MERITSTORE

NEET FULL PORTION **TEST ID: Day 27 – Test 3**

Time: 03 hrs **PCB** **Marks :720**

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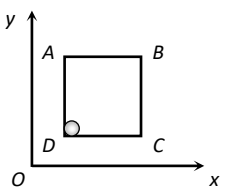
1. The dimensions of K in the equation $W = \frac{1}{2}Kx^2$ is
   a) $M^1L^0T^{-2}$ b) $M^0L^1T^{-1}$ c) $M^1L^1T^{-2}$ d) $M^1L^0T^{-1}$
2. $Ampere - hour$ is a unit of
   a) Quantity of electricity
   b) Strength of electric current
   c) Power
   d) Energy
3. A cricket ball is thrown up with a speed of $19.6\ ms^{-1}$. The maximum height it can reach is
   a) $9.8\ m$ b) $19.6\ m$ c) $29.4\ m$ d) $39.2\ m$
4. The wheel of toy car rotates about axis. It slows down from 400 rps to 200 rps in 2s. Then its angular retardation in $rads^{-2}$ is
   a) $200\ \pi$ b) 100
   c) $400\ \pi$ d) None of these
5. A particle of mass m is projected with a velocity v making an angle of 45° with the horizontal. The magnitude of angular momentum of projectile about the point of projection when the particle is at its maximum height h is
   a) Zero b) $\frac{mvh}{\sqrt{2}}$
   c) $\frac{mvh^2}{\sqrt{2}}$ d) None of these
6. A solid sphere of mass 2 kg is resting inside a cube as shown in the figure. The cube is moving with a velocity $v = (5t\hat{\imath} + 2t\hat{\jmath})m/s$. Here t is the time in second. All surface are smooth. The sphere is at rest with respect to the cube. What is the total force exerted by the sphere on the cube. (Take $g = 10\ m/s^2$)



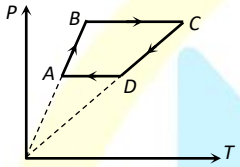
   a) $\sqrt{29}N$ b) $29\ N$ c) $26\ N$ d) $\sqrt{89}\ N$
7. A train is moving with velocity 20 m/sec. On this dust is falling at the rate of $50\ kg/minute$. The extra force required to move this train with constant velocity will be
   a) $16.66\ N$ b) $1000\ N$ c) $166.6\ N$ d) $1200\ N$
8. A wire of length L suspended vertically from a rigid support is made to suffer extension l in its length by applying a force F. The work is
   a) $\frac{Fl}{2}$ b) Fl c) $2Fl$ d) Fl
9. Three identical rods, each of length x, are joined to form a rigid equilateral triangle. Its radius of gyration about an axis passing through a corner and perpendicular to the triangle is
   a) $\frac{x}{\sqrt{3}}$ b) $\frac{x}{2}$ c) $\sqrt{\frac{3}{2}}x$ d) $\frac{x}{\sqrt{2}}$
10. A ring of diameter 0.4 m and of mass 10 kg is rotating about its axis at the rate of 1200 rpm. The angular momentum of the ring is
    a) 60.28 kg m^2s^{-1} b) 55.26 kg m^2s^{-1}
    c) 40.28 kg m^2s^{-1} d) 50.26 kg m^2s^{-1}
11. A research satellite of mass 200 kg circles the earth in an orbit of average radius $3R/2$ where R is the radius of the earth. Assuming the gravitational pull on a mass of 1 kg on the earth's surface to be 10 N, the pull on the satellite will be
    a) $880\ N$ b) $889\ N$ c) $890\ N$ d) $892\ N$
12. Energy stored in stretching a string per unit volume is
    a) $\frac{1}{2}\times$ stress $\times$ strain b) stress $\times$ strain
    c) $Y(\text{strain})^2$ d) $\frac{1}{2}Y\ (\text{stress})^2$
13. A parrot sitting on the floor of a wire cage which is being carried by a boy, starts flying. The boy will feel that the cage is now
    a) Heavier
    b) Lighter
    c) Shows no change in weight
    d) Lighter in the beginning and heavier later
14. Water falls from a tap , down the streamline
    a) Area decreases
    b) Area increases
    c) Velocity remains same

d) Area remains same

15. Work done in converting one gram of ice at -10°C into steam at 100°C is
a) 3045 J b) 6056 J c) 721 J d) 616 J

16. In an adiabatic expansion of a gas initial and final temperatures are T_1 and T_2 respectively, then the change in internal energy of the gas is
a) $\frac{R}{\gamma-1}(T_2-T_1)$ b) $\frac{R}{\gamma-1}(T_1-T_2)$
c) $R(T_1-T_2)$ d) Zero

17. Six moles of an ideal gas performs a cycle shown in figure. If the temperature are $T_A = 600\ K, T_B = 800\ K, T_C = 2200\ K$ and $T_D = 1200\ K$, the work done per cycle is



a) 20 kJ b) 30 kJ c) 40 kJ d) 60 kJ

18. The rates of heat radiation from two patches of skin each of area A, on a patient's chest differ by 2%. If the patch of the lower temperature is at 300 K and emissivity of both the patches is assumed to be unity, the temperature of other patch would be
a) 306 K b) 312 K c) 308.5 K d) 301.5 K

19. Due to some force F_1 a body oscillates with period $4/5\ s$ and due to other force F_2 oscillates with period $3/5\ s$. If both forces act simultaneously, the new period will be
a) 0.72 s b) 0.64 s c) 0.48 s d) 0.36 s

20. The displacement x(in metre) of a particle in simple harmonic motion is related to time t(in second) as
$x = 0.01\cos\left(\pi t + \frac{\pi}{4}\right)$
The frequency of the motion will be
a) 0.5 Hz b) 1.0 Hz c) $\frac{\pi}{2}$ Hz d) π Hz

21. Ultrasonic waves are produced by
a) Piezoelectric effect b) Pettiro's effect
c) Doppler's effect d) Coulomb's law

22. The top of the atmosphere is at about 400 kV with respect to the surface of the earth, corresponding to an electric field that decreases with attitude. Near the surface of the earth, the field is about 100 Vm^{-1}. Still, we do not get an electric shock as we step out of our house into the open house because (assume the house to be a steel cage so that there is no field inside)
a) There is a potential difference between our body and the ground
b) 100 Vm^{-1} is not a high electric field so that we do not feel the shock
c) Our body and the ground forms and Equipotential surface
d) The atmosphere is not a conductor

23. The electrostatic potential of a uniformly charged thin spherical shell of charge Q and radius R at a distance r from the centre is
a) $\frac{Q}{4\pi\varepsilon_0 r}$ for points outside and $\frac{Q}{4\pi\varepsilon_0 R}$ for points inside the shell
b) $\frac{Q}{4\pi\varepsilon_0 r}$ for both points inside and outside the shell
c) Zero for point outside and $\frac{Q}{4\pi\varepsilon_0 r}$ for points inside the shell
d) Zero for both points inside and outside the shell

24. A solid conducting sphere having a charge Q us surrounded by an uncharged concentric conducting hollow spherical shell. Let the potential difference between the surface of the solid sphere and that of the outer surface of the hollow shell be V. if the shell is now given a charge $-3Q$. the new potential difference between the same two surface is
a) V b) $2V$ c) $4V$ d) $-2V$

25. If 1 A current is passed through $CuSO_4$ solution for 10 s, the number of copper atoms deposited at the cathode will be
a) 8×10^{19} b) 3.1×10^{19}
c) 6.2×10^{19} d) 1.6×10^{20}

26. When two resistances R_1 and R_2 are connected in series and parallel with 120 V line power consumed will be 25 W and 100 W respectively. Then the ratio of power consumed by R_1 to that consumed by R_2 will be
a) 1 :1 b) 1 :2 c) 2 :1 d) 1 :4

27. Two cells with the same emf E and different internal resistances r_1 and r_2 are connected in series to an external resistance R. the value of R so that the potential difference across the first cell be zero is
a) $\sqrt{r_1 r_2}$ b) $r_1 + r_2$ c) $r_1 - r_2$ d) $\frac{r_1 + r_2}{2}$

28. A proton, a deutron and an α-particle with the same KE enter a region of uniform magnetic

field, moving at right angle to B. What is the ratio of the radius of their circular paths ?

a) $1 : \sqrt{2} : 1$ b) $1 : \sqrt{2} : \sqrt{2}$

c) $\sqrt{2} : 1 : 1$ d) $\sqrt{2} : \sqrt{2} : 1$

29. When the N-pole of a bar magnet points towards the south and S-pole towards the north, the null points are at the

a) Magnetic axis

b) Magnetic centre

c) Perpendicular divider of magnetic axis

d) N and S poles

30. Two small magnets each of magnetic moment 10 $A\text{-}m^2$ are placed in end-on position 0.1 m apart from their centres. The force acting between them is

a) $0.6 \times 10^7 N$ b) $0.06 \times 10^7 N$

c) $0.6\ N$ d) $0.06\ N$

31. A circular coil and a bar magnet placed near by are made to move in the same direction. The coil covers a distance of 1 m in 0.5 sec and the magnet a distance of 2$m$in 1 sec. The induced emf produced in the coil

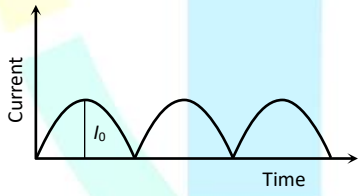
a) Zero

b) 1 V

c) 0.5 V

d) Cannot be determined from the given information

32. The output current versus time curve of a rectifier is shown in the figure. The average value of output current in this case is



a) 0 b) $\frac{I_0}{2}$ c) $\frac{2I_0}{\pi}$ d) I_0

33. A coil of wire of certain radius has 100 turns and a self inductance of 15 mH. The self inductance of a second similar coil of 500 turns will be

a) 75 mH

b) 375 mH

c) 15 mH

d) None of these

34. A capacitor having a capacity of 2 pF. Electric field across the capacitor is changing with a value of 10^{12} Vs^{-1}. The displacement current is

a) 2 A b) 4 A c) 6 A d) 10 A

35. A compound microscope has an eyepiece of focal length 10 cm and an objective of focal length 4 cm. Calculate the magnification, if an object is kept at a distance of 5 cm from the objective, so that final image is formed at the least distance of distinct vision 20 cm.

a) 12 b) 11 c) 10 d) 13

36. The angular magnification of a simple microscope can be increased by increasing

a) Focal length of lens b) Size of object

c) Aperture of lens d) Power of lens

37. Conditions of diffraction is

a) $\frac{a}{\lambda} = 1$ b) $\frac{a}{\lambda} \gg 1$

c) $\frac{a}{\lambda} \ll 1$ d) None of these

38. For the structural analysis of crystals, X-rays are used because

a) X-rays have wavelength of the order of interatomic spacing

b) X-rays are highly penetrating radiations

c) Wavelength of X-rays is of the order of nuclear size

d) X-rays are coherent radiations

39. The radius of the orbital of electron in the hydrogen atom is 0.5 Å. The speed of the electron is $2 \times 10^6\ m/s$. Then the current in the loop due to the motion of the electron is

a) 1 mA b) 1.5 mA

c) 2.5 mA d) $1.5 \times 10^{-2}\ mA$

40. Electrons in the atom are held to the nucleus by

a) Coulomb's forces

b) Nuclear forces

c) Van der Waals' forces

d) Gravitational forces

41. A radioactive substance has a half-life of four months. Three-fourth of the substance will decay in

a) 3 months b) 4 months

c) 8 months d) 12 months

42. Electron in hydrogen atom first jumps from third excited state to second excited state and then from second excited to the first excited state. The ratio of the wavelengths $\lambda_1 : \lambda_2$ emitted in the two cases is

a) 7/5 b) 27/20 c) 27/5 d) 20/7

43. In a NPN transistor, 108 electrons enter the emitter in $10^{-8} s$. If 1% electrons are lost in the base, the fraction of current that enters the collector and current amplification factor are

respectively

a) 0.8 and 49 b) 0.9 and 90

c) 0.7 and 50 d) 0.99 and 99

44. An antenna behaves as resonant circuit only when its length is

a) $\frac{\lambda}{2}$

b) $\frac{\lambda}{4}$

c) λ

d) $\lambda/2$ or integral multiple of $\lambda/2$

45. Which fibers are less expensive and simple to construct?

a) Single-mode step index fiber

b) Multi-mode step index fiber

c) Multi graded index fiber

d) All are equally expensive

46. Consider a titration of potassium dichromate solution with acidified Mohr's salt solution using diphenylamine as indicator. The number of moles of Mohr's salt required per mole of dichromate is

a) 3 b) 4 c) 5 d) 6

47. A metal oxide is reduced by heating it in a stream of hydrogen. It is found that after complete reduction, 3.15 g of oxide yielded 1.05 g of metal. From the above data we can say that

a) The atomic weight of metal is 8

b) The atomic weight of metal is 4

c) The equivalent weight of metal is 4

d) The equivalent weight of metal is 8

48. Stark effect refers to the

a) Splitting up of the lines in an emission spectrum in the presence of an external electrostatic field

b) Random scattering of light by colloidal particles

c) Splitting up of the lines in an emission spectrum in a magnetic field

d) Emission of electrons from metals when light falls upon them

49. The wave nature of electron is verified by

a) De-Broglie

b) Davisson and Germer

c) Rutherford

d) All of these

50. The highest first ionisation potential is of

a) Carbon b) Boron

c) Oxygen d) Nitrogen

51. The shape of sulphate ion is

a) Square planar b) Trigonal c) Trigonal planar d) Tetrahedral

52. The sp^3d^2 hybridisation of central atom of a molecule would lead to

a) Square planar geometry b) Tetrahedral geometry c) Trigonal bipyramidal geometry d) Octahedral geometry

