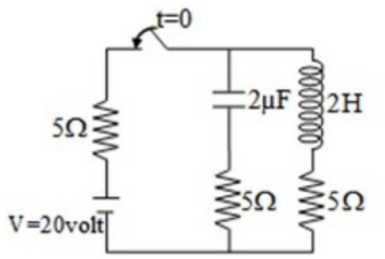
NATIONAL TEST ABHYAS NEET MOCK TEST-52

PHYSICS

1. Calculate the ratio of current following through the battery at t = 0 and $t=\infty$. (t = 0 is the time of closing of the switch)

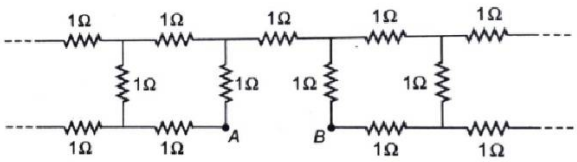


1)1 2)2 3)$\frac{1}{2}$ 4)0

2. A bar magnet 8cm long is placed in the magnetic meridian with the N pole pointing towards geographical north. Two neutral points separated by a distance of 6cm are obtained on the equatorial axis of the magnet. If the horizontal component of the earth's field $=3.2\times10^{-5}T$ then pole strength of the magnet is

1)0.5Am 2)1Am 3) 0.25Am 4)2Am

3. Shown in the figure is an infinite network of resistors each of resistance 1Ω. The effective resistance in between A and B is



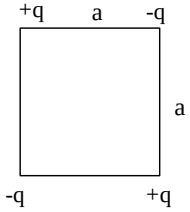
4. The wire of potentiometer is made of

1) Copper 2) Steel 3) Manganin 4) aluminium

5. In a series LCR circuit the frequency of a 10V AC voltage source is adjusted in such a fashion that the reactance of the inductor measures 15Ω and that of the capacitor 11Ω. If $R=3\Omega$ the potential difference across the series combination of L and C will be

1)8V 2)10V 3)22 4)52V

6. The work required to put the four charges from infinity to the position shown here is



1)$\frac{-0.65q^2}{\pi\varepsilon_0 a}$ 2)$\frac{-1.0q^2}{\pi\varepsilon_0 a}$ 3)$\frac{\left(1-\frac{1}{2\sqrt{2}}\right)q^2}{\pi\varepsilon_0 a}$ 4)Zero

7. The capacitance of a parallel plate condenser does not depend upon

1)The distance between the plates 2)area of the plates

3) medium between the plates 4) metal of the plates

8. A stream of electrons is projected horizontally to the right. A straight current –carrying conductor is supported parallel to the electron stream and above it. If the current in the conductor is form left to right, what will be the effect on the electron stream ?

1)The electron stream will be pulled upwards

2)the electron stream will be pulled downwards

3) the electron stream will be retarded

4) the electron stream will be speeded up towards the right

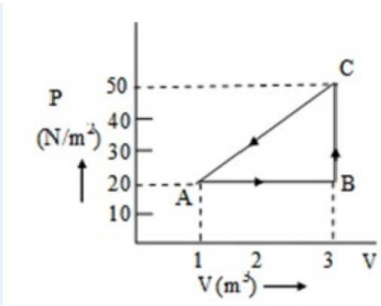
9. The magnetic field due to current carrying circular loop of the radius 12cm at its centre is $0.50\times10^{-4}T$. The magnetic field due to this loop at a point on the axis at a distance of 5cm from the centre is

1) $3.5\times10^{-9}T$ 2) $5.3\times10^{-9}T$ 3) $9.3\times10^{5}T$ 4) $3.9\times10^{-5}T$

10. A body cools is from 50^0C to 40^0C in 5min. If the temperature of the surroundings is 20^0C, the temperature of the body after the next 5 min would be

1) 36^0C 2) 35^0C 3) 33.33^0C 4) 30^0C

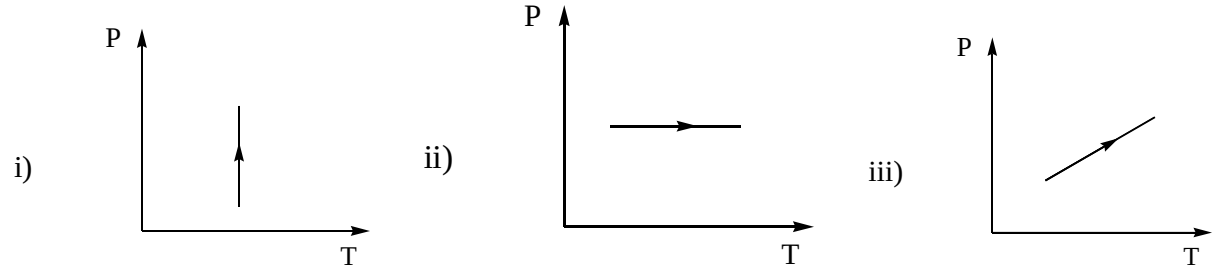
11. In the diagram, the graph between volume and pressure for a thermodynamic process is shown. If $U_A = 0, U_B = 20J$ and the energy given from B to C is 30J, then at the stage of C, the internal energy of the system is



1)50J 2)60J 3) 30J 4) 10J

12. Pressure versus temperature graphs of an ideal gas are as shown in figure

Choose the wrong statement



1)Density of gas is increasing in graph(i) 2)density of gas is decreasing in graph (ii)

3)density of gas is constant in graph (iii) 4)none of these

13. Value of adiabatic bulk modulus of elasticity of helium at NTP is

1) $1.01\times10^{5}\,Nm^{-2}$ 2) $1.01\times10^{-5}\,Nm^{-2}$ 3) $1.69\times10^{5}\,Nm^{-2}$ 4) $1.69\times10^{-5}\,Nm^{-2}$

14. A copper rod and a steel rod maintain a difference in their lengths of 10cm at all temperatures. If their coefficients of expansion are $1.6\times10^{-5}\,K^{-1}$ and $1.2\times10^{-5}\,K^{-1}$, then the length of the copper is

1)40cm 2)30cm 3)32cm 4)24cm

15. Steam is passed into 54g of water at $30^{0}C$ till the temperature of the mixture becomes $90^{0}C$. If the latent heat of steam is 536 cal g^{-1} the mass of the mixture will be nearly

1) 80g 2) 60g 3) 50g 4)24g

16. A string of length 2x is stretched by 0.1x and the velocity of a transverse wave along it is v. When it is stretched by 0.4x the velocity of the wave is

1) $\sqrt{\frac{5}{6}}v$ 2) $\sqrt{\frac{11}{7}}v$ 3) $\sqrt{\frac{32}{7}}v$ 4) $\sqrt{\frac{27}{6}}V$

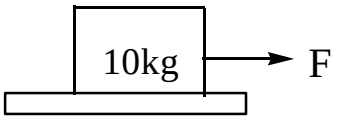
17. A car starts from rest and moves with uniform acceleration a on a straight road from time t = 0 and t =T. After that a constant deceleration of magnitude a brings it to rest. In this process the average speed of the car is

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

18. A body is thrown from a point with speed $50ms^{-1}$ at an angle 37^{0} with horizontal. When it has moved a horizontal distance of 80m then its distance from point of projection is

1) 40m 2) $40\sqrt{2}m$ 3) $40\sqrt{5}\,m$ 4)none

19. A force $F=2t^{2}$ is applied to the cart initially at rest. The speed of cart at t = 5s is

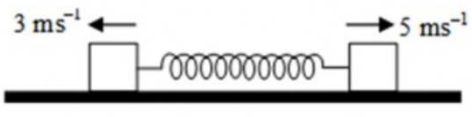


1) $10ms^{-1}$ 2) $8.33ms^{-1}$ 3) $2ms^{-1}$ 4)Zero

20. The coefficient of restitution for a body is $e=\frac{1}{3}$. At what angle the body must be incident on a perfectly hard plant so that the angle between the direction before and after the impact be at right angles ?

1) 37^{0} 2) 60^{0} 3) 45^{0} 4) 30^{0}

21. Two identical blocks each of mass 1kg are joined together with a compressed spring. Sometime later after the release of the system, the two blocks are seen to be moving with unequal speeds in the opposite directions as shown in the figure. Choose the correct statement



1)It is not possible

2) Whatever may be the speed of the blocks the centre of mass will remain stationary

3)the centre of mass of the system is moving with a velocity of $2ms^{-1}$

4) the centre of mass of the system is moving with a velocity of $1ms^{-1}$

22. A stationary pulley carries a rope one end of which supports a ladder with a man and the other a counter weight of mass M. The man of mass m climbs up a distance l with respect to the ladder and then stops. The displacement of the centre of mass of this system is

1) $\frac{ml}{M+m}$ 2) $\frac{ml}{2M}$ 3) $\frac{ml}{M+2m}$ 4) $\frac{ml}{2M+m}$

23. A ball of mass m moving with a speed u undergoes a head –on elastic collision with a ball of mass nm initially at rest. The fraction of the incident energy transferred to the heavier ball is

1) $\frac{n}{1+n}$ 2) $\frac{n}{(1+n)^2}$ 3) $\frac{2n}{(1+n)^2}$ 4) $\frac{4n}{(1+n)^2}$

24. The angular position of a line of a disc of radius r = 6cm is given by $\theta = 10 - 5t + 4t^2$ rad, the average angular velocity between 1s and 3s is

1) $\pi rad\, s^{-1}$ 2) $11 rad\, s^{-1}$ 3) $22 rad\, s^{-1}$ 4) $5.5 rad\, s^{-1}$

25. The total energy of a satellite is

1) always positive 2) always negative

3) always zero 4)Positive or negative depending upon radius of orbit

26. A small block of superdense material has mass $2\times10^{24} kg$. It is at a height h <<R. It falls towards the earth. Find its speed when it is at a height h/2.

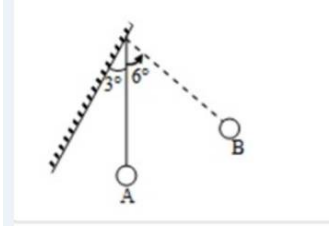
1) $\sqrt{\frac{2gh}{3}}$ 2) $\sqrt{\frac{3gh}{4}}$ 3) $\sqrt{\frac{3gh}{5}}$ 4) $\sqrt{\frac{gh}{2}}$

27. A student says that he had applied a force $F = -k\sqrt{x}$ on a particle and the particle moved in simple harmonic motion. He refuses to tell whether k is constant or not. Assume that he has worked only with positive x and no other force acted on the particle

1)as x increases k increases 2)as x increases k decreases

3)as x increases and k remains constant 4)the motion can not be simple harmonic

28. A pendulum of length 10cm is hanged by a wall making an angle 3^0 with vertical. It is swung to position B. Time period of pendulum will be



1) $\frac{\pi}{5}s$ 2) $\frac{2\pi}{15}s$ 3) $\frac{\pi}{6}s$ 4)Subsequent motion will not be periodic

29. A simple harmonic oscillator has amplitude A angular frequency ω and mass m. Then average kinetic energy in one time period is

1) $\frac{1}{2}m\omega^2A^2$ 2) $\frac{1}{4}m\omega^2A^2$ 3) $m\omega^2A^2$ 4)zero

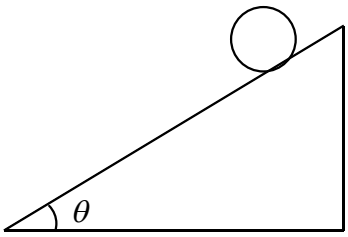
30. A 20N metal block is suspended by a spring balance. A beaker containing some water is placed on a weighing machine which reads 40N. The spring balance is now lowered so that the block gets immersed in the water. The spring balance now reads 16N. The reading of the weighing machine will be

1) 36N 2) 60N 3) 44N 4)56N

31. A metallic wire of density ρ floats horizontally in the water. The maximum radius of the wire so that the wire may not sink will be (surface tension of water = T and angle of contact $\theta = 0^0$)

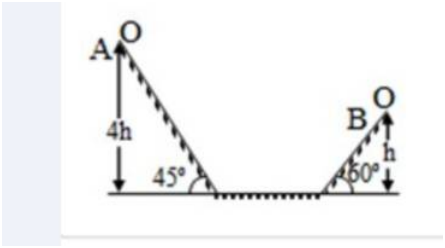
1) $\sqrt{\frac{2T}{\pi\rho g}}$ 2) $\sqrt{\frac{4T}{\pi\rho g}}$ 3) $\sqrt{\frac{T}{\pi\rho g}}$ 4) $\sqrt{\frac{T\rho}{\pi g}}$

32. A spherical shell of radius R is rolling down an incline of inclination θ without slipping. Find the minimum value of the coefficient of friction



1) $\frac{2}{7}\tan\theta$ 2) $\frac{2}{5}\tan\theta$ 3) $\frac{2}{3}\tan\theta$ 4)none of these

33. Two identical balls A and B are released from the position shown in the figure. They collide elastically on the horizontal portion. The ratio of heights attained by A and B after collision is (neglect friction)



1) 1 : 4 2) 2 : 1 3) 4 : 13 4) 2 : 5

34. The angular momentum of an electron in a hydrogen atom is proportional to

1) $\frac{1}{\sqrt{r}}$ 2) $\frac{1}{r}$ 3) $\sqrt{r}$ 4) r^2

35. The radius of an electron in second stationary orbit in Bohr's atom is R. The radius of the third orbit will be

1) 3R 2) 2.25R 3) 9R 4) $\frac{R}{3}$

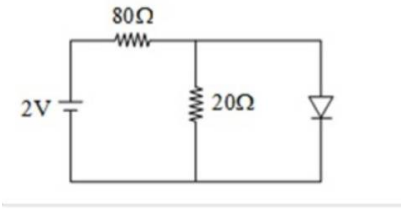
36. The ratio of radii of nuclei ${}_{13}Al^{27}$ and ${}_{52}X^{A}$ is 3 : 5. The number of neutrons in the nuclei of X will be

1) 52 2) 73 3) 125 4) 13

37. When a 1cm thick surface is illuminated with light of wavelength λ, the stopping potential is V_0. When the same surface is illuminated by the light of wavelength 3λ, the stopping potential is $\frac{V_0}{6}$. The threshold wavelength for the metallic surface is

1) 4λ 2) 5λ 3) 3λ 4) 2λ

38. In the circuit shown, the current through the ideal diode is



1)75mA 2) 20mA 3)100mA 4)25mA

39. For this truth table

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

Which logic expression is correct ?

