}}{d}$$

$$\Rightarrow \quad 100d = 166d - 166\left(\frac{4t}{5}\right)$$

$$\Rightarrow \quad 166\left(\frac{4t}{5}\right) = 66d \Rightarrow t = \frac{66d \times 5}{166 \times 4} = \frac{d}{2}$$

8. (2)

$$V = \frac{C_1V_1 - C_2V_2}{C_1 + C_2} = \frac{6\times 12 - 3\times 12}{3+6} = 4\,\text{volt}$$

9. (4)

$$U = \frac{1}{2}QV = \text{Area of triangle OAB}$$

10. (3)

Force on one plate due to another is

$$F = eE = q\times\frac{\sigma}{2\varepsilon_0} = q\left(\frac{q}{2A\varepsilon_0}\right) = \frac{q^2}{2A\varepsilon_0}$$

Where $\frac{\sigma}{2\varepsilon_0}$ is the electric field produced by one plate at the location of other.

11. (2)

Force on one plate due to another is

F = (Charge on the plate q) (Electric field due to other plate)

Electric field due to one plate = Half of Net electric field due to two plates of capacitor

Hence $F = \frac{Q\times E}{2} = \frac{10^{-6}\times 10^{5}}{2} = 0.05\text{ N}$

12. (3)

Net charge of the condenser should be zero

13. (1)

Effective speed of the bullet

= speed of bullet + speed of police jeep

= 180 m/s + 45 km/h = (180 + 12.5) m/s = 192.5 m/s

Speed of thief's jeep = 153 km/h = 42.5 m/s

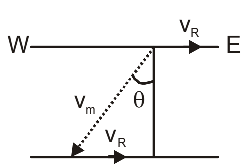
Velocity of bullet w.r.t. thief's car = 192.5 – 42.5 = 150 m/s

14. (3)

For shortest possible path man should swim with an angle $(90+\theta)$ with downstream.

From the figure

$$\sin\theta = \frac{\upsilon_r}{\upsilon_m} = \frac{5}{10} = \frac{1}{2}$$



$\Rightarrow \therefore \theta = 30°$

15. (4)

For the round trip he should cross perpendicular to the river

$\therefore$ Time for trip to that side $= \dfrac{1\text{km}}{4\text{km / hr}} = 0.25\,\text{hr}$

To come back, again he take 0.25 hr to cross then river.

Total time is 30 min, he goes to the other back and come back at the same point.

16. (1)

Let the speed of trains be x

$\therefore \dfrac{x-u}{x+u} = \dfrac{1}{2} \Rightarrow 2x - 2u = x + u \Rightarrow x = 3u$

17. (4)

Total distance = 130 + 120 = 250 m

Relative velocity = 30 – (–20) = 50 m/s

Hence t = 250/50 = 5s

18. (3)

$$y = x\tan\theta - \frac{gx^2}{2u^2\cos^2\theta}$$

For equal trajectories for same angle of projection $\dfrac{g}{u^2}$ = constant $\Rightarrow \dfrac{9.8}{5^2} = \dfrac{g'}{3^2}$

$$g' = \frac{9.8 \times 9}{25} = 3.528 \text{ m/s}^2 = 3.5 \text{ m/s}^2$$

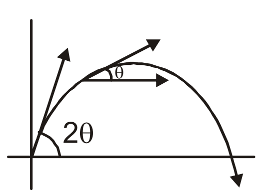
19. (3)

$t_1t_2 = \dfrac{2R}{g}$ (it is a formula) $t_1t_2 \propto R$

20. (2)

Let v be the velocity when projected with angle θ, then equating the horizontal velocities in both the the cases, we get

$v\cos\theta = u\cos 2\theta \quad \Rightarrow \quad v = \dfrac{u\cos 2\theta}{\cos\theta}$



where, $\sec\theta = \dfrac{1}{\cos\theta}$

$\therefore \quad v = u\cos 2\theta \sec\theta$

Using $\cos 2\theta = 2\cos^2\theta - 1$, we get

Given u = 4 ms^{-1}, we get

$v = 4(2\cos^2\theta - 1)\sec\theta \;\Rightarrow v = 4(2\cos\theta - \sec\theta)$

21. (1)

