25/04/2023

Phase-I
CODE-B

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FINAL TEST SERIES for NEET-2023

MM : 720 **Test-II** **Time : 3 Hrs. 20 Mins.**

Mock Test for NEET (Complete Syllabus of Class XI & XII)

Instructions for Paper (ΣXXVIVT11β) :

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet. (ΣXXVIVT11β)

PHYSICS

Choose the correct answer :

SECTION - A

1. The mass and volume of a body are 6.237 g and 3.5 cm^3, respectively. The density of the material of the body in correct significant figures is

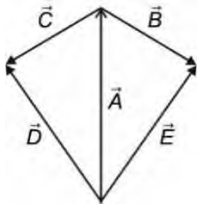
(1) 1.78 g/cm^3

(2) 1.782 g/cm^3

(3) 1.8 g/cm^3

(4) 1.7 g/cm^3

2. In the figure, $\vec{E}-\vec{D}+\vec{C}$ equals



(1) $\vec{A}$ (2) $\vec{B}$

(3) $-\vec{A}$ (4) $-\vec{B}$

Space for Rough Work

3. If R and h represents the horizontal range and maximum height respectively of an oblique projectile, then $\frac{R^2}{8h}+2h$ represents
   (1) Time of flight of that projectile
   (2) Maximum possible horizontal range by the projectile
   (3) Maximum height of that projectile
   (4) Velocity of that projectile at highest point

4. A ball falls vertically onto a floor, with momentum P, then bounces repeatedly. The coefficient of restitution is $\frac{1}{2}$, the total momentum imparted by the ball to the floor is
   (1) $2P$ (2) $\frac{3P}{2}$
   (3) $3P$ (4) $4P$

5. If radius of gyration of a body about an axis passing through its centre of mass is 24 cm then radius of gyration of a body about an axis parallel to prior axis and at a distance 7 cm from centre of mass, will be
   (1) 16 cm (2) 9 cm
   (3) 15 cm (4) 25 cm

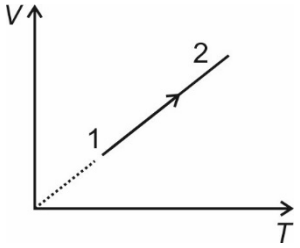
6. A uniform rod AB of mass 'm' length '$2a$' is allowed to fall under gravity with AB in horizontal position. When the speed of rod is 'v' suddenly the end 'A' is fixed. The angular velocity of rod with which it begins to rotate will be
   (1) $\frac{3v}{2a}$ (2) $\frac{5v}{3a}$
   (3) $\frac{3v}{4a}$ (4) $\frac{5v}{2a}$

7. A particle performing SHM with frequency 10 Hz and amplitude 5 cm is initially in left extreme position. The equation of its displacement will be (x is in metre)
   (1) $x=0.05\sin\left(20\pi t+\frac{3\pi}{2}\right)$
   (2) $x=0.05\sin\left(20\pi t+\frac{\pi}{2}\right)$
   (3) $x=0.05\sin(10\pi t)$
   (4) $x=0.05\sin(20\pi t+\pi)$

8. The gravitational field at some point in space is $\vec{g}=3\hat{i}+4\hat{j}$ N/kg. The force exerted on a 2 kg mass placed that a point, is
   (1) 10 N, 53° with x-axis
   (2) 10 N, 37° with x-axis
   (3) 14 N, 53° with x-axis
   (4) 7 N, 37° with x-axis

9. Which of the following is correct?
   (1) Doppler effect in sound and light is symmetric
   (2) Doppler effect in sound and light is asymmetric
   (3) Doppler effect in sound is symmetric and in light is asymmetric
   (4) Doppler effect in sound is asymmetric and in light is symmetric

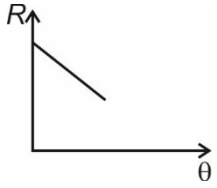
10. Volume versus temperature graph of two mole of helium gas is as shown in figure. The ratio of change in internal energy and the work done by the gas in process 1-2 is

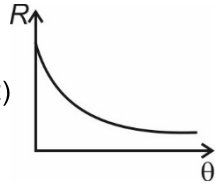


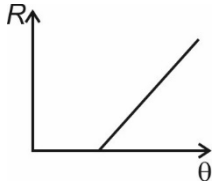
   (1) $\frac{5}{2}$ (2) $\frac{3}{2}$
   (3) $\frac{7}{2}$ (4) $\frac{7}{3}$