1) $Y = \overline{A}B + \overline{AB}$ 2) $Y = \overline{A}\overline{B} + A\overline{B}$ 3) $Y = \overline{A}\overline{B} + \overline{AB}$ 4) $Y = \overline{A}\overline{B} + AB$

40. If l_1, l_2, l_3 are the lengths of the emitter, base and collector of a transistor, then

1) $l_1 = l_2 = l_3$ 2) $l_3 < l_2 > l_1$ 3) $l_3 < l_1 < l_2$ 4) $l_3 > l_1 > l_2$

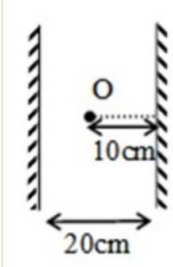
41. The relation between α and β parameters of a transistor is given by

1) $\alpha = \frac{1+\beta}{\beta}$ 2) $\alpha = \frac{1-\beta}{\beta}$ 3) $\alpha = \frac{\beta}{1+\beta}$ 4) $\alpha = \frac{\beta}{1-\beta}$

42. If the critical angle for total internal reflection from a medium to vacuum is 30^0, the velocity of light in the medium is

1) $3\times10^8 ms^{-1}$ 2) $1.5\times10^8 ms^{-1}$ 3) $6\times10^8 ms^{-1}$ 4) $\sqrt{3}\times10^8 ms^{-1}$

43. Two plane mirrors kept parallel at 20cm from each other. A point object is placed exactly in between them. Calculate distance between second images formed by two mirrors



1)80cm 2)60cm 3)40cm 4)10cm

44. A beam of light of wavelength 600nm from a distant source falls on a single slit 1mm wide and the resulting diffraction pattern is observed on a screen 2m away. The distance between the first dark fringes on either side of the central bright fringe is

1) 1.2cm 2)1.2mm 3)2.4cm 4)2.4mm

45. An unpolarised beam of intensity I_0 is incident on a pair of nicol prisms making an angle of 60^0 with each other The intensity of light emerging from the pair is

) I_0 2) $\frac{I_0}{2}$ 3) $\frac{I_0}{4}$ 4) $\frac{I_0}{8}$

CHEMISTRY

46. How many moles of lead (II) chloride will be formed from a reaction between 6.5g of PbO and 3.2g HCl? [Given : atomic mass of pb = 208u]

1)0.011 2)0.029 3)0.044 4)0.333

47. Consider the following sets of quantum number

	N	L	M	s
i)	3	0	0	+1/2
ii)	2	2	1	+1/2
iii)	4	3	-2	-1/2
iv)	1	0	-1	-1/2
v)	3	2	3	+1/2

Which of the following sets of quantum number is not possible ?

1) I,ii,iii and iv 2)ii,iv and v 3) iand iii 4)ii, iii and iv

48. Which one of the following arrangements represents the correct order of least negative to most negative electron gain enthalpy for C, Ca, AI, F and O ?

1) $Al < Ca < O < C < F$ 2) $Al < O < C < Ca < F$ 3) $C < F < O < Al < Ca$ 4) $Ca < Al < C < O < F$

49. Among the following, which one is a wrong statement ?

1) PH_5 and $BiCl_5$ do not exist 2) $p\pi - d\pi$ bonds are present in SO_2

3) SeF_4 and CH_4 have same shape 4) I_3^+ has bent shape

50. A bubble of air is under water at temperature 15^0C and the pressure 1.5 bar. If the bubble rises to the surface where the temperature is 25^0C and the pressure is 1.0 bar, what will happen to the volume of the bubble ?

1)Volume will become greater by a factor of 1.6 2)Volume will become greater by a factor of 1.1

3) Volume will become smaller by a factor of 0.70 4)Volume will become greater by a factor of 2.5

51. Complete hydrolysis of cellulose gives

1) D-ribose 2) D-glucose 3) L-glucose 4) D-fructose

52. For the reaction

$$CH_4(g) + 2O_2(g) \rightleftharpoons CO_2(g) + 2H_2O(I)$$

$$\Delta H_r = -170.8 kJmol^{-1}$$

Which of the following statements is not true ?

1) The reaction is exothermic

2) At equilibrium the concentrations of CO_2(g) and H_2O(I) are not equal

3)The equilibrium the constant for the reaction is given by $K_p = \frac{P_{CO_2}}{P_{CH_4} \times P_{O_2}}$

4)Addition of $CH_4(g)$ or $O_2(g)$ at equilibrium will cause a shift to the right

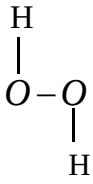
53. Which is the best description of the berhaviour of bromine in the reaction given below ?

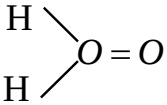
$H_2O + Br_2 \rightarrow HOBr + HBr$

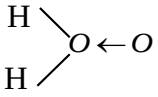
1)proton acceptor only 2)both oxidized and reduced
3)oxidised only 4)reduced only

54. Which of the following is the true structure of H_2O_2 ?

1)H – O – O – H

2) 

3) 

4) 

55. Match the list I with list II for the compositions of substances and select the correct answer using the code given above

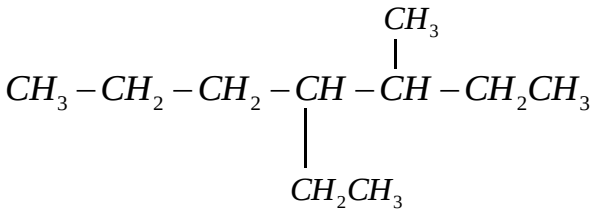
	List-I (Substances)		List-II (Substances)
1.	Plaster of paris	i)	$CaSO_4.2H_2O$
2.	Epsomite	ii)	$CaSO_4.1/2H_2O$
3.	Kieserite	iii)	$MgSO_4.7H_2O$
4.	Gypsum	iv)	$MgSO_4.H_2O$
		v)	$CaSO_4$

1)1-iii, 2-iv, 3-I, 4-ii 2)1-ii, 2-iii, 3-iv, 4 -i
3)1-I, 2-ii, 3-iii, 4-v 4)1- iv, 2 - iii, 3 - ii, 4 - i

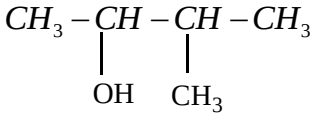
56. Which of the following anions is present in the chain structure of silicates ?

1) $\left(Si_2O_5^{2-}\right)$ 2) $\left(SiO_3^{2-}\right)$ 3) SiO_4^{4-} 4) $Si_2O_7^{6-}$

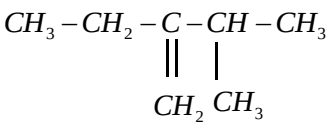
57. Names of some compounds are given which one is not in IUPAC system ?

1) 

3-methyl-4-ethylheptane

2) 

3-methyl-2-butanol

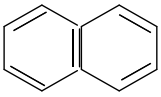
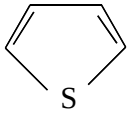
3) 

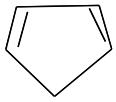
2-ethyl -3-methylbut-1-ene

4) $CH_3 - C \equiv C - CH\left(CH_3\right)_2$

4-methyl-2-pentyne

58. Which of the following chemical system is non aromatic ?

1)  2)  3) 

4) 

59. Pick out the statement which is not true ?

1)Tetrazine is harmful edible colour 2)Alitame is an artificial sweetner

3)BHT is an antioxidant 4)Sodium alkyl sulphate is a cationic detergent

60. The co-ordination number of metal crystallizing in a hexagonal close packed structure is

1)12 2)4 3)8 4)6

61. If 0.1M solution of glucose and 0.1M solution of urea are placed on two sides of the semipermeable membrane to equal heights then it will be correct to say that

1) There will be no net movement across the membrane
2) glucose will flow towards urea solution
3)Urea will flow towards glucose solution
4)Water will flow from urea solution to glucose

62. On the basis of the information available from the reaction,

$4/3Al + O_2 \rightarrow 2/3Al_2O_3; \Delta G = -827 kJmol^{-1}$ minimum e.m.f required to carry out electrolysis of Al_2O_3 is (F = 96500C mol^{-1})

1)2.14V 2)4.28V 3)6.42V 4)8.56V

63. When a bio-chemical reaction is carried out in laboratory outside the human body in absence of enzyme, then rate of reaction obtained is 10^{-6} times the activation energy of reaction in the presence of enzyme is

1) $-6RT$ 2) $+6RT$ 3) $-6(2.303)RT$ 4) $+6(2.303)RT$

64. The coagulation values in millimoles per litre of the electrolyte used for the coagulation of As_2S_3 are given below

I)(NaCl)=52

II)($BaCl_2$) = 0.69

III) ($MgSO_4$)= 0.22

The correct order of the coagulation power is

1)I > II > III 2) II > I > III 3) III > II > I 4)III > I > II

65. The method of zone refining of metals is based on the principle of

1)greater mobility of the pure metal than that of the impurity
2)higher melting point of the impurity than that of the pure metal
3)greater noble character of the solid metal than that of the impurity
4)greater solubility of the impurity in the molten state than in the solid

66. Which one of the following represents the correct order of acidic strength ?

1) $HOClO < HOCl < HOClO_3 < HOClO_2$

2) $HOClO_2 < HOClO_3 < HOClO < HOCl$

3) $HOClO_3 < HOClO_2 < HOClO < HOCl$

4) $HOCl < HOClO < HOClO_2 < HOClO_3$

67. In which of the following species the central atom has the type of hybridsation which is not the same as that present in the other three ?

1) PCl_5 2) SF_4 3) I_3^- 4) $SbCl_5^{2-}$

68. Atomic number of Cr and Fe are respectively 24 and 26 which of the following is paramagnetic with the spin of electron ?

1) $[Cr(CO)_6]$ 2) $[Fe(CO)_5]$ 3) $[Fe(CN)_6]^{4-}$ 4) $[Cr(NH_3)_6]^{3+}$

69. How many stereoisomers does this molecule have ?
$CH_3CH=CHCH_2CHBrCH_3$
1) 8 2)2 3)4 4)6

70. Consider the following reaction $Phenol \xrightarrow{Zn\ dust} X \xrightarrow{CH_3Cl} Y \xrightarrow{AlkalineKMnO_4} Z \xrightarrow{H_3O^+}$ the product z is
1)benzaldehyde 2)benzoic acid 3)benzene 4)toluene

71. Coordination number of Ni in $\left[Ni\left(C_2O_4\right)_3\right]^{4-}$ is
1)3 2)6 3)4 4)2

72. Electrolytic reduction of nitrobenzene in weakly acidic medium gives
1)N-phenylhydroxylamine 2)nitrosobenzene
3)aniline 4)p-hydroxyaniline

73. Which of the following is an amine hormone ?
1)Insulin 2)progesterone 3)Thyroxine 4)Oxypurin

74. Which one of the following polymers is prepared by condensation polymerization?
1)Teflon 2)Natural rubber 3)styrene 4)Nylon -6, 6

75. Gammexane is
1)bromobenzene 2)benzyl chloride 3)chlorobenzene 4)benzene hexachloride

76. An organic compound contains carbon, hydrogen and oxygen. Its elemental analsysis gave C, 38.71% and H, 9.67%. The empirical formula of the compound would be
1)CHO 2) CH_4O 3) CH_3O 4) CH_2O

77. The correct order of increasing bond length of C- H, C- O, C- C and C = C is
1) $C-H<C=C<C-O<C-C$ 2) $C-C<C=C<C-O<C-H$
3) $C-O<C-H<C-C<C=C$ 4) $C-H<C-O<C-C<C=C$

78. Consider the following reactions
i) $H^+\left(aq\right)+OH^-\left(aq\right)\rightarrow H_2I\left(I\right),\Delta H=-X_1KJmol^{-1}$
ii) $H_2\left(g\right)+1/2O_2\left(g\right)\rightarrow H_2O\left(I\right),\Delta H=-X_2kJmol^{-1}$
iii) $CO_2\left(g\right)+H_2\left(g\right)\rightarrow CO\left(g\right)+H_2O\left(I\right),\Delta H=-X_3kJmol^{-1}$
iv) $C_2H_2\left(g\right)+5/2O_2\left(g\right)\rightarrow 2CO_2\left(g\right)+H_2O\left(I\right),\Delta H=+X_4KJmol^{-1}$ Enthalpy of formation of $H_2O\left(I\right)$ is
1) $+X_3kJmol^{-1}$ 2) $-X_4kJmol^{-1}$ 3) $+X_1\,kJmol^{-1}$ 4) $-X_2\,kJmol^{-1}$