53. At 400 K, the root mean square (rms) speed of a gas X (molecular weight = 40) is equal to the most probable speed of gas Y at 60 K. The molecular weight of the gas Y is

a) 2 b) 4 c) 6 d) 8

54. Enthalpy of formation of HF and HCl are -161 kJ and -92 kJ respectively. Which of the following statements is incorrect?

a) HCl is more stable than HF

b) HF and HCl are exothermic compounds

c) The affinity of fluorine to hydrogen is greater than the affinity of chlorine to hydrogen

d) HF is more stable than HCl

55. In evaporation of water ΔH and ΔS are

a) $+,+$ b) $+,-$ c) $-,-$ d) $-,+$

56. An aqueous solution whose pH is zero will be called as

a) Acidic b) Basic

c) Neutral d) Amphoteric

57. The oxidation states of iodine in HIO_4, H_3IO_5 and H_5IO_6 are respectively

a) +1,+3,+7 b) +7,+7,+3

c) +7,+7,+7 d) +7,+5,+3

58. When sulphur dioxide is passed in an acidified $K_2Cr_2O_7$ solution, the oxidation state of sulphur is changed from

a) 4 to 0 b) 4 to 2 c) 4 to 6 d) 6 to 4

59. Which one of the following is a true peroxide?

a) SO_2 b) MnO_2 c) NO_2 d) BaO_2

60. A metal $'M'$ reacts with N_2 to give a compound $'A'(M_3N)$. $'A'$ on heating at high temperature gives back $'M'$and $'A'$ on reacting with H_2O gives a gas B. $'B'$ turns $CuSO_4$ solution blue on passing through it. M and B can be

a) Al and NH_3 b) Li and NH_3

c) Na and NH_3 d) Mg and NH_3

61. In diborane the two $H-B-H$ angles are nearly

a) 95° , 120° b) 60° , 120°

c) 120° ,180° d) 95° , 150°

62. Which glass has the highest percentage of lead?
a) Soda glass b) Flint glass
c) Jena glass d) Pyrex glass

63. Conversion of chlorobenzene to phenol involves
a) Electrophilic substitution
b) Nucleophilic substitution
c) Free radical substitution
d) Electrophilic addition

64. Aqueous solution of an organic compound, $'A'$ on electrolysis liberates acetylene and CO_2 at a node. $'A'$ is
a) Potassium acetate
b) Potassium succinate
c) Potassium citrate
d) Potassium maleate

65. Toluene, when treated with Br_2/Fe, gives p-bromotoluene as the major product because the $-CH_3$ group
a) Is *meta* directing
b) deactivates the ring
c) activates the ring by hyperconjugation
d) None of the above

66. Drained sewage has BOD
a) More than that of water
b) Less than that of water
c) Equal to that of water
d) None of these

67. A metal has bcc structure and the edge length of its unit cell is 3.04 Å. The volume of the unit cell in cm^3 will be
a) 1.6×10^{-21} cm^3 b) 2.81×10^{-23} cm^3
c) 6.02×10^{-23} cm^3 d) 6.6×10^{-24} cm^3

68. Iodine is a
a) Electrovalent solid b) Atomic solid
c) Molecular solid d) Covalent solid

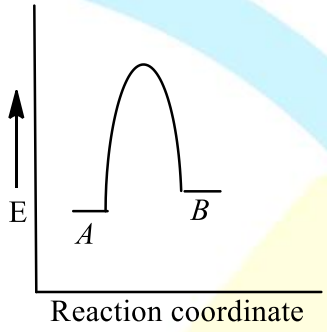
69. Which of the following concentration factors is affected by change in temperature?
a) Molarity b) Molality
c) Mole fraction d) Weight fraction

70. How many grams of a sucrose (mol wt. = 342) should be dissolved in 100 g water in order to produce a solution with a 105.0°C difference between the freezing point and boiling temperature? ($k_f = 1.86$ C/m, $k_b = 0.151$°C)
a) 34.2 g b) 72 g c) 342 g d) 460 g

71. Given the limiting molar conductivity as
$\Lambda_m^0(HCl) = 425.9\Omega^{-1}cm^2\ mol^{-1}$
$\Lambda_m^0(NaCl) = 126.4\Omega^{-1}cm^2\ mol^{-1}$
$\Lambda_m^0(CH_3COONa) = 91\Omega^{-1}cm^2\ mol^{-1}$
The molar conductivity , at infinite dilution, of acetic acid (in $\Omega^{-1}cm^2\ mol^{-1}$) will be
a) 481.5 b) 390.5 c) 299.5 d) 516.9

72. A first order reaction is 10% complete in 20 min. The time taken for 19% completion is
a) 30 min b) 40 Min c) 50 min d) 38 min

73. For a reversible reaction, $A \rightleftharpoons B$, which one of the following statements is wrong from the given energy profile diagram?



a) Activation energy of forward reaction is greater than backward reaction
b) The forward reaction is endothermic
c) The threshold energy is less than that of activation energy
d) The energy of activation of forward reaction is equal to the sum of heat of reaction and the energy of activation of backward reaction

74. Colloidal gold is given by injection to act as
a) Disinfectant
b) Anticancer agent
c) Germ killer
d) Tonic to raise vitality of human systems

75. Which of the following is a carbonate ore?
a) Pyrolusite b) Diaspore
c) Cassiterite d) Malachite

76. Argentite is a mineral of
a) Gold b) Silver
c) Copper d) Platinum

77. The formation of $O_2^+[PtF6]^-$ is the basis for the formation of xenon fluorides. This is because
a) O_2 and Xe have comparable sizes
b) Both O_2 and Xe are gases
c) O_2 and Xe have comparable ionisation energies
d) Both a and c

78. Which is the chief ore of copper?
a) Galena b) Copper pyrites
c) Sphalerite d) Siderite

79. Impurities of Cu and Ag from gold are removed

by

a) Boiling impure gold with dil.H_2SO_4

b) Boiling impure gold with conc.H_2SO_4

c) Electrolytically

d) Both (b) and (c)

80. A solution containing 2.675 g of $CoCl_3 .6NH_3$ (molar mass =267.5 g mol^{-1}) is passed through a cation exchanger. The chloride ions obtained in solution were treated with excess of $AgNO_3$to give 4.78 g of AgCl (molar mass=143.5 g mol^{-1}). The formula of the complex is
(Atomic mass of Ag=108 u)

a) $[Co(NH_3)_6]Cl_3$ b) $[CoCl_2(NH_3)_4]Cl$

c) $[CoCl_3(NH_3)_3]$ d) $[CoCl(NH_3)_5]Cl_2$

81. 1-chlorobutane on reaction with alcoholic potash gives

a) but-1-ene b) butan-1-ol

c) but-2-ene d) butan-2-ol

82. Which of the following reactions will not yield *p*-tert butylphenol?

a) $\text{Phenol} + CH_3 - \underset{|}{\overset{CH_3}{C}} = CH_2 \xrightarrow{H^+}$

b) $\text{Phenol} + (CH_3)_3COH \xrightarrow{H^+}$

c) $\text{Phenol} + (CH_3)_3C.Cl \xrightarrow{AlCl_3}$

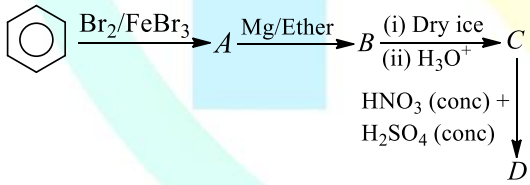
d) $\text{Phenol} + CHCl_3 \xrightarrow{NaOH}$

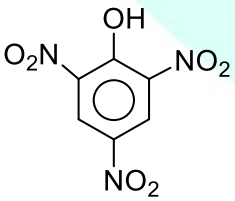
83. Pyroligneous acid doesn't contain

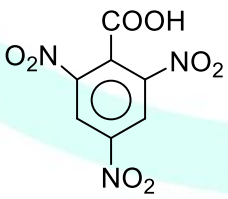
a) Acetic acid b) C_2H_5OH

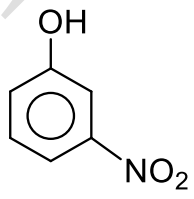
c) CH_3OH d) CH_3COCH_3

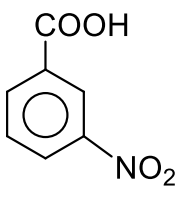
84. Identify the final product (D) of the reaction



a) 

b) 

c) 

d) 

85. Benzyl amine cannot be prepared by

a) $C_6H_5CONH_2 \xrightarrow[\text{ether}]{LiAlH_4}$

b) $C_6H_5CH_2CONH_2 + Br_2 + KOH \rightarrow$

c) $C_6H_5CN \xrightarrow{LiAlH_4}$

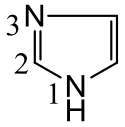
d) $C_6H_5CH_2NC \xrightarrow{LiAlH_4}$

86. Choose the incorrect comparision(s)

a) $H_3C-\underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}-NH_2 < CH_3-NHCH_3$
(basicity in aqueous medium)

b) $CH_3CH_2CH_2NH_2 > (CH_3)_3N$
(basicity in aqueous medium)

c) $CH_3-\underset{CH_3}{CH}-NH_2 < CH_3-NHCH_2CH_3$
(basicity in the gaseous state)

d) 

N(1) >N(3) (basicity in aqueous medium)

87. Which of the following indicates open chain structure of glucose?

a) Pentaacetyl derivative of glucose

b) Cyanohydrins formation with HCN

c) Reaction with Fehling solution

d) Reaction with Tollen's reagent

88. Which of the following polymers does not involve cross-linkages?

a) Vulcanized rubber b) Melamine

c) Bakelite d) Polystyrene

89. The condensation polymer is

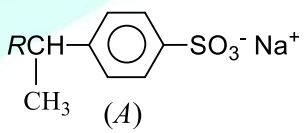
a) Teflon b) Polystyrene

c) Dacron d) Neoprene

90. For the preparation of a detergent ''A'' (given below) from benzene, the following steps are involved

I. $\xrightarrow[HF,Friedel-Craft's]{RCH=CH_2}$

II. $\xrightarrow{H_2SO_4/SO_3}$

III. $\xrightarrow{NaOH}$ 

(A)

