FULL TEST - 2

(PHYSICS SOLUTION)

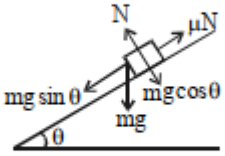
1.

(b) From the F.B.D.

$N = mg\cos\theta$

$F = ma = mg\sin\theta - \mu N$

$\Rightarrow \quad a = g(\sin\theta - \mu\cos\theta)$



Now using, $v^2 - u^2 = 2as$

or, $v^2 = 2 \times g(\sin\theta - \mu\cos\theta)\ell$

(ℓ = length of incline)

or, $v = \sqrt{2g\ell(\sin\theta - \mu\cos\theta)}$

2.

(b) Acceleration due to gravity at lattitude 'λ'

is given by $g_\lambda = g_e - R_e\omega^2\cos^2\lambda$

At equator, $\lambda = 90°$

$\Rightarrow \quad \cos\lambda = \cos 90° = 0$

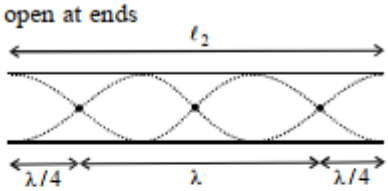
or $g_\lambda = g_e = g$ (as given in question)

At 30°, $g_{30} = g - R\omega^2\cos^2 30 = g - \frac{3}{4}R\omega^2$

or, $g - g_{30} = \frac{3}{4}R\omega^2$

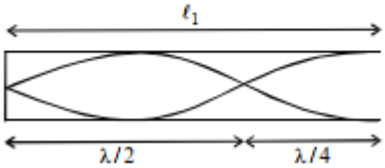
3.

(a) For 3rd harmonic/2nd over tone of organ pipe open at ends



$\Rightarrow n_2 = \frac{3V}{2\ell_2}$

For 1st overtone of organ pipe open at one end



$\Rightarrow \quad n_1 = \frac{3V}{4\ell_1}$

Given $\quad n_1 = n_2 \Rightarrow \quad \frac{3V}{2\ell_2} = \frac{3V}{4\ell_1}$ or

$\frac{\ell_1}{\ell_2} = \frac{1}{2}$

4. (c)
5. **(b) v α r^2**
6. (a) The charge is moving in an equipotential line. So no work is done.
7. (a)
8. (c) An EMW is the one constituted by oscillating electric and magnetic field which oscillate in two mutually perpendicular planes. The wave itself propagates in a direction perpendicular to both of the directions of oscillations of electric $(\vec{E})$ and magnetic fields $(\vec{B})$, i.e. $\vec{E}\times\vec{B}$.
9. (a) The angular magnification,

$$M = \frac{\text{angle subtended by the image at eye}}{\text{angle subtended at eye with object in actual position}}$$

For telescope, $M = \frac{f_o}{f_e} = \frac{F_1}{F_2}$

10. (c) As per Reynold's formula critical velocity of a liquid is defined as

$$v_c = \frac{K\eta}{\rho r} \Rightarrow v_c \propto \frac{1}{\rho} \text{ \& } v_c \propto \frac{1}{r}$$

Where η is coefficient of viscosity of the liquid, ρ its density and r is the radius of the tube. K is a dimensionless constant called the Reynold number. Thus critical velocity increases when density and radius of the tube decreases.

11. (b) Let the fundamental frequency of organ pipe be f

Case I : $f = 200 \pm 5 = 205$ Hz or 195 Hz

Case II : frequency of 2nd harmonic of organ pipe = 2f (as is clear from the second figure)

$2f = 420 \pm 10$ or $f = 210 \pm 5$
or $f = 205$ or 215
Hence fundamental frequency of organ pipe
= 205 Hz

12. (a) The moment of inertia (I) of circular ring whose axis of rotation is passing thought its center, $I_1 = m_1R^2$

Also, $I_2 = m_2(nR)^2$
Since both rings have same density,

$$\Rightarrow \frac{m_2}{2\pi(nR)\times A_2} = \frac{m_1}{2\pi R\times A_1}$$

Where A is cross-section of ring,
$A_1 = A_2$ (Given) $\therefore m_2 = nm_1$

$$\text{Given } \frac{I_1}{I_2} = \frac{1}{8} = \frac{m_1R^2}{m_2(nR)^2} = \frac{m_1R^2}{nm_1(nR)^2}$$

$$\Rightarrow \frac{1}{8} = \frac{1}{n^3} \quad \text{or} \quad n = 2$$

13.

(d) Volume of bigger bubble
= volume of 27 smaller bubbles

$$\Rightarrow \frac{4}{3}\pi D^3 = 27\times\frac{4}{3}\pi d^3 \Rightarrow d = \frac{D}{3}$$

Initial surface energy $S_i = 4\pi D^2\,\sigma$

Final surface energy $S_f = 27\times 4\pi D^2\sigma$

$\Delta S = S_f - S_i$ and using $d = \frac{D}{3}$

$$\Delta S = \sigma\times 4\pi\left[27\times\frac{D^2}{9} - D^2\right]$$

$$= 2D^2\times 4\pi\times\sigma = 8\pi\sigma D^2$$

14.

(a) $\frac{V_1}{V_2} = \sqrt{\frac{M_1}{M_2}} \Rightarrow 4 = \sqrt{\frac{64}{M_1}}$

or $M_1 = 4$ i.e. He

15.

(b) At constant pressure

$$W = P(V_f - V_i) = nR\alpha(T_f - T_i)$$
$$= 1\times 8.14\,(127-27) = 8.14\times 100 = 814\,J$$

16.

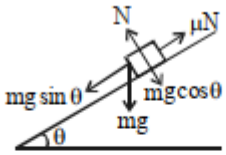
(a) $\frac{mv^2}{r} = qvB$

$$B = \frac{mv}{qr} = \frac{9.1\times10^{-31}\times10^6}{1.6\times10^{-19}\times0.5}$$

$$= 1.13\times10^{-5}\,T$$

17.

(a) Remember that acceleration of a cylinder down a smooth inclined plane is



$a = \frac{g\sin\theta}{\left(1+\frac{I}{mR^2}\right)}$ where $I = \frac{mR^2}{2}$ is the moment of Inertia for cylinder

$$a = \frac{g\sin 30^\circ}{\left(1+\frac{mR^2}{2}\times\frac{1}{mR^2}\right)} = \frac{g\times\frac{1}{2}}{1+\frac{1}{2}} = \frac{g}{3}$$

18.

(b) According to Kepler's third law,

$$R^3 \propto T^2 = \frac{R}{R_e} = \left(\frac{T}{T_e}\right)^{\frac{2}{3}} = \left(\frac{27\,T_e}{T_e}\right) = 9$$

19. (b) as the lift is moving with uniform speeds, there is no apparent weight as there is no acceleration in the lift in both the cases. Therefore, the ratio of weights of man is 1:1

20.

(a) Kinetic energy = translational kinetic energy + rotational kinetic energy

$$K.E = \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$$

$$\text{Moment of inertia of sphere } (I) = \frac{2}{5}MR^2$$

$$\therefore K.E. = \frac{1}{2}mv^2 + \frac{1}{2}\times\frac{2}{5}MR^2\left(\frac{V}{R}\right)^2 = \frac{7}{10}mv^2$$

21. (c) total potential difference $= 0.5 + iR = 0.5 + 20 \times 0.1$

22.