79. Which of the following pairs constitutes a buffer ?
1)HCl and KCl 2) HNO_2 and $NaNO_2$ 3) $NaOH$ and NaCl 4) HNO_3 and NH_4NO_3

80. Which one of the following order s wrong, with respect to the property indicated ?
1)benzoic acid > phenol > cyclohexanol (acidic strength)
2)Aniline > cyclohexylamine > benzamid (basic strength)
3)Formic acid > acetic acid > propanoic acid (acid strength)
4)Fluoroacetic acid > chloroacetic acid > bromoacetic acid (acid strength)

81. Which is the most suitable reagent among the following to distinguish compound (3)from the rest of the compounds ?
1) $CH_3-C\equiv C-CH_3$ 2) $CH_3-CH_2-CH_2-CH_3$
3) $CH_3-CH_2C\equiv CH$ 4) $CH_3-CH=CH_2$
1) Bromine in carbon tetrachloride 2)Bromine in acetic acid
3)Alk.$KMnO_4$ 4)Ammoniacal silver nitrate

82. An electrochemical cell is set up as :pt; H_2 (1 atm)$\left|HCl\left(0.1M\right)\right|\left|CH_3COOH\left(0.1M\right)\right|\ H_2\left(1atm\right);Pt$ The e.m.f of this cell will not be zero because
1)acids used in two compartments are different
2)e.m.f depends on molarities of acids used
3)the temperature is constant
4)pH of 0.1M HCl and 0.1M CH_3COOH is not same

83. Which of the following sets has strongest tendency to form anions ?
1)Ga, Ni, TI 2)Na, Mg, AI 3) N, O, F 4) V, Cr, Mn

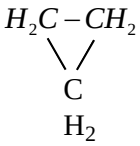
84. The most convenient method to protect the bottom of ship made of iron is
1)Coating it with red lead oxide 2) White tin plating
3) connecting it with Mg block 4)Connecting it with Pb block

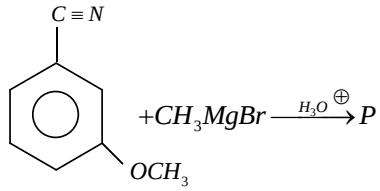
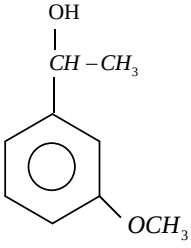
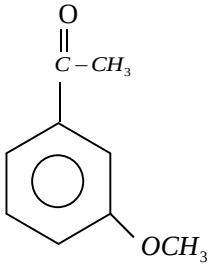
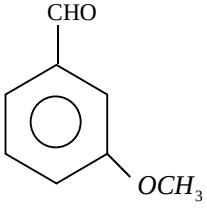
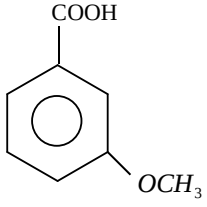
85. If there is no rotation of plane polarized light by a compound in a specific solvent , through it is chiral, it may mean that
1)the compound is certainly meso
2) there is no compound in the solvent
3)the compound may be a racemic mixture
4)the compound is certainly a chiral

86. Ethylene oxide when treated with Grignard reagent yields
1)Primary alcohol 2)Secondary alcohol
3)tertiary alcohol 4)cyclopropyl alcohol

87. In this reaction $CH_3CHO+HCN\rightarrow CH_3CH\left(OH\right)CN\xrightarrow{HOH}CH_3CH\left(OH\right)COOH$
A symmetric centre is generated. The acid obtained would be
1)D- isomer 2)L- isomer
3)50% D + 50% L-isomer 4)20% D+ 80% L-isomer

88. The first and second dissociation constants of an acid H_2A are 1.0×10^{-5} and 5.0×10^{-10} respectively. The overall dissociation constant of the acid will be
1) 5.0×10^{-5} 2) 5.0×10^{15} 3) 5.0×10^{-15} 4) 0.2×10^{5}

89. Which of the following compounds shall not produce propene by reaction with HBr followed by elimination or direct only elimination reaction ?
1) 
2) $H_3C-CH_2-CH_2OH$
3) $H_2C=C=O$
4) $H_3C-CH_2-CH_2Br$

90. 
Product 'P' in the above reaction is
1) 
2) 
3) 
4) 

BOTANY

91. Red tide is caused by an organism which closely resembles which closely resembles which of these structures ?

1)  2)  3)  4) 

92. Individuals homozygous for 'XY' genes were crossed with wild type ' ++'. The F_1 dihybrid thus produced was test crossed. It produced progeny in the following ratio '++'900; '+y'115; 'xy'880; 'x+'105 Find out the recombination frequency

1)47 map units 2) 88 map units 3) 11 map units 4) 5.75 map units

93. During an enzyme catalyzed reaction, the substrate reaches a transition stage which is

1)Temporary but stable 2)Permanent but unstable

3)Temporary and unstable 4)Permanent and stable

94. The eukaryotic, multicellular saprophytic organisms reproduce sexually by

1)zygospores, ascospores, basidiospores 2)Zoosporesm ascospores, basidiospores

3)Sporangiospores and conidia 4)Zygospores, zoospores, basidiospores

95. The correct difference between the embryonic development of monocot and dicot plants is

1)In monocots, suspensor is single celled while in dicots it contains 6- 10 cells

2)In monocots endosperm is formed before embryo while in dicots embryo is formed before endosperm

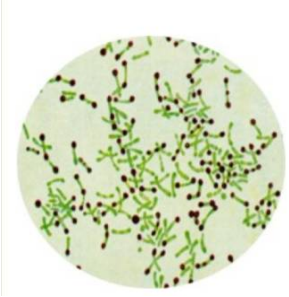
3)In dicots, coleoptiles and coleorhizae are seen while they are not seen in monocots

4)In dicot the growth of embryo is lateral but in monocots it is vertical

96. What will be the molecular formula of a polypeptide consisting of 10 glycine residues ?

1) $C_6H_{12}ON_5$ 2) $C_{20}H_{32}O_{11}N_{10}$ 3) $C_{30}H_{16}O_6N_{10}$ 4) $C_{20}H_{30}O_{12}N_{10}$

97. The throat swab of a patient with a sore throat, hoarseness of voice, and difficulty in breathing was taken. The organism was observed under the microscope and was identified as Corynebactrium diphteriae. The following is an image of the slide.



What is the nature of the organisms?

1)They are spherical organisms without a well – developed nucles

2) They are rod shaped organisms without a well developed nucles

3) They are spherical organisms with a well – developed nucles

4) They are rod shaped organisms with a well – developed nucleus

98. The study of mutations is easy in haploids as compared to diploids because

1) Haploids are more abundant in nature than diploids

2) All mutations, whether dominant or recessive are expressed in haploids

3) They are reproductively more stable than diploids

4) Mutagens penetrate in haploids more effectively than in diploids

99. How many of the following fungi belong to the group 'Sac- Fungi'?
Ustilago, Aspergillus, neurospora, Trichoderma, Albugo, claviceps, saccharomyces, Colletotrichum
1)Two 2)Four 3) Five 4) Three

100. Which point of difference between Geitonogamy and xenogamy is incorrect ?

	Geitonogamy	**Xenogamy**
1)	It is self pollination	It is cross pollination
2)	It produces fewer variations	If produces a lot of variations
3)	It occurs between two flowers of same plant	It occurs between two flowers of different plants
4)	Pollination occurs between genetically dissimilar plants	Pollination occurs between morphologically and genetically dissimilar plants

101. Some strains of Bacillus thuringiensis produce proteins that kill certain insects such as armyworm. Armyworm is
1)Dipteran 2)lepidopteran 3) coleopteran 4) all of these

102. The condition where protoxylem lies towards periphery is called as (i) while the condition where protoxylem lies towards periphery and metaxylem towards pith is known as (ii)
1)i)endarch xylem (ii) exarch xylem 2) i)exarch xylem (ii) endarch xylem
3) (i) diarch xylem (ii) polyarch xylem 4)hexarch xylem (ii) tetrarch xylem

103. The shape and starch synthesis in pea seeds is controlled by one gene. Which among the following statements is/are correct for heterozygotes ?
i)Round seeds are due to the law of dominance while the size of the starch grain is due to the law of incomplete dominance
ii)Round seeds are due to the law of incomplete dominance while the size of the starch grain is due to the law of dominance
iii)Dominance is not an autonomous feature of a gene or the product that it has information for
1) Both (i) and (ii) are correct but (ii) is false 2) Both ii and iii are correct but i is false
3)both i and iii are correct but ii is false 4) only i is correct and both ii & iii are false

104. RNA interference involves
1)Silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA
2)Silencing of a specific mRNA due to a complementary ssRNA molecule that binds to and prevents translation of the mRNA
3) silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents post transcriptional processing of the mRNA
4)Silencing of a specific mRNA due to a complementary ssRNA molecule that binds to and prevents post transcriptional processing of the mRNA

105. Observe this image of a cut section of the tree. What would be the approximate age of this tree ?

1) 7 years 2) 10 years 3) 14 years 4) 28 years

106. Read the following statements and state how many of them are true ?
A) primary succession, is a very slow process, taking thousands of years for the climax to be reached
B) All succession whether taking place in water or land proceeds to a similar climax community, the mesic
C) As succession proceeds, the number and types of animals and decomposers also change
D) Saprophytes are not given by place in the ecological pyramids as they play no role in the ecosystem
1)A 2) B 3) C 4) D

107. Michelia has 1) multiple carpels which are free from each other
2) multiple carpels which are fused to each other
3) single carpel 4) an inferior ovary

108. If the molecular mass of an amino acid is 150 daltons, the molecular mass of a tripeptide will be
1)414 2) 486 3)504 4)450

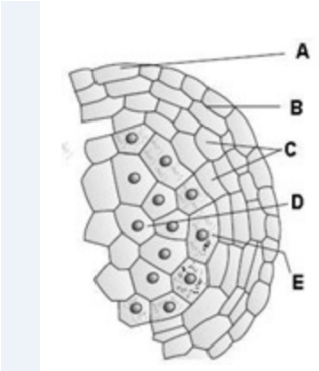
109. $2NO_2^- + O_2 \rightarrow 2NO_3^-$ This step of nitrification is done by ____ bacteria

1)Pseudomonas 2)Thiobacillus 3)Nitrobacter 4)Nitrococcus

110. In order to isolate the DNA from a suspension of Bacillus subtilis, which of the following enzymes will be required to break open the cells ?
1) Cellulase 2) Lysozyme 3) Chitinase 4) Ribonuclease

111. Consider the following four statements (i), (ii), (iii) and (iv) and select the right option
i) In vexillary aestivation , the large posterior petal is called – standard, two lateral ones are wings and two small anterior petals are termed keel
ii)The floral formula for liliaceae is $\oplus \nearrow OP_3 + 3A_{3+3} + \underline{G_3}$ (+)
iii) In pea flower the stames are monadelphous
iv) The floral formula for solanaceae is $\oplus \nearrow OP_{(3)}C_{(3)}A_{(4)} + G_{\underline{(2)}}$ (+)
1)i and iii 2) i and ii 3) ii and iii 4) iii and iv

112. Observe the diagrams and state the nutritive layer(s) of microsporangium



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

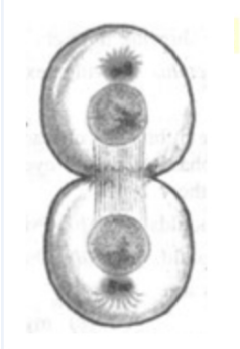
113. A simple stirred tank bioreactor has all of the following properties, except
1) It is usually cylindrical or with a curved base to facilitate the mixing of the reactor contents
2) The stirrer facilitates even mixing and oxygen availability throughout the bioreactor
3) Foam control system is present
4) Sterile air bubbles are sparged into the simple stirred tank bioreactor

114. Observe the following leaf of papaya and state its type

1)Pinnately compound leaf 2) Palmately compound leaf
3) Simple palmate leaf 4) Decompound leaf

115. Allium cepa shows all the following properties, except
1) It has cymose inflorescence with umbellate clusters
2) During unfavrourable conditions, the aerial part of the plant dies but the stem bulbs survive and develop into shoots
3) Its flower has three green sepals and three pink petals
4) It is placed in the same family as that of colchicum autumnale

116 Identify this stage of mitosis and match it with its properties

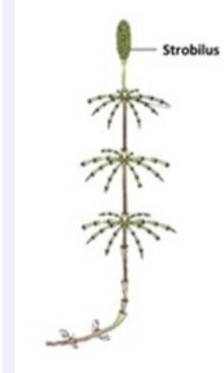


1) Late anaphase – Chromosomes move away from equatorial plate, Golgi complex not present
2) Cytokinesis – cell plate formed, mitochondria distributed between two daughters cells
3) Telophase – Tetrad formation
4) Telophase – Nuclear envelop reforms Golgi complex reforms

117. The property not shown by the “amphibians of the plant kingdom” is
1) The plant body is thallus like, attached to substratum by help of rhizoids
2)The antherozoids are released in water for fertilization
3)Zygote formed undergoes meiotic division immediately
4) They have leak like, stem like and root like structures