These steps should be in sequence

a) I, II, III b) II, I, III

c) II, III, I d) I, III, II

91. Which is not a category?

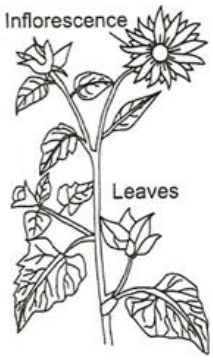
a) Asteraceae/Fabaceae b) Species

c) Phylum d) Class

92. What is illustrated by the statement 'Nothing

lives forever, yet life continues'?
a) Metabolism
b) Embryogenesis
c) Reproduction
d) Replication

93. Choose the correct classification for the given plant



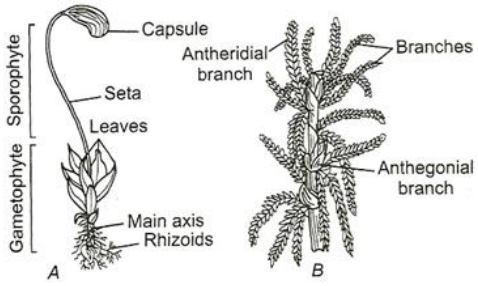
a) Plantae, Anglosperm, Monocotyledons
b) Plantae, Anglosperm, Dicotyledons
c) Plantae, Gymnosperm, Monocot
d) Plantae, Pteridophytes, Dicot

94. The hyphae of *Rhizopus* are
a) Unbranced, aseptate and uninucleate
b) Branched, aseptate and multinucleate
c) Branched, septate and uninucleate
d) Unbranched, septate and coenocytic

95. The smallest free-living organism is
a) Virus b) Mycoplasma
c) Diatom d) Cyanobacterium

96. Which of the following statements is right?
a) Fronds are found in bryophytes
b) Multiciliate sperms are found in angiosperms
c) Diatoms produce basidiospores
d) Heterocysts are found in *Nostoc*

97. Which of the following options correctly identifies the plants their groups from the following structure?



a) A-*Funaria*-Moss; B-*Sphagnum*-Moss
b) A-*Funaria*-Liverwort; B-*Sphagnum*-Moss
c) A-*Selaginella*-Bryophytes; B-*Funaria*-Liverwort
d) A-*Selaginella*-Pteridophytes; B-*Funaria*-Moss

98. Syndactyly, prehensile tail and long protrusible tongue are the unique features of
a) Rhesus monkey b) *Archaeopteryx*
c) Horse fish d) *Chamaeleon*

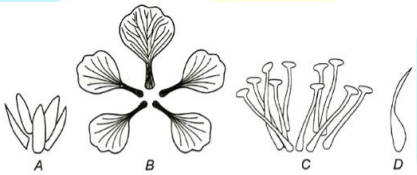
99. Which of the following is present in the integument of frog but not in mammals?
a) Dermis
b) Mucous gland
c) Sweat glands
d) Stratum germinativum

100. Which one of the following is the true description about an animal concerned?
a) Earthworm – The alimentary canal consists of a sequence of pharynx, oesophagus, stomach, gizzard and intestine
b) Frog – Body is divisible into three regions : head, neck and trund
c) Rat – Left kidney is slightly higher in position than the right one
d) Cockroach – 10 pairs of spiracles (2 pairs on thorax and 8 pairs on abdomen)

101. In angiosperms, male gametes are formed from
a) Antipodals b) Prothallial cell
c) Tube cell d) Generative cell

102. Edible part of tomato is
a) Epicarp
b) Pericarp and placenta
c) Mesocarp
d) Thalamus

103. Identify flower parts *A* to *D* in the given diagrams correctly



a) A-Corolla, B-Calyx, C-Androecium, D-Gynoecium
b) A-Calyx, B-Corolla, C-Androecium, D-Gynoecium
c) A-Calyx, B-Corolla, C-Gynoecium, D-Androecium
d) A-Corolla, B-Calyx, C-Gynoecium, D-Androecium

104. China rose have five fused carpals at the base. This condition is called
a) Pentacarpellary, syncarpous, monoadelpherus
b) Pentacarpellary, apocarpous, monoadelpherus

c) Polycarpellary, syncarpous, monoadelpherus
d) Pentacarpellary, syncarpous, monoadelpherus

105. Bicollateral vascular bundles are found in the members of this family
a) Malvaceae b) Fabaceae
c) Caesalpiniaceae d) Cucurbitaceae

106. Interfascicular cambium is found
a) Between pith and vascular bundle
b) Between two vascular bundles
c) In the vascular bundle
d) Outside the bundle

107. Which of the following intersegmental grooves contains four pairs of spermthecal apertures on the ventro-lateral sides of the earthworm?
a) 4th – 8th b) 5th – 9th
c) 6th – 10th d) 7th – 11th

108. The lining of intestine and kidneys in human is
a) Keratinized b) Brush bordered
c) Ciliated d) None of these

109. Cellulose, the most important constituent of plant cell wall is made up of
a) Branched chain of glucose molecules linked by α 1-6 glycosidic bond at the site of branching
b) Unbranched chain of glucose molecules liked by α, 1-4 glycosidic bond
c) Branched chain of glucose molecules linked by β,1-4 glycosidic bond in straight chain and α, 1-6 glycosidic bond at the site of branching
d) Unbranched chain of glucose molecules liked by β, 1-4 glycosidic bond

110. The Golgi apparatus
a) Is found only in animals
b) Is found in prokaryotes
c) Is a site of rapid ATP production
d) Modifies and packages proteins

111. The left handed DNA is called
a) A-DNA b) B-DNA c) Z-DNA d) C-DNA

112. What provides roughage (fibre) in our diet?
a) Cellulose b) Sucrose
c) Maltose d) Collagen

113. During cell division, sometimes there will be failure of separation of sister chromatids. This event is called
a) Interference b) Complementation
c) Non-disjunction d) Coincidence

114. The term, mitosis was coined by
a) Flemming b) Strasburger
c) Remak d) Moore

115. In plants, continuous water supply is due to
a) Osmosis
b) Imbibition
c) Guttation
d) Adhension-cohension forces

116. Choose, true and false statements from the following and select the correct option from the set (a-d) given below
I. Diffusion is an important process of transport in plants since it is the only means for gaseous movement within the plant body
II. In active transport, pumps are proteins that use energy to carry substance across the cell membrane against concentration gradient
III. In facilitated diffusion, special proteins helps hydrophilic substances to be transported across the membrane
IV. In diffusion, molecules move against concentration gradient in a random manner
V. Facilitated diffusion is faster than active transport
a) I, II, III and IV
b) I, II, III are true, while IV and V are false
c) IV and V are true, while I, II and III are false
d) Only II, III, IV are true while I and V are false

117. How much of absorbed water is lost during transpiration in a plant?
a) 99% b) 98-99%
c) 99.9% d) 90-95%

118. What is the correct order of nitrogen assimilation?
a) $N_2 \rightarrow NO_2 \rightarrow NO_3 \rightarrow NH_2OH \rightarrow NH_3$
b) $N_2 \rightarrow NO_3 \rightarrow NO_2 \rightarrow NH_2OH \rightarrow NH_3$
c) $N_2 \rightarrow NO_2 \rightarrow NO_3 \rightarrow NH_3 \rightarrow NH_2OH$
d) $N_2 \rightarrow NO_3 \rightarrow NO_2 \rightarrow NH_3 \rightarrow NH_2OH$

119. Molybdenum causes
a) Mottling b) Wilting
c) Reclamation d) Chlorosis

120. Conditions helpful in photorespiration are
a) More oxygen and less carbon dioxide
b) Less oxygen and more carbon dioxide
c) More temperature and less oxygen
d) More humidity and less temperature

121. The absorption spectrum of chlorophyll
a) Showa that some colours of light are
b) Approximates the action spectrum of

absorbed more than the others
c) Explains why chlorophyll is a green pigment
photosynthesis
d) Has all the above properties

122. Which of the following is a 4-carbon compound?
a) Oxaloacetic acid
b) Phosphoglyceric acid
c) Ribulose bisphosphate
d) Phosphoenol pyruvate

123. Which of these are respiratory poisons or inhibitors of electron transport chain?
a) Cyanides
b) Antimycin-A
c) Carbon monoxide
d) All of these

124. Stimulus of vernalisation is perceived by
a) Shoot tips
b) Mature tissues
c) Embryo tips
d) Both (a) and (c)

125. Growth of an organism is characterised by
a) An irreversible permanent increase in size of an organ
b) An irreversible permanent increase in size of a cell
c) Both (a) and (b)
d) Reversible permanent changes

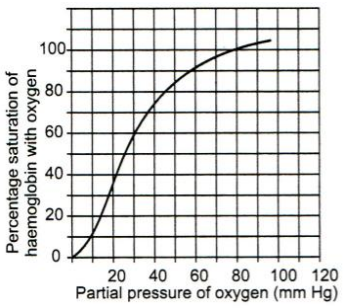
126. The stress hormone that helps plant to respond drought is
a) Auxins
b) Abscisic acid
c) Cytokinin
d) Ethylene

127. Which enzyme is present in human saliva?
a) Ptylin
b) Pepsin
c) Enterokinase
d) Maltase

128. Angiotensinogen is a protein produced and secreted by
a) Macula densa cells
b) Endothelial cells (cells lining the blood vessels)
c) Liver cells
d) Juxtaglomerular (JG) cells

129. Dead space air in man is
a) 500 mL b) 150 mL c) 250 mL d) 1.5 mL

130. Shifting of the curve to right takes place in the case



a) Raise in ρCO_2
b) Fall in pH
c) Raise in temperature
d) All of these

131. The first heart sound is produced when
a) Diastole begins
b) Semilunar valve close quickly
c) Interventricular pressure decreases
d) Bicuspid and tricuspid valve close quickly

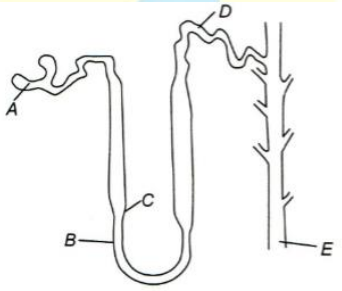
132.

Blood Group	May Receive Blood	May Donate Blood
O	O	Z
A	X	A, AB
B	B, O	B, AB
AB	*Y*	*P*

Choose the correct option for X, Y, Z and P
a) X-A,O, Y-O,A, B, AB, Z-O,A,B, AB, P-A,B
b) X-A, Y-O,A, B, AB, Z-O,A,B, AB, P-A,B
c) X-O, Y-O,A, B, AB, Z-O,A,B, AB, P-A
d) X- O, Y-O,A, B, AB, Z-O,A,B, AB, P-B

133. Green glands present in some arthropods help in
a) Respiration
b) Excretion
c) Digestion
d) Reproduction

134. Study the given structure of a nephron and match the level A, B, C and D with the given statement I, II, III and IV. Then choose the correct option from the codes given below



I. Podocyte are present through which filterate generated
II. Glomerulus filtrate is concentrate in descending limb of loop of Henle
III. Glomerular filtrate is diluted in ascending limb of loop of Henle
IV. Juxtra-glomerular apparatus is found

codes

	A	B	C	D
a)	I	II	III	IV
b)	I	II	IV	III
c)	II	III	I	IV
d)	III	II	IV	I

135. Haemodialysis is associated with
a) Liver
b) Spleen
c) Kidney
d) Stomach

136. Formula of vertebral column of man is
a) $C_4T_4L_4S_8C_8$
b) $C_7T_{12}L_5S_1C_1$

c) $C_7T_{12}L_1S_5C_1$ d) $C_7T_8L_5S_6C_7$

137. Hardness of the bones is due to
a) Hard matrix made up of calcium salts
b) Soft matrix made up of sodium salts
c) Hard matrix made up of sodium salts
d) Soft matrix made up of chondroitin salts

138. Functional unit of skeletal muscle is called
a) Sarcomere b) Twitch
c) Z-band d) None of these

139. Which of the following is an example of conditioned reflex?
a) Breast feeding
b) Swallowing of food
c) Blinding of eyes
d) Salivation in dog on seeing bread

140. …….. is not involved in knee-jerk reflex
a) Muscle spindle b) Motor neuron
c) Brain d) Interneurons

141. ACTH is secreted by
a) Thyroid gland b) Thymus gland
c) Pituitary gland d) Islets of Langerhans

142. Low Ca^{2+} in the body fluid may be the cause of
a) Tetany b) Anaemia
c) Angina pectoris d) Gout

143. Parameters of old age are
a) End of reproductive phase b) Concomitant changes in the body
c) Slowing down of vital process d) All of the above

144.