Let h be the maximum height attained by the projectile. Then,

$h = \dfrac{u^2 \sin\theta}{2g}$ and $\dfrac{\Delta h}{h} = \dfrac{2\Delta u}{u}$

Also Horizontal range is $R = u^2 \dfrac{\sin 2\theta}{g}$

Hence $\dfrac{\Delta R}{R} = \dfrac{2\Delta u}{u}$ Therefore, $\dfrac{\Delta R}{R} = \dfrac{\Delta h}{h}$

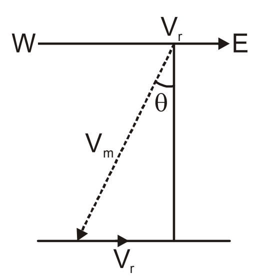
Hence, percentage increase in R

= percentage increase in height h = 5%

22. (1)

Let the swimmer swims at an angle θ

From, figure, $\sin\theta = \dfrac{v_r}{v_m}$



where, v_r is velocity of river, v_m is velocity of man.

Given, v_r = 5 m min^{-1}, v_m = 10 m min^{-1}

$\therefore \quad \sin\theta = \dfrac{5}{10} = \dfrac{1}{2} \quad \Rightarrow \theta = 30^\circ$

So angle with downstream is 30º + 90º = 120º

23. (2)

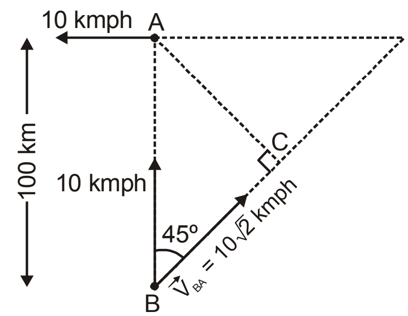
Velocity of 'A' $\vec{V}_A = 10\hat{i}$ km/h

Velocity of 'B' $\vec{V}_B = 10\hat{j}$ km/h

$\left|\vec{V}_{BA}\right| = \sqrt{(10)^2 + (10)^2}$

$|\vec{V}_{BA}| = 10\sqrt{2}$ km/h directed along BC

The shortest distance between the ships will be at position 'C'. Hence relative displacement of B w.r.t. A when distance between A and B is shortest will be equal to BC.



From figure $BC = \frac{100}{\sqrt{2}}$ km

so time $t = \frac{BC}{|\vec{V}_{BA}|} = \frac{100/\sqrt{2}}{10\sqrt{2}}$ t = 5 h

24. **(4)**

Acceleration $a = \alpha x^2 \Rightarrow \frac{dV}{dt} = \alpha x^2$

$\Rightarrow \; dV = \alpha x^2 dt \;\; \Rightarrow \;\; dV = \alpha x^2 dx \frac{dt}{dx}$

$\int_0^{v_0} VdV = \int_0^{v_0} \alpha x^2 dx \Rightarrow \frac{V_0^2}{2} = \frac{\alpha x^3}{3} \Rightarrow x = \left[\frac{3V_0^2}{2\alpha}\right]^{1/3}$

25. **(3)**

The vertical component of velocity of projection = –50 sin 30° = –25 m/s

It t be the time taken to reach the ground,

$h = ut + \frac{1}{2}gt^2 \Rightarrow 70 = -25t + \frac{1}{2} \times 10t^2$

$\Rightarrow \; 70 = -25t + 5t^2 \Rightarrow t^2 - 5t - 14 = 0$

$\Rightarrow \; t = -2\text{s and } 7\text{s}$

Since, t = –2 s is not valid $\therefore \; t = 7\text{s}$

26. (3)

$$H = \frac{u^2 \sin^2\theta}{2g} \Rightarrow \frac{H_1}{H_2} = \frac{\sin^2\theta_1}{\sin^2\theta_2}$$

$$\frac{\sqrt{3}}{1} = \frac{\sin\theta_1}{\sin\theta_2} \quad \text{So,} \quad \frac{\cos\theta_1}{\cos\theta_2} = \frac{1}{\sqrt{3}}$$

$$\frac{R_1}{R_2} = \frac{(2u)^2 \sin 2\theta_1}{u^2 \sin 2\theta_2} = \frac{4.\sin\theta_1 \cos\theta_1}{\sin\theta_2 \cos\theta_2} = \frac{4}{1}.$$

27. (3)