(a) Pot. gradient = 0.2mV/cm

$$= \frac{0.2\times10^{-3}}{10^{-2}} = 2\times10^{-2}\,v/m$$

$$\text{Emf of cell} = 2\times10^{-2}\times1m = 2\times10^{-2}\,V$$
$$= 0.02\,V$$

As per the condition of potentiometer

$0.02(R+490) = 2(R)$ or $1.98R = 9.8$

$$\Rightarrow R = \frac{9.8}{1.98} = 4.9\,\Omega$$

23.

(c) Work done in rotating a dipole by an angle 'θ' is

$$W = pE(1-\cos\theta) = pE(1-\cos 60) = \frac{pE}{2}$$

Again, $W_{180} = pE(1-\cos 180)$

$$= pE[1-(-1)] = 2pE = 4W$$

24.

(a) Magnetic moment = M = IA, where A is the area of the orbit (πr^2) and I is the current flowing due to charge e. Further orbital motion of electron is equivalent to a current

$$I = \frac{e}{T} = e\upsilon$$

(where $T = \frac{1}{\upsilon}$ is the time period)

$$\therefore M = IA = e\upsilon\pi r^2$$

25.

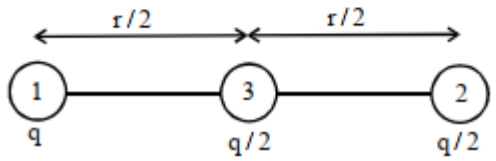
(c) Initial force between the two spheres carrying charge (say q) is

$$F = \frac{1}{4\pi\varepsilon_0}\frac{q^2}{r^2}$$

(r is the distance between them)

Further when an uncharged sphere is kept in touch with the sphere of charge q, the net charge on both become $\frac{q+0}{2} = \frac{q}{2}$.

Force on the 3rd charge, when placed in center of the 1st two



$$F_3 = \frac{1}{4\pi\varepsilon_0}\frac{q\left(\frac{q}{2}\right)}{\left(\frac{r}{2}\right)^2} - \frac{1}{4\pi\varepsilon_0}\frac{\left(\frac{q}{2}\right)^2}{\left(\frac{r}{2}\right)^2}$$

$$= \frac{1}{4\pi\varepsilon_0}\frac{q^2}{r^2}[2-1] = F$$

26.

(b) A bimetallic strip, on uniform heating, bends in the form of an arc and the metal with greater ' α ' lies on the convex side.

27.

(c) General wave equation

$y = A\sin(\omega t - kx)$

On comparing, we get $\omega = 100\pi$

$\therefore$ Wave number, $k = \frac{\omega}{v} = \frac{100\pi}{100} = \pi\ m^{-1}$

28. (c) For constant pressure, $V \propto T$

29. (d)

30.

(d) $T = 2\pi\sqrt{\frac{\ell}{g}}$

$\Rightarrow$ Frequency, $n = \frac{1}{T} \propto \frac{1}{\sqrt{\text{length}}}$

$\frac{n_1}{n_2} = \frac{\sqrt{\ell_2}}{\sqrt{\ell_1}} \Rightarrow \frac{2}{3} = \frac{\sqrt{\ell_2}}{\sqrt{\ell_1}} \Rightarrow \frac{\ell_1}{\ell_2} = \frac{9}{4}$

31.

(c) $V_e = \sqrt{2gR}$ and $V_0 = \sqrt{gR}$

$V_e = \sqrt{2}V_0 \qquad V_0 \Rightarrow \frac{2}{\sqrt{2}} = \sqrt{2}$ km/s

32. (c) work done in overcoming resistance is change in kinetic energy (work energy theorem)

33.

(c) $\chi = \frac{C}{T}$ (as per Curie's law)

Paramagnetic materials obey Curies law.

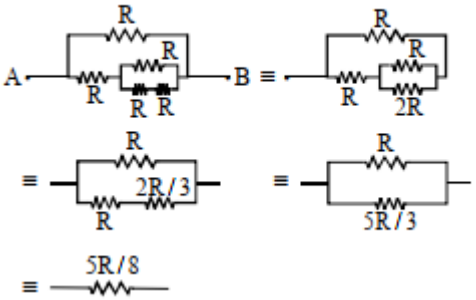
C = Curies constant

34. (c) $e = -M\frac{di}{dt}$

35. (a)

36.

(b) The equivalent circuit can be redrawn as



37.

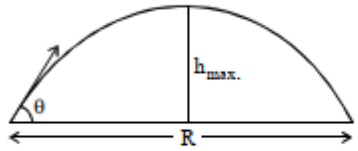
(b) As per Einstein's photoelectric equation :

$E = h\upsilon = wF + KE_{max}$

i.e. till a certain valve of υ, KE remains 0, it only starts increasing once the Work function (WF) of the metal surface is achieved.

38.

(a) $R = \frac{u^2 \sin 2\theta}{g}$; $R_{max} = \frac{u^2 \sin^2 \theta}{2g}$



Equating we get $\sin 2\theta = \frac{\sin^2 \theta}{2}$

or $4 \sin \theta \cos \theta = \sin^2 \theta$

$\Rightarrow \tan \theta = 4$ or $\theta = \tan^{-1} 4$

39.

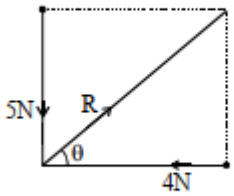
(c) $R = \frac{u^2 \sin 2\theta}{g}$ will be maximum for

$\sin 2\theta = 1 \Rightarrow 2\theta = \frac{\pi}{2}$ or $\theta = \frac{\pi}{4} = 45°$

40.

(a) $R = \sqrt{4^2 + 5^2} = \sqrt{41}N$

The angle θ will be given by $\tan \theta = \frac{5}{4}$



or $\theta = \tan^{-} \frac{5}{4}$

41.

(b) Let I_1 be the current throug 5 Ω resistance, I_2 through (6 + 9) Ω resistance. Then as per question,

$I_1^2 \times 5 = 20$ or, $I_1 = 2A$.

Potential difference across C and D = 2 × 5 = 10V

Current $I_2 = \frac{10}{6+9} = \frac{2}{3}$A.

Heat produced per second in 2Ω

$= I^2 R \left(\frac{8}{3}\right)^2 \times 2 = 14.2 \text{cal/s}.$

42.

(a) Convex lens can form image with m < 1, m > 1 and m = 1 depending upon the positionof the object. Convex lens forms magnified image (m > 1) when the object is pole and 2f, same size as the object (m = 1) when the object is at 2fand smaller image (m < 1), when the object is beyond 2f.

43. (c) fringe width $\beta = \frac{\lambda D}{d}$ No. of fringes = $\frac{length}{fringe\ width}$

44.

(b) **Case - I :** When resistor is not connected

Using V = IR ⇒ V = 25 (R_G) ..... (i)

Case - II : When resistor is connected

V = 5(20 + R_G) = 100 + 5 R_G ..... (ii)

From (i) and (ii), 20 R_G = 100

⇒ R_G = 5Ω

45.

(d) Let internal resistance of source = R

Current in coil of resistance

$$R_1 = I_1 = \frac{V}{R+R_1}$$

Current in coil of resistance

$$R_2 = I_2 = \frac{V}{R+R_2}$$

Further, as heat generated is same, so

$I_1^2 R_1 t = I_2^2 R_2 t$

or $\left(\frac{V}{R+R_1}\right)^2 R_1 = \left(\frac{V}{R+R_2}\right)^2 R_2$

$\Rightarrow R_1(R+R_2)^2 = R_2(R+R_1)^2$

$\Rightarrow R^2R_1 + R_1R_2^2 + 2RR_1R_2$

$= R^2R_2 + R_1^2R_2 + 2RR_1R_2$?

$\Rightarrow R^2(R_1 - R_2) = R_1R_2(R_1 - R_2)$

$\Rightarrow R = \sqrt{R_1R_2}$

46. (a) Microwaves are used for communication in artificial satellites

47.

(c) de Broglie wavelength, $\lambda = \frac{h}{\sqrt{2mE_{KE}}}$

$$\therefore \frac{\lambda_p}{\lambda_\alpha} = \sqrt{\frac{m_\alpha}{m_p}} = \sqrt{\frac{4m_p}{m_p}}$$

$[\because E_{KE(\alpha)} = E_{KE(p)}]$

$$\therefore \frac{\lambda_p}{\lambda_\alpha} = \frac{2}{1}$$

48.

(c) $h = \frac{E}{\upsilon} = \frac{ML^2T^{-2}}{T^{-1}} = ML^2T^{-1}$

49. (d) for constant momentum, debroglie wavelength is also same for all the particles

50.

(b) Fringe width $\propto \lambda$. Also $\lambda_{blue} > \lambda_{red}$

Therefore, fringes come closer when blue light is replaced by red light in diffraction pattern.

(CHEMISTRY SOLUTION)

51. (a)

52.

(d)

$$pH = pK_a + \log\frac{[\text{Conjugate base}]}{[\text{Acid}]}$$

$$= -\log 1.8 \times 10^{-5} + \log\frac{0.2}{0.1}$$

$$= 5.045$$

$\therefore [H^+] = 9.0 \times 10^{-6}$.

53. (a)

Spin only magnetic moment = $\sqrt{n(n+2)}$ B.M.

where, n = number of unpaired electrons.

$\sqrt{n(n+2)} = 2.84$ B.M. (given)

Hence, $n = 2$

In octahedral complex, a strong field ligand results in a low spin complex.

Thus, d^4 configuration has two unpaired electrons.

54. (d)

Ethyl chloride can be converted into ethanol either by its alkaline hydrolysis or by its reaction with moist AgOH.

$$C_2H_5Cl \xrightarrow[\Delta]{\text{Aq.NaOH}} C_2H_5OH \xleftarrow{AgOH} C_2H_5Cl$$

55. (a)

$E_{Cu/Cu^{2+}} = E^{\circ}_{Cu/Cu^{2+}} - \frac{0.059}{2}\log[Cu^{2+}]$

if $\log[Cu^{2+}] = 0, i.e., [Cu^{2+}] = 1$, then $E_{Cu/Cu^{2+}} = E^{\circ}_{Cu/Cu^{2+}}$

or $OA = E^{\circ}_{Cu/Cu^{2+}} = -E^{\circ}_{Cu/Cu^{2+}} = -0.34$

Now, $E_{Cu/Cu^{2+}} = -0.34 - \frac{0.059}{2}\log 0.1$

$= -0.34 + \frac{0.059}{2}V$

56. (c)

The size of given metals decreases whereas ionization enthalpy increases from Ti to Fe. Hence, the metallic character of the metals decreases and therefore, basicity of oxides decreases from Ti to Fe.

57. (b) $Mg + 2HCl \rightarrow MgCl_2 + H_2$ 24 g Mg gives one mole H_2
58. (b) The configuration at.no. 15 is $1s^2, 2s^2 2p^6, 3s^2 3p^3$
59. (d) Rest all involves nuclear forces of higher degree.
60. (a)
61. (b) sp^3d^2- hybridization leads to octahedral geometry
62. (d)

BCl_3 has trigonal planar structure due to 3 bond pairs in the valence shell of boron whereas NCl_3 has distorted tetrahearal structure due to one lone pair and three bond pair in the valence shell of nitrogen.

63. (a)

$200 = \sqrt{\frac{2RT}{2 \times 10^{-3}}}$

or $RT = 40$

Average kinetic energy $= \frac{3}{2}nRT$

$= \frac{3}{2} \times \frac{8}{2} \times 40$

$= 240$ J

64. (c)

Heat of formation of H_2O = − heat of decomposition of water.

65. (b)

$W = -p\Delta V = -p(V_2 - V_1)$

Given $p = 100$ k·Pa $= 10^5$ Pa.

$V_1 = 1 dm^3 = 10^{-3} m^3$

$V_2 = 1 m^3$

$\therefore W = -p(V_2 - V_1)$

$= -10^5(1 - 10^{-3})$ J

$W = -99900$ J

66. (c)

$N_2 + 3H_2 \rightleftharpoons 2NH_3$

1 3 0 initially

$1-0.81$ $3-2.43$

$(=0.19)(=0.57)$ 1.62 at equilibrium

Number of moles of $N_2 = \frac{28}{28} = 1$ mol

Number of moles of $H_2 = \frac{6}{2} = 3$ mol

Number of moles of $NH_3 = \frac{27.54}{17} = 1.62$ mol

$\therefore K_c = \frac{[NH_3]^2}{[N_2][H_2]^3} = \frac{[1.62]^2}{[0.19][0.57]^3} = 75$

67. (c)

N in NH_3, NH_4^+, N_3H and NO_2^- has -3, -3, $-1/3$ and $+3$ oxidation number respectively.

68. **(a)**

Indicator then only can show redox change with either of the titre species to indicate end point.

69. **(d)**

It forms calcium and magnesium complex with EDTA sal

70. **(c)**

Alkaline earth metal carbonates are insoluble in water and lose CO_2 on heating

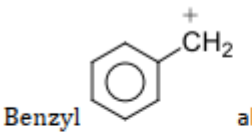
71. **(d)**

Quartz is an example of three dimensional network of $(SiO_2)_n$ silicate

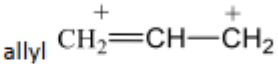
72. **(b)**

Antiknocks are used to increase octane no. of gasoline

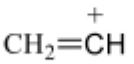
73. (b)



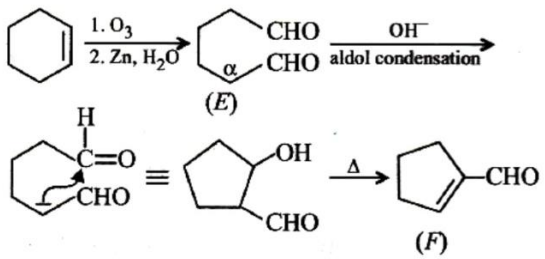
Benzyl



allyl

methyl CH_3, vinyl  given options can be solved on the basis of conjugative and hyperconjugative structures

74. (a)



75. (d)

$$CH_3 - \underset{2-Methylpent-2-ene}{\overset{CH_3}{\overset{|}{C}} = CH - CH_2CH_3} \xrightarrow{Reductive\ ozonolysis} CH_3 - \underset{Propanone}{\overset{CH_3}{\overset{|}{C}} = O} + \underset{Propanal}{CH_3CH_2CHO}$$

76. (c)
77. (d)

Schottky defect arises when equal number of a cations and anions are missing from their sites. This defect is generally found in ionic compounds like NaCl, KCl, CsCl, etc.

78. (b)

In ZnS each sulphide ion is tetrahedrally surrounded by four zinc ions and each zinc ion is surrounded by four sulphide ions. Thus, zinc sulphide possesses 4 : 4 coordination.

79. (a)

"Solutions having same osmotic pressure are called isotonic solutions." The osmotic pressure is given as

$$\therefore \quad \pi = \frac{w_b RT}{VM_B}$$

π (cane sugar)$=\pi$ (unknown solute)

$$\frac{5.12}{342} = \frac{0.9}{M}$$

$$M = \frac{342 \times 0.9}{5.12}$$

$$= 60$$

80. (b) In a pair of two solution, the one having higher osmotic pressure is called hypertonic and the other having lower osmotic pressure is called hypotonic.

81. (c)

Electrolysis of water takes place as follows

$$H_2O \rightleftharpoons \underset{\text{Cathode}}{H^+} + \underset{\text{anode}}{OH^-}$$

At anod

$$OH^- \xrightarrow{\text{oxidation}} OH + e^-$$

$$4OH \longrightarrow 2H_2O + O_2$$

At cathode

$$2H^+ + 2e^- \xrightarrow{\text{Reduction}} H_2$$

Given, time, $t = 1930s$

Number of moles of hydrogen collected

$$= \frac{1120 \times 10^{-3}}{22.4} \text{ moles}$$

$$= 0.05 \text{ moles}$$

$\because$ 1 mole of hydrogen is deposited by = 2 moles of electrons

$\because$ 0.05 moles of hydrogen will be deposited by

$$= 2 \times 0.05$$

$$= 0.10 \text{ mole of electrons}$$

Charge, $Q = nF$

$$= 0.1 \times 96500$$

Charge, $Q = it$

$$0.1 \times 96500 = i \times 1930$$

$$i = \frac{0.1 \times 96500}{1930}$$

$$= 5.0 \text{ A}$$

82. (c)

The rate of reaction is

$$\text{rate} = k[NO]^2[O_2]$$

When the volume is reduced to $\frac{1}{3}$, the concentration of each reactant is increased by 3 times

$$\text{rate}' = k[3NO]^2[3O_2]$$

$$= 27k[NO]^2[O_2]$$

$$\frac{\text{rate}'}{\text{rate}} = \frac{27k[NO]^2[O_2]}{k[NO]^2[O_2]}$$

$$\text{rate}' = 27 \text{ rate}$$

83. (c)

$$\left(\frac{dx}{dt}\right) = k[NO]^2[o_2]$$

$$= k\left(\frac{n_{NO}}{V}\right)^2\left(\frac{n_{O_2}}{V}\right)$$

$$\left(\frac{dx}{dt}\right) = \frac{k}{V^3}(n_{No})^2(n_{O_2})$$

$$\left(\frac{dx}{dt}\right) = \frac{k(n_{No})^2(n_{O_2})}{\left(\frac{V}{2}\right)^3}$$

$$= 8\left(\frac{dx}{dt}\right)$$

84. (a)

$(C_6H_{12}O_6) \xrightarrow{\text{Touching}} C_2H_5OH$

85. (b)
86. **(b)** Cinnabar (HgS) is a sulphide ore, hence it is concentrated by forth floatation process
87. **(b)**

Bleaching action of Cl_2 is only in presence of moisture where nascent oxygen is displaced from H_2O

$Cl_2 + H_2O \rightarrow HCl + HClO$

$HClO \rightarrow HCl + [O]$

88. (b)

$HgO \xrightarrow{\Delta} Hg + \frac{1}{2}O_2$

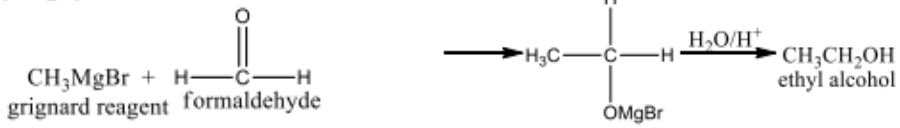
89. **(c)** The process is called hardening of steel and it develops hard and brittle nature in steel.
90. **(d)**
91. **(c)**
92. **(b)** Pyroligneous acid obtained during destructive distillation of wood contains mainly acetic acid (9-10 %), methyl alcohol (2-2.5%) and acetone about 0.5%; the other distillation products are wood gas, wood charcoal, wood tar
93. (a)

$(RMgX) + HCHO \rightarrow 1°\text{alcohol}$

Grignard reagent

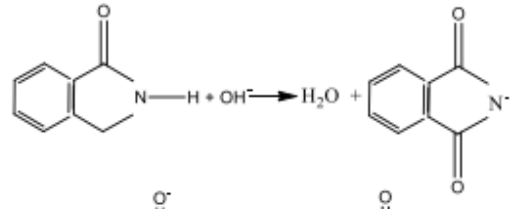
$(RMgX) + RCHO \rightarrow 2°\text{alcohol}$

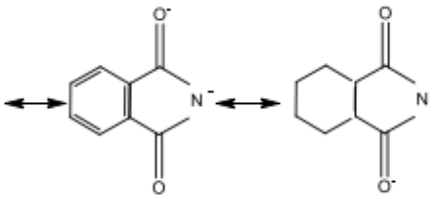
$(RMgX) + RCOR \rightarrow 3°\text{alcohol}$



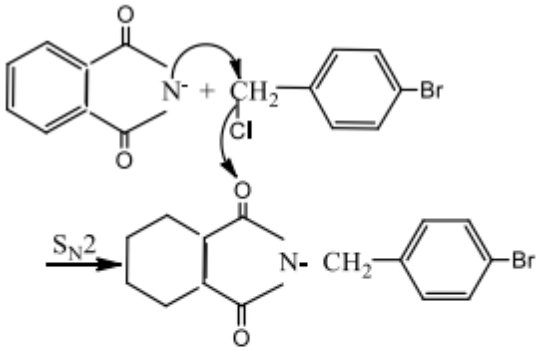
94. **(b)** O is more electronegative than C
95. (a)
96. (a)

It is the first step of Gabriel's phthalimide synthesis. The hydrogen bonded to nitrogen is sufficiently acidic due to two α-carbonyls.

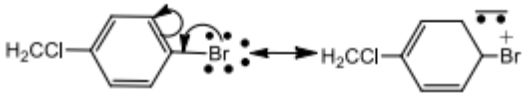




The conjugate base forms above act as nucleophile in the subsequent step of reaction. As shown above, the nucleophile exist in three resonating form, one may think of oxygen being the donor atom in the nucleophilic attack. However, nitrogen act as donor as it is better donor than oxygen.



Bromine is not substituted in the above reaction as it is in resonance with benzene ring giving partial double bo0nd character to C — Br bond, hence difficult to break.



97. (c)
98. **(a)** A fact; H-bonding makes them highly crystalline and highly tensile material.
99. **(a)**
100. **(b)** Penicillin G is widely used as broad spectrum antibiotics

PART A – BOTANY

101. Match List I with List II and select the correct option:

List I	List II
A Bacillus thuringiensis	1 Production of chitinases
B Rhizobium meliloti	2 Scavenging of oil spills
C Escherichia coli	3 Incorporation of nif-gene
D Pseudomonas putida	4 Production of Bt toxin
E Trichoderma	5 Production of human insulin

(a) A = 2, B = 4, C = 1, D= 5, E = 3 (b) A = 2, B = 4, C = 5, D = 1, E = 3
(c) A = 4, B = 3, C = 5, D = 2, E = 1 (d) A = 3, B = 4, C = 5, D=1, E = 2

102. Linnaeus system of plant classification is

(a) Natural (b) artificial (c) phylogenetic (d) unsymmetrical.

103. Which of the following pair of diseases is caused by virus?
(a) rabies, mumps (b) cholera, tuberculosis
(c) typhoid, tetanus (d) AIDS, syphilis.

104. Pea flower is a
(a) Monocarpellary (b) Bicarpellary (c) Tricarpellary (d) Pentacarpellary

105. A gymnospermic leaf carries 16 chromosomes. The number of chromosomes in its endosperm will be
(a) 16 (b) 8 (c) 24 (d) 12.