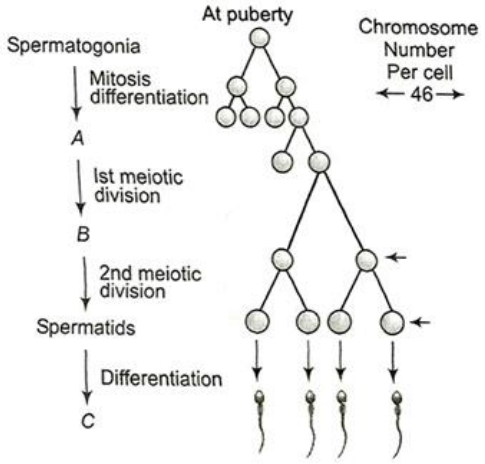
The above figure depicts
a) Budding
b) Binary fission
c) Fission
d) Zoospore

145. Megasporogenesis is
a) Formation of fruit b) Formation of seeds
c) Formation of megaspores d) Both (b) and (c)

146. A normal plant suddenly started reproducing parthenogenetically. The number of chromosomes of the second generation as compared to the parent will be
a) One half b) One fourth
c) Same d) Double

147. Two nuclei with one cell are found in
a) Antipodal cell b) Chalazal cell
c) Central cell d) Synergid cell

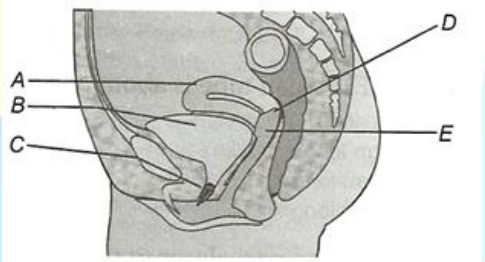
148. Find out the chromosome number in the structures A, B and C



a) 46, 23, 46
b) 23, 46, 46
c) 46, 23 ,23
d) 23, 23, 46

149. Ovulatory phase lasts for
a) 1 day
b) 2 days
c) 3 days
d) 4 days

150. The following diagram refers to female reproductive system of human. Identify A to E



a) A-Urethra, B-Urinary bladder, C-Uterus, D-Cervix, E-Vagina
b) A-Urethra, B-Urinary bladder, C-Uterus, D-Vagina, E- Cervix
c) A-Urethra, B-Urinary bladder, C-Uterus, D-Cervix, E-Vagina
d) A- Uterus, B-Urinary bladder, C- Urethra, D-Cervix, E-Vagina

151. The cell division that takes place in a zygote is known as
a) Meiosis b) Mitosis
c) Cleavage d) Differentiation

152. Find out the right aspects of lactationalamenorrhoea
I. Ovulation do not occur during the lactational period
II. Chances of the failure of contraception are

almost nil uptosix months following parturition
III. Side effects are almost nil
IV. It is a natural method of contraception
V. It increases phagocytosis of sperms

a) II, III, IV and V b) All except V
c) II, III, IV and V d) All of these

153. Find out the natural contraception methods
I. Implantation
II. Lactational (amenorrhoea)
III. Condoms
IV. Vasectomy
V. Tubectomy
VI. Sterilisation

a) I and II b) III and IV c) V and VI d) Only II

154. Mendel performed test cross to know the

a) Genotype of F_1 b) Genotype of F_2 c) Genotype of F_3 d) Genotype of F_4

155. A man with normal vision whose father was colourblind marries with women whose father was also colourblind. Suppose their first child is daughter then what are the chances of this child to be colourblind?

a) 100%
b) 25%
c) 50%
d) 0%

156. In which one of the following combinations (a-d) of the number of the chromosomes is the present day hexaploid wheat correctly represented?

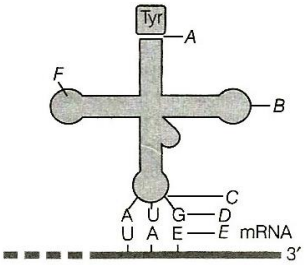
Combination	Monosomic	Haploid	Nullisomic	Trisomic

a) 27-28-42-43 b) 7-82-40-42
c) 21-7-42-43 d) 41-21-40-43

157. A gene that takes part in synthesis of polypeptide

a) Regulator gene b) Structural gene
c) Operator gene d) Promoter gene

158. Study the given figure and identify *A* to *F*



a) A-Variable arm, B-D-loop, C-T-loop, D-Anticodon arm, E-codon, F-Variable arm
b) A-Aminoacid arm, B-T-loop, C-Variable arm, D-Anticodon arm, E-codon, F-D-loop
c) A-Aminoacid arm, B-T-loop, C-Anticodon loop, D-Anticodon arm, E-codon, F-D-loop
d) A-Amino acid arm, B-T-loop, C-Anticodon loop, D-Anticodon, E-codon, F-Variable arm

159. Lamarck's theory of evolution is also known as

a) Theory of acquired characters b) Theory of genetic characters c) Theory of spontaneous characters d) Theory of impose characters

160. What is meant by the term "Darwin fitness"

a) The ability to survive and reproduce
b) High aggressiveness
c) Healthy appearance
d) Physical strength

161. Vaccination protects a person from disease because it

a) Helps in RBC production b) Produces antibodies
c) Helps in digestion d) Correct body function

162. Antibody production is controlled by

a) B-lymphocytes b) T-lymphocytes
c) Both (a) and (b) d) Interferon

163. Amoebiasis is prevented by

a) Eating balanced food
b) Eating washed fruits
c) Using mosquito coil
d) Drinking boiled water

164. The composition of cotton fibre is:

a) Cellulose b) Callose
c) Chitin d) Pectin

165. Sonalika and KalyanSona are the varieties of

a) Wheat b) Rice
c) Millet d) Tobacco

166. Cotton fibre is basically a type of

a) Trichome b) Scale
c) Dried seed coat d) Non glandular hair

167. An important drug is obtained from the bark of

a) *Papaver* b) *Cinchona*
c) *Withania* d) *Momordica*

168. Transgenic animals are produced by injecting

foreign gene into the:
a) Egg
b) Nucleus of unfertilized egg
c) Nucleus of fertilized egg
d) Nucleus of sperm

169. The message from nuclear DNA for the synthesis of specific cytoplasmic protein is carried by:
a) mRNA b) t-RNA c) s-RNA d) r-RNA

170. Which one of the following hydrolyses internal phosphodiester bonds in a polynucleotide chain?
a) Lipase b) Exonuclease
c) Endonuclease d) Protease

171. Golden rice is a promising transgenic crop. When released for cultivation, it will help in
a) Producing a petrol like fuel from rice
b) Alleviation of vitamin-A deficiency
c) Pest resistance
d) Herbicide tolerance

172. An example of gene therapy is
a) Production of injectible hepatitis-A vaccine
b) Introduction of the genes for adenosine deaminase in a person suffering from SCID
c) Production of test-tube babies by artificial insemination
d) All of the above

173. B-horizon is also called
a) Top soil region b) Below soil region
c) Sub-soil region d) Upper soil region

174. Climate is the
a) Average weather b) Dynamic weather
c) Static weather d) None of these

175. …… temperature is required for the proper functioning of an enzyme. The most appropriate word
a) Low b) High
c) Optimum d) None of the above

176. …A… is required for higher primary productivity. …B… have the lowest primary productivity as the soil is deficient in moisture. Choose the correct option for A and B
a) A-Rain; B-desert b) A-Heat; B-forest
c) A-Rain; B-forest d) A-Forest; B-desert

177. Most of the endangered species are the victims of
a) Competition with introduced species
b) Habitat destruction
c) Over-hunting
d) Acid rain

178. Siberian cranes are regular visitors of
a) Bharatpur sanctuary, Rajasthan
b) Lalbagh, Bangaluru
c) Vedanthgol sanctuary, Tamil Nadu
d) Jim Corbett national park, Uttarakhand

179. Minamata disease is caused due to presence of ……..in water.
a) Cadmium b) Lead
c) Arsenic d) Mercury

180. The atmosphere around earth is warmed because
a) Warm air cannot escape, as in a greenhouse
b) Molecules in the atmosphere are warmed by radiation from earth and retain that heat
c) Fossil fuels release heat
d) Plants release CO_2

Mukesh Sir's Group Tuitions

Date : **NEET FULL PORTION** **TEST ID: 38**

Time: 03 hrs **PCB** **Marks :720**

: ANSWER KEY :

1)	a	2)	a	3)	b	4)	a	5)	b	6)	c	7)	a
8)	a	9)	a	10)	d	11)	b	12)	a	13)	b	14)	a
15)	a	16)	a	17)	c	18)	d	19)	c	20)	a	21)	a
22)	d	23)	a	24)	a	25)	b	26)	a	27)	c	28)	a
29)	a	30)	c	31)	a	32)	c	33)	b	34)	a	35)	a
36)	d	37)	a	38)	a	39)	a	40)	a	41)	c	42)	d
43)	d	44)	d	45)	b	46)	d	47)	c	48)	a	49)	b
50)	d	51)	d	52)	d	53)	b	54)	a	55)	a	56)	a
57)	c	58)	c	59)	d	60)	b	61)	a	62)	b	63)	b
64)	d	65)	c	66)	a	67)	b	68)	c	69)	a	70)	b
71)	b	72)	b	73)	c	74)	d	75)	d	76)	b	77)	d
78)	b	79)	d	80)	a	81)	a	82)	d	83)	b	84)	d
85)	d	86)	d	87)	a	88)	b	89)	c	90)	a	91)	a
92)	c	93)	b	94)	b	95)	b	96)	d	97)	a	98)	d
99)	b	100)	d	101)	d	102)	b	103)	b	104)	a	105)	d
106)	b	107)	b	108)	b	109)	d	110)	d	111)	c	112)	a
113)	c	114)	a	115)	d	116)	b	117)	b	118)	b	119)	a
120)	a	121)	d	122)	a	123)	a	124)	d	125)	c	126)	b
127)	a	128)	c	129)	b	130)	d	131)	d	132)	a	133)	b
134)	a	135)	c	136)	b	137)	d	138)	a	139)	d	140)	c
141)	c	142)	a	143)	d	144)	a	145)	c	146)	a	147)	c
148)	c	149)	b	150)	d	151)	c	152)	b	153)	d	154)	b
155)	d	156)	d	157)	b	158)	c	159)	a	160)	a	161)	b
162)	c	163)	d	164)	a	165)	a	166)	a	167)	b	168)	c
169)	a	170)	c	171)	b	172)	b	173)	c	174)	a	175)	c
176)	a	177)	b	178)	a	179)	d	180)	b				

: HINTS AND SOLUTIONS :

Single Correct Answer Type

1 **(a)**

$W = \frac{1}{2}kx^2 \Rightarrow [k] = \frac{[W]}{[x^2]} = \left[\frac{ML^2T^{-2}}{L^2}\right] = [MT^{-2}]$

2 **(a)**

Charge = current × time

3 **(b)**

$H_{\max} = \frac{u^2}{2g} = \frac{19.6 \times 19.6}{2 \times 9.8} = 19.6\ m$

4 **(a)**

Given, $\omega_1 = 2\pi \times 400\ \text{rad s}^{-1}$

$\omega_2 = 2\pi \times 200\ \text{rad s}^{-1}$

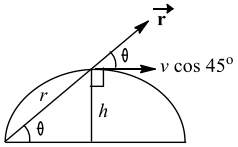
$\therefore \alpha = \frac{2\pi(400-200)}{2} = 200\pi\ \text{rad s}^{-2}$