Suppose t_0 be the time to reach maximum height in the absence of air resistannce, then from the relation

$$t_0 = \frac{u\sin\alpha}{g} \quad \ldots\text{(i)}$$

when a is retardation causes by air resistance, then total retardation will be g + a

$$t_1 = \frac{u\sin\alpha}{g+a} = \frac{u\sin\alpha}{g+\left(\frac{1}{10}\right)g} = \frac{10u\sin\alpha}{11g} \quad \ldots\text{(ii)}$$

Now from equations (i) and (ii), we get have

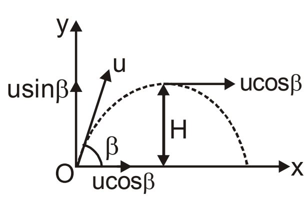
$$\therefore\ t_1 = \frac{10}{11}t_0 \ \Rightarrow t_0 - t_1 = t_0 - \frac{10}{11}t_0 = \frac{1}{11}t_0 = 0.09t_0$$

$\therefore$ Time will decrease by 9%.

28. (1)

Initial kinetic energy at the point of projection O is

$$K = \frac{1}{2}mu^2$$



where, m = mass of the body

u = initial velocity of the projection]

At the highest point (i.e. at maximum height H)

velocity is $v = u\cos\beta$,

where β is the angle of projection

$\therefore$ Kinetic energy at the hghest point is

$K' = \frac{1}{2}mv^2 \Rightarrow K' = \frac{1}{2}m(u\cos\beta)^2 = \frac{1}{2}mu^2\cos^2\beta$

According to given problem, $K' = \frac{3}{4}K$

$\frac{1}{2}mu^2\cos^2\beta = \frac{3}{4}\left(\frac{1}{2}mu^2\right) \Rightarrow \cos^2\beta = \frac{3}{4}$

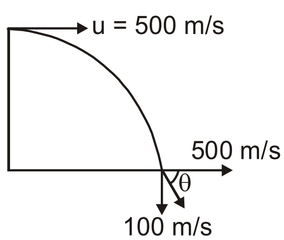
$\cos\beta = \frac{\sqrt{3}}{2}$ or $\beta = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right) = 30^\circ$.

29. (1)

Horzontal component of velocity v_x = 500 m/s

and vertical components of velocity while striking the ground.

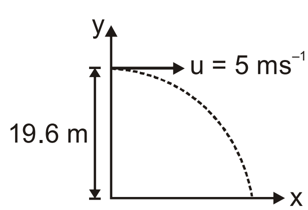
v_y = 0 + 10 × 10 = 100 m/s



∴ Angle with which it strikes the ground.

$\theta = \tan^{-1}\left(\frac{v_y}{v_x}\right) = \tan^{-1}\left(\frac{100}{500}\right) = \tan^{-1}\left(\frac{1}{5}\right)$.

30. (2)



Let t s be time taken by the ball to hit the ground

$\therefore H = \frac{1}{2}gt^2 \Rightarrow t = \sqrt{\frac{2H}{g}} = \sqrt{\frac{2 \times 19.6\,m}{9.8\,ms^{-2}}} = 2\,s$

31. (3)

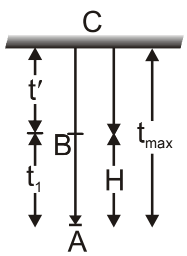
Let time taken by the body to fall from point C to B be t'

Then, $t_1 + 2t' = t_2$

$$t' = \left(\frac{t_2 - t_1}{2}\right)$$

Total time taken, to reach point C

$$T = t_1 + t'$$



$$= t_1 + \frac{t_2 - t_1}{2}$$

$$= \frac{2t_1 + t_2 - t_1}{2} = \left(\frac{t_1 + t_2}{2}\right)$$

Then maximum height attained

$$H_{max} = \frac{1}{2}g(T)^2 = \frac{1}{2}g\left(\frac{t_1 + t_2}{2}\right)^2 = \frac{1}{2}g \cdot \frac{(t_1 + t_2)^2}{4}$$

$$\Rightarrow H_{max} = \frac{1}{8}g \cdot (t_1 + t_2)^2 \text{ m}$$

32. (3)

In position '1'