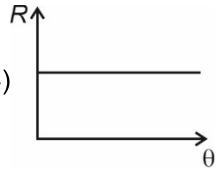
Space for Rough Work

11. Temperature of a body θ is slightly more than the temperature of the surrounding θ_0, its rate of cooling (R) versus temperature of body (θ) is plotted, its shape would be (as per Newton's law of cooling)

(1) 

(2) 

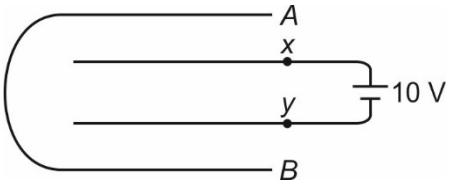
(3) 

(4) 

12. Expansion of liquid on heating is different from that of solids, since expansion of liquid is
    (1) More than solids because molecular spacing in them is less
    (2) More than solids because molecular spacing in them is more
    (3) Less than solid because molecular spacing in them is more
    (4) Less than solids because molecular spacing in them is less

13. Charge Q is distributed on two metallic spheres having radii R and $3R$ such that both spheres have equal charge density then charge on smaller sphere is
    (1) $\frac{Q}{10}$
    (2) $\frac{Q}{9}$
    (3) $\frac{9Q}{10}$
    (4) $\frac{10Q}{11}$

14. There are four identical metal plates each of area A. The plates are placed at equal distance 'd' successively as shown in figure. If $\frac{A\varepsilon_0}{d} = 2\ \mu F$ and source of emf 10 V is connected between x and y, then charge on plate x will be



    (1) +30 μC (2) +10 μC
    (3) +20 μC (4) –20 μC

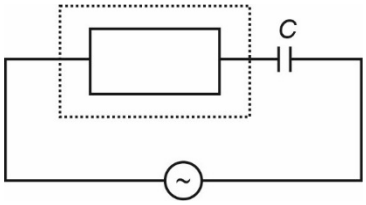
15. Current i is carried in a wire of length L. If the wire is turned into a circular coil. The maximum magnitude of torque acting on it, when placed in a given uniform magnetic field B, will be
    (1) $\frac{LiB^2}{2}$ (2) $\frac{Li^2B}{2}$
    (3) $\frac{L^2iB}{4\pi}$ (4) $\frac{Li^2B}{4\pi}$

16. If a coil of 50 turns area 5.0 cm^2 is suddenly removed from magnetic field. It is observed that charge of 5×10^{-4} C flows into the coil. If the resistance of the coil is 100 Ω, the magnetic flux density in Wb/m^2 is
    (1) 1 (2) 3
    (3) 2 (4) 4

17. A transformer is used to light 150 W, 30 V lamp from a 240 V mains. The current in the main cable is 0.8 ampere. The efficiency of the transformer is nearly
    (1) 78%
    (2) 48%
    (3) 88%
    (4) 92%

Space for Rough Work

18. In the circuit shown, there is a box containing a resistance R and inductance L and with this box a capacitor of capacitance C connected in series to an alternating source of angular frequency 4 rad/s. Box has power factor $\frac{1}{\sqrt{3}}$ and the circuit has overall power factor 1. The impedance of the box is



(1) $\frac{\sqrt{3}}{4\sqrt{2}C}$ (2) $\frac{1}{4C}$

(3) $\frac{1}{4\sqrt{2}C}$ (4) $\frac{3}{4\sqrt{2}C}$

19. The number of photons emitted per second by 60 W source of monochromatic light of wavelength 5000 Å are

(1) 1.5×10^{20} (2) 1.5×10^{-18}

(3) 3.5×10^{20} (4) 3.5×10^{-18}

20. A certain substance decays to $\frac{1}{64}^{\text{th}}$ of its initial activity in 24 days. The half-life of the substance will be

(1) 6 days (2) 4 days

(3) 3 days (4) 2 days

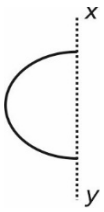
21. A ball impinges directly on a similar ball at rest. The first ball is brought to rest by the impact. If half of the kinetic energy is lost during impact, the value of coefficient of restitution is

(1) $\frac{1}{2\sqrt{2}}$ (2) $\frac{1}{\sqrt{3}}$

(3) $\frac{1}{\sqrt{2}}$ (4) $\frac{\sqrt{3}}{2}$

22. A rod of length L and Mass M is bent to form a semi-circular ring as shown in figure.

The moment of Inertia about xy is



(1) $\frac{ML^2}{2\pi^2}$ (2) $\frac{ML^2}{\pi^2}$

(3) $\frac{ML^2}{4\pi^2}$ (4) $\frac{2ML^2}{\pi^2}$

23. A body in projected up from surface of the earth with velocity $\left(\frac{3}{4}\right)^{\text{th}}$ of its escape velocity. If R be the radius of earth, the height it reaches is