5 **(b)**

The angular momentum of a particle is given by

$\vec{\mathbf{L}} = \vec{\mathbf{r}} \times m\vec{\mathbf{v}}$

$L = mvr \sin\theta$



From figure,

$L = rm(v\cos 45°)\sin\theta$

$= \frac{mv}{\sqrt{2}}(r\sin\theta)$

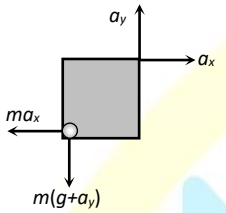
$= \frac{mvh}{\sqrt{2}}\left(\because \sin\theta = \frac{h}{r}\right)$

6 **(c)**

As $\vec{v} = 5t\hat{\imath} + 2t\hat{\jmath}$ $\therefore \vec{a} = a_x\hat{\imath} + a_y\hat{\jmath} = 5\hat{\imath} + 2\hat{\jmath}$

$F = ma_x\hat{\imath} + m(g + a_y)\hat{\jmath}$

$\therefore |\vec{F}| = m\sqrt{a_x^2 + (g + a_y)^2} = 26\ N$



7 **(a)**

$F = u\left(\frac{dm}{dt}\right) = 20 \times \frac{50}{60} = 16.66\ N$

8 **(a)**

$dW = Fdl$

$W = \int_0^l F\ dl \quad Y = \frac{FL}{dl}$

or $W = \int_0^l \frac{Y\ al}{L} dl$ or $F = \frac{Y\ al}{L}$

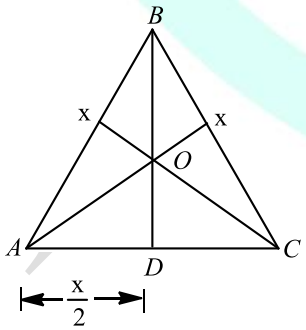
or $W = \frac{Ya}{L}\int_0^l dl$ or $W = \frac{Ya}{L}\left(\frac{l^2}{2}\right)$

or $W = \frac{1}{2}\frac{Y\ al}{L}l = \frac{1}{2}Fl$

9 **(a)**

The radius of gyration is the distance from the axis of rotation at which if whole mass of the body is supposed to be concentrated.

Here, the whole mass of the equilateral triangle acts at point O. So the distance OA is the radius of gyration of this system. Now from triangle ADB



$x^2 = BD^2 + \left(\frac{x}{2}\right)^2$

or $BD^2 = x^2 - \frac{x^2}{4}$

or $BD^2 = \frac{3x^2}{4}$

or $BD = \sqrt{3}\frac{x}{2}$

Hence, the distance, $OB = \frac{\sqrt{3}x}{2} \times \frac{2}{3}$

$\Rightarrow OB = \frac{x}{\sqrt{3}}$

But, the distances OA, OB and OC are the same.

So, $OA = \frac{x}{\sqrt{3}}$

Hence, the radius of gyration of this system is $\frac{x}{\sqrt{3}}$.

10 **(d)**

Here, $r = 0.2$ m, $M = 10$ kg,

$n = 1200$ rpm $= 20$ rps

$L = I\omega = (Mr^2)(2\pi n)$

$= 10 \times 0.2^2 \times 2 \times \frac{22}{7} \times 20 = 50.28\ \text{kg m}^2\text{s}^{-1}$

11 **(b)**

$g' = g\left(\frac{R}{R+h}\right)^2 = g\left(\frac{R}{3R/2)}\right)^2 = \frac{4}{9}g\ [g = 10m/sec^2]$

$\therefore W' = \frac{4}{9} \times mg = \frac{4 \times 200 \times 10}{9} = 889\ N$

12 **(a)**

Total work done in the stretching a string

$= \frac{1}{2} \times$ stress $\times$ strain $\times$ volume

Hence, the work done per unit volume is $\frac{1}{2}$(stress $\times$ strain).

This work is stored as the potential energy in the string.

13 **(b)**

The air pushed down by the wings of the parrot while flying will go out of the wire cage. Due to which the weight of wire cage will decreases

15 **(a)**

Work done $W = JQ$

$= 4.2(0.5 \times 10 + 1 \times 80 + 1 \times 100 + 1 \times 540)$

$= 3045$ J

16 **(a)**

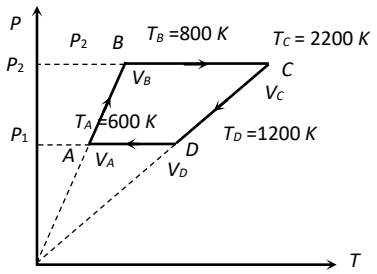
$\Delta U = -\Delta W = -\frac{R(T_1 - T_2)}{(\gamma - 1)} = \frac{R(T_2 - T_1)}{\gamma - 1}$

17 **(c)**

Processes A to B and C to D are parts of straight line graphs of the form $y = mx$

Also $P = \frac{\mu R}{V}T$ $(\mu = 6)$

$\Rightarrow P \propto T$. So volume remains constant for the graphs AB and CD



So no work is done during processes for A to B and C to D

$i.e., W_{AB} = W_{CD} = 0$ and $W_{BC} = P_2(V_C - V_B) = \mu R(T_C - T_B)$

$= 6R(2200 - 800) = 6R \times 1400\ J$

Also $W_{DA} = P_1(V_A - V_D) = \mu R(T_A - T_B)$

$= 6R(600 - 1200) = -6R \times 600\ J$

Hence work done in complete cycle

$W = W_{AB} + W_{BC} + W_{CD} + W_{DA}$

$= 0 + 6R \times 1400 + 0 - 6R \times 600$

$= 6R \times 800 = 6 \times 8.3 \times 800 \approx 40\ kJ$

18 **(d)**

According to Stefan's law.

$E_1 = \sigma T^4$ and $E_2 = \sigma(T + \Delta T)^4$

$\therefore \quad \frac{E_2 - E_1}{E_1} = \frac{\sigma[(T + \Delta T)^4 - T^4]}{\sigma T^4} = 4\frac{\Delta T}{T}$

Now, $\frac{E_2 - E_1}{E_1} = \frac{2}{100} = 4\frac{\Delta T}{300}$

$\therefore\ \Delta T = \frac{300 \times 2}{4 \times 100} = 1.5\ \text{K}$

$\therefore$ Temperature of other patch $= T + \Delta T$

$= 300 + 1.5 = 301.5\text{K}$

19 **(c)**

Under the influence of one force $F_1 = m\omega_1^2 y$ and under the action of another force, $F_2 = m\omega_2^2 y$

Under the action of both the forces $F = F_1 + F_2$

$\Rightarrow m\omega^2 y = m\omega_1^2 y + m\omega_2^2 y$

$\Rightarrow \omega^2 = \omega_1^2 + \omega_2^2 \Rightarrow \left(\frac{2\pi}{T}\right)^2 = \left(\frac{2\pi}{T_1}\right)^2 + \left(\frac{2\pi}{T_2}\right)^2$

$\Rightarrow T = \sqrt{\frac{T_1^2 T_2^2}{T_1^2 + T_2^2}} = \sqrt{\frac{\left(\frac{4}{5}\right)^2\left(\frac{3}{5}\right)^2}{\left(\frac{4}{5}\right)^2 + \left(\frac{3}{5}\right)^2}} = 0.48s$

20 **(a)**

The standard equation in SHM is

$x = a\cos(\omega t + \emptyset)$ ...(i)

Where a is amplitude, ω the angular velocity and $(\emptyset)$ the phase difference.

Also, $\omega = \frac{2\pi}{T}$ where T is periodic time.

So, Eq. (i) becomes

$x = a\cos\left(\frac{2\pi t}{T} + \emptyset\right)$ ...(ii)

Given, equation is

$x = 0.01\cos\left(\frac{2\pi t}{2} + \frac{\pi}{4}\right)$

...(iii)

Comparing Eq. (ii) with Eq. (iii), we get

$\frac{2\pi t}{T} = \frac{2\pi t}{2}$

$\Rightarrow \quad T = 2\text{s}$

So, frequency $n = \frac{1}{T} = \frac{1}{2} = 0.5$ Hz

21 **(a)**

Ultrasonic waves are produced by piezoelectric effect.

24 **(a)**

Due to additional charge of $-3Q$ given to external spherical shell, the potential difference between conducting sphere and the outer shell will not change because by presence of charge on outer shell, potential everywhere inside and on the surface of the shell will change by same amount. Therefore, the potential difference between sphere and shell remain unchanged.

25 **(b)**

Given, $I = 1\text{ A}, t = 10\text{ s}, q = It, q = 10\text{ C}$

Charge of $\text{Cu}^{2+} = 2e = 2 \times 1.6 \times 10^{-19}\text{C}$

The number of copper atoms deposited at the cathode

$= \frac{10}{2 \times 1.6 \times 10^{-19}} = 3.1 \times 10^{19}$

26 **(a)**

$P = \frac{V^2}{R} \Rightarrow \frac{P_P}{P_S} = \frac{R_S}{R_P} = \frac{(R_1 + R_2)}{R_1 R_2/(R_1 + R_2)}$

$= \frac{(R_1 + R_2)^2}{R_1 R_2}$

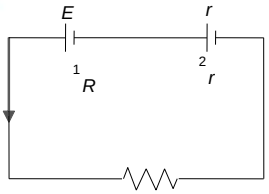
$\Rightarrow \frac{100}{25} = \frac{(R_1 + R_2)^2}{R_1 R_2} \Rightarrow \frac{R_1}{R_2} = \frac{1}{1}$

27 **(c)**

$I = \frac{2E}{R + r_1 + r_2}$

Potential difference across first cell

$V = E - Ir_1 = 0$



$\text{E} - \frac{2\text{E}r_1}{R + r_1 + r_2} = 0$

$$\left[\frac{R+r_1+r_2-2r_1}{R+r_1+r_2}\right]=0$$

$\Rightarrow \quad R+r_2-r_1=0$

$\Rightarrow \quad R=r_1-r_2$

28 **(a)**

In a magnetic field, perpendicular to velocity of particle

$\frac{mv^2}{r}=Bq\sqrt{2m\,E_k}v \quad$ or $\quad r=\frac{mv}{Bq}$ and E_k

$$=\frac{1}{2}\,mv^2$$

$mv=\sqrt{2m\,E_k}v \quad$ so,

$$r=\frac{\sqrt{2m\,E_k}v}{Bq} \text{ or } r\propto\frac{\sqrt{m}}{q}$$

For same value of E_k and B.

$r_P:r_d:r_\alpha=\frac{\sqrt{m}}{l}:\frac{\sqrt{2m}}{l}:\frac{\sqrt{4m}}{2l}$

$=1:\sqrt{2}:1$

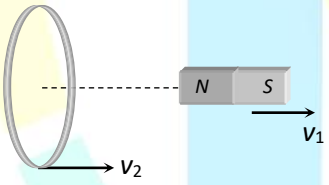
30 **(c)**

$F=\frac{\mu_0}{4\pi}\left(\frac{6MM'}{d^4}\right)$ in end-on position between two small magnets

$\therefore F=10^{-7}\left(\frac{6\times10\times10}{(0.1)^4}\right)=0.6N$

31 **(a)**

Speed of the magnet



$v_1=\frac{2}{1}=2m/s$

Speed of the coil

$v_2=\frac{1}{0.5}=2m/s$

Relative speed between coil and magnet is zero, so there is no induced emf in the coil

32 **(c)**

$I_{av}=\frac{\int_0^{T/2}i\,dt}{\int_0^{T/2}dt}=\frac{\int_0^{T/2}I_0\sin(\omega t)dt}{T/2}$

$=\frac{2I_0}{T}\left[\frac{-\cos\omega t}{\omega}\right]_0^{T/2}=\frac{2I_0}{T}\left[-\frac{\cos\left(\frac{\omega T}{2}\right)}{\omega}+\frac{\cos0°}{\omega}\right]$

$=\frac{2I_0}{\omega T}[-\cos\pi+\cos0°]=\frac{2I_0}{2\pi}[1+1]=\frac{2I_0}{\pi}$

33 **(b)**

$\frac{L_2}{L_1}=\frac{N_2^2}{N_1^2}$

$\therefore \quad L_2=L_1\frac{N_2^2}{N_1^2}=1.5\left(\frac{500}{100}\right)^2=375\text{ mH}$

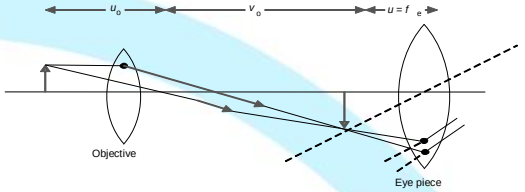
34 **(a)**

$i=\frac{dQ}{dt}=\frac{d}{dt}(CV)$

$=C\frac{dV}{dt}=2\times10^{-12}\times10^{12}=2\text{ A}$

35 **(a)**

The following ray diagram shows the formation of image by a compound microscope.