V_i = Energy stored $\frac{1}{2}CV^2$

when switch is shifted to position '2'

common potential = $\frac{CV}{C = 2C} = \frac{V}{3}$

$$V_f = \frac{1}{2}C\left(\frac{V}{3}\right)^2 + \frac{1}{2}2C \times \left(\frac{V}{3}\right)^2$$

$$=\frac{1}{2}\frac{CV^2}{9}+\frac{1}{2}2C\frac{V^2}{9}$$

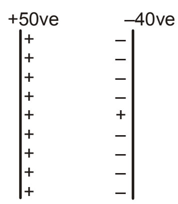
$$=\frac{1}{2}\frac{CV^2}{9}(1+2)=\frac{1}{2}\frac{CV^2}{3}$$

% of energy dissipated $=\dfrac{\frac{1}{2}CV^2-\frac{1}{2}\frac{CV^2}{3}}{\frac{1}{2}CV^2}\times 100$

$=66.66\%$

33. (2)

Q = CV = 50ve



$$V=\frac{50-(-40)}{2\times 5}=\frac{90}{10}=9v$$

34. (4)

$6_{large}=6_{small}n^{1/3}$ $\quad \dfrac{6_{small}}{6_{large}}=\dfrac{1}{n^{1/3}}=\dfrac{1}{4}$

35. (4)

Dielectric in a capacitor reduces the occurrence of a spark between plates of a capacitor (by creating an induced opposing field)

dielectric constant K and dielectric strength X must we high for a suitable material for a capacitor.

36. (2)

Q_1 = 120 C_1

Q_2 = 200 C_2

120 C_1 – 200 C_2 = 0

120 C_1 = 200 C_2

$3C_1 = 5C_2$

37. (4)

Work done by cell = CV^2

Energy stored = $\frac{1}{2}CV^2$

Ratio $= \frac{\frac{1}{2}CV^2}{CV^2} = \frac{1}{2}$

38. (2)

Before contact $Q_1 = 64\pi R^2 \quad Q_2 = 64\pi(2R)^2$

after contact net charge $= 564\pi R^2$

Surface potential of both sphere are same

$Q_1^1 = \frac{5}{3}64\pi R^2 \quad Q_2^1 = \frac{10}{3}64\ \pi R^2$

$\sigma_1^1 = \frac{5}{3}\sigma \qquad \sigma_2^1 = \frac{5}{6}\sigma$

$\frac{\sigma_1^1}{\sigma_2^1} = \frac{5}{3} \times \frac{6}{5} = 2$

39. (2)

$C = \frac{\epsilon_0 A}{d - t}$

t is negligible.

40. (3)

Q = CV $\quad$ Q^1 = KCV $\quad$ $\delta Q = KCV - CV \quad = (K-1)CV$

41. (1)

Dielectric break down strength of water is less than that of vaccum.

So more charge can be given to sphere invaccion

$C \propto R$

Capacitance ratio always '1'

42. (3)

For conservation of vertical momentum the second part must have a vertical downward velocity 50 m/s. per sonservation of second part must have a horizontal velocity 120 m/s

v = | 50^2 | 20^2 = 130

43. (2)

$$y = x\tan\theta\left(1-\frac{x}{R}\right) \Rightarrow y = \sqrt{3}x - \frac{gx^2}{2}$$

$$y = \sqrt{3}x\left(1-\frac{gx^2}{2\sqrt{3}x}\right) = \sqrt{3}x\left(1-\frac{gx}{2\sqrt{3}}\right)$$

$$\tan\theta = \sqrt{3}$$

44. (3)

$$\frac{H}{h} = \frac{u^2\sin^2 60^0 / 29}{\frac{u^2\sin^2 30^o}{29}} = \frac{\frac{3}{4}}{\frac{1}{4}} = 3$$

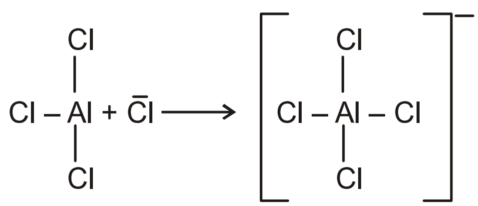
45. (3)