106. Bryophytes resemble algae in the following aspects
(a) thallus like plant body, presence of roots and autotrophic nutrition
(b) thallus like plant body, lack of vascular tissues and autotrophic nutrition
(c) filamentous body, presence of vascular tissues and autotrophic nutrition
(d) differentiation of plant body into root, stem and leaves and autotrophic nutrition.

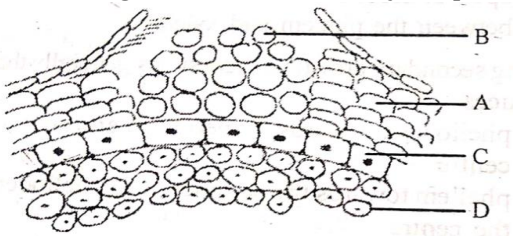
107. Bicarpellary, syncarpous ovary with axile placentation is seen in
(a) Solanaceae (b) caesalpinaceae (c) Asteraceae (d) malvaceae.

108. Ovary is called inferior in
(a) epigynous condition (b) perigynous condition
(c) hypogynous condition (d) none of these

109. When placenta forms a ridge along the ventral suture of the ovary and the ovules are borne on this ridge forming two rows, the type of placentation is termed as
(a) Marginal (b) axile (c) parietal (d) free central.

110. Which of the following is true?
(a) vessels are unicellular and with narrow lumen (b) vessels are multicellular and with wide lumen
(c) tracheids are unicellular and with wide lumen (d) tracheids are multicellular and with narrow lumen

111. In the diagram of lenticel identify the parts marked as A, B, C, D.



(a) A-phellem, B-periderm, C- phellogen, D-phelloderm
(b) A-phellem, B-complementary cells, C- phellogen, D- phelloderm
(c) A-complementary cells, B- phellogen, C - phelloderm, D - periderm
(d) A - complementary cells, B - phellem, C - periderm, D- phelloderm

112. Identify the plant parts whose transverse sections show a clear and prominent pith.
(a) dicot stem and monocot stem (b) dicot stem and monocot root
(c) dicot root and monocot root (d) dicot stem and dicot root.

113. Which of the following is not true for osmosis?
(a) transfer of water from xylem vessels to vessels (b) soil to root hairs

(c) water from xylem to phloem (d) none of the above

114. Which of the following two are exogenously produced

(a) Asscospore, conidia (b) conidia, basidiospore

(c) Asscospore, sporangiospore (d) Basidiospore, Asscospore

115. Insectivorous plants are usually adapted to

(a) water logged soil (b) soil deficient in sugars

(c) soil rich in trace elements (d) soil deficient in nitrogenous compounds

116. Which of the following is a part of cytochrome?

(a) Mg b) Zn c) Fe d) Ca

117. Photosynthesis cannot continue for long if during light reaction, only cyclic photophosphorylation takes place. This is because

(a) only ATP is formed, $NADPH^+ + H^+$ is not formed

(b) photosystem I stops getting exicted at a wavelength of light beyond 680 nm.

(c) there is unidirectional cyclic movement of the electrons

(d) there is no evolution of O_2.

118. Golden rice is a transgenic crop with

(a) Insect resistance (b) High lysine content (c) High Protein (d) High vitamin A

119. Which statement about photosynthesis is false?

(a) the enzymes required for carbon fixation are located only in the grana of chloroplasts

(b) in given plants, both PS I and PS II are required for the formation of $NADPH + H^+$

(c) the electron carriers involved in photophosphorylation are located on the thylakoid membranes

(d) photosynthesis is a redox process in which water is oxidised and carbon dioxide is reduced

120. Which of the following characteristics out of A, B and C are exhibited by C_4 plants?

A. kranz anatomy

B. the first stable product of photosynthesis is oxaloacetic acid

C. both PEP carboxylase and Ribulose– bisphosphate carboxylase act as carboxylating enzymes

The correct answer is

(a) only A and B, but not C (b) only B and C, but not A

(c) only A and C, but not B (d) all A, B and C

121. Which one of the following pairs is an example for lateral meristem?

(a) procambium and phelloderm (b) interfascicular cambium and phellem

(c) phellogen and phelloderm (d) phellogen and fascicular cambium.

122. Oxidative phosphorylation refers to

(a) anaerobic production of ATP (b) the citric acid cycle production of ATP

(c) production of ATP by chemiosmosis (d) alcoholic fermentation

123. Match the compounds given in column I with the number of the atoms present in them which are listed under column II. Choose the answer which are the correct combination of alphabets of the two columns.

Column I	Column II
A. Oxaloacetate	p. 6-C compound
B. Phosphoglyceraldehyde	q. 5-C compound
C. Oxalosuccinate	r. 4-C compound
D. α-ketoglutarate	s. 3-C compound
	t. 2 - C compound

(a) A = r, B = t, C = p, D = q (b) A = q, B = s, C = p, D = t

(c) A = s, B = t, C = q, D = r (d) A = r, B = s, C = p, D = q

124. In Krebs' cycle, the FAD participates as electron acceptor during the conversion of

(a) fumaric acid to malic acid (b) succinic acid to fumaric acid

(c) succinyl CoA to succinic acid (d) a-ketoglutarate to succinyl CoA.

125. Match the phytohormones given in Column I with their functions given in Column II. Choose the answer with correct combination of alphabets.

Column I (Phytohormones)	Column II (Functions)
i. auxins	p. breaking seed dormancy
ii. gibberellins	q. inducing fruit ripening
iii. cytokinins	r. formation of abscission layer
iv. ethylene	s. root initiation

t. chloroplast development and chlorophyll synthesis.

	(i)	(ii)	(iii)	(iv)
a)	p	r	q	s
b)	r	s	p	t
c)	s	p	t	q
d)	s	t	r	q

126. Which of the following fern is an excellent biofertilizer?
(a) Marsilia (b) Pteridium (c) Azolla (d) Salvinia.

127. Parthenocarpic tomato fruits can be produced by
(a) treating the plants with phenylmercuric acetate
(b) removing androecium of flowers before pollen grains are released
(c) treating the plants with low concentrations of gibberellic acid and auxins
(d) raising the plants from vernalized seeds

128. Which one of the following methods is commonly used to maintain the genetic traits of a given plant?
(a) by propagating through seed germination
(b) by propagating through vegetative multiplication
(c) by generating hybrids through intergeneric pollination
(d) by treating the seeds with gamma radiations.

129. Which one of the following pairs of plant structures has haploid number of chromosomes?
(a) nucellus and antipodal cells. (b) egg nucleus and secondary nucleus.
(c) megaspore mother cell and antipodal cells. (d) egg cell and antipodal cells.

130. Which of the element is needed for nitrogenase
(a) Ca – Mg (b) Mo – Fe (c) Cu – Mg (d) Mo – Zn

131. Which of the following is wrong?
(a) lysosomes are single membraned vesicles budded off from Golgi apparatus and contain digestive enzymes.
(b) endoplasmic reticulum consists of a network of membranous tubules and helps in transport, synthesis and secretion.
(c) leucoplasts are bound by single membranes, lack pigment but contain their own DNA and protein synthesizing machinery
(d) None of the above

132. Each phospholipid molecule in a cell membrane consists of
(a) one polar head and two nonpolar tail (b) one polar head and one polar tail
(c) one non polar head and one polar tail (d) one non polar head and one polar tail

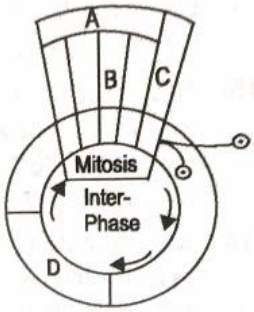
133. What is true about fluid mosaic model ?
(a) phospholipid layer is sandwiched between two protein layers
(b) phospholipid monolayer is present on the top of a protein layer
(c) phospholipid bilayer is present on the top of a protein layer
(d) proteins as embedded at places in the phospholipid bilayer

134. The specificity of any protein and its physical and enzymatic properties depends upon
(a) absence of amino acids (b) linear sequence of the amino acids
(c) amino acid without any sequence (d) number of amino acids.

135. The major role of minor elements inside living organisms is to act as
(a) co-factors of enzymes (b) building blocks of important amino acids
(c) constituent of hormones (d) binder of cell structure

PART B - BOTANY

136. The given figure is a schematic break-up of the phases/stages of cell cycle. Which one of the following is the correct indication of the stage/phase in the cell cycle?

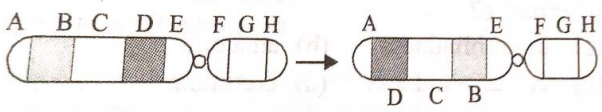


(a) C-karyokinesis (b) D-synthetic phase (c) A – cytokinesis (d) B- metaphase.

137. When a dwarf pea plant was treated with gibberellic acid, it became as tall as tall pea plants. If these pea plants are crossed with pure tall plants, then what will be the phenotypic ratio in F1 generation?
(a) 75% tall and 25% dwarf plants (b) 100% dwarf plants
(c) 100% tall plants (d) 25% tall and 75% dwarf plants.

138. Two pea plants were subjected for cross pollination. Of the 183 plants produced in the next generation, 94 plants were found to be tall and 89 plants were found to be dwarf. The genotypes of the two parental plants are likely to be
(a) TT and tt (b) Tt and Tt (c) Tt and tt (d) TT and TT.

139. Given below is a representation of a kind of chromosomal mutation. What is the kind of mutation represented?



(a) deletion (b) duplication (c) inversion (d) reciprocal translocation.

140. In man, which of the following genotypes and phenotypes may be the correct result of aneuploidy in sex chromosomes?
(a) 22 pairs + XXY males (b) 22 pairs + XX females
(c) 22 pairs + XXXY females (d) 22 pairs + Y females

141. The quickest method of plant breeding is
(a) introduction (b) selection (c) hybridization (d) mutation breeding

142. The restriction endonuclease is used for cutting
(a) single stranded DNA (b) RNA fragment (c) mRNA (d) double stranded DNA

143. The polymerase chain reaction (PCR) technology was discovered by
(a) Karry Mullis (b) Saiki et al (c) Craig Venter (d) Maxam and Gilbert

144. Most widely used bioweapon is
(a) Barulher mais (b) Peudomonas putida (c) Bacillus anthracis (d) none of these

145. Genetic engineering is possible, because
(a) we can cut DNA at specific sites by endonucleases like DNAase I
(b) restriction endonucleases purified from bacteria can be used in vitro
(c) the phenomenon of transduction in bacteria is well understood
(d) we can see DNA by electron microscope.

146. The transgenic animals are those which have
(a) foreign RNA in all its cells (b) foreign DNA in some of its cells
(c) foreign DNA in all its cells (d) both (a) and (b).

147. PCR is related with
(a) DNA cloning (b) amplification of DNA
(c) DNA selective replication (d) all of the above.

148. Gene therapy involve
(a) introduction of a normal genes in cell (b) treating of defective genes with radiation
(c) eliminating defective and useless genes (d) replacement of defective genes by normal one

149. Polyploidy can result from
(a) double fertilization (b) polyspermy (c) diploid gametes (d) all of the above

150. The loss of one single chromosome creates a condition called
(a) trisomy (b) nullisomy (c) monosomy (d) haploid.

PART A – ZOOLOGY

151. Which of the following group is characterized by the animals with worm like body, exclusively marine, open circulatory system, gill respiration and proboscis gland for excretion?
a) Echinodermata b) Mollusca c) Hemichordata d) Ctenophora

152. Which one of the following statements is totally wrong about the occurrence of notochord while the other three are correct?
a) Notochord is persistent throughout the life in Amphioxus
b) It is absent throughout the life in mammals from the very beginning including the embryonic stage.
c) Notochord is present in larval tail only in ascidians.
d) Notochord is replaced by vertebral column in adult frogs.

153. Match the following with reference to Cockroach and choose the correct option
A. Phallomere i. Chain of developing ova

B. Gonopore — ii. Bundles of sperm
C. Spermatophore — iii. Opening of the ejaculatory duct
D. Ovarioles — iv. The external genitalia

a) A-iii, B-iv, C-ii, D-i
b) A-iv, B-iii, C-ii, D-i
c) A-iv, B-ii, C-iii, D-i
d) A-ii, B-iv, C-iii, D-i

154. Choose the correctly matched pair:
a) Inner lining of salivary ducts -– Ciliated epithelium
b) Moist surface of buccal cavity ---- Glandular epithelium
c) Tubular parts of nephrons ---- Cuboidal epithelium
d) Inner surface of bronchioles ---- Squamous epithelium

155. Diagnostic report of a person revealed the fact that he is suffering with the deficiency of Vitamin B12 Based on that result assume which of the following cells in his alimentary canal are not working properly /damaged?
a) Peptic cells b) Brunner's gland cells c) Oxyntic cells d) Neck cells

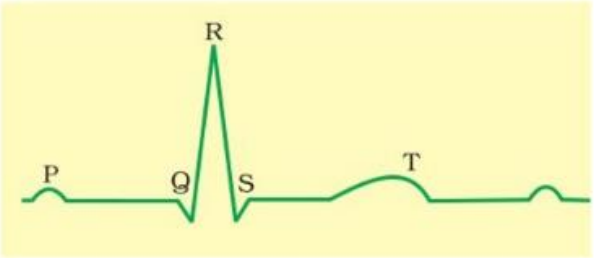
156. Identify the type of PEM which occurs in the infants less than a year in age if mother's milk is replaced too early by other foods which are poor in both protein and caloric values?
a) Rickets b) Cretinism c) Kwashiorkor d) Marasmus

157. Select the condition that occurs/leads to normal inspiration among the human beings
a) Intra pulmonary pressure < Atmospheric pressure b) Atmospheric pressure = Intra pulmonary pressure
c) Atmospheric pressure < Intra pulmonary pressure d) p O_2 in atmosphere < p O_2 in lungs

158. Identify the correct and incorrect match about respiratory volume and capacities and mark the correct answer
i) Inspiratory capacity (IC) = Tidal Volume + Residual Volume
ii) Vital Capacity (VC) = Tidal Volume (TV) + Inspiratory Reserve Volume (IRV) + Expiratory Reserve Volume (ERV).
iii) Residual Volume (RV) = Vital Capacity (VC) – Inspiratory Reserve Volume IRV)
iv) Tidal Volume (TV) = Inspiratory Capacity (IC) – Inspiratory Reserve Volume (IRV)
a) (i) Incorrect, (ii) Incorrect, (iii) Incorrect, (iv) Correct
b) (i) Incorrect, (ii) Correct, (iii) Incorrect, (iv) Correct
c) (i) Correct, (ii) Correct, (iii) Incorrect, (iv) Correct
d) (i) Correct, (ii) Incorrect, (iii) Correct, (iv) Incorrect

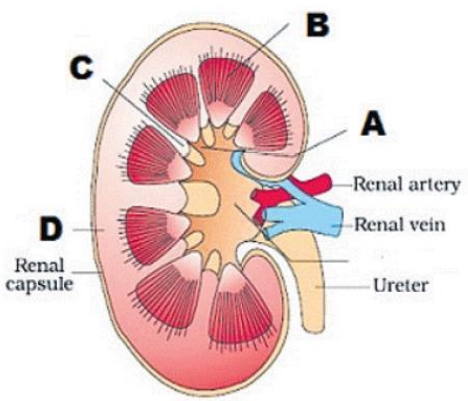
159. In human beings, which blood vessel would normally carry largest amount of nutrients?
a) Hepatic veins b) Post caval vein c) Hepatic portal vein d) Left systemic arch

160. Diagrammatic representation of a standard ECG is given below. Select the correct option



a) P - wave: Repolarisation of the atria.
b) T - wave: Depolarisation of ventricles.
c) QRS complex: Depolarization of ventricles
d) R - wave: Repolarization of ventricles

161. Figure shows the longitudinal section of human kidney with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and/or functions.



a) C - Columns of Bertini - Extensions of cortex in between the medullary pyramids
b) D - Pelvis - Gives ureter to carry urine from kidney
c) B - Cortex - Forms renal pyramids

d) A - Renal columns – It is a part of renal pelvis

162. Arrange the following events in correct sequence of their occurrence.

(I) Increase in blood pressure
(II) Releasing of Renin by JG cells
(III) Releasing of Aldosterone
(IV) Conversion of Angiotensinogen into Angiotensin II
(V) Fall in GFR

a) V - IV - II - I – III b) I - II - III - IV – V c) V - III - II - IV – I d) V - II - IV - III – I

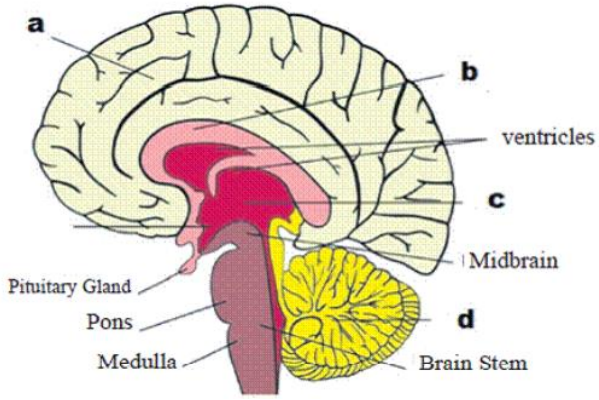
163. Pick out the reason why 8th,9th and 10th pairs of ribs in human beings are considered as "vertebro-chondral ribs"

a) They attach dorsally with thoracic vertebrae and with sternum ventrally with hyaline cartilage
b) They attach ventrally with 7th pair of ribs with hyaline cartilage
c) They are free ventrally
d) They are free dorsally

164. Which of the following about muscle fibers is correctly matched?

a) 'H' zone in Sarcomere - With both thin and thick filaments
b) White muscle fibres - With high amount of sarcoplasmic reticulum and plenty of sarcosomes
c) Sarcomere - Portion of myofilament between two successive 'Z' lines
d) 'Z' line - An elastic fiber which bisects 'A' band

165. A sagittal section of human brain is shown here. Identify the labelled parts of a, b, c, d.



a) a - Cerebellum ; b - Corpus callosum b) b - Arbor vitae ; d - Cerebellum
c) a - Cerebrum ; c – Thalamus d) b - Corpus callosum ; d – Cerebrum

166. Which of the following two statements regarding the retina is correct?

(a) Fovea is the point of retina with the greatest visual activity (resolution)
(b) Fovea consists of densely packed cones only.

a) (a) is correct but (b) is false b) (b) is correct but (a) is false
c) Both (a) and (b) are true d) Both (a) and (b) are false

167. Which of the following pairs of hormones are not antagonistic to each other?

a) Gastrin – Gastric inhibitory peptide b) Thyrocalcitonin - Parathyroid hormone
c) Aldosterone - Atrial natriuretic factors d) Adrenalin - Nor adrenaline

168. Match the following conditions/disorders given in column - I with the reasons mentioned in column - II and choose the correct option.

Column – I	Column - II
(a) Acromegaly	(i) Hypo secretion of ADH
(b) Grave's disease	(ii) Hypo secretion of insulin
(c) Addison's disease	(iii) Hyper secretion of Growth hormone
(d) Diabetes mellitus	(iv) Hypo secretion of glucocorticoids
(e) Diabetes insipidus	(v) Hyperthyroidism

a) (a) - (iii); (b) - (ii) ; (c) - (iv) ; (d) - (i) ; (e) - (v)
b) (a) - (iii) ; (b) - (v) ; (c) - (iv) ; (d) - (ii) ; (e) - (i)
c) (a) - (iv) ; (b) - (iii) ; (c) - (ii) ; (d) - (v) ; (e) - (i)
d) (a) - (ii) ; (b) - (v) ; (c) - (i) ; (d) - (iv) ; (e) - (iii)

169. Which one of the following is the correct matching of the events that occur during menstrual cycle?

a) Follicular phase: Degeneration of endometrium of uterus and formation of Graafian follicle.
b) Secretory phase: Development of corpus luteum and secretion of large amount of progesterone
c) Ovulation phase: LH and FSH attain minimum levels and sharp increase of oestrogen
d) Menstruation phase: Breakdown of myometrium and releasing of fertilised ovum

170. Identify the wrong statement from the following:

a) high levels of estrogen triggers the ovulatory phase.

b) sperms released from seminiferous tubules are poorly motile/non –motile.

c) progesterone level is high during the post ovulatory phase of menstrual cycle.

d) oogonial cells start to proliferate and give rise to functional ova in regular cycles from puberty onwards.

171. Identify the incorrect match.

S.No.	Contraceptive device	Type	Mode of action
1)	Condom	Barrier	Prevents the meeting of sperm and ovum
2)	Multiload 375	IUD	Suppress the fertilizing capacity of sperms
3)	Saheli	Oral steroidal contraceptive pill	Inhibits ovulation and implantation
4)	LNG 20	IUD	Phagocytosis of sperms and release of hormones

a) 1 b) 2 c) 3 d) 4

172. Which of the following statements regarding the contraceptive methods are correct?

(a) In the Lactational Amenorrhea method, ovulation generally will not occur during the period of intense lactation by the mother after parturition.

(b) Active prolactin secretion during lactation suppresses the release of GnRH from hypothalamus and thus reduces the levels of FSH and LH from the pituitary gland.

a) Both (a) and (b) are false b) (a) is true but (b) is false

c) Both (a) and (b) are true d) (b) is true but (a) is false

173. Select the correct combination of methods of natural selection:

a) Disruptive selection: more individuals acquire peripheral character value at both ends of the distribution curve.

b) Stabilization selection: more individuals acquire value other than the mean character.

c) Directional selection: less individuals acquire value other than the mean character.

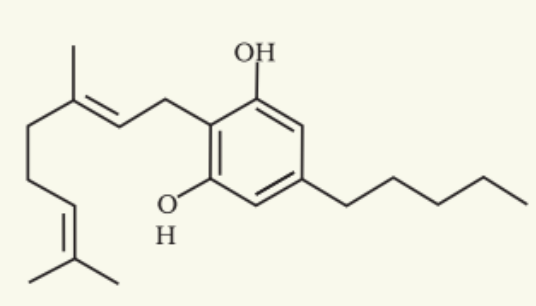
d) None of these

174. Select one correct example each of convergent evolution and divergent evolution?

Convergent evolution	Divergent evolution
P) Thorns of Bouganivillia and tendrils of Cucurbita;	Eyes of Octopus and mammals
Q) Potato and sweet potato	Flippers of Penguins and Dolphins
R) Bones of forelimbs of vertebrates	Wings of butterfly and birds
S) Eyes of Octopus and mammals	Bones of forelimbs of vertebrates

a) P b) Q c) R d) S

175. Diagrammatic representation of certain drug is given below. Select the correct option about it.



a) Morphine - Derived from Papaver somniferum - Cause Hallucinations

b) Cannabinoid - Derived from Cannabis sativa - Effects on Cardiovascular system

c) Cocaine - Derived from Erythroxylum coca - Causes Euphoria

d) Hallucinogen - Derived from Atropa Belladona - Causes Euphoria

176. Identify the correct combination regarding the disease which is characterized by the turning of lips and finger nails into grey to bluish in colour in severe cases.

a) Pneumonia – Microsporum b) Ringworms - Trichophyton

c) Typhoid - Salmonella typhi d) Pneumonia - Haemophilus influenza

177. AIDS is caused by HIV. Which among the following is not a mode of transmission of HIV?

a) Sexual contact with infected persons b) Shaking hands with infected persons

c) Sharing the infected needles d) Transfusion of infected blood

178. Consider the following two statements:

I. In spite of having more than 70 per cent of the world livestock population, the contribution of India and china to the world farm produce is only 25 per cent.

II. The productivity per unit of cattle in these countries is very low.

a) Both I and II are true and II explains I b) Both I and II are true but II does not explain I

c) I is true but II is false d) Both the statements are not true

179. Amongst the following the number of fresh water fishes is: Catla, Rohu, Common carp, Hilsa, Sardines, Mackerel, Pomfrets

a) 2 b) 3 c) 4 d) 5

180. The vitamin whose content increases following the conversion of milk into curd by lactic acid bacteria is:

a) Ascorbic acid b) Calciferol c) Cobalamine d) Tocopherol

181. Identify the incorrectly matched pair

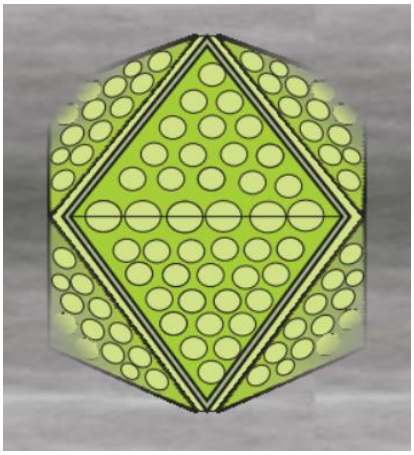
a) Trichoderma – Biocontrol agent

b) Aspergillus niger - source of citric acid

c) Baculovirus - narrow spectrum species specific insecticides

d) Monascus purpureus – blood cholesterol increasing agent

182. The virus shown here is a causative agent of



a) Intestinal infections b) Respiratory infections

c) CNS infections d) Genito-urinary infections

183. Select the correct option related to co-existence instead of competition by following the mechanism known as 'resource partitioning':

a) Connell's experiments – about Balanus and Chathamlus

b) MacArthur observations – about Warbler birds

c) Gause's principle – between goats and Abingdon tortoise.

d) Edward Wilson - flamingo birds and fishes.

184. The logistic population growth is expressed by the equation

a) $\frac{dt}{dN} = Nr\left(\frac{K-N}{K}\right)$ b) $\frac{dN}{dt} = rN\left(\frac{N-K}{N}\right)$

c) $\frac{dN}{dt} = rN$ d) $\frac{dN}{dt} = rN\left(1-\frac{N}{K}\right)$

185. Which of the following associations is exampled for the interaction like commensalism?

a) Micorrizae between fungi and roots of higher plants. b) Lichens between algae and fungi

c) Cuckoo (koel) and the crow d) Orchid growing on a mango branch

186. Among the following where do you think the process of decomposition would be the fastest?

A) Tropical rain forests b) Antarctic c) Dry arid region d) Alpine region

187. Ecological niche is

a) an ecologically adapted zone

b) the surface area of the ocean

c) the physical position and functional role of a species within the community

d) formed of all plants and animals living at the bottom of a lake.

188. The annual net primary productivity of the whole biosphere is approximately 170 billion tons (dry weight) of organic matter. In this, the productivity of the oceans alone are only

a) 85 billion tons b) 70 Billion tons c) 170 billion tons d) 55 Billion tons

189. Which one is a hot spot of biodiversity

a) Aravalli Hills b) Western Ghats c) Indo Gangetic plain d) Eastern Ghats

190. In India, ecologically unique and biodiversity-rich regions are legally protected as biosphere reserves, national parks and sanctuaries. India now has

a) 10 Biosphere reserves, 50 National Parks and 400 wildlife sanctuaries

b) 14 Biosphere reserves, 50 National Parks and 400 wildlife sanctuaries
c) 10 Biosphere reserves, 90 National Parks and 448 wildlife sanctuaries
d) 14 Biosphere reserves, 90 National Parks and 448 wildlife sanctuaries

191. Select the incorrect combination of pollution control measures and their actions.
a) Incinerators - Burn hospital wastes
b) Catalytic converters - Convert Carbon dioxide into Carbon monoxide
c) Electrostatic precipitators - Remove particulate matter
d) Scrubber - Removes soluble gases like Sulphur dioxide

192. Match the following and choose the correct option

Act	Year
a) Environment protection Act	i) 1987
b) National Forest Policy	ii) 1986
c) Water Act	iii) 1988
d) Amendment of Air act to include noise	iv) 1974

a) a-ii, b-iii, c- i, d-iv b) a-iii, b- iv, c-ii, d-i
c) a-ii, b- iii, c- iv, d-i d) a-iii, b-i, c-ii, d-iv

193. Genital pouch in male cockroach is
a) Dorsally bound with 9th terga but ventrally with 9th sterna.
b) Dorsally bound with 9th and 10th terga but ventrally with 9th pleura only.
c) Dorsally bound with 9th and 10th sterna but ventrally with 9th terga only.
d) Dorsally bound with 9th and 10th terga but ventrally with 9th sterna only.

194. In normal blood pressure of 120/80 mm Hg the numerator represents
a) Diastolic pressure b) Systolic pressure c) Pulse pressure d) Cardiac index

195. Which of the following statements is correct?
a) The descending limb of loop of Henley is impermeable to water.
b) The ascending limb of loop of Henley is permeable to water.
c) The descending limb of loop of Henley is permeable to electrolytes.
d) The ascending limb of loop of Henley is impermeable to water.

196. During the transmission of nerve impulse through a nerve fibre, the potential on the inner side of the plasma membrane has which type of electric charge?
a) First positive, then negative and continue to be negative
b) First negative, then positive and continue to be positive
c) First positive, then negative and again back to positive
d) First negative, then positive and again back to negative

197. Which of the following is mismatched?
a) Vitamin A – Xerophthalmia b) Vitamin D - Rickets
c) Vitamin K - Beri-beri d) Vitamin C – Scurvy

198. Identify air-borne diseases from the following
a) Common cold and ring worms b) Conjunctivities and amoebiasis
c) Ancylostomiasis and hay fever d) Pneumonia and common cold

199. The species diversity decreases from lower to higher altitudes on a mountain. This is due to
a) increase in temperature b) decrease in temperature
c) greater seasonal variability d) Both (b) and (c)

200. Retrogressive metamorphosis
a) Hemichordata b) Cephalochordata c) Urochordata d) Vertebrata.