118. The nucles of a gamete of an animal has 5pg DNA. What will be the content of DNA in the somatic cell of the same animal at the end on G2 phase ?
1) 10 pg 2) 5 pg 3) 20 pg 4) 40pg

119. Which of the following properties correctly describes the plant depicted in this diagram ?



1) It produces seeds but they are not enclosed in fruits
2) It has gametophyte and sporophyte which are independent of each other
3) It is a vascular cryptogam placed under class Lycopsida
4) It shows protonema stage in its life cycle and doesn't bear true roots

120. Match the chromosomes with their properties

	Chromosome		Property
1)	Metacentric chromosome	i)	Terminal centromere
2)	Acrocentric chromosome	ii)	Equal arms
3)	Submetacentric chromosome	iii)	One slightly shorter arm, one slightly longer arm
4)	Telocentric chromosome	iv)	One extremely short arm and one very long arm

1)1-iv, 2- iii, 3- ii, 4- i 2) 1- i, 2- ii, 3- iii, 4- iv
3)1- ii, 2-iv, 3- iii, 4- I 4) 1-iv, 2-i, 3- iii, 4- ii

121. Which of these varieties of wheat is biofortified ?
1) Kalyan sona 2) Sonalika 3) Atlas 66 4) Himgiri

122. The Golgi cisternae are concentrically arranged near the nucleus with distinct
1)concave trans or the forming face and convex cis or the maturing face
2)Concave cis or the forming face and convex trans or the maturing face
3)convex trans or the forming face and concave cis or the maturing face
4) convex cis or the forming face and concave trans or the maturing face

123. Which of these microbes is used in the inoculums to form curd ?
1)Lactobacillus acidophilus 2)Agrobacterium tumefaceins
3)Streptococcus thermophiles 4)Streptoccus faecalis

124. Membrane – bound cell organelles are absent in
1) Plasmodium 2) Saccharomyces 3)Streptococcus 4)Chlamydomonas

125. Which of the following options shows correct pairing of alcohol and the substrate from which it is obtained ?
1) Beer : Wheat, Rum: Molasses, Whiskey : barley and Vodka: Potato
2) Beer : Barley malt: Rum : Molasses, whiskey : Cereals and Vodka : Potato
3) Beer : Juices of fruits, Rum : Potato, Whiskey : Wheat and Vodka: Molasses
4)Beer : Barley malt, Rum : Potato, whiskey: Fermented juices and Vodka molasses

126. Wobble hypothesis cannot be applied to the tRNA carrying which of the following amino acids
1)Tryptophan and cysteine 2) Cysteine and serine
3) Tryptophan and methionine 4) Serine and methionine

127. All the following plants are biennials except
1) Sugarbeet 2) Cabbage 3) Carrot 4) Pea

128. The essential photosynthetic pigment has a ___at carbon atom 3 of the pyrrole ring – II of chlorophyll a
1)Methyl group 2) Ethyl group 3) Carboxyl group 4) Magnesium

129. With respect to photoperiodism, site of perception of light / dark duration is
1)Root apex 2)Shoot apex 3) Flower 4) Leaf

130. Match the mode of dark reactions with their correct example

a	Calvin cycle	i)	Kalanchoe
b	C_4 plants	ii)	Zea mays
c	CAM plants	iii)	Triticum

1)a- ii, b-iii, c- i 2) a –i, b – ii, c – iii 3)a- iii, b- ii, c – i 4)a –i, b- ii, c – ii

131. Mark the incorrect differences between eukaryotic and prokaryotic transcription
I)In eukaryotes, the genes are split having exons and introns while in prokaryotes it isn't
II)The structural gene which is to be transcribed is generally mono-cistronic in prokaryotes and poly cistronic in eukaryotes
III)The RNA formed with the help of RNA polymerase in eukaryotes requires further processing to function as m-RNA while in prokaryotes it is directly used as m-RNA
IV)In eukaryotes , RNA polymerase blinds to the promoter region while in prokaryotes it binds to the operator region
1)I and IV 2) II and III 3) II and IV 4)III and IV

132. Male and female gametophytes are independent and free – living in
1)Mustard 2)Castor 3) Pinus 4)Sphagnum

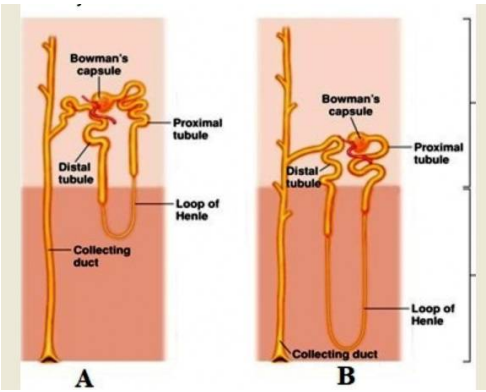
133. Substrate level phosphrylation occurs during
1)Citric acid $\rightarrow$ alpha-ketoglutaric acid 2)Malic acid $\rightarrow$ oxalo –acetic acid
3)alpha-ketoglutaric acid $\rightarrow$ Succinyl co A 4)Succinyl –co A $\rightarrow$ succinic acid

134. Observe this floral diagram. What does the part denoted by the arrow indicate ?

1)The position of bract in the flower 2) The position of petiole or stalk of the flower
3) The position of thalamus of the flower
4) The position of the mother axis with respect to the flower

135. During glycolysis, water is released along with the formation of
1)3- phosphoglyceric acid 2) Phosphenol pyruvic acid
3) Dihydroxyl acetone phosphate 4) 3- phosphoglyceric acid

136. Observe the labelling in the diagram and identify A and B



1)A-Cortical nephrons (50% of total nephrons) & B – Juxtaglomerular neurons (50% of total nephrons)
2)A – Juxtaglomerular nephrons (80% of total nephrons) & B-Cortical nephrons (20% of total nephrons)
3)A-Cortical nephrons (80-85% of total nephrons) B – Juxtaglomerular neurons (15-20% of total nephrons)
4) A- Cortical nephrons (25% of total nephrons) & B- Juxtaglomerular neurons (75% of total nephrons)

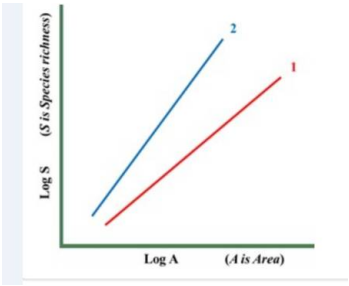
137. Steller's sea cow from Russia, described by George Wilhelm Steller, became extinct due to
1)Habitat destruction 2)Over-exploitation
3)Bird- flu virus infection 4) Pollution

138. Which one of the following is incorrectly matched with its characteristic and the taxon ?

	Animal	**Characteristics**	**Taxon**
I)	*Trygon*	Poison sting	Chondrichthyes
II)	*Scoliodon*	Ampulla of Lorenzini	Chondrichthyes
III)	*Exocoetus*	Pectoral fins are large & wing- like	Osteichthyes
IV)	*Hippocampus*	Male Parental care	Chondrichthyes

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

139. Observe the graph of area versus species richness and select the options that explain lines 1 and 2



1)1-Molluscs in new York state and 2-plants in Britain
2)1- Plants in Britain and 2 – birds in California
3) 1- Frugivorous birds and mammals in the tropical forests of different continents and 2- plants in Britain
4) 1- Molluscs in New York state and 2-frugivorous birds and mammals in the tropical forests of different continents

140. Systolic blood pressure of a patient was 140mm Hg while has diastolic blood pressure is 90 mm Hg. If this is not controlled, it can lead to
a)Heart disease b) Brain haemorrhage
c) Damage of the blood vessels of kidney d)Failure in conducting system
1)a, b, c and d 2) a, b and c 3) only a and b 4) b and c only

141. Analyze the given options and select the one that corresponds to have the least percentage value
1)The percentage of drugs currently sold in the market worldwide which are derived from plants
2) The estimated percentage of total oxygen in the earth's atmosphere produced by Amazon forest through photosynthesis
3) The percentage of tropical rain forests covering the earth's land surface presently
4)The percentage of India's share of the global species diverisity

142. The immune regulator molecule prostaglandin is derived from
1) oligosaccharides 2) fatty acids 3) steroids 4) amino acids

143. Cardiac output is defined as the amount of blood
1) Pumped by the left atrium per hour 2)Received by the heart in one minute
3) Pumped by each ventricle per minute 4) Pumped by both ventricles per second

144. Match the process of decomposition with the event that occurs in it

i)	Fragmentation	A)	Degradation of detritus by bacterial and fungal enzymes
ii)	Leaching	B)	Precipitation of water – soluble nutrients as un available salt
iii)	Catabolism	C)	Break down of detritus into smaller particles

1)i-A, ii-B, iii-C 2)i-B, ii- C, iii-A 3)i- C, ii-B, iii-A 4)i- C, ii – A, iii- B

145. The endocrine gland that produces somatostatin also produces
1)Insulin and glucagon 2) Progesterone and oestrogen
3) Thyroxine and calcitonin 4) Somatotropin and prolactin

146. Which of these is not a correct difference between carbon cycle and phosphorus cycle ?
1)Carbon cycle is a gaseous type of nutrient cycle while phosphorous cycle is a sedimentary type of nutrient cycle
2) The reservoir of carbon is ocean while the reservoir of phosphorus is rock
3)In carbon cycle, there is respiratory release of carbon into atomosphere while this doesn't happen in phosphorus cycle
4) Atmospheric inputs of phosphorus through rainfall are much larger than carbon inputs

147. The outermost layer of adrenal cortex, Zona glomerulosa is associated with
1)Water and electrolyte balance 2) Carohydrate metabolism
3) Blood cells production 4) Secretion of emergency hormones

148. Which of these hormones is not produced by pituitary (hypophysis cerebri)?
1) Growth hormone 2) Follicle stimulating hormone
3) Oxytocin 4)Adrenocorticotrophic hormone

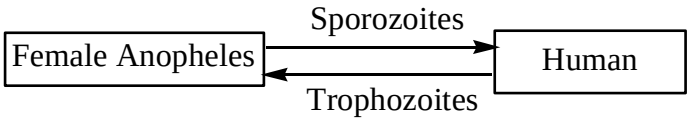
149. Which of the following names of environmental activists are matched correctly with their work ?
I)Amritadevi Bishnoi: Conservation of trees in Jodhpur of Rajasthan
II) Ramesh Chandra Dagar : Organic farmer in Sonipat of Haryana
III) Ahmed khan: Remedy for plastic waste in Bangalore of Karnataka
1) I and II 2)I and III 3) II and III 4) I , II and III

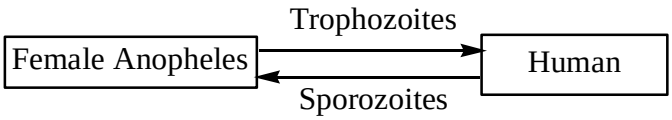
150. How many different types of genetically different gametes will be produced by a heterozygous person having the genotype AABbCc for the skin colour ?
1)Two 2)Four 3) Six 4) Nine

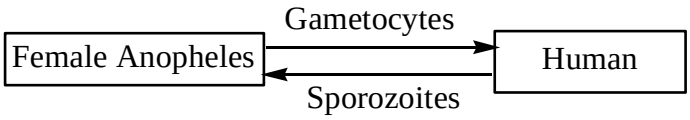
151. RAAS is a system involving many organs. Which of these statements about RAAS is false ?
1)It operates in response to decrease in blood pressure or blood volume
2) The JG cells release an enzyme renin which converts angiotensinogen into a peptide angiotensin I
3) Angiotensin II inhibits the release of aldosterone from adrenal gland
4) Angiotensin II increases blood pressure by causing arterioles to constrict

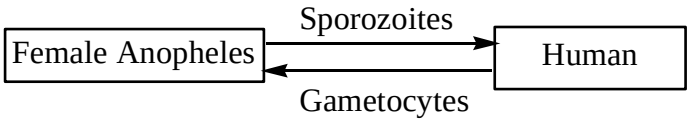
152. Photochemical smog is characterised by the absence of involvement of
1)Ozone 2) nitrogen dioxide 3) carbon dioxide 4)PAN

Anopheles mosquito and humans ?

1)


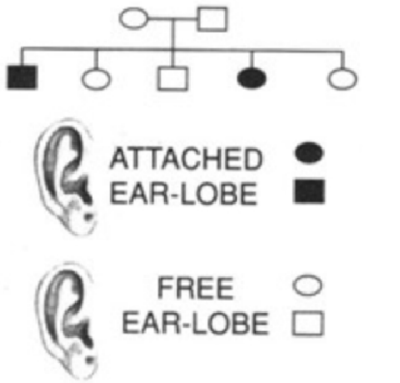
2)


3)


4)


154. Reptiles of different shape and size dominated Earth. Which reptile went back into water to evolve into fish -like reptiles, probably 200mya ?
1) *Ichthyosaurs* 2) *Tyrannosaurus* 3) *hemidactylus* 4) *pelycosaurs*

155. Observe the following pedigree chart and state the correct statement about it



1) The parents are homozygous recessive 2) The trait is Y – linked
2) The parents are homozygous dominant 4) The parents are heterozygous

156. Choose the correct statement from the following
1) Internal fertilisation shows a greater degree of synchrony due to the production of a large number of Gametes
2) Offsprings born from external fertilization are extremely vulnerable to predators
a. Both birds and reptiles show external fertilisation
4)Non- motile male gametes are the characteristic feature of internal fertilization

157. Which of these partial pressures are equal ?
1) pO_2 in atmospheric air and pO_2 in alveoli
2) pO_2 in alveoli and pO_2 in oxygenated blood
3) pCO_2 in oxygenated blood and pO_2 in deoxygenated blood
4) pCO_2 in oxygenated blood and pCO_2 in tissues

158. All the following statements about cannabinoids are true, except
1) Cannabinoids are known for their effects on cardiovascular system
2) Cannabinoids are obtained from leaves , flowers tops & resins of hemp plant
3)Cannabinoids interact with cannabinoid receptors present principally in brain
4) Coke or crack is a very commonly abused cannabinoid

159. Cave paintings by pre- historic humans can be seen at Bhimbetka rock shelter in Raisen district of Madhya pradesh. Such pre- historic cave art developed about
1) 18,000 years ago 2) 24, 000 years ago 3) 53,000 years ago 4) 10,000 years ago

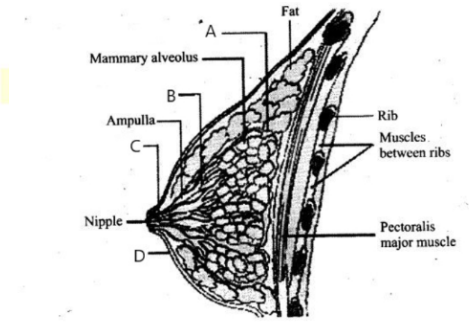
160. Select the chromosomal disorders from the following diseases affecting humans
I) Haemophilia II)Down's syndrome III) Klinefelter's syndrome
IV) Sickle cell anemia V) Turner's syndrome VI) Thalessemia
1) All except II, III and V 2) All except I and IV
3)All except I, IV and VI 4) All except I, II and VI

161. Arrange the various respiratory volumes in ascending order
1) Tidal volume → Residual volume → Expiratory reserve volume → inspiratory Reserve volume
2) Tidal volume → Expiratory reserve volume → Residual volume → Inspiratory reserve volume
3) Tidal volume → Residual volume →Inspiratory Reserve volume → Expiratory Reserve volume
4) Residual volume → Tidal volume → Inspiratory Reserve volume → Expiratory Reserve volume

162. Which of these statements about cancer is incorrect ?
1)Cellular oncogenes (c-onc) are present in normal cells which do not become cancerous until activation
2)Antibodies against cancer- specific antigens are used for detection of certain cancers
3) MRI uses strong magnetic fields and ionizing radiations to accurately detect pathological and physiological changes in the living tissue
4)Cancers can be treated using alpha interferons which activate immune system and helps in destroying tumor cells

163. Which of the following options has an odd pair ?
1) Sting of AP is (honey bee)and Trygon (sting ray fish) 2) Wing of an insect and bird
3) Stipules of *Lathyrus* & petiole of *Acacia*
4) Forelimbs of frog and human

164. Given below is a labeled diagram of the mammary gland, of which some parts are labelled as A, B, C and D. Based on these labels, choose the part that contains the cluster of cells which secrete milk



1)A 2) B 3) C 4) D

165. Plants adapted to deserts have
1)Sunken stomata 2) Deep roots 3) Thick cuticle 4) All the above

166. The correct statement of cleavage in humans is
1) It is a process to convert ovum (n) to zygote to (2n)
2) It starts while the egg is moving towards uterus in the fallopian tube
3) It is not identical to mitosis
4) It starts only when the egg reaches the uterus

167. Observe the table depicting interactions between various organism and select the correct option

Species A	Species B	Name of Interaction
+	+	Mutualism
-	-	A
+	-	B
+	-	Parasitism
+	0	C
-	0	D

(+) Beneficial (-)detrimental (0) neutral

1) A: Commensalism , B: Predation, C: Amensalism, D: Competition
2) A: Predation, B: Parasitism, C: Commensalism, D :Amensalism
3) A: Competition, B : Predation , C: Commensalism , D : Amensalism
4) A: Competition ; B: Predation , C : Amensalism, D: Commensalism

168. Which of the following is incorrect about the uterine wall ?

1)Perimetrium-outer thin membranous layer
2) Myometrium – Middle thick smooth muscle layer
3)Mesometrium-smooth muscle layer below myometrium
4) Endometrium-Inner glandular layer that lines the uterine cavity

169. How many of the following glands release their secretions that don't have a zymogen in them ?
Fundic glands, Salivary glands, Pancreatic acini, Hepatic lobules, Intestinal glands

1)1 2) 2 3) 4 4) 5

170. Which of the following is correct about binomial nomenclature ?

1)Both the words in binomial name when handwritten, are separately underlined
2)Both generic name and the specific epithet are printed in italics
3) Generic name starts with a small letter and the specific epithet always starts with a Capital letter
4) Both (1) and (2) are correct

171. An anteriorly convex and posteriorly concave curve is seen in which of the following region of our vertebral column ?

1)Thoracic 2) Lumbar 3) Sacral 4) Both (1) and (3)

172. How many statements about diffusion is /are false ?

i)The diffusion rate depends on the size of the substrate
ii)Diffusion across the membrane depends upon its solubility in lipids
iii)membrane protein provides sites for a hydrophilic substance to cross the membrane
iv)Facilitated diffusion is carried out by proteins

1) 0 2) 1 3) 2 4) 3

173. In each of the following table each property is linked with two structural aspects. The letter 'N' denotes 'NO' and letter 'Y' indicates 'YES' written against the structural aspects. Which of the following is incorrectly expressed ?

	Property	Structural aspects	N/Y
i)	Higher amount sarcoplasmic reticulum	Red muscles	N
		White muscles	Y
ii)	Smaller size in contracted myofibril	I band	Y
		A band	N
iii)	An involuntary muscle with stripes	Skeletal muscle	N
		Cardiac muscle	Y
iv)	ATP is required	Muscle contraction	N
		Muscle relaxation	Y

1)i 2) ii 3) iii 4) iv

174. Multiload 375 acts as a contraceptive because
1)it prevents ovulation 2) it releases progesterone hormone
3)it releases copper ions which suppress the motility and fertilizing capacity of sperm
4) it decreases sperm mortality and increases sperm motility

175. How many of these statements are correct ?
i)In transcription, adenosine pairs with uracil
ii)Regulation of lac operon by a repressor is referred to as positive regulation
iii) The human genome has approximately 50, 000 genes
iv) DNA fingerprinting utilizes VNTRs and RFLPs
1)Two 2) Three 3) Four 4) One

176. Louise Joy Brown is an English woman who was born as the first test –tube baby. She was born by a process in which
1)Fertilization is external and foetus formation is internal
2) Fertilization is internal and foetus formation is external
3) Both fertilization and foetus formation are internal
4) Both fertilization and foetus formation are external

177. Which of the following statement is correct regarding association areas in the human brain ?
1)It contains large regions which are sensory 2)It is present in cerebral cortex
3)it is responsible for simple functions of brain 4)It is present in rhombencephalon

178. The following list contains some connective tissues. Which of these is/are present beneath (in)our integument/ skin ?
a)Areolar tissue b)Adipose tissue c)Dense irregular connective tissue
1)only b 2) both a & c 3) both a and b 4) a, b, and c

179. All statements about electrical synapses are correct except
1)The membranes of pre and post synaptic neurons are in very close proximity
2) Transmission of impulse across this synapse is very similar to impulse conduction along a single axon
3)Impulse transmission is always faster than that across a chemical synapse
4)Electrical synapses are very common in our body

180. Which of these differences between male and female cockroaches(Periplaneta Americana) is correct ?
1)The testis in male cockroach is longer than the ovary in female cockroach
2) The male cockroach has anal cerci while female cockroach has anal styles
3) The male cockroach has one chromosome less than the female cockroach
4) The spermatheca is found in male cockroach while ootheca is found in the female cockroach

NATIONAL TEST ABHYAS NEET MOCK TEST-52

Answers and Solutions

PHYSICS

1) 1	2) 1	3) 3	4) 3	5) 1	6) 1	7) 4	8) 2	9) 4	10) 3
11) 1	12) 4	13) 3	14) 2	15) 2	16) 3	17) 3	18) 3	19) 2	20) 4
21) 4	22) 2	23) 4	24) 2	25) 2	26) 2	27) 1	28) 2	29) 2	30) 3
31) 1	32) 2	33) 3	34) 3	35) 2	36) 2	37) 2	38) 4	39) 4	40) 4
41) 3	42) 2	43) 1	44) 4	45) 4					

CHEMISTRY

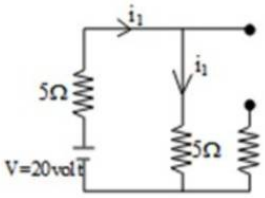
46) 2	47) 2	48) 4	49) 3	50) 1	51) 2	52) 3	53) 2	54) 2	55) 2
56) 2	57) 1	58) 4	59) 4	60) 1	61) 1	62) 1	63) 3	64) 3	65) 4
66) 4	67) 4	68) 4	69) 3	70) 2	71) 2	72) 3	73) 3	74) 4	75) 4
76) 3	77) 1	78) 4	79) 2	80) 2	81) 4	82) 4	83) 3	84) 2	85) 1
86) 1	87) 3	88) 3	89) 3	90) 2					

BIOLOGY

91)1	92)3	93)3	94)1	95)1	96)2	97)2	98)2	99)2	100) 4
101) 2	102) 1	103) 3	104) 1	105) 3	106) 3	107) 1	108) 1	109) 3	110) 2
111) 2	112) 4	113) 4	114) 3	115) 3	116) 4	117) 3	118) 3	119) 2	120) 3
121) 3	122) 4	123) 1	124) 3	125) 2	126) 3	127) 4	128) 1	129) 4	130) 3
131) 3	132) 4	133) 4	134) 4	135) 2	136) 3	137) 2	138) 4	139) 4	140) 2
141) 3	142) 2	143) 3	144) 3	145) 1	146) 4	147) 1	148) 3	149) 4	150) 2
151) 3	152) 3	153) 4	154) 1	155) 4	156) 2	157) 3	158) 4	159) 1	160) 3
161) 2	162) 3	163) 4	164) 1	165) 4	166) 2	167) 3	168) 3	169) 2	170) 4
171) 2	172) 1	173) 4	174) 3	175) 1	176) 1	177) 2	178) 4	179) 4	180) 3

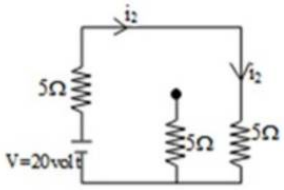
PHYSICS

1. At $t=0$ capacitor is short circuit and inductor is open circuit



$$i_1=\frac{20}{5+5}=2A$$

At $t=\infty$ capacitor is open circuit and inductor is a short circuit



$$i_2=\frac{20}{5+5}=2A$$

$$\therefore \frac{i_1}{i_2}=\frac{2}{2}=1$$

2. Field due to a bar magnet on equatorial position

$$B=\frac{\mu_0 m(2l)}{4\pi\left(r^2+l^2\right)^{3/2}}$$

Given

$$2l=8cm$$

$$r=\frac{6}{2}=3cm$$

At the null point,

$$B=B_H$$

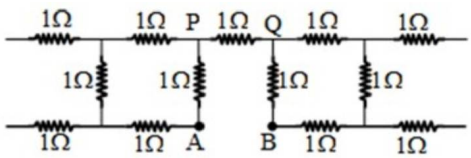
$$\frac{\mu_0}{4\pi}\frac{m(2l)}{\left(r^2+l^2\right)}=B_H$$

$$\left(10^{-7}\right)\frac{m\left(8\times10^{-2}\right)}{\left[\left(3\times10^{-2}\right)^2+\left(4\times10^{-2}\right)^2\right]^{3/2}}=3.2\times10^{-5}$$

$$m=\frac{(125)(3.2)}{8}\times10^{-2}$$

$$m=0.5Am$$

3:



The effective resistance of the infinite ladder between A and P will be less than one

$$R_{AP}<1\Omega$$

Similarly, the effective resistance of the infinite ladder between B and Q will also be less than one

$$R_{BQ}<1\Omega$$

Therefore resistance between A and B is

$$R_{AB}=R_{AP}+R_{PQ}+R_{QB}$$

As $R_{PQ}=1\Omega$

Therefore $1\Omega<R_{AB}<3\Omega$

4: Manganin is used in potentiometer as its temperature coefficient of resistance is virtually zero and it has long term stability

5: Reactance $Z=\sqrt{R^2+\left(X_L-X_C\right)^2}$

$$Z=\sqrt{3^2+(15-11)^2}=5$$

$$\therefore I=\frac{V}{Z}=\frac{10}{5}=2A$$

$$\therefore V_L=IX_L=2\times15=30V$$

$$V_C=IX_C=2\times11=22V$$

But V_L & V_C are in opposite phase $\Rightarrow$ net voltage of L & $C=30-22=8V$

6: Work is equal to the potential energy of the system

$$U=4\frac{k(q)-(q)}{a}+2\frac{k(q)(q)}{a\sqrt{2}}$$

$$U = \frac{kq^2}{a}\left(-4+\sqrt{2}\right)$$

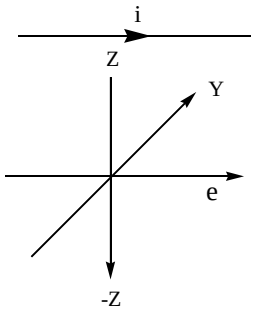
$$U = \frac{q^2}{\pi\varepsilon_0 a}\left(-1+\frac{\sqrt{2}}{4}\right) = -\frac{0.65q^2}{\pi\varepsilon_0 a}$$

7: The capacitance of a parallel plate condenser is ,

$$C = \frac{\varepsilon_0 kA}{d}$$

Therefore capacitance does not depend on the metal of the plates

8.



Magnetic field due to wire at electron stream is in +y direction the velocity of e is in $+\hat{i}$

$\therefore$ Force on electrons

$$\vec{F} = q\left(\vec{v}\times\vec{B}\right)$$

The direction of this force is

$$= -\left(\hat{i}\times\hat{j}\right) = -\hat{k}$$

9. use $\frac{B_{axis}}{B_{centre}} = \left(\frac{R^2}{R^2+x^2}\right)^{3/2}$

$$\frac{B_{axis}}{0.5\times10^{-4}} = \left(\frac{12^2}{12^2+5^2}\right)^{3/2}$$

$$B_{axis} = \left(0.5\times10^{-4}\right)\left(\frac{12}{13}\right)^3$$

$$B_{axis} = 3.9\times10^{-5}T$$

10: $\frac{\theta_2-\theta_1}{\Delta t} = K\left(\frac{\theta_2+\theta_1}{2}-\theta_0\right)$

$$\frac{50-40}{5\,\text{min}} = K\left(\frac{50+40}{2}-20\right) \text{ ----(1)}$$

$$\frac{40-\theta}{5\,\text{min}} = K\left(\frac{40+\theta}{2}-20\right) \text{ ---(2)}$$

$(2)\div(1)$

$$\frac{40-\theta}{50-40} = \frac{\left(\frac{40+\theta}{2}-20\right)}{\left(\frac{50+40}{2}-20\right)}$$

$$\frac{40-\theta}{10} = \frac{\left(\frac{\theta}{2}\right)}{25}$$

$$200-5\theta = \theta$$

$$\theta = \frac{200}{6} = 33.33^0 C$$

11: $W_{BC} = 0$

$$\therefore \Delta U_{BC} = \Delta Q$$

$$U_C - U_B = 30$$

$$U_C - 20 = 30$$

$$U_C = 50J$$

12: (i) At constant temperature $P\infty\rho$

(ii) At constant pressure $T\infty\frac{1}{\rho}$

(iii) $V \rightarrow$ constant

$\therefore \rho \rightarrow$ constant

13: $B = \gamma P$

For He, $\gamma = \frac{5}{3}$

And pressure at NTP is

$$P = 1.01\times10^5\, Nm^{-2}$$

$$\therefore B = \frac{5}{3}\left(1.01\times10^5\right)$$

$$B = 1.69\times10^5\, Nm^{-2}$$

14: $\Delta l_1 = \Delta l_2$

$$\Rightarrow l_1\alpha_1\Delta T = l_2\alpha_2\Delta T$$

$$\Rightarrow l_1\alpha_1 = l_2\alpha_2$$

$$\Rightarrow \frac{l_2}{l_1} = \frac{\alpha_1}{\alpha_2}$$

$$\Rightarrow \frac{l_2}{l_1} - 1 = \frac{\alpha_1}{\alpha_2} - 1$$

$$\frac{l_2 - l_1}{l_1} = \frac{\alpha_1 - \alpha_2}{\alpha_2}$$

$$\Rightarrow l_1 = \frac{\alpha_2(l_2 - l_1)}{(\alpha_1 - \alpha_2)}$$

$$l_1 = \left(\frac{1.2\times10^{-5}(10)}{(1.6-1.2)\times10^{-5}}\right)cm$$

$$\Rightarrow l_1 = 30cm$$

15. Steam $\left[100^0C\right] \xrightarrow{Heat\ Lost} water$

$$\left[100^0C\right] \xrightarrow{Heat\ Lost} water\left[90^0C\right]$$

= [Heat gain by water 30^0C to 90^0C]

$$m(536) + m(1)(100-90)$$

$$= 54(1)(90-30)$$

$$m(546) = (540)(6)$$

$$m = \frac{540}{546}(6) \approx 6g$$

$\therefore$ mass of mixture = 54 + 6 = 60g

16. Wave speed $v = \sqrt{\frac{T}{\mu}} = \sqrt{\frac{TL}{M}}$

$$\frac{v_2}{v_1} = \sqrt{\frac{T_2L_2}{T_1L_1}} = \sqrt{\frac{(kx_2)(l_0+x_2)}{(kx_1)(l_0+x_1)}}$$

$$\frac{v_2}{v} = \sqrt{\frac{4(24)}{(1)(21)}} = \sqrt{\frac{32}{7}}$$

$$v_2 = \sqrt{\frac{32}{7}}v$$

17. Distance while accelerating

$$X_1 = \frac{1}{2}aT^2 .....(1)$$

Velocity $v = aT ----(2)$

Time taken during deceleration

$$0 = (aT) - at$$

t = T

$\therefore$ Distance while decelerating

$$x_2 = (aT)T - \frac{1}{2}aT^2$$

$$x_2 = \frac{1}{2}aT^2 .....(3)$$

Average Speed = $\frac{x_1 + x_2}{T+T}$

$$u_{av} = \frac{\frac{1}{2}aT^2 + \frac{1}{2}aT^2}{2T}$$

$$u_{av} = \frac{aT}{2}$$

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

$$y = 80\times\frac{3}{4} - \frac{10\times80\times80\times25}{2\times50\times50\times16} = 40m$$

$\therefore$ distance from point of projection

$$= \sqrt{(80)^2 + (40)^2}\,m = 40\sqrt{5}m$$

19. $F = 2t^2$

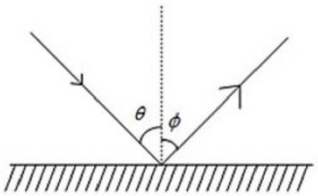
$$\Rightarrow m\frac{dv}{dt} = 2t^2$$

$$\Rightarrow 10\int_0^v dv = \int_0^5 t^2 dt$$

$$\Rightarrow 10v = 2\left(\frac{t^3}{3}\right)_0^5$$

$$\Rightarrow v = 8.33ms^{-1}$$

20.



$$\tan\phi = \frac{1}{e}\tan\theta$$

Given $\theta + \phi = 90^0$

$$\therefore \tan\left(90^0 - \theta\right) = \frac{1}{\left(\frac{1}{3}\right)}\tan\theta$$

$$\cot\theta\left(\frac{1}{3}\right) = \tan\theta$$

$$\tan^2\theta = \frac{1}{3}$$

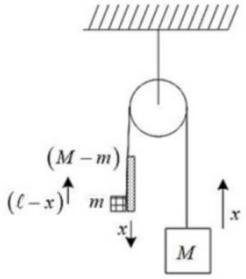
$$\tan\theta = \frac{1}{\sqrt{3}}$$

$$\theta = 30^0$$

21. $v_{cm} = \dfrac{(1)(5)+(1)(-3)}{1+1}$

$$v_{cm} = 1ms^{-1}$$

22.



From the question mass of the ladder is (M – m)

Let's assume that counter weight goes up by distance x then ladder also goes down by x. Therefore from the ground frame, man goes up by $(l-x)$

Then distance moved by the center of mass is given by

$$x_{cm} = \frac{M(x)+m(l-x)+(M-m)(-x)}{2M}$$

$$x_{cm} = \frac{ml}{2M}$$

23. Speed of heavier ball

$$v = 0 + \frac{2m}{m+nm}(u)$$

$$v = \frac{2u}{(n+1)}$$

The fraction of energy transferred

$$\frac{\frac{1}{2}(nm)v^2}{\frac{1}{2}mv^2}$$

$$= \frac{nv^2}{v^2} = \frac{n}{v^2}\left(\frac{2u}{n+1}\right)^2 = \frac{4n}{(n+1)^2}$$

24.

$$\omega_{av} = \frac{\Delta\theta}{\Delta t}$$

$$\omega_{av} = \frac{\left[10-5(3)+4(3)^2\right]-\left[10-5(1)+4(11)\right]}{2}$$

$$\omega_{av} = \frac{31-9}{2} = 11rad\ s^{-1}$$

25. The total energy of the satellite is $T.E = -\dfrac{GMm}{2r}$

26. Mass of earth is $M = 6\times10^{24}kg$

Mass of superdense material

$$m = 2\times10^{24}kg = \frac{M}{3}$$

From momentum conservation, $MV_1 = \dfrac{M}{3}V_2$

From energy conservation $V_1 = \dfrac{V_2}{3}$

$$\frac{1}{2}MV_1^2+\frac{1}{2}\left(\frac{M}{3}\right)V_2^2=\frac{GM\left(\frac{M}{3}\right)}{\frac{h}{2}+R}-\frac{GM\left(\frac{M}{3}\right)}{h+R}$$

$$\therefore v_2=\sqrt{\frac{3gh}{4}}$$

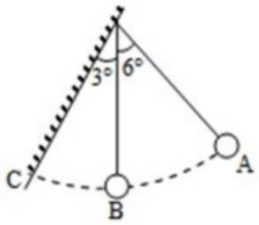
27. It is given that $F=-k\sqrt{x}$

But for SHM $F=-k_0x$

Therefore by comparing them $k=k_0\sqrt{x}$

Therefore as x increases k increases

28.



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

$$T=2\pi\sqrt{\frac{0.1}{10}}=\frac{\pi}{5}s$$

Time taken by the pendulum in going from A to B $=\frac{T}{4}$

Time taken by the pendulum in going from B to C $=\frac{T}{12}$

$\therefore$ The time period of the pendulum

$$=2\left(\frac{T}{4}+\frac{T}{12}\right)=\frac{2T}{3}=\frac{2}{3}.\frac{\pi}{5}=\frac{2\pi}{15}s$$

29. Let displacement be $x=A\sin(\omega t+\phi)$

Kinetic energy,

$$K=\frac{1}{2}m\omega^2A^2\cos^2(\omega t+\phi)$$

As the average value of $\cos^2(\omega t+\phi)$ over a cycle is $\frac{1}{2}$

Therefore average kinetic energy is

$$K_{av}=\frac{1}{4}m\omega^2A^2$$

30. Let reading of spring balance = R_1 and reading of weighing machine be = R_2

$$\therefore R_1+R_2=w_1+w_2$$

$$16+R_2=20+40$$

$$R_2=44N$$

31. $2Tl\cos\theta=mg$

$$2Tl\cos\theta=\pi r^2l\rho g$$

For maximum radius, $\cos\theta=1$

$$\therefore r=\sqrt{\frac{2T}{\pi\rho g}}$$

32. $F_fr=I\alpha$

$$\Rightarrow \mu mg\cos\theta=\frac{2}{3}ma$$

$$\Rightarrow \mu mg\cos\theta=\frac{2}{3}m\,\frac{g\sin\theta}{1+\frac{2}{3}}$$

$$\Rightarrow \mu=\frac{2}{5}\tan\theta$$

33. As the mass of the two balls are equal they exchange their velocities on colliding elastically. They also exchange their kinetic energies on collision

Therefore after collision particle A reaches the maximum height $H_A=h$

Speed of the ball B when it reaches back to the initial position

$$\frac{1}{2}mv^2=mg(4h)-mgh=3mgh$$

$$\Rightarrow v=\sqrt{6gh}$$

The height reached by the particle B(from the highest point on the incline)

$$H = \frac{v^2 \sin^2 60^0}{2g} = \frac{9h}{4};$$

Total height $H_B = h + \frac{9h}{4} = \frac{13h}{4}$

Ratio $\frac{H_A}{H_B} = \frac{4}{13}$

34 $L = mvr = \frac{nh}{2\pi}$

But $r = 0.529\frac{n^2}{z}$

$L \infty n \infty \sqrt{r}$

35. $r = 0.529\frac{n^2}{z}$

$R = \frac{0.529 \times 4}{Z}$

$R^1 = \frac{0.529 \times 9}{Z}$

$\frac{R^1}{R} = \frac{9}{4}$

36. $r \infty A^{\frac{1}{3}}$

$\Rightarrow \frac{3}{5} = \left(\frac{27}{A}\right)^{\frac{1}{3}}$

$A = 125$

$N_n = A - Z = 125 - 52 = 73$

37.Let λ_0 be threshold wavelength,

$eV_0 = hc\left(\frac{1}{\lambda} - \frac{1}{\lambda_0}\right)$

Also,

$e\frac{V_0}{6} = hc\left(\frac{1}{3\lambda} - \frac{1}{\lambda_0}\right)$

$\therefore \frac{1}{6}\left(\frac{1}{\lambda} - \frac{1}{\lambda_0}\right) = \left(\frac{1}{3\lambda} - \frac{1}{\lambda_0}\right)$

$\frac{1}{\lambda_0}\left(1 - \frac{1}{6}\right) = \frac{1}{\lambda}\left(\frac{1}{3} - \frac{1}{6}\right)$

$\frac{5}{6\lambda_0} = \frac{1}{6\lambda}$

$\lambda_0 = 5\lambda$

38. Ideal junction in farward bias behaves like a conducting wire

$\therefore$ Current from the battery

$i = \frac{2}{80} = 25mA$

This current goes from diode as it behaves as short circuit

39. This is exclusive Nor gate or XNOR gate

Therefore $Y = \overline{A}\overline{B} + AB$

40. In a transistor base is thinnest and emitter is largest therefore l_2 is least

41. α and β both are amplification factors

$I_E = I_C + I_B$

$\frac{I_E}{I_C} = 1 + \frac{I_B}{I_C}$

$\frac{1}{\alpha} = 1 + \frac{1}{\beta}$

$\alpha = \frac{\beta}{1+\beta}$

42. The relative refractive index of denser medium with respect to the rarer medium is

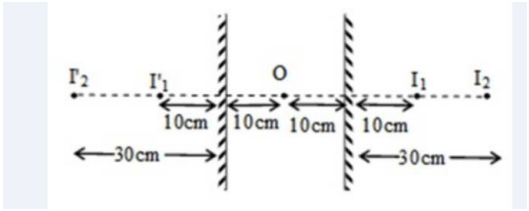
$\mu_{dr} = \frac{\mu_d}{\mu_r}$

$\sin i_c = \frac{1}{\mu_{dr}} = \frac{\mu_r}{\mu_d} = \frac{v_d}{v_r}$

$\sin 30^0 = \frac{v_d}{3 \times 10^8}$

$\Rightarrow v_d = 1.5 \times 10^8 ms^{-1}$

43.



$\therefore$ Distance between I_2 & I_2

$=(30+20+30)cm=80cm$

44. The distance between the first dark fringes is equal to width of central bright

$$\frac{2D\lambda}{a}=\frac{2\times600\times10^{-9}\times2}{10^{-3}}=2.4\times10^{-3}m$$

= 2.4mm

45. The intensity of light emerging from the first prism = $\frac{I_0}{2}$ and intensity of light emerging from the second prism is

$$=\frac{I_0}{2}\cos^2 60^0=\frac{I_0}{8}$$

CHEMISTRY

46: $PbO+2HCl\rightarrow PbCl_2+H_2O$

$\frac{6.5}{224}mol$ $\frac{3.2}{36.5}mol$

$0.029mol$ $0.087mol$

Formation of moles of lead (II) chloride depends upon the number of moles of PbO which acts as a limiting factor here, So, number of moles of $PbCl_2$ formed will be equal to number of moles of PbO i.e 0.029

47.: (i) represents an electron in 3s orbital.

(ii) is not possible as value of I varies from 0, 1,....(n-1)

(iii)represents an electron in 4f orbital

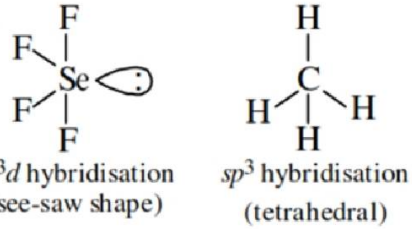
iv)is not possible as value of m varies from -1... +1

v) is not possible as value of m varies from -1... +1, it can never be greater than 1

48.Electron gain enthalpy becomes less negative from top to bottom in a group while it becomes more

negative from left to right within a period $Ca<Al<C<O<F$

49.



sp^3d hybridisation (see-saw shape) sp^3 hybridisation (tetrahedral)

50. We known that from ideal equation , $V\propto\frac{T}{P}$

Given $T_1=15+273=288, P_1=1.5$ bar

$T_2=25+273=298, P_2=1bar$

$V_1\propto\frac{288}{1.5}i.e\ V_1\propto192\ and\ V_2\propto\frac{298}{1}$

$\frac{V_2}{V_1}=\frac{298}{192}=1.55\cong1.6$

51: Cellolose is a linear polymer of $\beta-D-$ glucose in which C_1 of one glucose unit is connected to C_4 of the other through $\beta-D-$ glucosidic linkage.It does not undergo hydrolysis easily.However on heating with dilute H_2SO_4 under pressure . It does undergo hydrolysis to give only D – glucose

$$(C_6H_{10}O_5)_n+nH_2O\xrightarrow{H^+}nC_6H_{12}O_6$$

D- Glucose

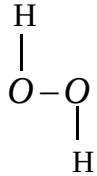
52: $CH_4(g)+2O_2(g)\rightleftharpoons CO_2(g)+2H_2O(I)$

$$K_p=\frac{P_{CO_2}}{P_{CH_4}.P_{O_2}^2}$$

53: $H_2O+B_{r_2}^0\rightarrow H\overset{+1}{O}Br+H\overset{-1}{B}r$

In the above reaction the oxidation number of Br_2 increases from zero (in Br_2) to +1(in HoBr) and decreases from zero (in Br_2) to – 1(in HBr). Thus Br_2 is oxidized as well as reduced and hence it is a redox reaction

54.



is the true structure

55. Plaster of paris - $CaSO_4.\frac{1}{2}H_2O$

Epsomite - $MgSO_4.7H_2O$

Kieserite - $MgSO_4.H_2O$

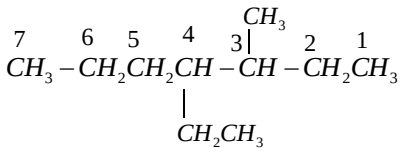
Gypsum - $CaSO_4.2H_2O$

56. chain silicates are formed by sharing two oxygen atoms by each tetrahedron Anions of chain silicate have two general formula

i) $\left(SiO_3\right)_n^{2n-}$

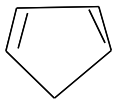
ii) $\left(Si_4O_{11}\right)_n^{6n-}$

57 .



4-ethyl- 3-methylheptane

58. The molecules which do not satisfy Huckel rule or $(4n+2)\pi-$ electron rule and conditions of aromaticity are said to be non- aromatic . The compound D has total $4\pi e^-$ so it does not follow (4n + 2) rule and coplanarity is lost in it so it is non – aromatic compound. All other compounds (A,B,C) are planar and have $6\pi e^-$ (option A and C) and $10\pi e^-$ (option D), so they are aromatic SP^3



59: Sodium alkyl sulphate is not a cationic detergent but it is an anionic detergent as it gives anion which acts

as surfactant

$$RCH_2-SO_3Na \rightarrow RCH_2SO_3^- + Na^+$$

Sodium alkylsulphate (Anionicpart)

60: The co-ordination number of metal crystallizing in a hexagonal close packed structure is 12

61. There is no net movement of the solvent through the semipermeable membrane between two solutions of equal concentration

62. $\Delta G=-nFE^0$

$$E^0=\frac{\Delta G}{-nF}-\frac{-827000}{-4\times96500}=2.14$$

63. We know that,

Rate of reaction (K) = $Ae^{-E/RT}$ ...(i) and $10^6.K=Ae^{-E_c/RT}$ ...(ii)

By dividing equation (ii) by (i)

$$\frac{10^6.K}{K}=\frac{Ae^{-E_c/RT}}{Ae^{-E/RT}}$$

$$10^6=e^{(E-E_c)/RT}$$

$$6.1n10=\left(E-Ec\right)/RT$$

$$\frac{E-E_c}{RT}=2.303\times6$$

$$E-E_c=6\times2.303RT$$

Or $\Delta E_a=E_c-E=-6\times2.303RT$

64. Coagulating power $\propto\frac{1}{coagulation\ value}$ Lower the coagulation value, higher is the coagulating power so the correct order is

$$\underset{(III)}{MgSO_4}>\underset{(II)}{BaCl_2}>\underset{(I)}{NaCl}$$

65.Elements which are used as semiconductors such as Si, Ge, Ga etc. are refined by this method, which

is based on the difference in solubility of impurities in molten and solid state of the metal

66.

$$\overset{+1}{HOCl}<\overset{+3}{HClO_2}<\overset{+5}{HClO_3}<\overset{+7}{HClO_4}$$

As the number of oxygen atom increases, an increasing amount of electron density shifts from Cl atom to more electronegative O atom. Hence as the oxidation number of Cl atom increases, the amount of actual positive charge on Cl atom increases which in turn attracts the electron density from O – H bond hence the O – H bond is weakend proton is easily released and acidity increases

67. Here $SbCl_5^{2-}$ is having Sp^3d^2 hybridisation while in all other the hybridization is SP^3d

68. Old electrons, ions and molecules are paramagnetic. In $Cr(CO)_6$ molecule 12 electrons are contributed by – CO

group and it contains no odd electron $Cr \to 3d^5 4s^1$ $Fe(CO)_5$ molecule also does not contain odd electron.

$Fe \to 3d^6 4s^2$ in $\left[Fe(CN)_6\right]^{4-}$ ion Fe(+II)

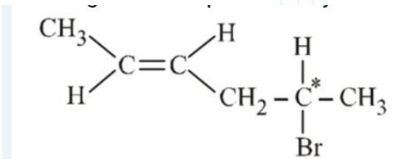
$\to 3d^6 4s^0$

So, no odd electrons

In $\left[Cr(NH_3)_6\right]^{3+}$ ion Cr(+III) $\to 3d^3 4s^0$

This iron contains odd electron so it is paramagnetic

69. The given compound may be written as



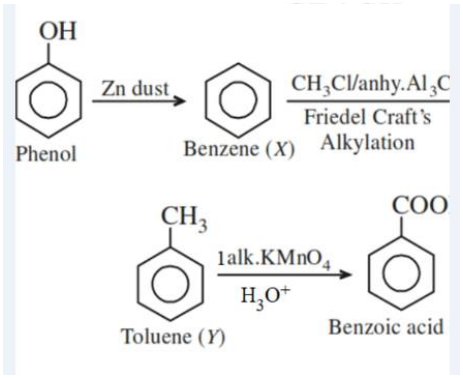
Both geometrical isomerism (cis-transform) and optical isomerism is possible in the given compound number of optical isomer

$= 2^n = 2^1 = 2$

(Where n = number of asymmetric carbon)

Hence total number of stereoisomers = 2 + 2 = 4

70.



71 $C_2O_4^{2-} \to$ bidentate ligand.3molecules attached from two sides with Ni makes co-ordination number

72. Electrolytic reduction of nitrobenzene in weakly acidic medium gives aniline but in strongly acidic

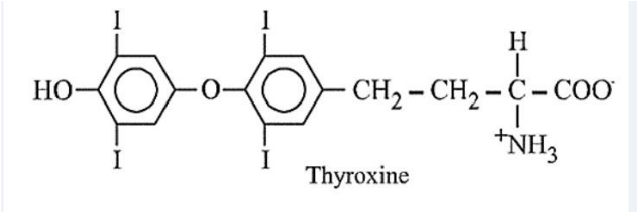
medium it gives p-aminophenol through the acid-catalysed rearrangement of the initially formed

phenylhydroxylamine

$$C_6H_5NO_2 \xrightarrow{Electrolytic} C_6H_5NH_2$$

nitrobenzene *Aniline*

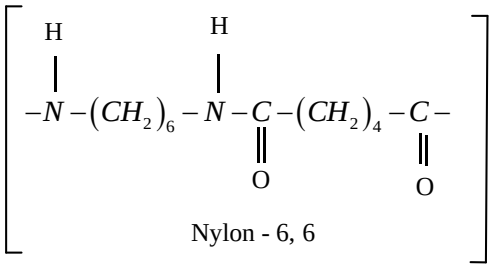
73.Thyroxine is an amine hormone and water soluble hormone containing amino group



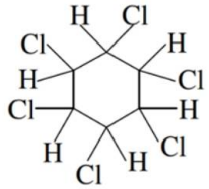
74. Nylon -6, 6 is a condensation polymer of adipic acid and hexamethylene diamine

$$nHOOC-(CH_2)_4-COOH + nH_2N-(CH_2)_6-NH_2$$

Adipic acid *Hexamethylenedia* min *e*



75. Gammezane is an isomeric form of benzenehexachloride (BHC)



76.

Element	%	Atomic mass	mole ratio	simple ratio
C	38.71	12	$\frac{38.71}{12} = 3.22$	$\frac{3.22}{3.22} = 1$
H	9.67	1	$\frac{9.67}{1} = 9.67$	$\frac{9.67}{3.22} = 3$
O	51.62	16	$\frac{51.62}{16} = 3.22$	$\frac{3.22}{3.22} = 1$

hence empirical formula of the compound would be CH_3O

77. The C- H bond is the shortest due to the small size of both atoms & large electronetativity difference. The double bonds are shorter than single bonds. Hence $C = C < C - O$ and C – C

Due to electronegativity difference between C and O

$C-O < C-C$

Increasing order of bond length is

$C-H < C=C < C-O < C-C$

$107\,pm \quad 134\,pm \quad 141\,pm \quad 154\,pm$

78. The amount of heat absorbed or released when 1mole of a substance is directly obtained from its constituent element is called the heat of formation of enthalpy of formation. Equation(i) represents neutralization reaction (iii) represents hydrogenation reaction and (iv) represents combustion reaction

79. HNO_2 and $NaNO_2$ are examples of acidic buffer

80. Basic strength decreases as, cyclohexylamine > aniline > benzamide lesser basicity in aniline and benzamide is due to participation of lone pair of electron of $-NH_2$ group

81. The compound 3 possessing the terminal alkyne only reacts with ammonical $AgNO_3$ giving white ppt and thus can be distinguished from 1, 2 and 4 compounds

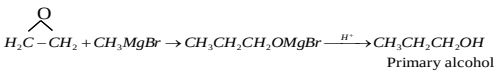
82. Since it is a concentration cell and the concentration of ions in two electrolyte solutions (HCl and CH_3COOH) are different, therefore e.m.f of this cell will not be zero

83. N, O and F are highly electronegative non metals and will have the strongest tendency to form anions by gaining electrons from metal atoms

84 The most convenient method to protect the bottom of the ship made of iron is white tin plating preventing the build up of branches

85 Meso compound does not rotate plane polarized light. Compound which contains tetrahedral atoms with four different groups but the whole molecule is achiral, is known as meso compound. It possesses a plane of symmetry and is optical in active One of the asymmetric carbon atoms turns the plane of polarized light to the right and other to the left and to the same extent so that the rotation due to upper half is compensated by the lower half, i.e., internally compensated, and finally there is no rotation of plane polarized light

86.



87. Lactic acid $\left(CH_3CH\left(OH\right)COOH\right)$ is an optically active compound due to the presence of asymmetric carbon atom. It exists in D – and L- form the ratio of which is found to be (1:1) i.e., a racemic mixture is obtained

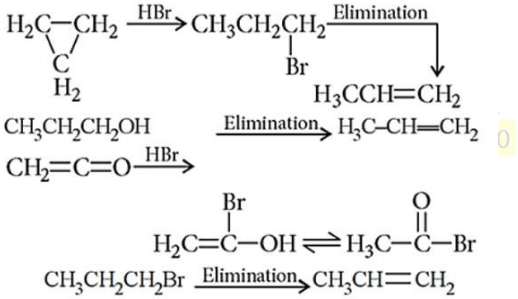
88. Given $K_1 = 1.0\times10^{-5}, K_2 = 1.0\times10^{-5}$

So overall dissociation constant of the acid will be $K = K_1 \times K_2$

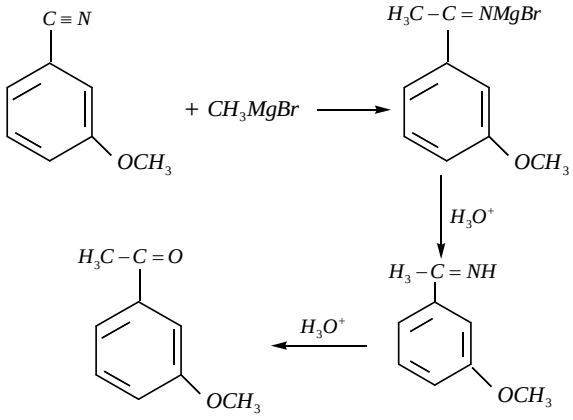
$= 1.8\times10^{-5}\times5.0\times10^{-10}$

$= 10\times10^{-15}$

89.



90.



(P)

BIOLOGY

91. Gonyaulax undergo such rapid multiplication that they make the sea appear red (red tide)

92. The following steps can be used to calculate the recombination frequency is

$RF = \left(\frac{NR}{TP}\right) \times 100$ map units where RF is recombinant frequency, NR – number of recombinants, TP- total number of progeny. The total number of progeny. The total number of recombinants, in this case, is 115 + 105 = 220 and the total number of progeny is 900 +115+880+105= 2000. So the recombination frequency is

$$\frac{220}{2000} \times 100 = 11 map\, units$$

93. Temporary and unstable (E + S complex)

94. Zygospores, Ascospores and basidiospore are sexual spores in fungi

95. In monocots, suspensor is single called while in dicots it contain 6-10 cells

96. Glycine molecular formula $C_2H_5O_2N$

$10\left(C_2H_5O_2N\right) \rightarrow 9\, peptide\, bonds - 9H_2O$ released out

$\downarrow 9H_2O$

$C_2OH_{32}O_{11}N_{10}$

97. Corymebacterium diphteriac are rod shaped bacteria with out well developed nucleus

98. In haploid condition both dominant gene and recessive genes are express

99. Aspergillus, claviceps, neurospora sacchasomyces belongs to sac fungi

100. Geitomogamy pollination occurs between genetically similar plants

Xenogamy $\rightarrow$ pollination occurs between morphologically similar and genetically dissimilar plants

101. Army worm is lepidopteran

102. Protoxylem lies towards periphery –endarch xylem

Protoxylem lies towards periphery and metaxylem towards pith is known as exarch xylem

103. Both I & iii are correct related to shape complete dominance size – In complete dominance

104. Silencing of a specific mRNA due to a complementary dsRNA molecule

105. 14 Annual rings

106. 3 statements are correct

107. Multicarpellary apocarpoud in condition

108. In tripeptide two water molecules are released out

109. Nitrobacter – nitrification

Nitrite to nitrate formation

110. Lysozyme is cell wall breaking enzyme

111. I & iii are correct

i) $C_{1+2(2)}$

iii) In pea $\rightarrow$ Monoadelphous

112. E, Tapetym

113. Sterile air bubbles are sparged into the sparged stirred tank bioreactor

114. Simple palmate leaf

115. Its flowers has 3+3 Tepals

116. Telophase – nuclear envelop reforms

117. Zygotes not undergoes meiotic division

118. Gamete – 5 pg DNA

Somatic cell at the end on G_2 phase – 20 pg

119. Equisetum which is belongs to sphenopsida

120. I – ii, 2 – iv, 3- ii, 4 – i

121. Atlas 66

122. Convex cis / the forming face and concave trans/ the maturing face

123. Lactobacillus acidophilus

124. Streptococcus (prokaryote)

125. Beer – Barley malt Rym – Molasses,

Whisky – Cereals Vodka – Potato

126. Tryptophan and mettnionine because these to have single codon

127. Pea (Annual)

128. Inchlorophyll – a – II pyrrolering at 3 position methyl group is present

129. Leaves are site of perception of light

130. a) calvin cycle – Triticum

b) Cyplant – Zeamays

C) CAM plant – kalanchoe

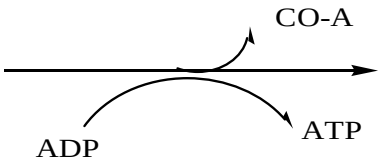
131. Both II and IV are incorrect

II) mono cistronic – Eukaryotes

Polycistronic – Prokaryotes

IV) RNA polymerase always binds at the prometer region

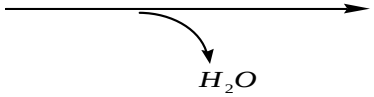
132. Sphagnum is a Bryophyte in which male and female gametophytes are independent and free living. In pinus (agymnosperm), mustard and castor (angiosperms) the main plant body is sporophytic. Gametophyte is highly reduced and is completely dependents on sporophyte.



133. Succinyl to A Succinic acid

134. Posterior (position of mother axis)

135.



Phosphoenol pyruvic acid

136. Majority of nephrons are cortical nephrons while some nephrons are juxtamedullary nephrons

137. Steller's sea cow became extinct in the last 500 years due to overexploitation by humans

138. Hippocampus does not belong to chondrichthyes because it is a bony fish of osteichthyes

139. The slope of regression is less for molluscus in new yorkk where as steeper slope appears in case of frugivorous birds & mammals in the tropical forests of different continents

140. If 140/90 blood pressure is not controlled , it indicates high Bp that affects the vital organs like Heat, Brain & kidneys

141. More than 25% 2) 20% 3) not more than 6% 4) 8.1%

142. Prostaglandins are derived from fatty acids

143. Cardiac output can be defined as "The volume of blood pumped out by each ventricle per minute

144. Breaking down of detritus into smaller particles in fragmentation, precipitation of water soluble inorganic nutrients as unavailable salts into the soil horizon- Leaching. Degradation of detritus by bacterial and fungal enzymes – catabolism

145. Delta cells of pancreatic islets produce somatostatin where as Alphacells of pancreatic islets produce Glucagon while beta cells of pancreatic islets produce insulin.

146. Atmospheric inputs of phosphorus through rainfull are much smaller (not larger) than carbon inputs

147. The outer layer of cortex of adrenal (suprarenal) glands is zona glomerulosa which secrets mineralocarticoids like Aldosterone regulates water & electrolytes balance in our body

148. Oxytoan is a small peptide hormone produced by hypothalamus but not by hypophysis or pituitary gland

149. All the given 3 aspects of case studies are correctly matched

150. The given genotype AABbCc resembles almost dihybrid/double heterozygous condition. Such genotypic individual can produce 4 different types of gametes like ABC, ABc, AbC, Abc

151. Angiotension – II activates /stimulates (not inhibits) the release of aldosterone from zona glomerulosa of adrenal cortex

152. CO_2 is not involved in the photochemical smog It is formed by interaction of less dangerous

primary pollutants like NO & HCs in presence of sunlight forming more dangerous secondary pollutions like PAN, O_3, etc that are components of PC smog

153. Plasmodium infects the human host in the form of 'sporozoites' that enter human by the inoculating of infected female Anopheles mosquito. Plasmodium enters female Anopheles mosquito in the form of 'Gametocytes' from blood of man when this mosquito bites and sucks the blood of malaria infected person

154. Some of the land reptiles went back into water to evolve into fish- like reptiles (eg: Ichthyosaurs) probably 200 mya

155. 'Atached ear lobes' is an autosomal recessive disorder Here, both the parents are unaffected but some children (both son & daughter) are affected. This shows that both the parents are heterozygous normal genotypically

156. 1)Internal fertilization does not depend on the production of large number of gametes. Hence, 1st option is wrong

2)offsprings formed from external fertilization are exposed to predators since birth time and are thus extremely vulnerable (susceptible) to predators. Hence, 2nd option correct

3) Birds & reptiles show internal (not external) fertilization

4)Actively motile (not non – motile) male gametes are one of the characterstic feature of internal fertilization

157. Sol:The pCO_2 in oxygenated blood and pO_2 in deoxygenated blood both are same/equal . It is 40 mm of Hg

158. Sol:Coke or crack is the common name of Cocaine. It is obtained from Erythroxylum coca, plant of south Americana. It is not a cannabinoid drug

159. Sol: Pre – historic cave art developed about 18, 000 years ago

160. Sol: Chromosomal disorders (due to aneuploidy) are commonly called syndromes, They are Down's syndrome, Klinefelter's syndrome & Turner's syndrome etc

161. Sol: Tidal volume (500mL) $\rightarrow$ ERV (1000 to 1100 mL) $\rightarrow$ RV(1100 to 1200 mL) $\rightarrow$ IRV (2500 to 3000mL) is the correct ascending order as per the values

162. Sol: MRI uses strong magnetic fields and non – ionizing (not- ionizing) radiations to accurately detect pathological & physiological changes in the living tissue

163. Sol: Forelimbs of human & whale are homologous organs that explains divergent evolution where the remaining are the examples of analogous structures that explain convergent evolution

164. Sol: In the given figure/ diagram, the part labeled as 'A' refers to 'mammary lobe' that contain cluster milk of secreting cells called alveoli

165. Sol: Plants adapted to deserts have sunken stomata, thick cuticle and deep roots

166. Sol: Cleavage in the mitotic division of zygote that starts while it is moving thorough isthmus fallopian tube towards the uterus

167. a)Interaction is detrimental to both partners $\rightarrow$ A $\rightarrow$ competition.

b)Interaction is detrimental to one but beneficial to the other $\rightarrow$ B $\rightarrow$ Predation & or parasitism

c)Interaction is beneficial to one but other partner is neutral $\rightarrow$ C $\rightarrow$ Commensalism

d) Inter actum is detrimental to one but other partner is neural $\rightarrow$ D $\rightarrow$ Amensalsim

168. Mesometrium is the layer that connects uterine wall with dorsal abdominal wall. It is not the smooth muscle layer of uterine wall

169. Only the secretions of Salivary glands and Hepatic lobules doesn't contain zymogens[inactive enzymes]

170. In binomial nomenclature, when scientific name of an organism is hand written

a) then the generic world & species word are to be underlined separately

b)When printed, the two words in binomen [Generic epithet & Species epithet] are to be italics

c) Generic name starts with capital letter. Species name starts with small capture

171. The larger/greater convex curve is seen in the lumbar region of our vertebral column

172. Diffusion is a slow process, depends on the size of substances, smaller the size faster if the diffusion. The diffusion of any substance across a membrane depends on its solubility in the lipids, substances that are soluble diffuse faster through the membrane. Some substances find it difficult to pass through the membrane and to facilitate the movement of such molecules, the membrane protein provides sites at which these molecules cross the membrane. This is known as facilitated diffusion

173. ATP is required for muscle contraction but not for muscle relaxation

174. Multiload 375 is a copper releasing IUD which releases copper ions that suppress the motility & fertilizing capacity of sperms

175. (i) In transcription, adenosine pairs with uracil. It is correct

    (ii) Regulation of lac operon by a repressor is referred to as negative regulation (Not positive regulation)

    (iii) The human genome has approximately 30, 000 gens (not 50, 000)

    iv) DNA finger printing utilizes VNTRs and RFLPs. It is correct

176. The first test tube baby was an English female individual named Louise Joy Brown. She was born by a process in which fertilization is external (in vitro fertilization) but formation and development of foetus is internal

177. Association are as in our brain are present in cerebral cortex of fore brain. They are neither sensory nor motor but are associated with complex activities / functions

178. Out integument (skin) beneath / below/ in it contains 'areolar CT', 'adipose CT' also 'dense irregular CT'

179. Electrical synapses are rare (not very common) in our body

180. The male cockroach, male beetles / bugs & male grasshoppers contain unpaired allosomal condition 'XO' where as females have paired allosomes 'XX'. Thus males have 'one chromosome less' than that of the females