The four plates are alternately connected and form three capacitor in parallel. The capacity of each capacitor is $(\varepsilon_0 A/d)$. Hence, the net capacitance between A and B is given by

$$C_{AB} = C + C + C = \frac{3\varepsilon_0 A}{d}$$

CHEMISTRY

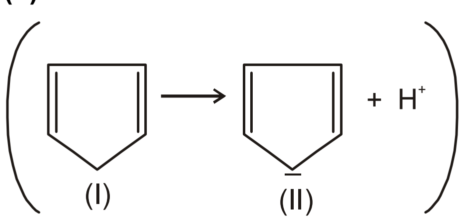
46. (2)



47. (2)

(Delocalization of lone pair of electron of $-NH_2$ group. of aneline throughout the righ makes it less available for donation so, it is less basic than CH_3-NH_2)

48. (1)



Cyclopentadienyl anion (II) is stable due to resonance and (i) (non–aroumatic changes to (II) aromatic)

Stability is increased from (I) to (II). Thus, (I) is maximum acidic.

49. (2)

Bond length of b is <c due to partial double bond character due to hyperconjugation.

50. (1)

B.E. of allylic 3°(C–H) bond is least thus, it is abstracted most easily.

51. (3)

(It contains 7 $\propto$ C–H hyper–conjugative bonds)

52. (3)

In (iv) two $-NO_2$ groups present at ortho & para are involved in –R as well as –I effect so makes it more acidic while in case of (ii) two $-NO_2$ groups are invoved in –I effect while in (I) only one NO_2 group is involved in –I effect & in case of (III) – CH_3 group involved in hyper–conjugation and +I effect which makes it least acidic .

(III < I < II < IV)

53. (1)

($-\overset{+}{N}H_3$ and –COOH are – I – effect exerting group. while D and $-CO_2^-$ are +I – effect exerting group.)

54. (3)

(They obey (4n + 2) π –electrons rule).

55. (2)

$$H_2\ddot{N}-\ddot{N}H-\overset{\overset{\displaystyle O}{||}}{C}-\ddot{N}H_2$$

Here lone pair of electron of $-NH_2$(I) does not involve in delocalization. So, easily available for donation and hence most nucleophilic)

56. (2)

(b) is the most stable due to 9 hyper conjugative bonds and then (a) which containe 8 hyper conjugative bonds are persent while in case (c) 6 hyper conjugative bonds and (d) containe only 3 hyper conjugative bonds

57. (2)

Acid strength – COOH > $-\overset{+}{N}H_3$, $-\overset{+}{N}H_3$(y) is attached with–I group of–COOH but not $-\overset{+}{N}H_3$ (z)

58. (2)

(Its conjugate base is the most stable).

59. (4)

60. (3)

*Presence of two EWG and resonance stablisation makrs (i) strongest acid

*In (ii), two NH_2 group acts as ERG through resonance after the loss of H^+ therefore loss of H^+ is most difficult

61. (3)

For M-shell (n value) = 3

So, angular momentum $= \frac{nh}{2\pi} = \frac{3h}{2\pi}$

62. (2)

Energy difference

$$E_1 - E_3 = -2.18 \times 10^{-11}\left(\frac{1}{1} - \frac{1}{3^2}\right)$$

$$= 2.18 \times 10^{-11} \times \frac{8}{9} = 0.1911 \times 10^{-10} \text{ ergs}$$

63. (4)

For azimnuthal quantum number $\ell = 4$ total number of magnetic quantum number $(2\ell + 1) = (4 \times 2 + 1) = 9.$

For each magnetic quantum number there is spin quantum number +1/2.

64. (2)

Given magneticn quantum number is true for

n = 2 **.** So angular momentum

$$= \frac{nh}{2\pi} = 2\frac{h}{2\pi} = \frac{h}{\pi}.$$

65. (4)

$(n + \ell) = 5$

ℓ may be,	0	1	2
	s	p	d
	Spherical	Dumb – bell	Double doub – bell

66. (2)

Total number of magnetic quantum number.

$m = 2\ell + 1$

67. (3)

X^{3-} is isoelectronic with argon. and e:n ratio is 1 : 1 so we can say there are 18 number mass number p+n = 15+18=33

68. (4)

$\boxed{K.E \ \alpha \frac{1}{\lambda^2}}$ $m_e < m_p < m_\alpha$

$E_e > E_p > E_\alpha$

69. (2)

$$\frac{KE_A}{KE_B} = \frac{\frac{h}{2 \times 4 \times m_B}}{\frac{h}{2 \times m_B \times 25}} = 25:4$$

70. (1)

$V \alpha \frac{z}{n}$

for n = 2

Velocity is halved.

71. (3)

$$\frac{hc}{\lambda} - \frac{hc}{\lambda_0} = \frac{1}{2} mv^2$$

$$V = \left[\frac{2hc}{m}\left(\frac{\lambda_0 - \lambda}{\lambda\lambda_0}\right)\right]^{1/2}$$

72. (2)

Angular momentum $= n\frac{h}{2\pi}$ compairing it with $\frac{h}{\pi}$ if n_1 = 2 it n = 2 comes under Balmer series, visible region.

73. (2)

Electronic configuration for 2nd excited state.

$=1s^2 2s^2 2p^6 3s^2 3p^3 3d^2$

74. (3)

$$\frac{hc}{\lambda_1} = \phi + K.E_1 \qquad ...(1)$$

$$\frac{hc}{\lambda_2} = \phi + 2KE_1 \qquad ...(2)$$

Multipliying (1) with (2) and substating (2) by (1)

$$hc\left(\frac{2}{\lambda_1}-\frac{1}{\lambda_2}\right)=\phi$$

$$hc\left(\frac{2}{\lambda_1}-\frac{1}{\lambda_2}\right)=h\nu_0$$

$$\nu_0=1.19\times10^{15}\ s^{-1}$$

75. (1)

E_d = 0.04×400=16 kJ

Total number of moles of H = 0.04×2 = 0.08 moles H - atom.

Energy for excitation.

$$=0.08\times6.022\times10^{23}\left|\frac{-13.6}{4}-\frac{(-13.6)}{1}\right|=4.914\times10^{23}\ eV$$

= 78.734 kJ

So. toal energy = 16+78.734=94.7345 kJ.

76. (4) 77. (3) 78. (4)

79. (3) $LE\propto\frac{q^+.q^-}{r^++r^-}$

(1) AlF_3 > MgF_2 [Charge on cation]
(2) Li_3N > Li_2O [Charge on anion]
(3) NaCl > LiF [Size of cation and anion]
(4) TiC > ScN [Charge on cation and anion]

80. (3)

Lattice energy $\propto\frac{\text{Charge of cation}\times\text{charge of anion}}{\text{Inter ionic distance}}$

81. (4)

HCl is highly soluble in water because it ionise in water and form ion-dipole interaction with water.

82. (1)

Bond polarity is directly related to difference of electronegativity of bonded atoms.

83. (1) 84. (4) 85. (3) 86. (2) 87. (3) 88. (1)

89. (3) 90. (1)

BOTANY

91. (3)

The leaflets of palmotely compound leaves raadiate outward from the end of petiole. Pinnatehy compound arranged along the middle vein(rachis).

92. (1)

Scape is leafless flowering shoot.

93. (2)

Opuntia has flattened phyllochde which euporbia has cyliadrial phylloclade.

94. (4)

Underground steon is modified for food storage, perennation and asexnal repnednetion.

95. (2)

Phylcode is flattened leaf like structure found in australian acaria and parkinsonia.

96. (4)

Sunflower is an example of head inflores cence.

97. (2)

Calotropis has valvate aestivation.

98. (4)

The pulse flowers has vexillary asstivation

99. (1)

100. (4)

Brassicareas has actinomorphic flower.

101. (2) 102. (1) 103. (3) 104. (3) 105. (1) 106. (3)

107. (4)

Visit has moniliform root.

108. (2) 109. (3) 110. (1) 111. (4) 112. (4)

113. (2)

Complex tissue has different types of cells performing same function togetherly.

114. (2) 115. (1) 116. (1) 117. (3) 118. (4) 119. (3)

120. (4) 121. (3) 122. (1) 123. (4) 124. (1) 125. (4)

126. (4) 127. (3) 128. (4) 129. (4) 130. (2) 131. (1)

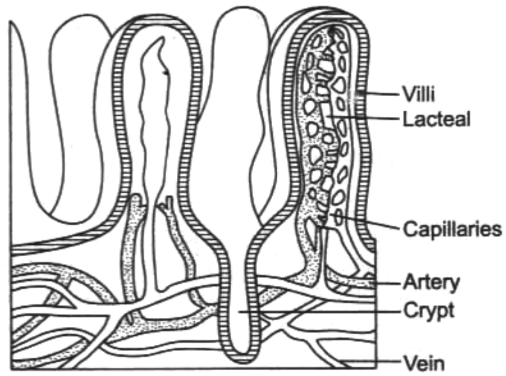
132. (2)

Sorghum belong to poaceae (Monocot)

133. (4) 134. (4) 135. (4)

ZOOLOGY

136. (1)



By a transverse section of mucosa of small intestine, villi can be observed along with capilaries, artery and crypt of Leiberkuhn. The four basic layers of alimentary canal shows modification in different parts of alimentary canal.

137. (4)

A–Gall bladder, B–Common bile duct, C–Pancreas, D–Pancreatic duct, E–Hepatopancreatic duct.

138. (2)

There are three pair of salivary glands in human being namely, paratoid glands, sublingual glands and submaxillary glands. All of the three pairs of glands secreates saliva into buccal cavity through their ducts. About 1000-1500 Ml of saliva is secreted per day by an adult person.

139. (1)

The rights and left hepatic duct joins to from the common hepatic duct, which joins the c\ystic duct arising from gall bladder. The cystic duct and common hepatic duct joins to from common bile duct, which after joining the main pancreatic duct forms, hepatopancreatic ampulla. thye ampulla opens into duodenum. This opening is guarded by sphincter of Oddi.

140. (1)

141. (1)

142. (2)

Process of digestion starts in the mouth, continues in stomach and is completed in small intestine. In buccal cavity or oral cavity, the digestion of carbohydrates gets started and 30% of polysaccharides present in the food get converted into dissaccharides (maltose). Rest 70% of carbohydrates are completely digested in the small intestine.

143. (1)

144. (2)

When food in the form of bolus reaches into the stomach by involuntary movement of muscular coat from oesophagus, it mixes throughly with the gastric juices present in the stomach.This thoroughly mixed food is called chyme.

145. (2)

146. (1)

Pancreas is a yellowish, leaf like mixed gland which is located posterior to the stomach in abdominal cavity. It is composed of two parts namely, an exocrine part and an endocrine part. The exocrine part secretes a slightly alkaline juice, which is known as pancreatic juice. this pancreatic juice contains trypsinogen, chymotrypsinogen, carboxypeptidase (proenzyme) and sodium bicarbonate. Pancreatic lipase, pancreatic-amylase, DNase and RNase are also present in little amount.

147. (3)

$$\text{Fat} \longrightarrow \text{Diglycerides} \longrightarrow \text{Monoglycerides} + \text{Fatty acid}$$

Fat in the intestine is emulsified by bile salts. Process of emulsification increases the lipase action on fats. Pancreatic lipase is the main enzyme for the digestion of fats.

148. (1)

149. (3)

150. (1)

Digestion of nucleic acids takes place in the small intestine. The enzyme present in pancreatic and intestinal juices acts on nucleic acids as follows

$$\text{RNA} \longrightarrow \text{Ribonucleotides}$$

$$\text{Ribonucleotides (Nucleotides)} \longrightarrow \text{Nucleosides} + \text{Phosphoric acid}$$

$$\text{Nucleosides} \longrightarrow \text{Nitrogenous base + Pentose sugar}$$

151. (3)

Goblet cells are present throughout, the epithelium of mucosa, which secrete mucous and continuously lubricate the inner most layer. It protects the stomach wall along with bicarbonates of gastric juices, against HCl action and protein digesting enzymes.

152. (3)

153. (4)

During prolonged hunger strike or starvation of food the reserve food (carbohydrates) is used up first by the body. Fats are used as second source of energy after carbohydrates. At last, when both carbohydrates and fats are used completely, proteins are used as a source of energy. Proteins are used at last because they are the main structural components of body.

154. (3)

The oxyntic cells or parietal cells of gastric glands secreates HCl acid. HCl converts proenzymes, pepsinogen and prorennin into pepsin and rennin (active forms), respectively. HCl also helps in maintaining the pH of gastric juices between 2 to 3.0. So pepsinogen will not be activated thus, the digestion of proteins will not take place.

155. (1)

Secretin and cholecystokinin are the two main gastrointestinal hormones secreated in the duodenum of alimentary canal. Cholecystokinin stimulates gall bladder contraction and hence flow of bile salts is increased into the intestine, while secretin stimulates the release of an alkaline pancreatic fluid, which in turn, neutralises stomach acid.

156. (3)

Tocopherol (Vitamin-E) is an anti-sterilitic factor. Its deficiency leads to reversible sterility in female and male.

157. (2)

Enterogastrone, a gastrointestinal hormone regulates the digestive secretion along with the other hormones gastrin, secretin, cholecystokini, etc. Enterogastrone slows down rthe gastric contraction. Therefore, it is also called as Gastro Inhibitory Peptide (GIP).

158. (1)

159. (1)

	Column I		**Column II**
(A)	Neck cells	(ii)	Mucous
(B)	Peptic or chief cells	(iii)	Pepsinogen
(C)	Parietal/Oxyntic cells	(i)	HCl, intrinsic factor
(D)	Hepatocyte	(iv)	Bile

160. (4)

161. (1)

162. (2)

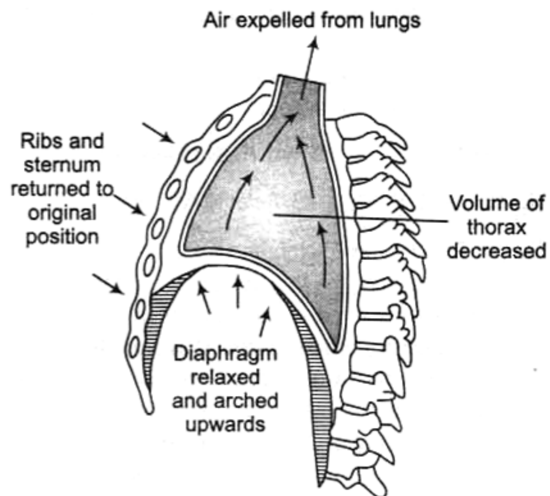
163. (3)

164. (4)

A–increase, B–decreases, C–outside, D–inspiration.

165. (2)

Relaxation of the diaphragm and intercostal muscles returns the diaphragm and stenum to their normal positions and reduces the thoracic volume and thereby the pulmonary volume. This leads to an increase in intra-pulmonary pressure to slightly abiove the atmospheric pressure, causing the expulsion of air from the lungs, i.e. expiration.



Mechanism of breathing showing expiration

166. (4)

167. (2)

168. (2)

Dead space volume is the amount of air that was inhaled by the body in breathing but does not taken part in the gaseous exchange. In man it is 150 mL.

169. (2)

Residual volume remains in the lungs even after the forcible expiration. That's why, spirometerr can't measure the volume of residual volume.

170. (3)

The ventilation movement of the lungs is governed by diaphragm and intercoastal muscles.

171. (4)

Usuall, there are 12 pairs of ribs. The first seven pairs of the ribs are known as true ribs, 8th, 9th and 10th pairs are called false ribs and last two pairs 11th and 12th pair are known as floating ribs.

172. (2)

173. (2)

174. (1)

175. (4)

Diffusion membrane is made up of three layers

(i) Thin squmous epithelium of alveoli. (ii) Endothelium of alveolar capillaries. (iii) Basement substance in between the squamous epithlium of alveoli and endothelium of alveolar capillaries.

176. (4)

Partial pressure of in tissues nad deoxygenated blood are almost same. Alveoli has 104 mm of Hg, whereas oxygenated blood has 95 mm of Hg.

177. (3)

Blood is the medium of transport for and about **97%** of is transported by **RBCs** in the blood. The remaining **3%** of is carried in a dissolved state through the **plasma.** Nearly 20-25% of is transported by **RBCs** whereas 70% of it is carried as **bicarbonate.** About 7% of is carried in a dissolved state through plasma.

178. (4)

In the tissues, there is

(1) Low O_2 (2) High CO_2 (3) High H^+ (4) High temperature

All these conditions are favourable for the dissociation of oxygen from oxyhaemoglobin.

179. (1)

Under the normal physiological conditions, 100 mL of the oxygenated blood can deliver around 5 mL to the body.

180. (3)

RBCs contain very high concentration of enzymes, carbonic anhydrase and minute quantities of the same is present in the plasma too. This enzyme facilities the following reaction in both directions.