Given, $f_e=10$ cm, $f_0=4$ cm, $u_0=$ -5 cm, $D=20$ cm

For objective lens

$\frac{1}{f_0}=\frac{1}{v_0}-\frac{1}{u_0}$

$\frac{1}{4}=\frac{1}{v_0}-\frac{1}{-5}$

$\Rightarrow\frac{1}{v_0}=\frac{1}{4}-\frac{1}{5}=\frac{1}{20}$

$\Rightarrow v^0=20cm$

Magnification $M=-\frac{v_0}{u_0}=\left(1+\frac{D}{f_e}\right)$

$=-\frac{20}{-5}\left(1+\frac{20}{10}\right)=4(1+2)=12$

36 **(d)**

$m\propto\frac{1}{f}\propto P$

37 **(a)**

For diffraction size of the obstacle must be of the order of wavelength of wave, $i.e.\,a\approx\lambda$

38 **(a)**

Interatomic spacing in a crystal acts as a diffraction grating

39 **(a)**

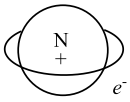
Time period of revolution of electron $T=\frac{2\pi}{\omega}=\frac{2\pi r}{v}$

Hence corresponding electric current $i=\frac{e}{T}=\frac{ev}{2\pi r}$

$\Rightarrow i=\frac{1.6\times10^{-19}\times2\times10^6}{2\times3.14\times0.5\times10^{-10}}=1mA$

40 **(a)**

The positively charged nucleus, has electrons revolving around it in stationary orbits. The Coulomb's force provides the necessary centripetal force attraction to keep the electrons is orbits.



41 **(c)**

From Rutherford-Soddy's law

$N = N_0\left(\frac{1}{2}\right)^n$

Given, $N = 1 - \frac{3}{4} = \frac{1}{4}N_0$, $n = \frac{t}{T} = \frac{t}{4}$

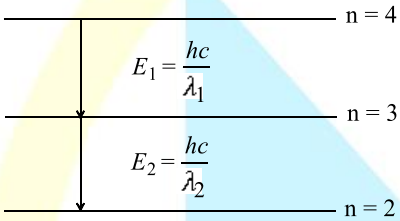
$\therefore \quad \frac{1}{4} = \left(\frac{1}{2}\right)^{t/4}$

$\Rightarrow \quad \left(\frac{1}{2}\right)^2 = \left(\frac{1}{2}\right)^{t/4}$

$\Rightarrow \quad 2 = \frac{t}{4}$

$\Rightarrow \quad t = 8$ months

42 **(d)**



$E_1 = \frac{hc}{\lambda_1} = 13.6\left[\frac{1}{(3)^2} - \frac{1}{(4)^2}\right]$ ...(i)

$E_2 = \frac{hc}{\lambda_2} = 13.6\left[\frac{1}{(2)^2} - \frac{1}{(3)^2}\right]$ ...(ii)

Dividing eq. (ii) by eq. (i)

$\frac{\lambda_1}{\lambda_2} = \frac{\frac{1}{4} - \frac{1}{9}}{\frac{1}{9} - \frac{1}{16}} = \frac{20}{7}$

43 **(d)**

108 electrons enter the emitter in $10^{-8}\ s$

$i.e., i_E = \frac{108 \times 1.6 \times 10^{-19}}{10^{-8}} A = 172.8 \times 10^{-11} A$

$\therefore$ 1% of i_E is lost in base $i.e., i_B = \frac{i_E}{100}$

$\Rightarrow 99\% i_E\ i.e., \frac{99}{100} i_E$ enters the collector

$\Rightarrow I_C = 0.99\ i_E$

Current amplification factor

$\beta = \frac{i_C}{i_B} = \frac{0.99 i_E}{0.01 i_E} = 99$

45 **(b)**

Multi-mode step index fibers are less expensive and easy to construct

46 **(d)**

$6Fe^{2+} + Cr_2O_7^{2-} + 14H^+ \rightarrow 6Fe^{3+} + 2Cr^{3+} + 7H_2O$

$\overset{+6}{Cr_2O_7^{2-}} \rightarrow Cr^{3+}$

x-factor=6

Mohr's salt, $FeSO_4.(NH_4)_2SO_4.6H_2O$

oxidation; $Fe^{2+} \rightarrow Fe^{3+}$

x-factor=1

Mole ratio is reverse of x-factor ratio. Therefore, one mole of dichromate required=6 moles of Mohr's salt.

48 **(a)**

Splitting of spectral lines under the influence of an external electrostatic field is called Stark effect.

50 **(d)**

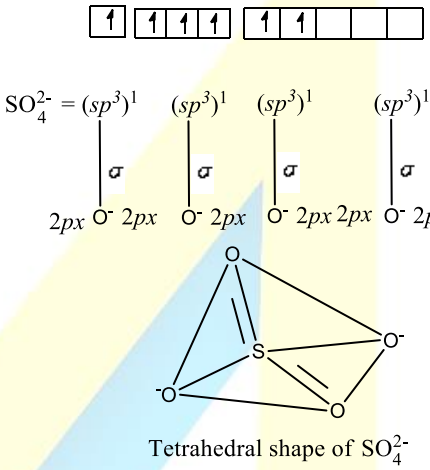
Ionisation potential is the amount of energy required to take out most loosely bonded electron from isolated gaseous atom. Its value increases in a period. Element having stable configuration have exceptionally high ionisation potential

N has highest ionisation potential among C, B, O and N ($\because$ N has $2p^3$ stable configuration).

51 **(d)**

Sulphade ion (SO_4^{2-}) has tetrahedral geometry, as in S-atom undergoes sp^3 hybridisation.

S in II excited state =



Tetrahedral shape of SO_4^{2-}

52 **(d)**

sp^3d^2 hybridised molecule have octahedral geometry.

53 **(b)**

$V_{rms} = V_{mps}$

$\sqrt{\frac{3RT}{M\ (X)}} = \sqrt{\frac{2RT'}{M\ (Y)}}$

$\Rightarrow \sqrt{\frac{3R \times 400}{40}} = \sqrt{\frac{2R \times 60}{M\ (Y)}}$

$\Rightarrow \quad M(Y) = 4$

54 **(a)**

HF is more stable than HCl. This reason is that in the formation of HF, more energy is produced. It means, HF has less energy than HCl and hence is more stable.

In other words, we need more energy to break H − F bond, hence HF is more stable.

55 **(a)**

Evaporation of water is an endothermic reaction. Hence, ΔH value will be positive and when changes to vapour, randomness increases. So, ΔS value also positive.

56 **(a)**

pH=0 means $[H^+] = 10^\circ = 1$ M. hence, solution is strongly acidic.

57 **(c)**

The oxidation state of iodine inHIO_4 is + 7 as

$1 + x + 4(-2) = 0$

$x = +7$

The oxidation state of iodine in H_3IO_5 is +7 as

$3+x + 5(-2) = 0$

$x = +7$

The oxidation state of iodine in H_5IO_6 is +7 as

$5+x + 6(-2) = 0$

$x = +7$

58 **(c)**

Acidified $K_2Cr_2O_7$ solution oxidises SO_2into $Cr_2(SO_4)_3$.

$$\overset{+4}{3SO_2} + \underset{+6}{K_2Cr_2O_7} + H_2SO_4 \longrightarrow K_2SO_4 + Cr_2(SO_4)_3 + H_2O$$

Hence, oxidation state of sulphur changes from +4 to +6.

60 **(b)**

The formula of $'A'$is M_3N. It suggests that M is a monovalent metal.

$$6Li + N_2 \rightarrow 2Li_3N \xrightarrow{\Delta} 6\,Li + N_2$$

$(M)(A)$

lithium nitride

$$Li_3N + 3H_2O \rightarrow 3LiOH + NH_3$$

(B)

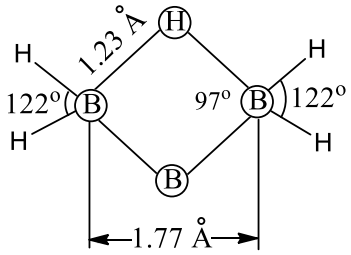
$$CuSO_4 + 4NH_3 \rightarrow [Cu(H_3)_4]SO_4$$

blue solution

Hence, M and B are Li and NH_3 respectively.

61 **(a)**

Dilthey in 1921 proposed a bridge structure for diborane. Four hydrogen atoms, two on the left and two on the right known as terminal hydrogens and two boron atoms lie in the same plane. Two hydrogen atoms forming bridges, one above and other below, lie in a perpendicular to the rest of molecule

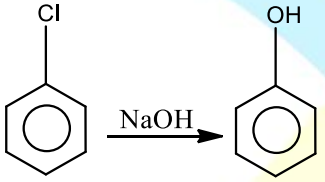


62 **(b)**

Flint glass or lead glass has composition of $K_2O.PbO.6SiO_2$.

It is used in making electric bulb and optical instruments.

63 **(b)**



In this process one group is replaced by other, hence, it is a substitution process and both the leaving and attacking groups are nucleophilic, therefore it is an example of nucleophilic substitution reaction.

64 **(d)**

$$\begin{matrix} CHCOOK \\ || \\ CHCOOK \\ \text{Potassium maleate} \end{matrix} \xrightarrow{\text{Electrolysis}} \underset{\text{cathode}}{|||} + 2CO_2 + 2KOH + \underset{\text{acetylene anode}}{H_2}$$

67 **(b)**

Edge length $\alpha = 3.04$ Å

$= 3.04 \times 10^{-8}$ cm

Volume of bcc (cubic) cell $= a^3$

$= (3.04 \times 10^{-8})^3$

$= 2.81 \times 10^{-23}\text{cm}^3$

69 **(a)**

Molarity gets affected as it is the number of moles per unit volume (volume increases with increase of temperature).

70 **(b)**

Boiling point $(T_b) = 100 + \Delta T_b = 100 + k_b m$

Freezing point $(T_f) = 0 - \Delta T_f = -k_f m$

$T_b - T_f = (100 + k_b m) - (-k_f m)$

$105 = 100 + 0.51\text{m} + 1.86\text{m}$

$2.37\ m = 5$ or $m = \dfrac{5}{2.37} = 2.11$

∴ Weight of sucrose to be dissolved in 100 g water

$= \dfrac{2.11 \times 342}{1000} \times 100 = 72\text{g}$

71 **(b)**

Sum of molar conductivity of reactants = sum of molar conductivity of products

Therefore, for the reaction

$CH_3COOH + NaOH \longrightarrow CH_3COONa + HCl$

$\Lambda_m^0 CH_3COOH = \Lambda_m^0 CH_3COONa + \Lambda_m^0 HCl - \Lambda_m^0 NaCl$

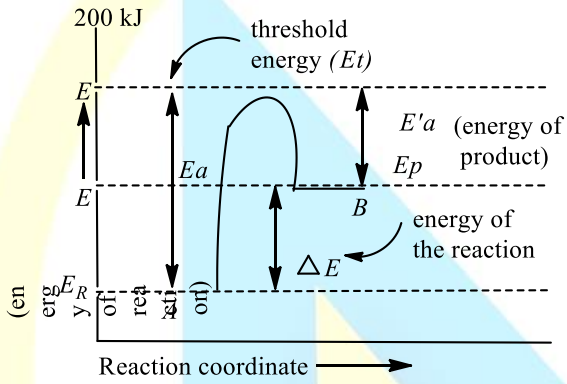
$= 91 + 425.9 - 126.4$

$= 390.5 \Omega^{-1} cm^2\ mol^{-1}$

72 **(b)**

10% of the reaction is completed in 20min .Next 20% of the reaction will be completed in next 20min.Hence, 10%+9%=19% of the reaction will be completed in 20+20=40min.

73 **(c)**



Where,

E_a =activation energy of forward reaction

E_a''=activation energy of backward reaction

The above energy profile diagram shows that

$E_a > E_a''$

The potential energy of the product is greater than that of the reactant, so the reaction is endothermic.

$E_a = E_a'' + \Delta E$

$E_t = E_a$ or $E_t > E_a''$

74 **(d)**

In medical field, colloidal gold is used as tonic to raise vitality of human systems

75 **(d)**

Pyrolusite– MnO_2

Malachite $-CuCO_3.Cu(OH)_2$

Diaspore $-Al_2O_3.H_2O$

Cassiterite$-SnO_2$

77 **(d)**

The first ionisation energy of xenon is quite close to that of oxygen and the molecular diameter of xenon and oxygen are almost identical.

Based on the above facts it is suggested that since oxygen combines with PtF_6, so xenon should also form similar compounds with PtF_6.

78 **(b)**

The chief ore of copper is copper pyrite, $CuFeS_2$.

79 **(d)**

Impurities of Cu and Ag from gold are removed by boiling impure gold with conc. H_2SO_4 and also by electrolytic method.

$Cu + 2H_2SO_4 \xrightarrow{Heat} CuSO_4 + SO_2 + 2H_2O$

$2Ag + 2H_2SO_4 \xrightarrow{Heat} Ag_2SO_4 + SO_2 + 2H_2O$

This method is called parting. Conc. HNO_3 can also be used for this purpose.

80 **(a)**

Mole of $CoCl_3.6NH_3 = \frac{2.675}{267.5} = 0.01$

$AgNO_3(aq) + Cl^-(aq) \longrightarrow AgCl \downarrow$ (white)

Moles of $AgCl = \frac{4.78}{143.5} = 0.03$.

1. mole $CoCl_3.6NH_3$ gives $=0.03$ mol AgCl

$\therefore$1 mole $CoCl_3.6NH_3$ ionizes to gives $=3$ molCl^-

Hence, the formula of compound is $[Co(NH_3)_6]Cl_3$.

81 **(a)**

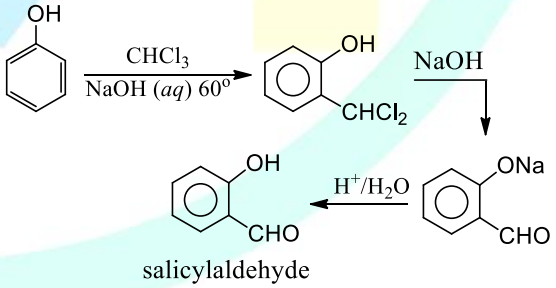
$CH_3 - CH_2 - CH_2 - CH_2 - Cl \xrightarrow[\Delta]{Alc.KOH} CH_3 - CH_2 - CH = CH_2 + HCl$

1-chlorobutane

butene-1

82 **(d)**

Phenol, on refluxing with chloroform and sodium hydroxide followed by hydrolysis yields *o*-hydroxy benzaldehyde



salicylaldehyde

83 **(b)**

Pyroligneous acid is used for the preparation of acetic acid. It contains about 10% acetic acid, and was originally treated by neutralising with lime and then distilling off the volatile compounds like methanol and acetone

85 **(d)**

(a) $C_6H_5CONH_2 \xrightarrow[ether]{LiAlH_4} C_6H_5CH_2NH_2$

Benzylamine

(b) $C_6H_5CH_2CONH_2 \xrightarrow{Br_2/KOH} C_6H_5CH_2NH_2$

Benzylamine

(c) $C_6H_5CN \xrightarrow{LiAlH_4} C_6H_5CH_2NH_2$

Benzylamine

(d) $C_6H_5CH_2NC \xrightarrow{LiAlH_4} C_6H_5CH_2NHCH_3$

2°amine

87 **(a)**

Glucose reacts with acetic anhydride in the presence of anhydrous $ZnCl_2$ to form penta-acetyl glucose which indicates the presence of 5-OH groups in glucose molecule and the open chain structure of glucose.

$$\begin{array}{l} CHO \\ | \\ (CHOH)_4 + 5(CH_3CO)_2O \xrightarrow[\Delta]{ZnCl_2} \\ | \\ CH_2OH \\ \text{glucose} \end{array}$$

$$\begin{array}{l} CHO \\ | \\ (CHOCOCH_3)_4 + 5CH_3COOH \\ | \\ CH_2OCOCH_3 \\ \text{Pentaacetyl glucose} \end{array}$$

88 **(b)**

Polystyrene contains only linear chains.

91 **(a)**

Species, phylum and class are all taxonomic categories, while Asteraceae/Fabaceae are families

92 **(c)**

Reproduction is not essential for the survival of individual. However, it is essential and required for the survival of population because the through this loss of life is compensated

93 **(b)**

The given figure shows flowering plant so, plant belongs to angiosperm. And the leaf venation is reticulate so plant is dicot

94 **(b)**

The plant body of the *Rhizopus* is mycelium which is eucarpic. The mycelium is distinguishable into three types of hyphae namely rhizoidal hyphae, stolons and sporangiophores. The mycelium is aspetate, branched and multinucleate (coenocytic).

95 **(b)**

Mycoplasmas are the smallest known anaerobic, Gram negative prokaryotes without a cell wall. These are also known as Pleuro Pneumonia Like Organisms (PPLOs). These cause pleuropneumonia in humans and cattles.

96 **(d)**

Heterocysts are specialized cells found in blue-green algae like *Nostoc*, *Anabaenopsis*, *Anabaena*, *Rivularia*, *Aulosira*, *Scytonema*, etc.

97 **(a)**

A-*Funaria*-Moss; B-*Sphagnum*-Moss

98 **(d)**

Chamaeleon belongs to sub-order-Zacertilia includes lizards of order-Squamata. Syndactyly (a condition where two or more digits are fused together); prehensile tail and long protrusible tongue are the unique features of *Chamaeleon*.

99 **(b)**

Mucous glands are present in the skin of frog, which secrete mucus that makes the frog's skin slippery and moist and help in cutaneous respiration, *i.e.,* gaseous exchange occurs through skin.

100 **(d)**

The respiratory system of cockroach consists of tracheae, tracheoles and spiracles. In cockroach,10 pairs of spiracles are present on the lateral side of the body. Two pairs are in thoracic region and remaining eight pairs are in the abdominal region.

101 **(d)**

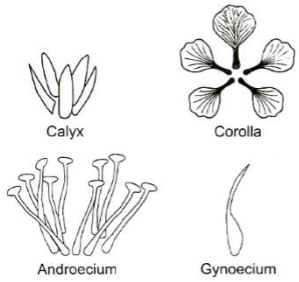
In angiosperms, male gametes are formed from generative cell.

102 **(b)**

The pericarp, placenta and seed of the tomato fruit are edible.

103 **(b)**

Parts of flower



Calyx Outer part of flower which is generally used for the protection of flower. It is sometime fused with the corolla and used for special functions.

Corolla It is the brightly coloured (generally) which is used for the attraction of insect for pollination.

Androecium Male reproductive part containing stamen. In stamen, three are pollen sac which contain pollens.

Gynoecium Female reproductive part which contains stigma, style and ovary

104 **(a)**

In China rose (*Hibiscus rose sinesis*), gynoecium is pentacarpellary, syncarpous, pentalocular, ovary superior, axile placentation, two ovules in each locule, style passes through the staminal tube branching into five branches, each ending into a prominent scarlet red knob-like stigma

105 **(d)**

In a bicollateral vascular bundle, the phloem occurs in two groups, one outside the xylem and the other inner to it, *i.e.,* the two groups of phloem one on each side of xylem. These are characteristically found in the stems of members of family-Cucurbitaceae, *e.g., Cucurbita, Luffa*, etc.

106 **(b)**

As growth begins, the cells of medullary rays, which lie in between vascular bundles become active and rise to cambial strip called interfascicular cambium constitute cambium.

107 **(b)**

Four pairs of spermathecal apertures are situated on the ventro-lateral sides of the intersegmental grooves, *i.e.*, 5th to 9th segments, *i.e.*, 5/6, 6/7, 7/8 and 8/9 segment. They leads into spermathecae and serves to receive the sperms from another worms during copulation

108 **(b)**

Lining of intestine and kidney in human is formed by columnar epithelium, which has cells with microvilli on free surface and forms brush border. Brush bordered surface increases the absorptive area of the surface.

109 **(d)**

Cellulose $(C_6H_{10}O_5)_n$ is the most abundant organic polymer. It is a polysaccharide and consists of long unbranched chains of glucose residues linked by β, 1-4 glycosidic bonds.

110 **(d)**

The Golgi complex functions primarily as a processing plant where proteins newly synthesized in endoplasmic reticulum are modified in specific ways. It is primarily associted with secretory activities of the cell.

111 **(c)**

Five forms of DNA have been reported A, B, C and D forms are right handed, while the Z-DNA is left handed

112 **(a)**

Cellulose provides roughage (fibre) in our diet

113 **(c)**

Non-disjunction occurs when a pair of homologous chromosomes do not separate in meiosis but migrate to the same pole of the cell, resulting in an even number of chromosomes being present in the daughter cells.

114 **(a)**

The term 'mitosis' was coined by **Flemming**

116 **(b)**

Diffusion is an important process of transport. It is also related to gaseous exchange in plants. Facilitated diffusion is comparatively a slow process than active transport and transport of molecule occurs along the concentration gradient in diffusion

117 **(b)**

Process of water absorption and transpiration are carried out continuously in plants. However, around 98-99% of absorbed water by plant is transpired through transpiration

118 **(b)**

By process of nitrogen fixation atmospheric nitrogen is fixed as nitrate which by denitrification converted to ammonia.

120 **(a)**

Photorespiration is the light dependent process of oxygenation of ribulosebiphosphate (RuBP) and release of carbon dioxide by the photosynthetic organs of a plant. More oxygen and less carbon dioxide is helpful in photorespiration.

121 **(d)**

Absorption spectrum of chlorophyll explain the

green colour of chlorophyll. It is approximate to action spectrum of photosynthesis and the rate is different at different colour.

122 **(a)**
Oxaloacetic acid – 4C. Phosphoglyceric acid – 3C Ribulose bisphosphite – 3C. Phosphoenl pyruvate – 3C

123 **(a)**
Cyanides, antimycin A, carbon monoxide inhibits the process of electron transport chain

124 **(d)**
Site of vernalisation The stimulus of vernalization is perceived only by the meristematic cells, *e*. *g*., shoot tip, embryo tip, root apex, developing leaves, etc.

125 **(c)**
Growth is regarded as one of the most fundamental and conspicuous characteristics of a living being. Growth can be defined as the irreversible permanent increase in the size of an organ or its part or even of an individual cell. Generally growth is accompanined by metabolic process (both anabolic and catabolic), that occurs at the expanse of energy

126 **(b)**
Abscisic acid (ABA) is called as **stress hormone** or **dormin**, as it induces dormancy and helps to overcome conditions of stress. Its function is stomatal closure in plants.

127 **(a)**
Secretion of salivary glands is known as saliva. This secretion is rich in hydrolases. The salivary secretion of parotid glands secretes much of salivary amylase or ptylin

128 **(c)**
Angiotensinogen is a plasma protein produced and secreted by the liver cells. Rennin secreted from juxtaglomerular cells acts enzymatically on angiotensinogen to release 10 amino acid peptide angiotensin-I.

129 **(b)**
Dead space is the air that inhaled by the body in breathing but does not take part in gas exchange. In man, it is 150 mL.

130 **(d)**
The relationship between the ρO_2 and the percent saturation of haemoglobin when represented on a graph is called as oxygen haemoglobin dissociation curve. It is sigmoid in shape. Rise in ρCO_2, H^+ ions (fall in pH), temperature and diphosphoglyceric acid shifts the HbO_2 dissociation curve to the right. (As more O_2 dissociate from the oxyhaemoglobin)

131 **(d)**
During working of heart, two sounds are produced lubb and dup. First sound (*i*. *e*., lubb) is produced, when auriculoventricular (tricuspid and bicuspid) valves are closed or at the end of diastole. The second sound (*i*. *e*., dup) is produced when semilunar valves at the base of dorsal aorta are closed or at the end of systole.

132 **(a)**

Blood Group	May Receive Blood	May Donate Blood
O	O	O, A, B, AB
A	A, O	A, AB
B	B, O	B, AB
AB	O, A, B, AB	AB

133 **(b)**
Green glands are present at the base of the antennae of certain crustaceans. These glands help in excretion.

134 **(a)**
Podocyte cells are present on membrane of Bowman capsule glomerular filtrate is concentrated in descending loop of Henle because it is permeable for water and is ascending limb it is diluted because Na, K^+, Cl^- are juxta-glomerular apparatus is present in distal convoluted tubule

135 **(c)**
When the kidneys completely damaged and do not function, the patient often receives **haemodialysis** (treatment with an artificial kidney). Haemodialysis is the separation of certain substances (*e*. *g*., urea, uric acid, creatinine, etc) from blood by use of a selective permeable membrane.

136 **(b)**
The formula for vertebral column is $C_7T_{12}L_5S_1C_1$
C_7 – 7 bones in cervical vertebrae
T_{12} – 12 bones in thoracic vertebrae
L_5 – 5 bones in lumbar vertebrae
S_1 – 1 bone in saccral vertebrae
C_1 – 1 bone in coccyx vertebrae

137 **(d)**
Bone and cartilage are specialized connective tissues. The former has a very hard matrix due to calcium salts in it and the later has slightly pliable matrix due to chondroitin salts

138 **(a)**

The skeleton muscles bring about voluntary movement under conscious control of brain and hence, called voluntary muscles. The segment of a fibril between two adjacent Z-bands is called a **sarcomere**.

139 **(d)**
A conditioned reflex is a response acquired by an animal during its own life by association of a new sensory stimulus (say bell) with an inborn response (salivation)

140 **(c)**
The knee-jerk reflex is an example of spinal reflex, which involves only control of spinal cord. Brain is not involved in this process

141 **(c)**
ACTH (Adrenocorticotropic hormone) is secreted by anterior lobe of pituitary. It stimulates the cortex of adrenal gland to produce its hormones.

142 **(a)**
The usual cause of tetany is lack of calcium. Since calcium is required for blood clotting, nerve and muscle functioning, so low level of calcium or hyposecretion of parathormone lead to tetany. But excess of phosphate can also trigger the spasms.

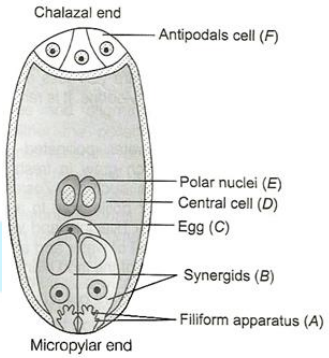
143 **(d)**
Old age is the phase in life span which occur before death and after maturity period.
In old age almost all of the vital processes starts slowing down. Gamete formation also stops in old age

144 **(a)**
Budding In this type of asexual reproduction the daughter individual is formed on the small outgrowth of parent body, *e*. *g*, Yeast, *Hydra*, etc

145 **(c)**
Megaspore is commonly called as ovum. These terms are generally used in case of plants and animals. The process of formation of ova or megaspore called oogenesis or megasporogenesis respectively

146 **(a)**
In parthenogenesis, the number of chromosomes of the second generation as compared to the parent remains half.

147 **(c)**
Central cell.
Six out of the eight nuclei are surrounded by cell walls and organized into cells (egg cells and antipodal cells) and remaining two nuclei called polar nuclei are situated below the egg apparatus in large central cell. Thus, a typical angiospermic embryo sac at maturity is 8-nucleate and 7-celled.
Mature embryo sac



A diagrammatic representation of the mature embryo sac

149 **(b)**
In ovulatory phase, release of ova occurs due to the rapid increase in LH called LH surge. It last for maximum two days

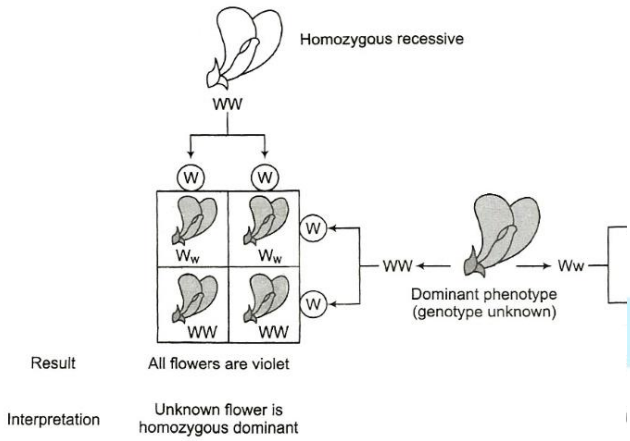
151 **(c)**
Cleavage is the series of rapid mitotic division of the zygote, which converts the single celled zygote into a multicellular structure called blastula.

152 **(b)**
IUDs (Intra Uterine Devices) increases the phagocytosis of sperms.
Natural method of contraceptive are the natural ways to prevent fertilisation. These methods are
(i) **Periodic Abstinence**
Couple avoid coitus or intercourse from day 10 to 17 of the menstrual cycle when ovulation is expected to occur
(ii) **Coitus interruption or withdrawl method**
Withdrawl of penis from the vagina just before ejaculation so as to avoid insemination
(iii) **LactationalAmenorrhoea** (Absence of menstruation) This method is based on the fact that ovulation and therefore the cycle don't occur during the period of intense following parturition. Therefore, as long as the mother breast feeds the child, chances of conception are almost nil

153 **(d)**
Lactationalamenorrhoea is the natural way to prevent the unwanted pregnancies

154 **(b)**
Genotype of F_1- plant
Crossing of F_1 (dominant phenotype) to any one of the parent called back cross and when phenotype of crossing parent is recessive than this is called test cross. The progeny of such cross can easily be analysed to predict the genotype of

test organism



155 **(d)**
Because in sex linked inheritance the chance of girl or female to be affected is almost nill. Generally, the females are carriers and in heterozygous condition

156 **(d)**
The basic chromosome number of wheat is 7(x=7) and its hexaploid species contain 42(6× 7) chromosomes. Thus, it's monosomic (one chromosomes missing) contains **41**(42-1) chromosomes. Haploid contains **21** (half to the 42) chromosomes. Nullisomic (one chromosome pair missing) contains **40**(42-2) chromosomes and trisomic contain (one chromosome extra) **43**(42+1) chromosomes.

157 **(b)**
Structural genes are the functional part of transcriptional unit. Rest of the part like promoter or terminator are the regulatory part of transcriptional unit

159 **(a)**
Lamarck's theory (theory of acquired characters).
Lakarckism includes the fourmain factors
(i) **Internal Vital Force** All the living things and their component parts are continually increased due to the internal vital force
(ii) **Effect of Environment and New Needs**
Environment influences all the type of organisms. Any changes in environment brings about changes in organisms. It gives rise to the new needs of organisms
(iii) **Use and Disuse of Organs** If an organ is constantly used it would be better developed whereas disuse of organ results in its degeneration
(iv) **Inheritance of Acquired Characters** Whatever an individual acquires (to possess) characters in its life time due to internal vital forces effect of environment, new needs and use and disuse of organs, they are inherited (transmitted) to the next generations. After several generations, the variations are accumulated upto such extent that they give rise to new species
Objection in Lamarck Theory
(i) Boring of pinna (external ear) and nose of women is never inherited to the next generations
(ii) The wrestler's powerful muscles are not transmitted to the offspring
(iii) European ladies wear tight waist garments in order to keep their waist slender but their off spring at the time of birth have normal waists
(iv) Chinese women used to wear irons shoes in order to have small feet, but their children at the time of birth have always normal feet

160 **(a)**
Darwin proposed the theory of Natural Selection. The organisms with favourable variations would survive because they are fittest to face their surroundings while unfits are destroyed originally, it was an idea of Herbert Spencer who used the term survival of the fittest while Darwin named it as Natural Selection.

161 **(b)**
Vaccines are made from microbes that are dead or inactive so that they are unable to cause the disease. The antigen in the vaccine is the same as the antigen on the surface of the disease-causing microbe. The vaccine stimulates the body to produce antibodies against the vaccine

162 **(c)**
The B-lymphocytes produce an army of proteins in response to pathogens into our blood to fight them. These proteins are called antibodies. The T-cells themselves do not secrete antibodies but help B-cells to produce them

163 **(d)**
This parasite can infect food and water so safety is of paramount importance. There are a few measures you can put in place to reduce the risk of amoebiasis, *whichincludes*
(i) Boiling untreated water especially when travelling or comping
(ii) Washing fruit and vegetables before eating them
(iii) Washing your hands, utensils and kitchen worktops before and after food preparation
(iv) Ensuring that all food is cooked at the correct

temperature
(v) Washing your hands everytime you visit the toilet or after you have been in contact with an infected animal
(vi) Ensuring that any cooked food is covered when left out to cool down

165 **(a)**
High yielding and disease resistant wheat varieties were introduced in India in 1963, *e*. *g*.,Sonalika and KalyanSona

166 **(a)**
Cotton fibres are basically trichomes.

167 **(b)**
Quinine is obtained from bark of Cinchona officinale. Opium is obtained from fruits of Papaver somniferum. Ashwagandha is obtained from root of *Withaniasomnifera*.

170 **(c)**
Endonuclease hydrolyses internal phosphodiester bonds in a polynucleotide chain.

171 **(b)**
Alleviation of vitamin-A deficiency.
Golden rice a variety of *Oryza sativa* is produced through the genetic engineering of biosynthesis beta-carotene, a precursor of provitamin-A in the edible parts of rice. The research that led to golden rice was conducted with the goal of helping children who suffer from vitamin-A deficiency and blindness in poor countries. Golden rice has been breed to be especially disease-resistant, resulting in better crop yield

172 **(b)**
Example of gene therapy Introduction of gene for adenosine deaminase in person suffering from Severe Combined Immune Deficiency (SCID)

173 **(c)**
B-Horizon It is also called sub-soil. The thickness can be up to 1.0 m. The sub-soil receives various material reached from top soil. This horizon is poor in aeration and biological activity. It is rich in plant humus and nutrients

174 **(a)**
Average weather.
Differences between weather and climate

Weather	Climate
It is a short term property of the atmosphere.	It is the long term property of the atmosphere. It is average weather.
Weather changes from place to place.	Climate is same over larger area.
Weather changes have little impact on flora and fauna of a place.	Climate determines the flora and fauna of a place.
Changes in weather occur from time to time	Climate remains the same over a long period of time

175 **(c)**
Temperature regulates the activity of an enzyme. So, optimum temperature is required for proper functioning of an enzyme

176 **(a)**
Rain is required for higher primary productivity. Desert have the lowest primary productivity as the soil is deficient in moisture

177 **(b)**
Habitat loss and fragmentation is the most important cause driving animals and plants to extinction. Due to various human activities when large habitats are destructed, various animals are badly affected leading to population declines.

178 **(a)**
Siberian cranes are regular visitors of Bharatpur sanctuary, Rajasthan.

179 **(d)**
Minamata disease is caused due to consumption of mercury polluted water.
Mercury consumption mainly affects central nervous system. This results impairment of vision, trembling, hair loss and inability to coordinate.

180 **(b)**
The atmosphere around earth is warmed because molecules in the atmosphere are warmed by radiation from earth and retain that heat