(1) $\frac{3R}{10}$ (2) $\frac{9R}{7}$

(3) $\frac{8R}{5}$ (4) $\frac{9R}{5}$

24. A wire of length L and radius r rigidly fixed at one end. On stretching the other end of the wire with a force F, the increase in its length is l. If another wire of same material but of length $2L$ and radius $2r$ is stretched with a force $2F$, the increase in its length will be

(1) $\frac{l}{4}$ (2) l

(3) $\frac{l}{2}$ (4) $2l$

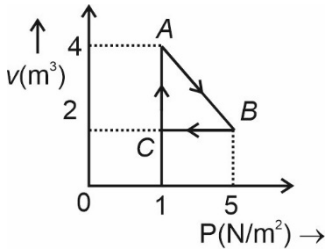
25. A block of wood floats in water with $\left(\frac{4}{5}\right)^{\text{th}}$ of its volume submerged. If the same block just floats in a liquid, the density of the liquid (in kg m^{-3}) is

(1) 1250 (2) 600

(3) 400 (4) 800

Space for Rough Work

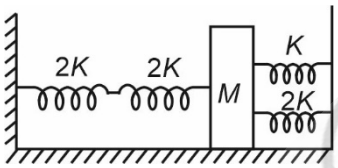
26. An ideal gas is taken through the cyclic process $A \to B \to C \to A$, as shown in fig. The work done by the gas in the process A → B → C → A is



(1) –2 J (2) –3 J

(3) –4 J (4) –5 J

27. Four massless springs whose force constants are 2*K*, 2*K*, *K* and 2*k* respectively are attached to mass *M* kept on a frictionless plane as shown in figure. If the mass *M* is displaced in the horizontal, then the frequency of the system is



(1) $\frac{1}{2\pi}\sqrt{\frac{K}{4M}}$ (2) $\frac{1}{2\pi}\sqrt{\frac{4K}{M}}$

(3) $\frac{1}{2\pi}\sqrt{\frac{K}{7M}}$ (4) $\frac{1}{2\pi}\sqrt{\frac{7K}{M}}$

28. When an observer moves towards a stationary source with velocity v_1, the apparent frequency of emitted note is F_1. When the observer moves away from the source with velocity v_1, the apparent frequency is F_2. If v is velocity of sound in air and $\frac{F_1}{F_2} = 2$ then $\frac{v}{v_1}$ will be equal to

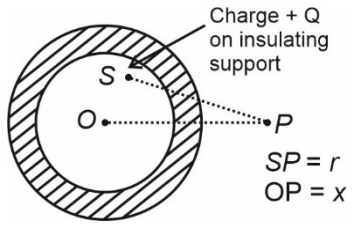
(1) 2

(2) 3

(3) 4

(4) 5

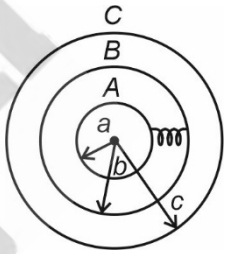
29. The adjacent diagram shows a charge + *Q* held on an insulating support *S* enclosed by a hollow spherical conductor. *O* represents the centre of the spherical conductor and *P* is a point such that *OP* = *x* and *SP* = *r*. The electric field at point *P* will be



(1) $\frac{Q}{4\pi\varepsilon_0 x^2}$ (2) $\frac{Q}{4\pi\varepsilon_0 r^2}$

(3) 0 (4) 1

30. Three conducting spheres *A*, *B* and *C* are as shown in figure. The radii of the spheres are *a*, *b* and *c* respectively *A* and *B* are connected by a conducting wire. The capacity of the system is



(1) $4\pi\varepsilon_0 (a + b + c)$ (2) $4\pi\varepsilon_0\left(\frac{bc}{c-b}\right)$

(3) $4\pi\varepsilon_0\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$ (4) $4\pi\varepsilon_0\left(\frac{abc}{ab+bc+ca}\right)$

31. A charge +*Q* is at a distance $\frac{L}{2}$ above the centre of a square plate having side *L*. Total flux linked with the square plate is

(1) $\frac{Q}{4\varepsilon_0}$ (2) $\frac{Q}{\varepsilon_0}$

(3) $\frac{Q}{6\varepsilon_0}$ (4) $\frac{4Q}{5\varepsilon_0}$

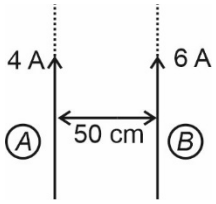
Space for Rough Work

32. A uniform potential gradient is established across a potentiometer wire. Two cells of emf E_1 and E_2 connected to support and oppose each other are balanced over l_1 = 180 cm and 60 cm respectively. Value of $\frac{E_1}{E_2}$ is

(1) $\frac{5}{3}$ (2) 2

(3) $\frac{8}{3}$ (4) $\frac{12}{7}$

33. Two long parallel straight wires *A* and *B* in which there are currents of 4 A and 6 A respectively in same direction are kept 50 cm apart. Magnetic field will be zero at a point



(1) 20 cm from wire A

(2) 20 cm from wire B

(3) 60 cm from wire A

(4) 30 cm from wire A

34. Susceptibility is positive and large for

(1) Paramagnetic substance

(2) Ferromagnetic substance

(3) Diamagnetic substance

(4) Non-magnetic substance

35. A transformer has an efficiency of 75%. It works at input of 6 kW and 100 V. If secondary voltage is 240 V, the current in secondary coil is

(1) 24.5 A

(2) 37.25 A

(3) 9.35 A

(4) 18.75 A

SECTION - B

36. In a moderately doped P-type semiconductor, the fermi energy level lies

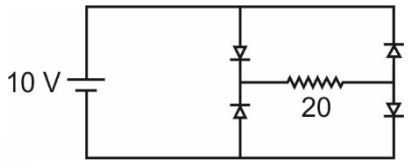
(1) In the forbidden energy gap nearer to the conduction band

(2) In the forbidden energy gap nearer to the valence band

(3) In the middle of forbidden energy gap

(4) Outside the forbidden energy gap

37. Four ideal diodes are connected as shown in circuit. The current through 20 Ω resistor will be



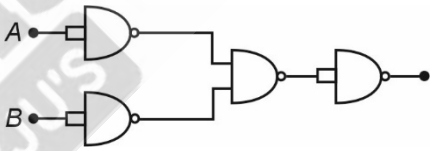
(1) 0.2 A

(2) 0.3 A

(3) 0.5 A

(4) Zero

38. The combination of the gate shown below produces



(1) AND gate

(2) NAND gate

(3) NOR gate

(4) OR gate

39. A ray of light passes normally through a slab ($\mu = 1.5$) of thickness 50 mm. If speed of light in vacuum be 3×10^8 m/s, then time taken by the ray to cross the slab will be

(1) 250 ps (2) 5 ps

(3) 250 ns (4) 5 ns

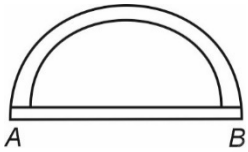
Space for Rough Work

40. The wavelength of light used in two young's double slit experiments are 400 nm and 500 nm. If the fringe width are equal when the screen are placed at 1.2 m and 1.6 m respectively. The ratio of the distance between the slits is

(1) $\frac{4}{5}$ (2) $\frac{3}{4}$

(3) $\frac{1}{2}$ (4) $\frac{3}{5}$

41. Two rods one is semi circular of thermal conductivity K_1 and other is straight of thermal conductivity K_2 and of same cross-sectional area are joined as shown in figure. The point A and B are maintained at same temperature difference. If rate of flow of heat is same in two rods, then $\frac{K_1}{K_2}$ is



(1) $\pi : 2$ (2) $2 : \pi$

(3) $1 : 2$ (4) $3 : 2$

42. The latent heat of vaporisation of water is more than latent heat of fusion of ice, because

(1) On vaporisation much larger increase in volume takes place

(2) Increase in kinetic energy is much smaller on boiling

(3) Kinetic energy decrease on boiling

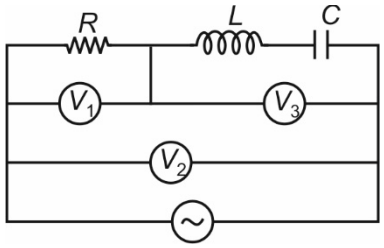
(4) Volume decreases when the ice melts

43. Among the following, the hydrogen spectral lines that lie in ultraviolet region of electromagnetic spectrum is

(1) Lyman series (2) Paschen series

(3) Brackett series (4) Pfund series

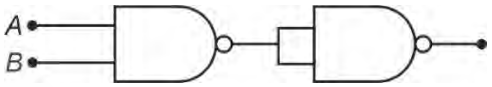
44. Which voltmeter will give non-zero reading at resonance?



(1) Only V_1 (2) Only V_2

(3) