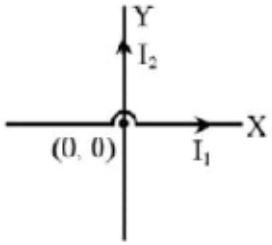
NTA NEET MOCK TEST – 2
PHYSICS

1. The pressure of a medium is changed from $1.01\times10^5\,Pa\,to 1.165\times10^5\,Pa$ and change in volume is 10% keeping temperature constant. The bulk modulus of the medium is

1) $204.8\times10^5\,Pa$ 2) $102.4\times10^5\,Pa$ 3) $51.2\times10^5\,Pa$ 4) $1.55\times10^5\,Pa$

2. Two long straight conductors with current $I_1 and\ I_2$ are placed along X and Y axes. The equation of locus of point of zero magnetic induction is:



1) $y=x$ 2) $y=\frac{I_2x}{I_1}$ 3) $y=\frac{I_1}{I_2}x$ 4) $y=\frac{x}{I_1I_2}$

3. The bob of a simple pendulum is a spherical hollow ball filled with water. A plugged hole near the bottom of the oscillating bob gets suddenly unplugged. During observation, till water is coming out, the time period of oscillation would

1) First increase and then decrease to the original value
2) First decrease and then increase to the original value
3) Remain unchanged 4) Increase towards a saturation value

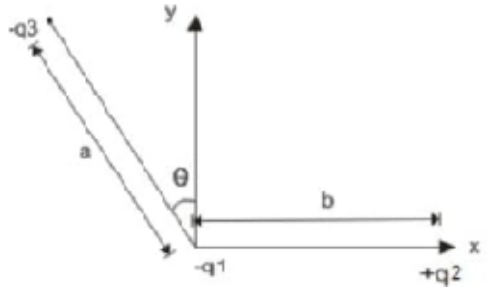
4. In n, e τ and m represent electron density, charge, relaxation time and mass of an electron respectively, then the resistance of a wire of length l and cross-sectional area A is

1) $\frac{ml}{ne^2\tau A}$ 2) $\frac{m\tau A}{ne^2l}$ 3) $\frac{ne^2\tau}{m}.\frac{A}{l}$ 4) $\frac{ne^2m}{\tau}.\frac{l}{A}$

5. At room temperature, copper has free electron density of $8.4\times10^{28}m^{-3}$. The electron drift velocity in a copper conductor of cross-sectional area of $10^{-6}m^2$ and carrying a current of 5.4 A, will be-

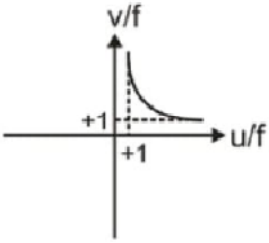
1) 4 ms^{-1} 2) $0.4ms^{-1}$ 3) $4cm\,s^{-1}$ 4) $0.4mm\,s^{-1}$

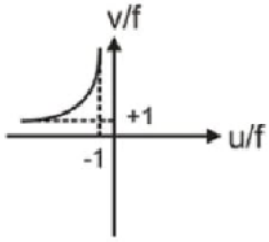
6. Three charges $-q_1,+q_2 and -q_3$ are placed as shown in the figure. The x – component of the force on $-q_1$ is proportional to

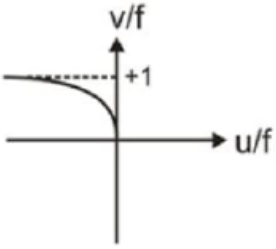


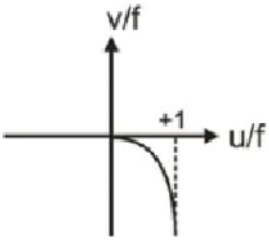
1) $\frac{q_2}{b^2}-\frac{q_3}{a^2}\cos\theta$ 2) $\frac{q_2}{b^2}+\frac{q_3}{a^2}\sin\theta$ 3) $\frac{q_2}{b^2}+\frac{q_3}{a^2}\cos\theta$ 4) $\frac{q_2}{b^2}-\frac{q_3}{a^2}\sin\theta$

7. A real inverted image in a concave mirror is represented by graph (u, v, f are coordinate)

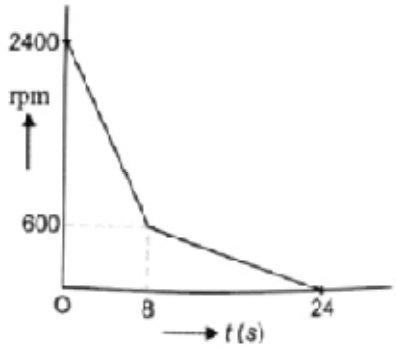
1) 

2) 

3) 

4) 

8. A table fan, rotating at a speed of 2400 rpm is switched off and the resulting variation of the rpm with time is shown in the figure. The total number of revolutions of the fan before it comes to rest is

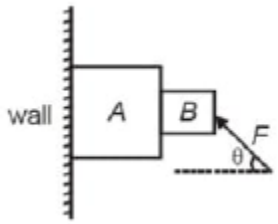


1) 420 2) 280 3) 240 4) 380

9. A ball rolls off the top of stair-way with a horizontal velocity of magnitude 1.8 ms^{-1}. The steps are 0.20 m high and 0.20 m wide. Which step will the ball hit first?

1) First 2) Second 3) Third 4) Fourth

10. Consider the situation shown in the figure. The wall is smooth but the surfaces of blocks A and B in contact are rough. The friction on B due to A in equilibrium



1) Is upward 2) Is downward

3) Is zero

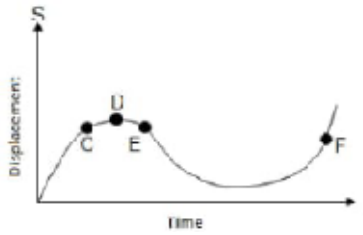
4) The system cannot remain in equilibrium for any value of F

11. The electromagnetic waves travel in free space with the velocity of

1) Sound 2) Light

3) Greater than that of light 4) Greater than that of sound

12. The displacement time graph of a moving particle is shown below



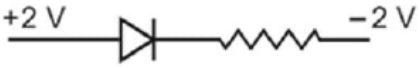
The instantaneous velocity of the particle is negative at the point

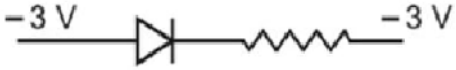
1) C 2) E 3) D 4) F

13. A stone is thrown at 25m/s at 53^0 above the horizontal. At what time its velocity is at 45^0 below the horizontal?

1) 0.5 s 2) 4 s 3) 3.5 s 4) 2.5 s

14. The forward biased diode connection among the following is

1) 

2) 

3) 

4) 

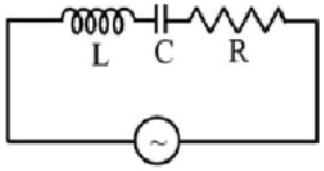
15. The length l, breadth b and thickness t of a block are measured with the help of a metre scale. Given

$l = 15.12 \pm 0.01cm, b = 10.15 \pm 0.01cm, t = 5.28 \pm 0.01cm$

The percentage error in volume is -

1) 0.64% 2) 0.28% 3) 0.35% 4) 0.48%

16. A 100V, AC source of frequency 500 Hz is connected to an LCR circuit with L = 8.1 mH, C = 12.5 μF, R = 10 Ω all connected in series as shown in figure. What is the quality factor of circuit?



1) 2.02 2) 2.54 3) 50.54 4) 200.54

17. Assertion(A): The film which appears bright in reflected system will appear dark in the transmitted system and vice-versa.

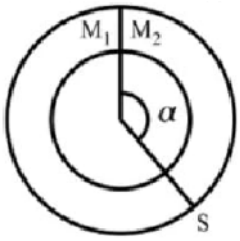
Reason (R): The conditions for film to appear bright or dark in the reflected light are just reverse to those in the transmitted light

1) (A) is true and (R) is true and (R) is the correct explanation of (A)
2) (A) and (R) are true but (R) is not the correct explanation of (A)
3) (A) is true, (R) is false
4) (A) is false, (R) is true.

18. Two particles A and B execute simple harmonic motion of period T and 5T/4. They start from mean position. The phase difference between them when the particle A completes one oscillation will be

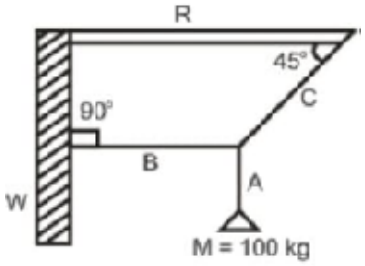
1) $\pi/2$ 2) Zero 3) $2\pi/5$ 4) $\pi/4$

19. A ring shaped tube contains two ideal gases with equal masses and molar masses $M_1 = 32 \, and \, M_2 = 28$. The gases are separated by one fixed partition and another movable stopper S which can move freely without friction inside the ring (at room temperature). The angle α is



1) 182^0 2) 170^0 3) 192^0 4) 180^0

20. A mass M of 100kg is suspended with the use of strings A, B and C as shown in the figure, where W is the vertical wall and R is a rigid horizontal rod. The tension in the string B is



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1) 100 gN 2) Zero 3) $100\sqrt{2}gN$ 4) $\frac{100}{\sqrt{2}}gN$

21. An inverted bell, lying at the bottom of lake 47.6m deep, has 50 cm^3 of air trapped in it. The bell is brought to the surface of lake. The volume of the trapped air will become (Atmospheric pressure = 70 cm of Hg and density of Hg = 13.6 g / cm^3)

1) 350 cm^3 2) 300 cm^3 3) 250 cm^3 4) 22 cm^3

22. In the experiment to determine the focal length of a concave mirror by graphical method the u-v graph is

1) A straight line 2) A circle 3) An ellipse 4) None of these

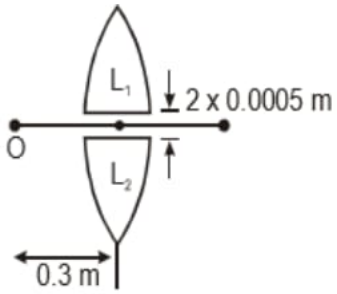
23. A polarized light of intensity I_0 is passed through another polarizer whose pass axis makes an angle of 60^0 with the pass axis of the former. What is the intensity of emerging polarized light from second polarizer?

1) $I = I_0$ 2) $I = \frac{I_0}{6}$ 3) $I = \frac{I_0}{5}$ 4) $\frac{I_0}{4}$

24. Electromagnetic waves propagate in the direction parallel to the vector

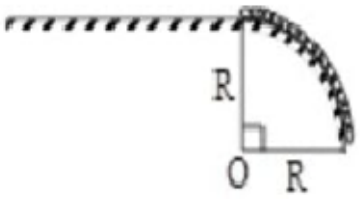
1) $\vec{E}$ 2) $\vec{B}$ 3) $\vec{E} \times \vec{B}$ 4) $\vec{B} \times \vec{E}$

25. A point object O is placed at a distance of 0.3m from a convex lens of focal length 0.2m. It is then cut into two halves each of which is displayed by 0.0005 m as shown in figure



1) 30 cm 2) 40cm 3) 50 cm 4) 60 cm

26. A chain of length $l < \frac{\pi R}{2}$ is placed on a smooth surface whose some part is horizontal and some part is on quarter circular of radius R in the vertical plane as shown. Initially the whole part of chain lies in the circular part with one end at topmost point of circuit surface. If the mass of chain is m, then work required to pull very slowly the whole chain on horizontal part is –



1) $\frac{m}{l}gR^2[\sin\left(\frac{l}{R}\right)]$ 2) $\frac{m}{l}gR^2[\cos\left(\frac{l}{R}\right)]$

3) $\frac{m}{l}gR^2[\left(\frac{l}{R}\right)-\sin\left(\frac{l}{R}\right)]$ 4) $\frac{m}{l}gR^2[\left(\frac{l}{R}\right)-\cos\left(\frac{l}{R}\right)]$

27. The radio of two planets are respectively $R_1 \& R_2$ and their densities are respectively $\rho_1 \& \rho_2$. The ratio of the acceleration due to gravity at their surface is-

1) $g_1 : g_2 = \frac{\rho_1}{R_1^2} : \frac{\rho_2}{R_2^2}$ 2) $g_1 : g_2 = R_1 R_2 : \rho_1 \rho_2$ 4) $g_1 : g_2 = R_1 \rho_2 : R_2 \rho_1$ 4) $g_1 : g_2 = R_1 \rho_1 : R_2 \rho_2$

28. An electron is in an excited state in a hydrogen like atom. It has a total energy of -3.4 eV. The kinetic energy is E and its de Broglie wavelength is λ. Then

1) E = 6.8 eV, λ = 6.6 $\times 10^{-10} m$ 2) E = 3.4 eV, λ = 6.6 $\times 10^{-10} m$

3) E = 3.4 eV, λ = 6.6 $\times 10^{-11} m$ 4) E = 6.8 eV, λ = 6.6 $\times 10^{-11} m$

29. In a resonance pipe the first and second resonance are obtained at depths 22.7 cm and 70.2 cm respectively. What will be the end correction?

1) 1.05 cm 2) 115.5 cm 3) 92.5 cm 4) 113.5 cm

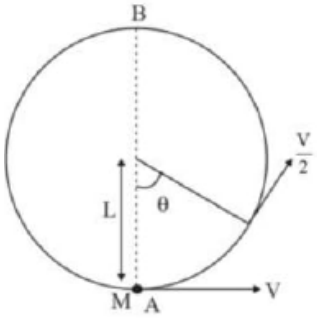
30. The efficiency of a Carnot engine working between 800K and 500K is-

1) 0.4 2) 0.625 3) 0.375 4) 0.5

31. The dimensional formula of $\frac{1}{\mu_0 \in_0}$ is _____

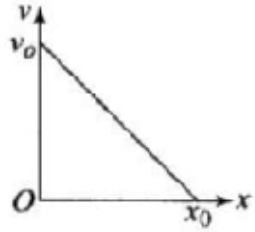
1) $M^0L^2T^{-2}$ 2) $M^0L^1T^{-1}$ 3) $M^0L^{-2}T^{-2}$ 4) $M^0L^1T^{-2}$

32. A bob of mass M is suspended by a massless string of length L. The horizontal velocity v at position A is just sufficient to make it reach point B. The angle θ at which the speed of the bob is half of that at A satisfies

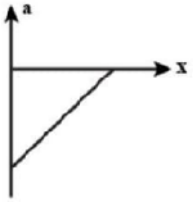


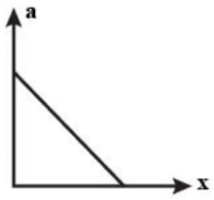
1) $\theta = \frac{\pi}{4}$ 2) $\frac{\pi}{4} < \theta < \frac{\pi}{2}$ 3) $\frac{\pi}{2} < \theta < \frac{3\pi}{4}$ 4) $\frac{3\pi}{4} < \theta < \pi$

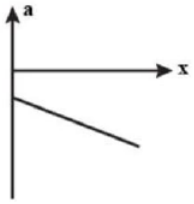
33. The velocity displacement graph of a particle moving along a straight line is-

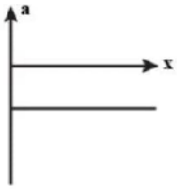


The most suitable acceleration-displacement graph will be

1) 

2) 

3) 

4) 

34. A drum of radius R and mass M rolls down without slipping along an inclined plane of angle θ. The frictional force

1) Converts translational energy to rotational energy
2) Dissipates energy as heat
3) Decreases the rotational motion
4) Decreases the rotational and translational motion

35. A sample of ^{18}F is used internally as a medical diagnostic tool to look for the effects of the positron decay $(T_{\frac{1}{2}} = 110\,\text{min})$. How long does it take for 99% of the ^{18}F to decay?

1) 12.4 h 2) 12.0 h 3) 12.2 h 4) 12.5 h

36. If the mass of neutron = 1.7×10^{-27} Kg, then the de-Broglie wavelength of neutron of energy 3 eV is

$(h = 6.6 \times 10^{-34}\, J - s)$

1) $1.6 \times 10^{-16} m$ 2) $1.6 \times 10^{-11} m$ 3) $1.4 \times 10^{-10} m$ 4) $1.4 \times 10^{-11} m$

37. A magnetic needle free to rotate in a vertical plane parallel to the magnetic meridian has its north tip pointing down at 22^0 with the horizontal. The horizontal component of the earth's magnetic field at the place is known to be 0.35 G. Determine the magnitude of the earth's magnetic field at the place. $(\cos 22^0 = 0.9272)$

1) 0.38 G 2) 0.35 G 3) 0.30 G 4) 0.40 G

38. Four rods of equal length l and mass m each from a square as shown in figure. Moment of Inertia about three axes 1, 2 and 3 are say $I_1, I_2 \text{ and } I_3$. Then, match the following

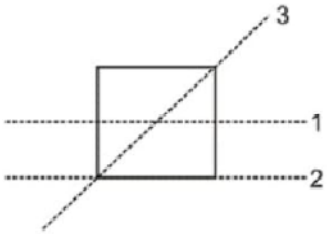


	Table-1		Table-2
(A)	I_1	(P)	$\frac{4}{3}m\ell^2$
(B)	I_2	(Q)	$\frac{3}{2}m\ell^2$
(C)	I_3	(R)	$\frac{1}{2}m\ell^2$
		(S)	None

1) (A)-Q, (B)-S, (C)-Q 2) (A)-S, (B)-Q, (C) –Q

3) (A) – Q, (B) – Q, (C) -S 4) (A) – R, (B) –Q, (C) – S

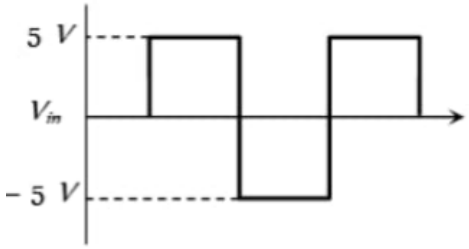
39. A room at 20^0 C is heated by a heater of resistance 20 ohm connected to 200 V mains. The temperature is uniform throughout the room at the heat is transmitted through a glass window of area 1 m^2 and thickness 0.2cm. Calculate the temperature outside. Thermal conductivity of glass is 0.2 cal/m^0C s and mechanical equivalent of heat is 4.2 J/cal

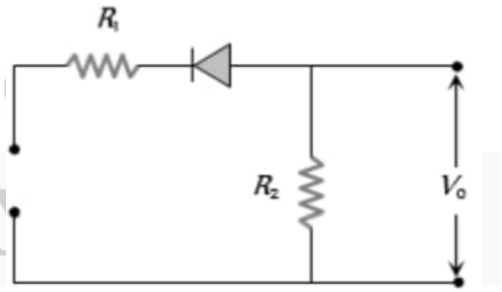
1) 13.69^0C 2) 15.24^0C 3) 17.85^0C 4) 19.96^0C

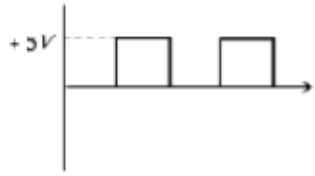
40. A gas mixture consist of 2 mole of oxygen and 4 mole of argon at temperature T. Neglecting all vibrational modes, the total internal energy of the system is-

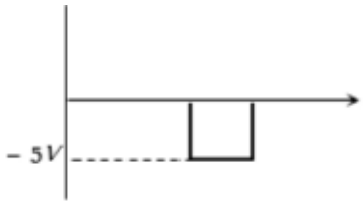
1) 4 RT 2) 15 RT 3) 9 RT 4) 11 RT

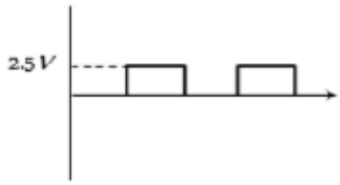
41. A waveform shown when applied to the following circuit will produce which of the following output waveform. Assuming ideal diode configuration and $R_1 = R_2$





1) 

2) 

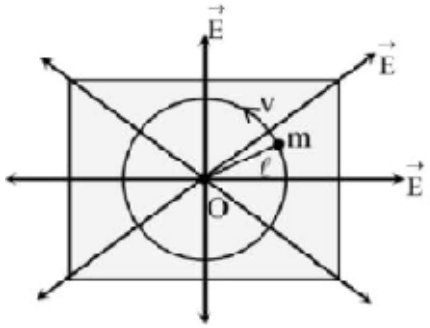
3) 

4) 

42. The maximum energy is thermal radiation from a source occurs at the wavelength $4000\overset{0}{A}$. The effective temperature of the source is (Wien's constant, b = $2.93\times10^{-3} mK$)

1) 7325 K 2) 800 K 3) 10^4 K 4) $10^6 K$

43. In a circular path on a frictionless table surface about point 'O' as shown in diagram. A hypothetical electric field in radial direction exists along the table surface. In this condition the bob is uncharged and tension is thread is T. If bob is given some charge –



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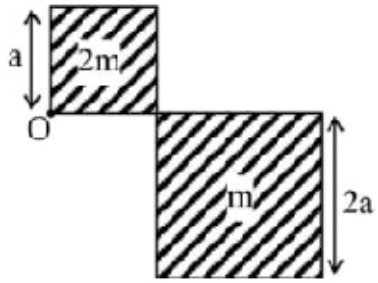
1) Tension in thread must increase 2) Tension in thread may increase or decrease

3) Tension in thread will remain unchanged 4) Tension in thread must decrease

44. An accurate pendulum clock is mounted on ground floor of a high building. How much time will it lose or gain in one day if it is transferred to top storey of a building which is h = 200 m higher than the ground floor? Radius of earth is $6.4\times10^{6}m$.

1) It will lose 6.2 s 2) It will lose 2.7 s 3) It will gain 5.2 s 4) It will gain 1.6 s

45. The distance of centre of mass from point O of two square plates system as shown, if masses of plates are 2m and m is (their edges are 'a' and '2a' respectively)-



1) $\frac{a}{2}$ 2) a 3) $\frac{3a}{2}$ 4) $\frac{2a}{3}$

CHEMISTRY

46. Which of the following statements are correct

A. CCP structures has three different types of layers.

B. In CCP structure, first and fourth layers are repeated.

C. In a HCP structures, first and fourth layers are repeated.

D. In FCC packing, the neighboring face centered atoms touch each other.

1) A and B only 2) A, B and D only 3) A, B, C and D 4) A, B and C only

47. Volume of 0.1 M H_2SO_4 required to neutralize 30 mL of 0.2 N NaOH is

1) 30 mL 2) 15mL 3) 40mL 4) 60 mL

48. The lanthanide contraction is responsible for the fact that

1)Zr and Hf have same radius 2)Zr and Zn have the same oxidation state

3)Zr and Y have same radius 4)Zr and Nb have similar oxidation state

49. The alkene C_6H_{10} producing $OHC(CH_2)_4CHO$ on ozonolysis is:

1)Hexene - 1 2)Hexene - 3

3) Cyclohexene 4) 1-Methylcyohexene

50. The final step for the extraction of copper from copper pyrite in Bessemer converter involves the reaction-

1) $4Cu_2O + FeS \rightarrow 8Cu + FeSO_4$ 2) $Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$

3) $2Cu_2O + FeS \rightarrow 4Cu + Fe + SO_2$ 4) $Cu_2S + 2FeO \rightarrow 2Cu + 2FeCO + SO_2$

(I) (II)

51.

(III) (IV)

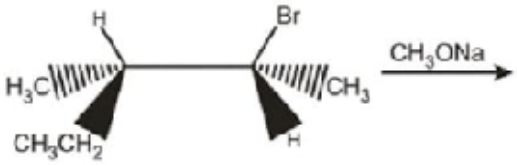
The order of reactivity towards diazo-coupling with phenol in the presence of dil.NaOH is -

1) I < IV < II < III 2) I < III < IV < II 3) III < I < II < IV 4) III < I < IV < II

52. Which of the following is an extensive property of the system?

1) Volume 2) Viscosity 3) Temperature 4) Refractive index

53. Choose the correct statement about the major product formed in E2 reaction?



1) The major product will be optically active

2) The major product will be trans-3-Methyl-2-pentene

3) The major product will be cis-3-Methyl-2-pentene

4)the major product will be 3-Methyl-1-pentene

54. Which of the following sets has strongest tendency to form anions?

1)Ga, In, TI 2) Na, Mg, Al 3) N, O, F 4) V, Cr, Mn

55. The decomposition of dimethyl ether leads to the formation of CH_4, H_2 and CO and the reaction rate is given by rate = $k[CH_2OCH_3]^{\frac{3}{2}}$

The rate of reaction is followed by increase in pressure in a closed vessel, so the rate can also be expressed in terms of the partial pressure of dimethyl ether i.e., rate = $k[P_{CH_3OCH_3}]^{\frac{3}{2}}$

If the pressure is measured in bar and time in minutes, then the unit of rate constant is:

1) $bar^{1/2}\ \min$ 2) $bar^{3/2}\ \min^{-1}$ 3) $bar^{-1/2}\ \min^{-1}$ 4) $bar\ \min^{-1}$

56. Given

$C(graphite)+O_2(g)\rightarrow CO_2(g); \Delta_r H^o = -393.5 kJmol^{-1}$

$H_2(g)+\frac{1}{2}O_2(g)\rightarrow H_2O(l); \Delta_r H^o = -285.8 kJmol^{-1}$

$CO_2(g)+2H_2O(l)\rightarrow CH_4(g)+2O_2(g); \Delta_r H^o = +890.38 kJmol^{-1}$

Based on the above thermochemical equations, the value of $\Delta_r H^o$ at 298K for the reaction $C(graphite)+2H_2(g)\rightarrow CH_4(g)$ will be

1) +144.0 kJ mol^{-1} 2) -74.8 kJ mol^{-1} 3) -144.0 kJ mol^{-1} 4) +74.8 kJ mol^{-1}

57. Determine the solubility of silver chromate at 298K given its K_{sp} value is 1.1×10^{-12}.

1) 6.5×10^{-5} 2) 2.4×10^{-2} 3) 3.6×10^{-3} 4) 8.9×10^{-4}

58. If the principal quantum number n = 6, the correct sequence of filling of electrons will be:

1)ns $\rightarrow$ (n-1)d $\rightarrow$ (n-2) f $\rightarrow$ np 2) ns $\rightarrow$ np $\rightarrow$ (n-1)d $\rightarrow$ (n-2)f

3)ns $\rightarrow$ (n-2)f $\rightarrow$ np $\rightarrow$ (n-1)d 4)ns $\rightarrow$ (n-2)f $\rightarrow$ (n-1)d $\rightarrow$ np

59. The valance shell electronic configuration of an element is ns^2np^5. The element will belong to the group of-

1) Alkali metals 2) Inert metals 3) Noble gases 4) Halogens

60. An azeotropic solution of two liquids has boiling point lower than either of them when it
1) shows negative deviation from Raoult's law
2)shows no deviation from Raoult's law
3)shows positive deviation from Raoult's law
4)is saturated

61. During electrolysis of water the volume of O_2 liberated is 2.24 dm^3. The volume of hydrogen liberated, under same conditions will be
1) 2.24 dm^3 2) 1.12 dm^3 3) 4.48 dm^3 4) 0.56 dm^3

62. The final product formed when methylamine is treated with $NaNO_2$ and HCl followed by hydrolysis is
1)Nitromethane 2)Methylcyanide 3) Methyl alcohol 4) Diazomethane

63. The bond angle of H_2Se is best described as
1) Between 109^0 and 120^0 2) Greater than 120^0
3) Less than that in H_2S but not less than 90^0 4) Less than 90^0

64. The equilibrium constant for a reaction $A+B \rightleftarrows C+D$ is 1×10^{-2} at 298K and is 2 at 273 K. The chemical process resulting in the formation of C and D is:
1) Exothermic 2) Endothermic 3) Unpredictable
4) There is no relationship between ΔH and K

65. The most suitable method of separation of 1:1 mixture of ortho and para-nitrophenol is
1) Sublimation 2) Chromatography 3)Crystallisation 4) Steam distillation

66. 4g of NaOH present in 0.1 dm^3 solution has specific gravity 1.038 $\frac{g}{mL}$. The normality of NaOH solution is?
1) 1N 2) 2N 3) 3N 4) 4N

67. 15 moles of H_2 and 5.2 moles of I_2 are mixed and allowed to attain equilibrium at 500^0C. At equilibrium, the number of moles of HI is found to be 10 mole. The equilibrium constant for the formation of HI is
1) 50 2) 15 3) 100 4) 25

68. Ferrous oxide has a cubic structure and each edge of the unit cell is $5.0\overset{0}{A}$. Assuming density of the oxide as 4.0 g cm^{-3} then the number of Fe^{2+} and O^{2-} ions present in each unit cell will be
1) Two Fe^{2+} and $four$ O^{2-} 2) Three Fe^{2+} and $three$ O^{2-}
3) Four Fe^{2+} and two O^{2-} 4) Four Fe^{2+} and $four$ O^{2-}

AAJ KA TOPPER

69. Which of the alkaline earth metal halides given below is essentially covalent in nature?
1) $BeCl_2$ 2) $MgCl_2$ 3) $SrCl_2$ 4) $CaCl_2$

70. Equal volumes of H_2 and Cl_2 are mixed. How will the volume of the mixture change after the reaction?
1) Unchanged 2) Reduced to half 3) Increases two fold 4) None of these

71. The mole fraction of a solute in its one molar aqueous solution is:
1) 0.018 2) 0.027 3) 0.036 4) 0.048

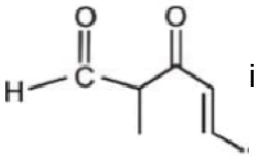
72. An ideal solution contains two volatile liquids A(P^0 =100 torr) and B(P^0 =200 torr). If the mixture contains 1 mole of A and 4 moles of B, then total vapour pressure of the distillate is

1) 150 torr 2) 180 torr 3) 188.88 torr 4) 198.88 torr

73. Identify the gas which is readily adsorbed by activate charcoal

1) H_2 2) N_2 3) SO_2 4) O_2

74. The IUPAC name of the compound



is _____

1)3-Keto-2-methylhex-4-enal 2) 5-Formylhex-2-en-3-one

3) 5-Methyl-4-oxohex-2-en-5-al 4) 3-Keto-2-methylhex-5-enal

75. Statement I: For adsorption $\Delta G, \Delta H, \Delta S$ all have negative values.

Statement II: Adsorption is an exothermic process in which randomness decreases due to force of attraction between adsorbent and adsorbate.

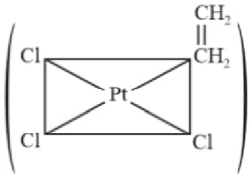
1) Statement I is true, statement II is also true and statement II is the correct explanation of statement I

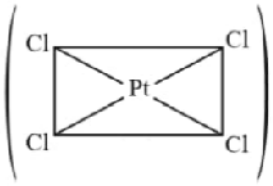
2) Statement I is true, statement II is also true and statement II is not the correct explanation of statement I

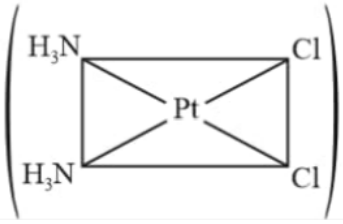
3) Statement I is true, statement II is false

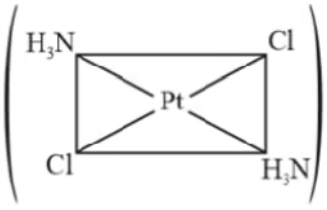
4) Statement I is false, statement II is true

76. Which of the following is considered to be an anticancer species?

1) 

2) 

3) 

4) 

77. The energy of an electron in first Bohr's orbit of H atom is -13.6 eV. The energy value of electron in the first excited state of Li^{2+} *is*

1) 27.2 eV 2) -30.6 eV 3) 30.6 eV 4) -27.2 eV

78. The ratio amongst most probable velocity, mean velocity and root mean square velocity is given by

1) $\sqrt{2}:\sqrt{3}:\sqrt{\frac{8}{\pi}}$ 2) $\sqrt{2}:\sqrt{\frac{8}{\pi}}:\sqrt{3}$ 3) $1:\sqrt{2}:\sqrt{3}$ 4) 1: 2 : 3

79. Which of the following has the lowest boiling point?

1) p-Nitrophenol 2) m-Nitrophenol 3) o-Nitrophenol 4) Phenol

80. The process of separation of racemic modification into d and 1 enantiomers is called as:
1) Resolution 2) Dehydration
3) Revolution 4)Dehydrohalogenation

81. Bakelite and polythene are considered as an example of:
1) Thermosetting polymers 2) Elastomers and thermoplastic polymers
3) Thermoplastic polymers 4) Thermosetting and thermoplastic polymers

82. Photochemical smog consists of excessive amount of X, in addition to aldehydes, ketones, peroxy acetyl nitrile (PAN). X is
1) CH_4 2) CO_2 3) O_2 4) CO

83. Which of the following statements is incorrect?
1) Different resonating structures contribute to the resonance hybrid in proportion of their energies
2) Equivalent resonating structures result in higher resonance energy
3) Resonating structures represent hypothetical molecules having no real existence.
4) Resonating structures are less stable than the resonance hybrid

84. In some solutions, the concentration of H_3O^+ remains constant even when small amounts of strong acid or strong base are added to them. These solutions are known as:
1) Ideal solutions 2) Colloidal solutions 3) True solutions 4) Buffer solutions

85. Among the following, the narrow spectrum antibiotic is:
1) Penicillin - G 2) Ampicillin 3)Amoxycillin 4) Chloramphenicol

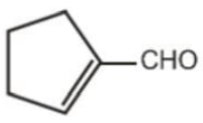
86. Which reaction is suitable for preparing α -Chloroacetic acid?
1) Hell-Volhard-Zelinsky reaction 2) Stephen's reaction
3) Perkin's reaction 4)None of these

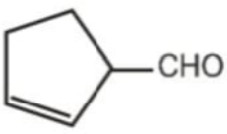
87. A mixture of methane and Ethene in a molar ratio of x:y has an average molecular mass of 20u. The mean molar mass when they are mixed in the molar ratio of y : x will be
1) 20 2) 25 3) 24 4) 15

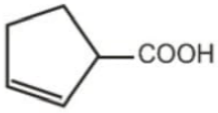
88. For a given reaction, energy of activation for forward reaction $(E_a)_f$ is 80 kJ mol^{-1} and $\Delta H = -40\ KJmol^{-1}$. A catalyst lowers $(E_a)_f$ to 20 KJ mol^{-1}. The ratio of energy of activation for reverse reaction before and after addition catalyst is:
1) 1.0 2) 0.5 3) 1.2 4) 2.0

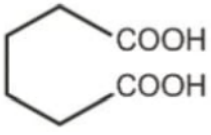
89. 3 Faradays of electricity was passed through an aqueous solution of iron (II) bromide. The weight of iron metal (at.wt. = 56) deposited at the cathode (in g) is
1) 65 2) 84 3) 112 4) 168

90. Cyclohexene on ozonolysis followed by reaction with Zn dust and water gives compound E and compound E on further treatment with aqueous KOH yields compound F.The compound F is

1) 

2) 

3) 

4) 

BIOLOGY

91. The embryogenesis is the process of the development of an embryo from the zygote. During this process zygote undergoes
1) Meiosis 2) Cleavage only
3) Cell differentiation 4) Both cleavage and cell differentiation

92. Most diverse macromolecules, found in the cell both physically and chemically are
1) Proteins 2) Carbohydrates 3) Nucleic acids 4) Lipids

93. The element which helps in oxygen evolution in the process of photosynthesis is
1) Zn and Mn 2) Mo and Cl 3) B and Mg 4) Cl and Mn

94. Although much carbon dioxide is carried in the blood, yet blood does not become acidic because
1) CO_2 is continuously diffused through the tissues and is not allowed to accumulate
2) CO_2 combines with water to form H_2CO_3 which is neutralized by Na_2CO_3
3) In CO_2 transport, blood buffers play an important role
4) CO_2 is absorbed by leucocytes

95. The science of rearing, feeding, care, breeding and utilization of animals is called
1) Poultry 2) Veterinary science 3) Animal husbandry 4) Dairy science

96. Which one of the following statements is correct regarding blood pressure?
1) 130/90 mm Hg is considered high and requires treatment 2) 105/55 mm Hg is considered an ideal blood pressure 3) 105/50 mm Hg makes one very active 4) 190/110 mm Hg may harm vital organs like brain and kidney

97. If the base sequence in one chain of DNA is GCATG, what shall be the sequence in the replicated complementary strand?
1) GCATG 2) CGTAC 3) ATGCG 4) GCATC

98. Collar cells from the lining of spongocoel in

1) Jelly fish 2) Sycon 3) Taenia 4) Pila

99. Choose the option that is showing the correct sequence of events occurring in each cycle of polymerase chain reaction (PCR).
1) Denaturation, extension, primer annealing.
2) Primer anneali ng, denaturation, extension.
3) Denaturation, primer annealing, extension.
4) Etension, primer annealing, denaturation.

100. In which of the following reactions of glycolysis, a molecule of water is removed from the substrate?
1) Fructose-6-phosphate $\rightarrow$ Fructose-1, 6- bisphosphate
2) 3-phosphate-glyceraldehyde $\rightarrow$ 1, 3 bisphosphoglyceric acid
3) PEP $\rightarrow$ Pyruvic acid
4) 2- phosphoglycerate $\rightarrow$ PEP

101. The cell junctions called tight, adhering and gap junctions are found in
1) Muscular tissue 2) Connective tissue 3) Epithelial tissue 4) Neural tissue

102. Which one of the following is not included under in-situ conservation?
1) Botanical garden 2) Biosphere reserve
3) National park 4) Sanctuary

103. A new crop, that is the source of a high-performance lubricants is
1) Simmondsia chinensis 2) Parthenium argentatum
3) Psophocarpus tetragonolobus 4) Leucaena leucocephala

104. The term test-tube implies that
1) Fertilization of ovum takes place in the uterus but develops in the test-tube
2) Fertilization of ovum takes place in the test-tube and develops in test-tube itself
3) Fertilization of ovum takes place in test-tube but it develops in the uterus
4) Fertilization of ovum takes place in the fallopian tube and embryo develops in the uterus

105. With respect of the sodium-potassium pump, what changes will be observed when one molecule of ATP is used during the process?
1) 3 ions of Na^+ are pumped out and $2K^+$ are taken in
2) 3 ions of Na^+ are taken in and $2K^+$ are pumped out
3) 2 ions of Na^+ are thrown out and $3K^+$ are absorbed
4) 3 ions of K^+ are absorbed, $3Na^+$ are pumped out

106. Which of the following soil bacterium produces a protein/chemical that is toxic to insect pests?
1) Proteobacteria 2) Bacillus thuringiensis 3) Spirochaetes 4) Trichoderma

107. What is sarcomere?
1) Part between two H-lines 2) Part between two A-lines
3) Part between two I-bands 4) Part between two Z-lines

108. The site of ADA production in the body is
1) Neutrophils 2) Lymphocytes 3) Blood plasma 4) Monocytes

109. Which on of the following can utilize molecular nitrogen (N_2) as a nutrient for growt?
1) Rhizobium 2) Spirogyra 3) Mucor 4) Methanococcus

110. Tobacco and Petunia belong to the family
1) Poaceae 2) Fabaceae 3) Solanaceae 4) Brassicaceae

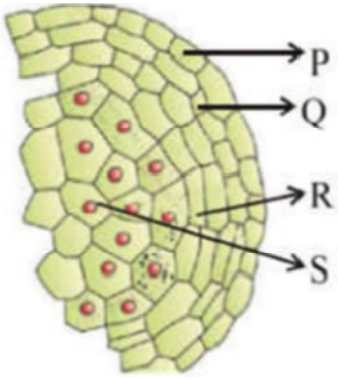
111. In lichens, sexual reproduction belongs to
1) Fungal partner only 2) Algal partner only
3) Both fungal and algal partners 4) Neither fungal or algal partner

112. If Cowper's glands are removed, it will affect
1) Erection of penis 2) Sperms 3) Sex recognition 4) Sexual behavior

113. In Pteridophytes, meiosis occurs in
1) Egg 2) Zygote 3) Antherozoids 4) Spore mother cells

114. Which one of the following pairs is wrongly matched?
1) Yeast - ethanol 2) Streptomyxetes - Antibiotic
3) Coliforms - vinegar 4) Methanogens – gobar gas.

115. Identity the parts labelled P, Q, R, and S, and select the right option about them.



	Part-(P)	Part-(Q)	Part-(R)	Part-(S)
1	Epidermis	Endothecium	Microspore mother cells	Middle layer
2	Epidermis	Endothecium	Middle layer	Microscope mother cells
3	Endothecium	Epidermis	Microspore mother cells	Middle layer
4	Endothecium	Epidermis		Microspore mother cells

116. Which on of the following is the product of the dark reaction of photosynthesis?

1) CO_2 2) ATP

3) Pyruvic acid 4) Phosphoglyceraldehyde

117. Which one of the following would occur during bolting?

1) Uptake of water 2) Elongation of internodes

3) Uptake of mineral salts 4) Extension of lamina

118. Which one of the following is not a component of saliva?

1) Saliva contains electrolytes Na^+ , K^+ ,CL^- and HCO_3^- ions.

2) a Ptyalin salivary amylase

3) Mucin, lysozyme and thiocyanate ions

4) Antibody IgM

119. The cell wall consists of

1) Lignin, hemicelluloses, protein and lipid

2) hemicelluloses, cellulose, tubulin and lignin

3) Lignin, hemicelluloses, pectin and lipid cellulose

4) Lignin, hemicelluloses, pectin and cellulose

120. In a Mendelian dihybrid cross, the probability of getting seeds with genotype Rryy, RrYy, rrYy and RrYY in F_2 genaration is respectively

1) $\frac{2}{16}:\frac{4}{16}:\frac{1}{8}:\frac{1}{8}$ 2) $\frac{2}{16}:\frac{2}{16}:\frac{2}{16}:\frac{2}{16}$ 3) $\frac{4}{16}:\frac{4}{16}:\frac{2}{16}:\frac{2}{16}$ 4) $\frac{1}{8}:\frac{1}{4}:\frac{2}{8}:\frac{1}{16}$

121. Which one of the following elements is not an essential micronutrient for plant growth?

1) Zn 2) Cu 3) Ca 4) Mn

122. If birth and death rates were equal, a zero population growth rate would result. It is known as
1) Replacement level 2) Rate of natural increase
3) Stable population 4) Doubling time

123. Menstruation cycle occurs
1) In all mammals 2) In eutherian animals 3) In metatherian animals 4) In all primates

124. Eutrophication is caused by
1) Phosphate rocks only 2) Agricultural fertilizers only
3) Sewage and phosphate rocks 4) Sewage and agricultural fertilizers

125. Which type of ovary is found in the Liliaceae family?
1) Superior & monocarpellary 2) Superior & tricarpellary
3) Inferior & monocarpellary 4) Inferior & bicarpellary

126. A somaclonal variation appears in plants
1) Growing in polluted soil or water 2) Exposed to gamma rays
3) Raised in tissue culture 4) Transformed by DNA technology

127. In honey bees, the drones are produced from
1) Unfertilized eggs 2) Fertilized eggs
3) Larvae fed by royal jelly 4)Fasting larvae

128. Active transport of lions by the cell requires
1) High temperature 2) ATP
3) Alkaline pH 4) Salts

129. The kind of epithelium which forms the inner walls of blood vessels is
1) Cuboidal epithelium 2) Columnar epithelium
3) Ciliated columnar epithelium 4) Squamous epithelium

130. Which one of the following is not an insectivorous plant?
1) Drosera 2) Nepenthes 3) Monotropa 4) Utricularia

131. Pregnancy begins with implantation of
1) Embryo 2) Fertilized ovum 3) Blastopore 4) Blastocyst

132. The application of biotechnology includes all, except
1) Biofortified crops 2) Gene therapy
3) Molecular diagnostics 4) Conventional hybridization

133. In an organism, if the normal diploid number of chromosomes is 8, how many chromatids are present in each daughter cell at the end of meiosis I
1) 2 2) 4 3) 8 4) 16

134. Diaphragms are contraceptive devices used by females. Choose the correct option from the statements given below:
I. They are introduced into the uterus
II.They are placed to cover the cervical region
III. They are an example of physical barriers.
IV. They act as spermicidal agents.
1) I and II 2) I and III
3) II and III 4) III and IV

135. ABA is involved in
1) Dormancy of seeds 2) Root elongation
3) Shoot elongation 4) Increased cell division

136. Calcitonin
1) Lowers calcium level in blood 2) Elevates calcium level in blood
3) Has no effect on calcium levels 4) Elevates potassium level in blood

137. Pollination that occurs in closed flowers is known as
1) Allgamy 2) Cleistogamy 3) Dicliny 4) Protogyny

138. Cork camblium is developed from
1) Apical meristem 2) Intercalary meristem 3) Primitive meristem 4) Lateral meristem

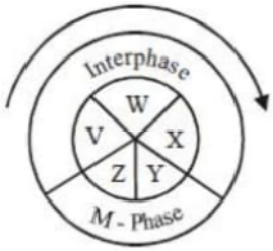
139. Which of the following statements regarding coenzymes and prosthetic groups of enzymes is not true?
1) Both are reqired for enzyme action
2) Both can be separated from enzyme by dialysis
3) Both are organic compounds 4) Both are not polypeptides

140. Which is not an opiate narcotic?
1) Amphetamine 2) Morphine 3)Heroin 4) Pethidine

141. Chloroplast of Chlamydomonas is
1) Collar-shaped 2) Spiral 3) Cup-shaped 4) Stellate

142. Viral infection is usually absent in
1) Phloem cells 2) Xylem cells 3) Pith cells 4) Apical meristem

143. The diagram below shows a cell cyle



AAJ KA TOPPER

Which of the following process occur during V?
1) Replication of DNA 2) Replication of centrioles
3) Chromosomes condense and become shorter and thicker
4) High metabolic rate and synthesis of proteins and cellular organelles

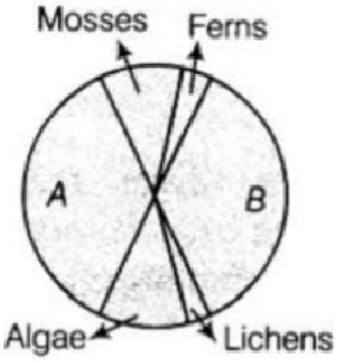
144. Two friend are eating together on a dining table. One of the them suddenly starts coughing while swallowing some food. This coughing would have been due to improper movement of
1) Epiglottis 2) Diaphragm 3) Neck 4) Tongue

145. Which one of the following is the first step of glycolysis?
1) Breakdown of glucose 2) Phosphorylation of glucose
3) Conversion of glucose into fructose 4) Dehydration of glucose

146. In mitochondrial electron transport system
1) Number of ATP molecules synthesized does not depend on nature of electron donor
2) Ubiquinone receives reducing equivalents via $FADH_2$ also
3) Cytochrome c is a large protein attached to outer surface of inner mitochondrial membrane
4) Complex IV has cyt. a and cyt a_3 but no copper centres

147. Which of the following branches of biology applies to both plants and animals?
1) Entomology 2) Zoology 3) Bacteriology 4) Taxonomy

148. Single the unlabelled areas 'A' and 'B' of the pie chart representing the biodiversity showing their proportionate number of species of major taxa



1) A = Bryophytes, B = Gymnosperms 2) A = Fungi, B = Gymnosperms
3) A = Pteriodphytes, B = Angiosperms 4) A = Fungi, B = Angiosperms

149. The Montreal Protocol refers to
1) Persistent organic pollutants 2) Global warming and climate change
3) Substances that deplete the ozone layer 4) Biosafety of genetically modified organisms

150. DNA or RNA segment tagged with radioactive molecule is called
1) Vector 2) Probe 3) Clone 4) Plasmid

151. Valium is an example of
1) Benzodiazephines 2) Barbiturates
3) Stimulants 4) Hallucinogens

152. If a colour-blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour-blind is
1) 0% 2) 50% 3) 75% 4) 100%

153. The net pressure gradient that causes the fluid to filter out from the glomeruli into the capsule is
1) 50 mm Hg 2) 75 mm Hg 3) 10 mm Hg 4) 30 mm Hg

154. Find the incorrect pair.
1) Humans – Ureotelic 2) Birds – Uricotelic
3) Lizards – Uricotelic 4) Whale – Ammonotelic

155. When environmental conditions are favorable, then the population growth curve will be
1) Hyperbola 2) 'J' shaped 3) 'S' shaped 4) None of these

156. Which bacteria are utilized the biogas plant?
1) Methanogens 2) Nitrifying 3) Ammonifying 4) Denitrifying

157. Erythropoiesis may be stimulated by the deficiency of
1) Iron 2) Oxygen 3) Protein 4) None of the above

158. Apomixis is a type of reproduction that results in the development of a/an
1) New seed with fusion of gametes 2) Embryo from nucellus
3) New seed without fusion of gametes 4) Embryo from endosperm

159. Which of the following statement is correct?
1) Paramoecium and Plasmodium belong to the same kingdom as that of Penicillium
2) Lichen is a composite organism formed from the symbiotic association of an algae and a protozoan
3) Yeast used in making bread and beer is a fungus
4) Nostoc and Anabaena are examples of protists

160. The largest number of neurons are found in
1) Brain 2) Retina 3) Spinal cord 4) Tongue

161. The adsorption of water by hydrophilic compounds like cellulose and pectin in root hair cell wall is called _____
1) Diffusion 2) Imbibition 3) Guttation 4) Osmosis

162. Plasmodesmata are cytoplasmic bridges between adjacent plant cells, lined by _____ and often have desmotubules.
1) Apoplasm 2) Plasma membrane 3) Desmosomes 4) ER tubule

163. Which one of the following phenomena supports Darwin's concept of natural selection in organic evolution?
1) Development of transgenic animals 2) Production of 'Dolly', the sheep by cloning
3) Prevalence of pesticide resistant insects
4) Development of organs from 'stem cells' for organ transplantation

164. One of the most important functions of botanical garden is
1) One can observe tropical plants there
2) They allow Ex-situ conservation of germplasm
3) They provide the natural habitat for wildlife
4) They provide a beautiful area of recreation

165. Haemocoel is found in
1) Hydra and Aurelia 2) Taenia and Ascaris
3) Cockroach and scorpion 4) Balanoglossus and Herdmania

166. With the disintegration of corpus luteum, a decrease in the secretion of _____ hormone occurs.
1) LH 2) Progesterone 3) LTH 4) FSH

167. Find the odd one out with respect to the functions of an ecosystem
1) Nutrient cycling 2) Energy flow 3) Decomposition 4) Stratification

168. The DNA molecule to which the gene of interest is integrated for cloning is called
1) Vector 2) REN 3) Competent cell 4) Transformer

169. In the tissues, high concentration of carbon dioxide
1) Increases the affinity of haemoglobin to both oxygen and hydrogen
2) Increases the affinity of haemoglobin to oxygen but decreases its affinity to hydrogen
3) Decreases the affinity of haemoglobin to oxygen but increases its affinity to hydrogen
4) Decreases the affinity of haemoglobin to both oxygen and hydrogen

170. In the C_4 pathway
1) Chloroplasts are of same type
2) Kranz anatomy occurs where mesophyll have large chloroplasts whereas bundle sheath have granular chloroplasts
3) Kranz anatomy occurs where mesophyll have small chloroplasts whereas bundle sheath have larger agranular chloroplasts
4) Kranz anatomy where mesophyll cells are diffused

171. Chlorophyll is
1) Soluble in organic solvents
2) Soluble in water
3) Soluble in both organic solvents and water
4) None of the above

172. Cut-pieces of a Bryophyllum leaf, when put into wet soil, produce new plants. This phenomenon is called as
1) Vegetative propagation
2) Tissue culture
3) Leaf primordial culture
4) Meristem culture

173. Innominate is a
1) Nerve
2) Muscle
3) Animal
4) Part of skeleton

174. Examples of areas where secondary succession occurs are
1) Abandoned farmlands, newly cooled lava, bare rock
2) Burned or cut forests, lands that have been flooded
3) Bare rock, newly created pond of reservoir
4) Newly created pond, lands that have been flooded

175. In negative operon
1) Inducer binds with repressor
2) Co-repressor does not bind with repressor
3) Co-repressor binds with inducer
4) cAMP have negative effect on lac operon

176. Choose the correct match w.r.t. the drug, its source, and its action

	Drug	Source	Action
1)	Morphine	Latex of Papaver somniferum	Depress brain activity and is very effective stimulant
2)	Cocaine	Erythroxylum coca	High levels don't cause hallucinations
3)	Heroine	Acetylation of morphine	Used to reduce pain
4)	Barbiturates	Derivative of opium	Depressed brain activity and produces feelings of calmness, relaxation and drowsiness.

177. Which one of the following represents a palindromic sequence in DNA?
1) $\begin{matrix}5'-GAATTC-3'\\3'-CTTAAG-5'\end{matrix}$
2) $\begin{matrix}5'-CCAATG-3'\\3'-GAATCC-5'\end{matrix}$
3) $\begin{matrix}5'-CATTAG-3'\\3'-GATAAC-5'\end{matrix}$
4) $\begin{matrix}5'-GATACC-3'\\3'-CCTAAG-5'\end{matrix}$

178. Wings of the bat, locust and pigeon are an example of
1) Vestigeal organs 2) Exoskeletal structures 3) Homologous organs 4) Analogous organs

179. Differentiation of shoot is controlled by
1) High gibberellins: cytokinin ratio 2) High auxin : cytokinin ratio
3) High cytokinin : auxin ratio 4) High gibberellin : auxin ratio

180. The method of sterilization is
1) Lippes Loop 2) IUD 3) Implants 4) Tubectomy

NTA NEET MOCK TEST – 2
KEY & SOLUTIONS
PHYSICS KEY

1-10	4	3	1	1	4	2	1	2	4	2
11-20	2	2	3	1	3	2	1	3	3	1
21-30	2	4	4	3	4	3	4	2	1	3
31-40	1	3	1	1	3	2	1	1	2	4
41-45	4	1	2	2	2					

CHEMISTRY KEY

1-10	1	1	1	3	2	2	1	2	3	3
11-20	2	1	4	4	3	3	3	3	1	4
21-30	1	1	4	1	1	1	3	3	1	1
31-40	3	2	2	4	1	4	3	1	4	1
41-45	1	3	4	2	1					

BIOLOGY KEY

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1-10	4	1	4	3	3	4	2	2	3	4
11-20	3	1	1	3	1	2	4	2	1	3
21-30	1	2	4	3	2	4	2	4	3	1
31-40	3	3	2	4	2	3	1	2	4	3
41-50	4	4	3	4	1	1	2	4	2	1
51-60	3	4	4	2	2	2	4	4	3	2
61-70	1	1	3	4	2	1	2	3	3	1
71-80	2	2	3	2	3	2	4	1	3	3
81-90	1	2	4	2	1	3	1	4	3	4

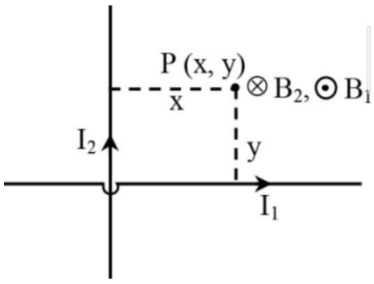
PHYSICS SOLUTIONS

1. From the definition of bulk modulus,

$$\beta = -\frac{\Delta P}{\Delta V / V} = -V.\frac{\Delta P}{\Delta V}$$

Substituting the values, we have

$$\beta = \frac{-(1.165-1.01)\times 10^5}{-10}\times 100 = 1.55\times 10^5\, Pa$$

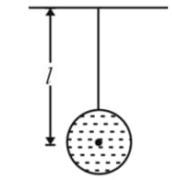
2. 

$B_P = 0$

$B_1 - B_2 = 0$

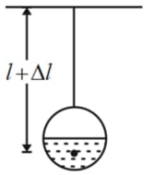
$\Rightarrow B_1 = B_2$

$$\frac{\mu_0 I_1}{2\pi y} = \frac{\mu_0}{2\pi}\frac{I_2}{x} \therefore y = \frac{I_1}{I_2}X$$



Spherical hollow ball filled with water

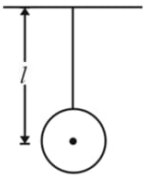
$T = 2\pi\sqrt{\frac{l}{g}}$



Spherical hollow ball half filled with water

$T_1 = 2\pi\sqrt{\frac{l+\Delta l}{g}}$

3.



Spherical hollow ball

$T_2 = 2\pi\sqrt{\frac{l}{g}}$

and $T_1 > T_2$

Hence, time period first increases and then decreases to the original value. The given system is like a simple pendulum, whose effective length between the point of suspension and the center of gravity of the hanging body is changing. When water slowly flows out, the sphere, the C.G of system is lowered and hence L increase.

4. $$R = \rho\frac{L}{A} = \frac{ml}{ne^2\tau A}$$

$$\left\{\rho = \frac{m}{ne^3 r}\right\}$$

m = mass of electron

l = length of conductor

n = charge density

e = charge of electron

τ = relaxation time

A = cross-sectional area

5. Use i = ne Av_d

$$\therefore V_d = \frac{i}{neA}$$

$$V_d = \frac{5.4}{8.4\times10^{28}\times1.6\times10^{-19}\times10^{-6}}$$

$$V_d = \frac{5.4\times10^{-3}}{8.4\times1.6}$$

$$V_d = 0.4mm\,s^{-1}$$

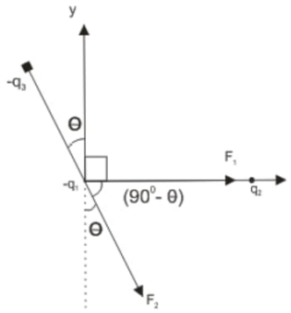
6. Force on $(-q_1)$ due to $q_2 = \frac{q_1 q_2}{4\pi\varepsilon_0 b^2}$

$$\therefore F_1 = \frac{q_1 q_2}{4\pi\varepsilon_0 b^2} along\,(q_1 q_2)$$

Force on $(-q_1)\,due\,to\,(-q_3) = \dfrac{(q_1)(q_3)}{4\pi\varepsilon_0 a^2}$

$F_2 = \dfrac{q_1 q_2}{4\pi\varepsilon_0 a^2}$ as shown

$F_2 >$ makes an angle of $(90^0 - \theta)$ with $(q_1 q_2)$



Resolved part of F_2 along $q_1 q_2 = F_2 \cos(90^0 - \theta)$

$= \dfrac{q_1 q_3 \sin\theta}{4\pi\varepsilon_0 a^2} along\,(q_1 q_2)$

$\therefore Total\ force\,on\,(-q_1)$

$= \left[\dfrac{q_1 q_2}{4\pi\varepsilon_0 b^2} + \dfrac{q_1 q_3 \sin\theta}{4\pi\varepsilon_0 a^2}\right]$ along x-axis

$\therefore$ x-component of force $\alpha\left[\dfrac{q_2}{b^2} + \dfrac{q_3}{a^2}\sin\theta\right]$

7. For real inverted image formed by concave mirroe.

$v = -ve, u = -ve, f = -ve$

$\Rightarrow \dfrac{u}{f} \& \dfrac{v}{f}$ are positive

So graph show be in 1st quadrant and $\dfrac{1}{v} + \dfrac{1}{u} = \dfrac{1}{f}$

$\Rightarrow \dfrac{f}{v} + \dfrac{f}{u} = 1$ AAJ KA TOPPER

This graph can also be realized by Newtons formula $x_1 x_2 = f^2$ where x_1, and x_2 are distance from focus so graph will be rectangular hyperbola

$\Rightarrow (1)$ is right angswer.

8. Number of revolutions = are under the curve

no.of revolution

$= \dfrac{1}{2} \times \left(\dfrac{2400}{60} + \dfrac{600}{60}\right) \times 8 + \dfrac{1}{2} \times \dfrac{600}{60} \times 16$

no. of revolution = 280

9. Given, $x = 0.20m, y = 0.20m, u = 1.8 ms^{-1}$

Let the ball strike the nth step of stairs,

Vertical distance travelled = ny

Using equation of motion in y-direction $s = ut + \dfrac{1}{2}at^2$

$\Rightarrow -ny = 0 - \frac{1}{2}gt^2$.....(1)

Horizontal distance travelled = nx

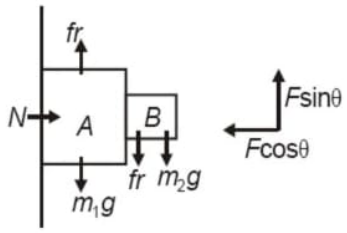
$\Rightarrow nx = ut$

$\Rightarrow t = \frac{nx}{u}$ ……(2)

Using (1) & (2)

$ny = \frac{1}{2}g\left(\frac{nx}{u}\right)^2$

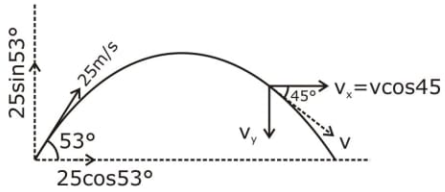
$or\ n = \frac{2u^2}{g}\frac{y}{x^2} = 3.3 \Rightarrow 4^{th}\ stair$

10. 

Block 'A' cannot be in equilibrium. Due to F sin θ component (upwards) on block 'B', Block 'A' moves downwards relative to block 'B'. So, friction on block 'B' downwards.

11. Electromagnetic waves travel in free space or vacuum with the velocity of light $(3\times10^8 ms^{-1})$.

12. At E, the slope of the curve is negative, i.e., for a displacement – time graph the slope represents the velocity and at E, the velocity is –ve as the slope is –ve.

13. 

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Horizontal component of velocity throughout the motion remain constant

Using $u\cos\theta = v\cos\alpha$

$25\cos 53^0 = v\cos 45^0$

$\Rightarrow v = 25\times\frac{3}{5}.\sqrt{2}$

$= 15\sqrt{2}$

$\Rightarrow v_\mu = v\sin 45 = 15$

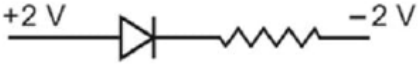
Now using $V_y = u_y + a_y t\ in\ y - direction,$

$-15 = 25\sin 53^0 - gt$

$-15 = 25\times\frac{4}{5} - 10t$

$\Rightarrow t = 3.5\sec$

14. In case of forward biased circuit P-junction should be at higher potential. Therefore



15. $\frac{\Delta l}{l}\times 100=\frac{0.01}{15.12}\times 100=0.07$

$\frac{\Delta b}{b}\times 100=\frac{0.01}{10.15}\times 100=0.1,$

$\frac{\Delta t}{t}\times 100=\frac{0.01}{5.28}\times 100=0.2$

Required percentage = 0.066 + 0.098 + 0.189 = 0.35%

16. $Q=\frac{1}{R}\sqrt{\frac{L}{C}}$

$=\frac{1}{10}\sqrt{\frac{8.1\times 10^{-3}}{12.5\times 10^{-6}}}=\frac{1}{10}\sqrt{\frac{81\times 1000}{125}}$

$=\frac{9}{5}\sqrt{2}=2.54$

17. For reflected system of the film, the consition for maxima is $2\mu t\cos r=(2n-1)\frac{\lambda}{2}$. While the maxima for transmitted system of film is $2\mu t\cos r=n\lambda$ and is reverse for minima. A & R are true and R is the correct explanation of A.

18. Equation of motion of the particles are $X_1=A_1\sin\frac{2\pi}{T_1}t$ *and* $X_2=A_2\sin\frac{2\pi}{T_2}t$

$\therefore$ Phase difference $\Delta\phi=\left(\frac{2\pi}{T_1}-\frac{2\pi}{T_2}\right)t=\left(\frac{2\pi}{T}-\frac{2\pi}{5T/4}\right)t$

at t = T

$\Delta\phi=(2\pi-\frac{4\times 2\pi}{5})\frac{T}{T}=\frac{2\pi}{5}$

19. $PV=\frac{m}{M}RT$ (for ideal gas)

$\therefore MV=\frac{mRT}{P}$

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In the position of equilibrium of stopper S.

$P_1=P_2, T_1=T_2, m_1=m_2$

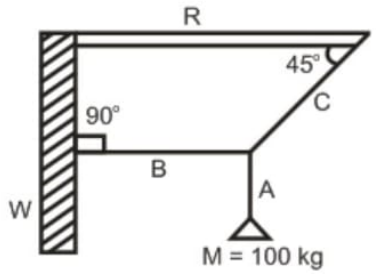
$\therefore MV=cons\tan t$

$M_1V_1=M_2V_2$

$\Rightarrow A\times 32(360-\alpha)=28\alpha\times A$

$\therefore \alpha=192^0$

20. Let T be the tension in the string C. Hence



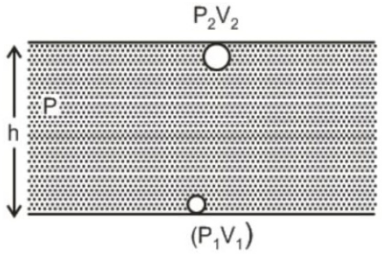
$T\cos 45^0 = Mg$

$T\sin 45^0 = tension\,in\,B$

Hence, tension in B = Mg = 100gN

21. According to Boyle's law, pressure and volume are inversely proportional to each other i.e.,

$p\alpha\frac{1}{v}$



$\Rightarrow P_1V_1 = P_2V_2$

$\Rightarrow (P_0 + h\rho_w g)V_1 = P_0V_2$

$\Rightarrow V_2 = (1+\frac{h\rho_w g}{P_0})V_1$

$V_2 = (1+\frac{47.6*1*1000*10}{70*10^{-2}*13.6*1000*10})V_1$

[As $P_2 = P_0 = 70cm\,of\,Hg = 70\times10^{-2}\times13.6\times1000\times10$]

$\Rightarrow V_2 = (1+5)50cm^3 = 300cm^3$

22. In the experiment to determine the focal length of a concave mirror by graphical methods the u-v graph is hyperbolic.

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23. By Malus law, $I = I_0\cos^2\theta$

(I = Intensity of emergent polarized light)

Where $\theta = 60^0, I = ?$

$= I_0\times\cos^2 60^0$

(I_0 =intensity passed through polarizer)

$= I_0\times\left(\frac{1}{2}\right)^2 = \frac{I_0}{4}$

24. Electromagnetic wave propagate perpendicular to electric and magnetic field vector and in the direction parallel to $\vec{E}\times\vec{B}$

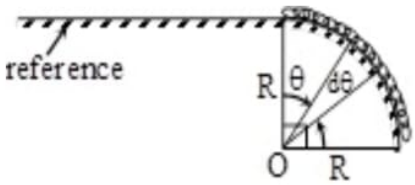
25. By using maker formula

$\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$

$\frac{1}{v}=\frac{1}{u}+\frac{1}{f}$

$\frac{1}{v}=\frac{1}{0.2}+\frac{1}{-0.3}\Rightarrow v = 60cm$

26. Taking flat surface as reference,



$$dU_i = -\left(\frac{m}{l}Rd\theta\right)\times g \times R[1-\cos\theta)$$

$$dU_i = -\frac{mgR^2}{l}[1-\cos\theta]d\theta$$

$$\therefore U_i = -\frac{mgR^2}{l}[\left(\frac{l}{R}\right)-\sin\left(\frac{l}{R}\right)] and\, U_f = 0$$

$$\therefore W_{ext} = -\Delta U$$

27. The value of g at surface

$$g = \frac{Gm_e\rho}{R_e^2} = \frac{G}{R_e^2}.\frac{4\pi}{3}R_e^3\rho$$

$$g = \frac{4}{3}\pi GR\rho$$

So, $\frac{g_1}{g_2} = \frac{\frac{4}{3}\pi GR_1\rho_1}{\frac{4}{3}\pi GR_2\rho_2}$

$$\Rightarrow \frac{g_1}{g_2} = \frac{R_1\rho_1}{R_2\rho_2}$$

28. $$K.E = \frac{KZe^2}{2r}$$

$$P.E = \frac{-KZe^2}{r}$$

$$T.E. = P.E. + K.E. = \frac{-KZe^2}{2R}$$

Therefore,

$$TE = -KE = \frac{PE}{2} = -3.4eV$$

So, KE = 3.14 eV

Let p = momentum and m = mass of the electron

$$\therefore E = \frac{p^2}{2m} or\ p = \sqrt{2mE}$$

de Broglie wavelength,

$$\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mE}}$$

On substituting the values, we get

$$\lambda = \frac{6.63\times10^{-34}}{\sqrt{2\times9.1\times10^{-31}\times3.4\times1.6\times10^{-19}}}$$

$$= 6.6\times10^{-10}m$$

29. For the end correction x,

$$\Rightarrow x = \frac{l_2 - 3l_1}{2}$$

$$= \frac{70.2 - 3 \times 22.7}{2} = 1.05cm$$

30. Efficiency, $\eta = 1 - \frac{T_2}{T_1} = 1 - \frac{500}{800} = \frac{3}{8} = 0.375$

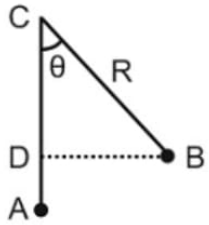
31. $$c = \frac{1}{\sqrt{\mu_0 \in_0}}$$

Or $c^2 = \frac{1}{\mu_0 \in_0}$

The dimensional formula is,

$$\left[\frac{1}{\mu_0 \in_0}\right] = M^0 L^2 T^{-2}$$

32.



$$V = \sqrt{4gR} = 2\sqrt{gR}$$

$$u = \frac{\sqrt{4gR}}{2} = \sqrt{gR}$$

Conserving Mechanical energy

$$\frac{1}{2}mv^2 = \frac{1}{2}mu'^2 + mgh$$

$$\frac{1}{2}m(4gR) = \frac{1}{2}m(gR)$$

$$+mgR(1 - \cos\theta)$$

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Cancelling common term mgR we have

$$2 = \frac{1}{2} + 1 - \cos\theta$$

$$\cos\theta = -\frac{1}{2}$$

33. The equation for the given v-x graph is $v = \frac{v_0}{x_0}x + v_0 ...(i)$

Differentiating the above equation w.r.t. x we get

$$\frac{dv}{dx} = -\frac{v_0}{x_0}$$

Multiplying both sides of the above equation by v, we get

$$v\frac{dv}{dx} = -\frac{v_0}{x_0} \times v = -\frac{v_0}{x_0}\left[-\frac{v_0}{x_0}x + v_0\right] ....(i),$$

$\therefore a = \frac{v_0^2}{x_0^2}x - \frac{v_0^2}{x_0}....(ii)$

$\left[\because a = v\frac{dv}{dx}\right]$

On comparing equation (ii) with equation of a straight line $y = mx + c$ where m is the slope of the line and c is its intercept on y-axis we get, $m = \frac{v_0^2}{x_0^2}$

[therefore , m will always be positive]

$\Rightarrow$ The slope m or $\tan\theta$ =0 or $'\theta'$ is an acute angle.

Also, the comparison gives –

$c = \frac{-v_0^2}{x_0}$ or the intercept will be negative.

These conditions are met only in this graph.

34. When a body rolls down without slipping along an inclined plane of inclination θ, it rotates about a horizontal axis through its centre of mass and also it centre of mass moves. Therefore, rolling motion may be regarded as a rotational motion about an axis through its centre of mass plus a translational motion of the centre of mass. As it rolls down, it suffers loss in gravitational potential energy provided translational energy due to frictional force is converted into rotational energy.

35. Radioactive decay equation is

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$N = N_0 e^{-\lambda t} = N_0 e^{-In(2)\frac{t}{T_{\frac{1}{2}}}}$

After decay of 99% of the initial sample only 1% will be left, and $\frac{N}{N_0} = 1\%$. We then have

$\frac{N}{N_0} = \frac{1}{100} = e^{-In(2)\frac{t}{T_{\frac{1}{2}}}}$

If we take the natural logarithm, we have

$-\ln 100 = -\frac{\ln 2 \times t}{T_{1/2}}$

Which one solving for t yields

$\therefore t = \frac{\ln 100}{\ln 2} \times T_{\frac{1}{2}}$

$= \frac{\log 100}{\log 2} \times T_{\frac{1}{2}}$

$= \frac{2}{0.3010} \times 110$

$= 731\min = 12.2h$

36. Given $E = 3eV = 3 \times 1.6 \times 10^{-19} J$

We know that $\lambda = \frac{h}{\sqrt{2mE}}$

$$= \frac{6.6\times10^{-34}}{\sqrt{2\times1.7\times10^{-27}\times3\times1.6\times10^{-19}}} = 1.65\times10^{-11}\,m$$

37. Given, angle of dip $\delta = 22^0$

Horizontal component of the earth's magnetic field H = 0.35 G

Let the magnitude of the earth's magnetic field at the place is R.

Using the formula H = R cos δ

Or

$$R = \frac{H}{\cos\delta} = \frac{0.35}{\cos 22^0} = \frac{0.35}{0.9272} = 0.8G$$

Thus, the value of the earth's magnetic field at the place is 0.38G.

38. $$I_2 = 2\left(\frac{ml^2}{12}\right) + 2(m)\left(\frac{1}{2}\right)^2 = \frac{2}{3}ml^2$$

$$I_2 = 0 + 2\left(\frac{ml^2}{3}\right) + ml^2 = \left(\frac{5}{3}\right)ml^2$$

$$I_3 = 4\left(\frac{ml^2}{3} + \sin^2 45^0\right) = \frac{2}{3}ml^2 = I_1$$

Note : $I_1 = I_3$ (think why?)

39. If θ is the temperature of outside, heat passing per second through the glass window,

$$\frac{dQ}{dt} = KA\frac{(\theta_1 - \theta_2)}{L} = \frac{0.2\times1\times(20-\theta)cal}{0.2\times10^{-2}} = 100(20-\theta)$$

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And hear produced per second by the heater in the room

$$P = \frac{V^2}{R}\frac{J}{S} = \frac{V^2}{R}\frac{cal}{s} = \frac{200\times200}{20\times4.2} = 476.2\frac{cal}{s}$$

Now as the temperature of the room is constant, the heat produced per second by heater must be equal to the heat conducted through the glass window.

$100(20-\theta) = 476.2; \theta = 15.24^0 C$

40. Total internal energy of system

$$= U_{Oxygen} + U_{Argon} = \mu_1\frac{f_1}{2}RT + \mu_2\frac{f_2}{2}RT$$

$$= 2\frac{5}{2}RT + 4\frac{3}{2}RT = 5RT + 6RT = 11RT$$

$[As\ f_1 = 5(\ for\ oxygen) and\ f_2 = 3(\ for\ Argon)$

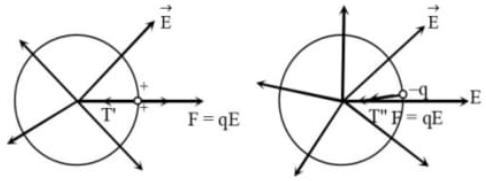
41. The P-N junction will conduct only when it is forward biased i.e., when -5V is fed to it, so it will conduct only for 3rd quarter part of signal shown and when it conducts potential drop 5 V will be across both the resistors, so output voltage across R_2 is 2.5 V

$\therefore V_0 = -2.5V$

42. According to Wien's displacement law

$$\lambda_m = \frac{b}{T} \Rightarrow T = \frac{b}{\lambda_m} = \frac{2.93\times10^{-3}}{4000\times10^{-10}} = 7325K$$

43. Tension may increase or decrease depending on the nature of charge given to sphere.



44. $T = 2\pi\sqrt{\frac{l}{g}} \text{ or } T \alpha \frac{1}{\sqrt{g}}$

$\therefore \frac{T'}{T} = \sqrt{\frac{g}{g'}}$

But $g' = \frac{g}{\left(1+\frac{h}{R}\right)^2} \text{ or } \frac{g'}{g} = \frac{1}{\left(1+\frac{h}{R}\right)^2}$

$\therefore \frac{T'}{T} = \left(1+\frac{h}{R}\right)$

$\text{or } T' = T\left(1+\frac{h}{R}\right)$

Since, $T' > T$, the clock will lose the time.

$\therefore \Delta T = T' - T = T\left(\frac{h}{R}\right)$

$\therefore Time\, lost\, in\, t = 1 day\, is = \frac{(24\times 3600)(200)}{6.4\times 10^6} s = 2.7s$

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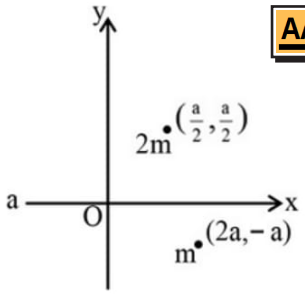
45.

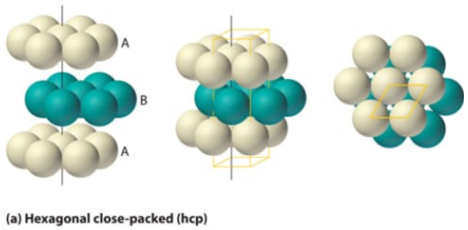


$x_{cm} = \frac{2m\times\frac{a}{2} + m\times 2a}{3m} = a$

$y_{cm} = \frac{2m\times\frac{a}{2} - ma}{3m} = 0$

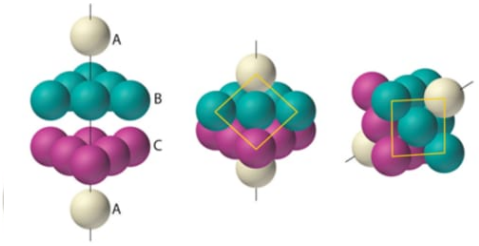
So distance of center of mass of the system is ‘a’.

CHEMISTRY SOLUTIONS



(a) Hexagonal close-packed (hcp)

46.



(b) Cubic close-packed (ccp)

CCP structure has three different type of layers.

In CCP structure, first and fourth layers are repeated.

In FCC packing, the neighboring face centered atoms touch each other.

47. 0.1 M of $H_2SO_4 \Rightarrow 0.2N\ of\ H_2SO_4$

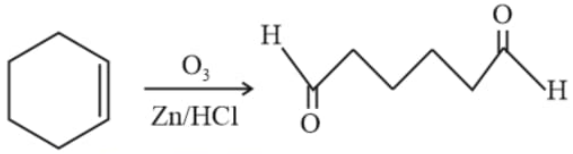
$\therefore N_1V_1 = N_2V_2 \qquad [N_1 = 0.2N\ H_2SO_4]$

$0.2 \times V_1 = 30 \times 0.2$

$\therefore V_1 = 30mL$

48. Due to lanthanide contraction effective nuclear charge of 5d series metals increases and size decreases.

49. Since the alkene (C_6H_{10}) on ozonlolysis gives a dialdehyde six carbon containing compound therefore, the alkene must be cyclohexene.



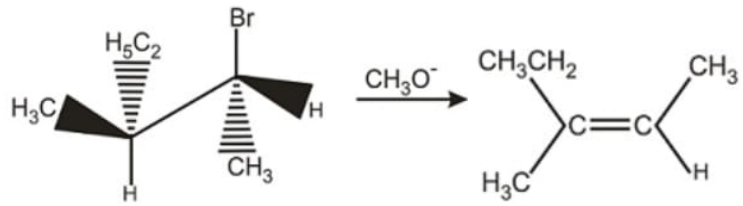
50. In Bessemer converter copper sulphide is partially oxidized to cuprous oxide which further reacts with remaining copper sulphide to form copper and sulphide dioxide.

$Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$

51. Diazonium ion acts as an electrophile, electron-withdrawing groups on its phenyl ring increasesits electrophilicity.

52. Extensive properties are those that depend upon the amount of substance and volume depends upon mass. Hence it is an extensive property.

53. The given alkyl bromide can be rotated to give the following conformer in which H and Br are anti-planar.



54. N, O and F (p-block elements) are highly electronegative non metals and will have the strongest tendency to form anions by gaining electrons from metal atoms.

55. As rate = $k[CH_3OCH_3]^{\frac{3}{2}}$

$bar/\min = k(bar)^{\frac{3}{2}}$

$unit\ of\ k = bar^{-\frac{1}{2}} \min^{-1}$

56. For reaction

$CO_2(g) + 2H_2O(l) \rightarrow CH_4(g) + 2O_2(g)$

$\Delta_r H^0 = \sum(\Delta_f H^0)_{products} - \sum(\Delta_f H^0)_{reactants}$

$= [(\Delta_f H^0(CH_4) + 2\times 0) - (\Delta_f H^0(CO_2) + 2\Delta_f H^0(H_2))]$

$+890.3 = [\Delta_f H^0(CH_4)] - [-393.5 + 2\times(-285.8)]$

$\Delta_f H^0\ of\ CH_4(g) = -74.8kJ/mol$

$Ag_2CrO_4 \rightleftarrows 2Ag^+ + CrO_4^{2-}; K_{sp} = 1.1\times10^{-12}$

57. $S \qquad\qquad 2S \qquad S$

$K_{sp} = [Ag^+]^2.[CrO_4^{2-}]$

$K_{sp} = [2S]^2.[S] = 4S^3$

$S^3 = \frac{K_{sp}}{4} = \frac{1.1\times10^{-12}}{4} \Rightarrow S = 6.53\times10^{-5}$

58. As per (n+1) rule electrons fill first in that orbital which have least (n + 1) value.
When (n+1) values are same, then electron fills that orbital which have lowest n value
When n = 6 as per (n+1) rule when n = 6
ns subshell $\Rightarrow 6+0=6$
(n-1)d subshell $\Rightarrow 5+2=7$
(n-2)f subshell $\Rightarrow 4+3=7$
np subshell $\Rightarrow 6+1=7$
ns, (n-2)f, (n-1)d, np
(n+1) values $\Rightarrow 7,7,7$
n value $\Rightarrow 4,5,6$

59. Halogen Family $\Rightarrow ns^2np^5$
All halogens contain seven electron in their outermost shell. All other shells are completely filled. These elements require only one electron to complete their octet.

60. In case of positive deviation from Raoult's law, the observed vapour pressure is greater than the ideal vapour pressure and boiling point of azeotrope becomes lower than either of pure liquid.

61. $H_2O \rightarrow H_2 + \frac{1}{2}O_2$

During electrolysis, volumes of O_2 and H_2 librated are in the ratio of 1:2.
Hence, volume of H_2 liberated

$= 2 \times 2.24 dm^3$

$= 4.48 dm^3$

62. $CH_3NH_2 \xrightarrow[HCl]{NaNO_2} CH_3N_2^+Cl^- \xrightarrow{H_2O} \underset{\text{Methyl alcohol}}{CH_3OH}$

63. According to Drago's rule: $\angle XHX : H_2O > H_2S > H_2Se > H_2Te$
$(104^0)\ (92^0)\ (91^0)\ (89.5^0)$

64. $\log \frac{K_2}{K_1} = \frac{\Delta H}{2.303R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

$T_1 > T_2 \,\&\, K_2 > K_1$

$\Delta H = -Ve$

65. The ortho and para isomers can be separated by steam distillation, o-nitrophenol is more volatile due to intramolecular hydrogen bonding.

66. Volume of solution = 0.1 Litre

Normality of NaOH solution = $\frac{Equivalent\ of\ NaOH}{Volume\ \ in\ \ litre}$

$N = \frac{\frac{4}{40}}{0.1} = 1N$

67.

H_2	+	I_2	$\rightleftharpoons 2HI$
15		5.2	0
$(15-5)$		$(5.2-5)$	10

Equilibrium constant

$(K_e) = \frac{[HI]^2}{[H_2][I_2]} = \frac{10 \times 10}{10 \times 0.2} = 50$

68. Density is given by

$\rho = \frac{Z \times M}{N_A \times (a)^3}$

Density = 4 g/cm^3 (given)

$\therefore 4 = \frac{72 \times Z}{6 \times 10^{23} \times (5 \times 10^{-8})^3} = \frac{72 \times Z}{6 \times 10^{23} \times 10^{-24} \times 125}$

$\therefore Z = 4$

69. Be^{2+} cation is very small in size and in terms of Fajan's rules brings about polarization of electronic aloud of anion (Cl^-) i.e., $BeCl_2$ is covalent in nature.

70. t = 0

t = completion

H_2	$+ Cl_2$	$\rightarrow$	$2HCl$
1	1		–
–	–		2

When equal volumes of H_2 and Cl_2 are mixed, the volume of mixture does not change after the reaction as the number of moles are constant.

71. $w = 1000g(H_2O)$;n (solute) = 1 mole

(as 1 molel aqueous solution implies 1 mol of solute in 1 kg of water)

N(water) = $\frac{W}{M} = \frac{1000}{18} = 55.55$

Whereas

n = number of moles of solute

N= number of moles of water (H_2O)

$$X_{solute} = \frac{n}{n+N} = \frac{1}{1+55.55} = 0.018$$

72. $$P_{Total} = p_A^o X_A + p_B^o X_B = 100 \times \frac{1}{5} + 200 \times \frac{4}{5} = 20 + 160 = 180$$

(vapour are condensed and again brought in equilibrium with vapours)

i.e., for distillate

$y_A \rightarrow to\,be\,replaced\,by\,x_A$

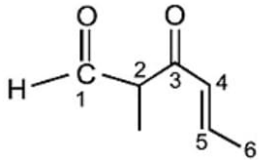
$y_B \rightarrow to\,be\,replaced\,by\,x_B$

$$y_A = \frac{p_A^o x_A}{p_T} = \frac{20}{180}$$

$$y_B = \frac{p_B^o x_B}{p_T} = \frac{160}{180}$$

$$P_{distillate} = \frac{100 \times 20}{18} + \frac{200 \times 160}{180} = 188.88$$

73. Easily liquefiable gases like SO_2, NH_3, CO_2 are adsorbed to a greater extent than the elemental gasses like N_2, O_2, H_2

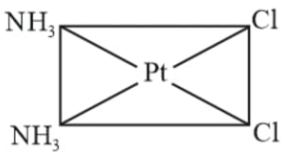
74. 

Aldehydes get higher priority over ketone and alkene in numbering of principal C-chain.

$\therefore 3-Keto-2-methylhex-4-enal$

75. II is correct explanation of I as adsorption leads to arrangement i.e., decreases randomness $(\therefore \Delta S = -ve)$ at the same time energy is released due to attraction between adsorbate and adsorbent $(\therefore \Delta H = -ve)$. Adsorption is a spontaneous process as it occurs on its own. For all spontaneous processes, the change in free energy is negative. Or, $\therefore \Delta G = -ve$

76. C is isomer of $[Pt(NH_3)_2Cl_2]$ is used as an anticancer drug for treating several types of malignant tumours.



(Cis - Platin)

77. For H atom & H like species. The electronic energy in the nth orbit is

$$E_n = -13.6\frac{z^2}{n^2}eV$$

$$(E_n)_{Li^{2+}} = \frac{-13.6\times 9}{n^2}eV = \frac{-122.4eV}{n^2}$$

If n = 2

$$(E_2)_{Li^{2+}} = \frac{-122.4}{2^2} = -30.6eV$$

78. Most probable velocity $C_{mpv} = \sqrt{\frac{2RT}{M}}$

Mean velocity $C_{avg} = \sqrt{\frac{8RT}{\pi M}}$

Root mean square velocity

$$C_{rms} = \sqrt{\frac{3RT}{M}}$$

$$C_{mpv} : C_{avg} : C_{rms} = \sqrt{\frac{2RT}{M}} : \sqrt{\frac{8RT}{\pi M}} : \sqrt{\frac{3RT}{M}} = \sqrt{2} : \sqrt{\frac{8}{\pi}} : \sqrt{3}$$

79. Boiling point α Molecular weight

Boiling point α Extent of H-bond

The extent of H-bond in the phenol is very less as well as the molecular weight also less.

80. Separation of a racemic mixture into individual enantiomers with the help of an optically pure compound is known as optical resolution.

81. Thermosetting polymers: Thermosetting polymers are permanently setting polymers. These polymers are cross linked or heavily branched molecules which one heating in a mould, get hardened and set and cannot be softened again. This hardening on heating is due to cross-linking between different polymer chains to give a three dimensional network solid. Its example includes Bakelite.

Thermoplastic polymers: Thermoplastics are linear or slightly branched polymers. They can be repeatedly softened on heating and hardened on cooling and hence can be used again and again without any change in chemical composition and mechanical strength. Its examples include polythene and polypropene.

82. Photochemical smog is the chemical reaction of sunlight, nitrogen oxides and volatile organic compounds in the atmosphere.

$$NO_2(g) \xrightarrow{hv} NO(g) + O(g)$$

$$O(g) + O_2(g) \rightarrow O_3(g)$$

So, it consist of excessive amount of ozone molecules as atomic oxygen reacts with one of the abundant oxygen molecules producing ozone.

83. The more stable resonating structure (lower energy structure) has a greater contribution towards the resonance hybrid.

84. In acidic Buffer solutions when

$$\text{pH} = \text{pKa} + \log\frac{[\text{Salt}]}{[\text{Acid}]}$$

pH is not disturbed i.e., $[H_3O^+]$, remains constant on a addition of small quantity of acid or Base.

85. Those effective mainly against gram positive or gram negative bacteria are marrow spectrum antibiotics. Pencillin – G has a narrow spectrum.

86. HVZ reaction is the halogenation of carboxylic acid with alpha hydrogen by red P and X_2.

87. Mol. Wt. of $CH_4 = 16$

Mol. Wt. of $C_2H_4 = 28$

$$\therefore 20 = \frac{16x + 28y}{x + y}$$

Or $16x + 28y = 20x + 20y$

Or $4x = 8y$

Or $x = 2y$

In the gaseous mixture when the mole ratio of $CH_4 \text{ and } C_2H_4 \text{ is } y : x$

Then, avg.mol.wt = $\frac{16x + 28y}{x + y} = \frac{16y + 56y}{3y} = \frac{72y}{3y} = 24$

88. $\Delta H = E_f - E_b$

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$-40 = 80 - E_b$

$E_b = 120kJ / mol$

Catalyst lower the $E_f \text{ to } 20kJ / mol$ for forward reaction then $E_f^{'} = 20kJ / mol$

We know catalyst decreases the activation energy equal amount in both direction.

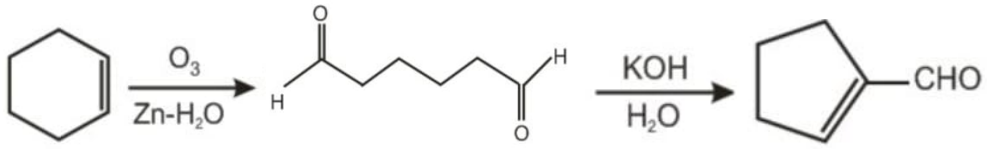
$E_b^{'} = (120 - 60) = 60kJ / mol$

$$\frac{E_b}{E_b^{'}} = \frac{120}{60} = 2$$

89. $Fe^{2+} + 2e^- \rightarrow Fe$

$$E_{Fe} = \frac{56}{2} = 28$$

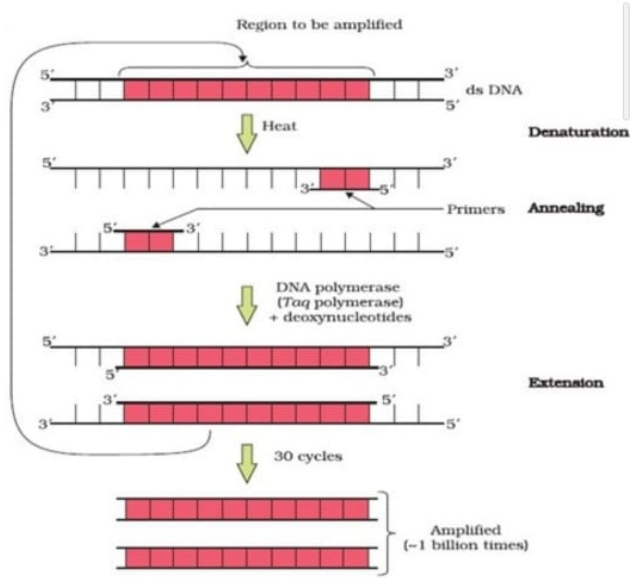
$w_{Fe} = E_{Fe} \times number\ of\ Faraday = 28 \times 3 = 84g$

90. 

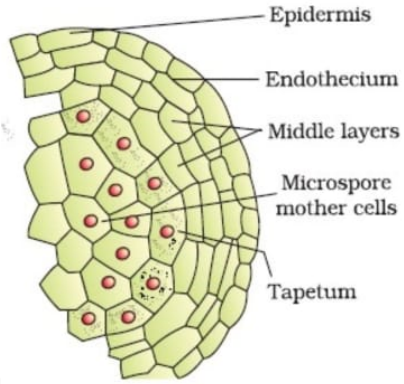
BIOLOGY SOLUTIONS

91. Embryogenesis is a developmental process that usually begins once the egg has been fertilized. It involves the multiplication of cells by cleavage and their subsequent differentiation into tissues and organs of a living organism

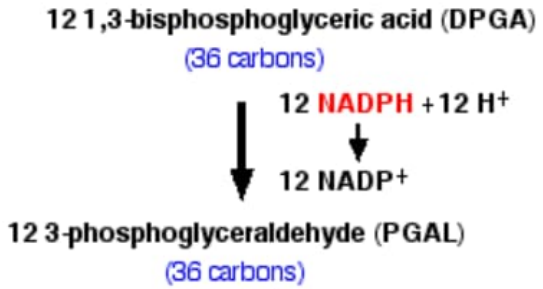
92. Each protein is a polymer of amino acids. As there are 20 types of amino acids (e.g., alanine, cysteine, proline, tryptophan, lysine, etc), a, protein is a heteropolymer. The amino acids can be arranged different orders in a polypeptide chain to form a wide array of proteins.
93. The plasma proteins and haemoglobin acts buffers and maintain almost neutral pH in the blood.
94. Blood does not become acidic due to buffering action. Bicarbonates acts as buffering agents.
$H_2O + CO_2 \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$
95. The Rearing, care, breeding, utilization of animals is Animal husbandary.
96. B.P – 130/90 is considered almost normal and 190/100 mm results hypertension damaging brain and kidneys.
97. The replicated complementary strand will have sequence CGTAC because A binds with T and G binds with C.
98. Spongocoel in sponges (Sycon) is linked with choanocytes or collar cells.
99. The purpose of a PCR (Polymerase Chain Reaction) is to make a huge number of copies of a gene. There are three major steps in a PCR, which are repeated for 30 or 40 cycles. This is done on an automated cycler, which can heat and cool the tubes with the reaction mixture in a very short time. The schematic representation of PCR is as follows



100. In glycolysis, a water molecule is removed during the conversion of 2-phosphoglycerate to PEP.
101. Cell junctions like Tight, Adhering and Gap junctions all exist in epithelium.
102. Botanical gardens are included under exsitu conservation. Biosphere reserves, Natural park, Sanctuarys are included under insitu method.
103. Simmondsia chinensis (Jojoba) seed has 50% liquid wax, that can be used as a high-performance lubricant for machinery involving pressure but not temperature changes.
104. In Test tube method, fertilization occurs in test tube invitro, but embryonic development occur in uterus.
105. Through Na-K-ATP potassium pump, 3 Na^+ move into ECF and 2 K^+ ions moves in to ICF i.e., axoplasm.

106. Bacillus thuringiensis is a soil bacterium. It produces a crystal protein, cry. Dried spores are mixed with water and sprayed on plants. Cry protein is produced in an inactive form but when it is ingested by insects, it enters the gut of insects and becomes an active toxin and kills them.
107. Sarcomere is a portion of Myofirbril from 2-line to adjascent Z line.
108. Adenosine Deaminase enzyme is produced in T lymphocytes. It is required for the maturation of T-cells.
109. N_2 is unavailable for use by most organisms because there is a triple bond between the two nitrogen atoms, making the molecule almost inert. In order to use the nitrogen for growth, it must be "fixed" (combined) in the form of ammonium ions or nitrate ions. Some bacteria can fix atmospheric N_2 like Rhizobium, Azotobacter, etc.
110. Tobacco plant (Nicotiana tabacum) yields tobacco, while Petunia is an ornamental plant. Both the plants are the member of family Solanaceae.
111. Lichens exhibit the symbiotic association between algae and fungi. The fungal partner is involved in sexual reproduction with the help of reproductive structures called apothecia.
112. Cowper's glands or bulbourethral gland secretions helps to neutralize the urethral acidity to prepare the passage of sperms during sexual arousal.
113. The sporangia produce spores by meiosis in spore mother cells. The spores germinate to give rise to inconspicuous, small but multicellular, free-living, mostly photosynthetic thalloid gametophytes called prothallus.
114. Coliforms are a broad class or bacteria found in our environment, including the faeces of man and other warm-blooded animals. The presence of coliform bacteria in the water body indicates the high BOD of water. Acetobacter aceti is used in the production of vinegar.
115. 

116. Phosphoglyceraldehyde is a product of dark reaction which is formed when 12 molecules of 1, 3 – biphosphoglyceric acid react with 12 molecules of NADPH.



117. Gibberellins promote bolting (internode elongation just prior to flowering) in beet, cabbages, and many plants with rosette habit.
118. Saliva contain antibodies IgA and IgG, but not IgM.
119. Cell wall consists of lignin, hemicellulose, pectin and cellulose.
120. In a Mendelian dihybrid cross, the genotypic ratio is RRYY:RrYY:RRYy:RrYy:rrYY:rrYy:RRyy:rryy: is 1:2:2:4:1:2:1:2:1
121. Essential microelements are Fe, Mn, Zn, B, Cu and Mo. Essential macronutrients are C, H, N, P, S, Ca, K and Mg.
122. If birth rate is equal to Death rate, then there is no population growth, such population is called stable populations and it is the carrying capacity of a habitat.
123. Menstrual cycle occur in Eutherians and in some primate mammals, estrons cycle occur (Rabbit)
124. Eutrophication is the hyper nitrification of p and by phosphates and nitrates when seawage and Agricultural fertilizers are applied in excess, it leads into Algal bloom.
125. Superior (An ovary attached to the receptacle above the attachment of other floral parts is termed superior) & tricapellary (having three carpels) type of ovary is found in the Liliaceae family.
126. Somaclonal variation is the variation seen in plants that have been produced by plant tissue culture. Somaclonal variation is not restricted to but is particularly common in, plants regenerated from callus. The variations can be genotypic or phenotypic, which in the latter case can be either genetic or epigenetic in origin.
127. In Honeybees, drones are developed from the unfertilized eggs by parthenogenesis. It is called Arrhenotoky. AAJ KA TOPPER
128. During active transport of ions, the energy is usually provided in the form of by ATP or by the concentration gradient of ions.
129. The epithelium that lines the inner wall of blood vessel is simple squamous epithelium . It is called Endothelium.
130. Monotropa is a saprophytic plant, whereas Nepenthes, Sarracenia, Drosera, Dionaea, and Utricularia are insectivorous plants.
131. Blastocyst is implanted into uterine endometrium of mother.
132. Conventional breeding uses hybridization to create new combinations of genes from parent varieties.
133. Meiosis I ends when the chromosomes of each homologous pair arrive at opposing poles of the cell. The microtubules disintegrate, and a new nuclear membrane forms around each haploid set of chromosomes.
134. Diaphragms covers the cervix and is a physical barrier. It is not introduced in to uterus. It is not spermicidal agent.
135. Abscisic acid acts a growth inhibitor and induces dormancy of buds towards the approach of winter. Dormancy of seeds is mainly caused by abscisic acid. Because of its action in inducing dormancy abscisic acid (ABA) is also called dormin. The buds, as well as seeds, sprout only when abscisic acid is overcome by gibberellins.
136. Calcitonin is hypocalcemic hormone. It reduced blood Ca^{++} and it inhibit Osteoclast activity.

137. The queen lays two types of eggs, fertilized and unfertilized eggs. From unfertilized eggs, male bees emerge which are known as drones, while the fertilized eggs produces females.
138. Cork cambium (phellogen) is an outermost lateral meristem in woody plants, that develops from permanent tissues in the region of epidermis hypodermis, cortex, and even in outer layers of phloem. It is alos known as a phellogen that forms a layer of cells that produces a secondary protective layer of the stem called the periderm.
139. The term prosthetic group is used as the non-protein moiety tightly binds (covalently) with the apoenzyme. The coenzyme can be separated by dialysis from the enzyme while the prosthetic group cannot be, as coenzyme is not bound with apoenzyme tightly.
140. Amphetamine is a stimulant on CNS resulting hyperactivity and is not ophiate narcotics.
141. Shape and number of chloroplast in a different member of algae is different.
Chlamydomonas – cup-shaped, 1/cell
Zygnema – Stellate, 2/cell
Spirogyra – Spiral, 1/cell
Ulothrix – Collar shaped, 1/cell
142. The apical meristems are present in the apices of primary and secondary shoots and roots of he plant. The cells of apical meristem are in an active stage of division, have dense cytoplasm, thin cell wall, and remain virus-free. Due to this reason, meristematic culture is carried out to obtain virus-free plants.
143. In the given diagram, the 'V; labelled phase is the G_1 phase. G_1 phase marks the start of interphase. G_1 phase is the metabolically active phase and during this phase, the cell grows n size. Synthesis of mRNA and protein of DNA synthesis occurs in this phase.
144. Due to improper movement of Diaphragm, coughing occur during eating.
145. The first step of glycolysis is the conversion of glucose to glucose 6-phosphate utilizing ATP.
146. i. $NADH_2 \xrightarrow{ETC} 3ATP$
ii. $FADH_2 \xrightarrow{ETC} 2ATP$
iii. Small protein
iv. Two copper centres
147. Taxonomy is the branch of biology that is applied to both plants and animals. The classification of plants into various groups is called plant taxonomy or systematic botany. Similarly, the classification of animals is called animal taxonomy or systematic zoology. Entomology is the study of insects. Bacteriology is the study of bacteria.
148. As per NCERT, A = Fungi, B = Angiosperms.
149. Montreal protocol is related to ozone depleting substances.
150. A single stranded RNA or DNA with tagged Radio-active molecule is probe.
151. Valium is otherwise called Benzo-diazephine.
152. If father is colourblind, mother is homozygous normal, none of their sons suffer from coloublindness.
153. Net pressure with which ultra filtration takes place via glomerulus is 10 mm Hg.
154. Whales are ureotelic as they live in marine water habitat facing the problem of Exosmosis.

155. When environment conditions are favorable and there is no resistance, populations grows exponentially and hence curve is J-shaped.
156. Methanobacillus (methanogen) occurs in marshes and also in drug. It produced CH4 gas under anaerobic conditions and is utilized in gobar gas plants.
157. Erythropoisis occurs when there is hypoxia condition.
158. Apomixis is the formation of new individuals by asexual methods that mimic sexual reproduction including seed formation but do not involves the fusion of gametes or sex cells. The organism reproducing through apomixes is called apomict. It is commonly seen in grasses and plants of family Asteraceae. Seeds formed by the process of apomixis are called apomictic seeds.
159. Saccharomyces cerevisiae is a yeast used in making bread (Baker's yeast) and commercial production of ethanol.
160. Largest number of neurons exist in human brain.
161. It is a physical process which involves adsorption and/or absorption of water by hydrophilic substances without forming a solution e.g., wooden doors absorb water and swell up in rainy season and seeds of pea and gram when placed in water swell up due to imbibition.
162. Plasmodesmata are plasma membrane-lined pores that span the adjoining walls of plant cells. The symplast pathway is where water moves from cell to cell in the cytoplasm via the plasma membranes and plasmodesmata.
163. Prevalence of pesticide resistance insects is an example of Directional selection, which is a type of natural selection.
164. Botanical gardens comes under Ex-situ conservation method.
165. Haemocoel is a cavity filled with haemolymph presen in Arthropoda and Mollusca.
166. Corpus luteum produces progesterone estrogen hormones.
167. Four functions of the ecosystem are nutrient cycling, energy flow, productivity, and decomposition, stratification along with species composition is two main structural features of the ecosystem. z
168. The DNA molecule to which the gene of interest is integrated for cloning is called a vector.
169. As the CO_2 content of blood increase, the pH of the blood falls. This produces a decrease in oxygen affinity of haemoglobin. This is called the Bohr effect and is closely related to the fact that deoxygenated haemoglobin (deoxygaemoglobin) binds hydrogen ion more actively than does the haemoglobin.
170. C_4 plants have 'Kranz type' anatomy. Vascular bundles are surrounded by bundle sheath cells. The chloroplasts are dimorphic. The cells of bundle sheath have very large chloroplasts. They lack grana and contain starch grains. They are centripetally arranged white mesophyll cells have small and granular chloroplast.
171. Chlorophyll is soluble in organic solvents like alcohol, acetone, etc.
172. Vegetative propagation is a form of asexual reproduction of a plant. Only one plant is involved and the offspring is the result of one parent. The new plant is genetically identical to the parent. The plants arise from the nodes present in the nodes come in contact with the damp soil or water, they produce roots. Similarly, adventitious buds arise from the notches present

at the margins of leaves of Bryophyllum. This ability is fully exploited for commercial propagation of such plants.

173. Innominate is a bone present in pelvic Girdle.

174. Secondary succession begins in areas where natural biotic communities have been destroyed such as in abandoned farmlands, burned or cut forests, lands that have been flooded. Since some soil or sediment is present, secondary succession is faster than primary succession.

175. The repressor is a protein produced by the regulator gene in the operon, which binds to the operator and stops the RNA polymerase to transcribe the structural genes. Hence, the repressor acts negatively in controlling the gene expression.

176. Heroine is Acetyl / Morphine and is used as pain Reliever.

177. A palindromic sequence is a nucleic acid sequence that is the same whether read 5' to 3' on one strand or 5' to 3 on the complementary strand with which it forms a double helix.
5' – GAATTC – 3'
3'-CTTAAG-5'
It is a palindromic sequence of DNA cut by restriction enzyme EcoRI.

178. Wings of the bat, Locust and pigeon are analogus organs as they share same habitat, same function, but different ancestries.

179. In tissue culture, differentiation of shoot is controlled by high cytokinin : auxin ratio, while high auxin: cytokinin ratio is responsible for root formation.

180. Tubectomy in females, vasectomy in males are sterilization methods.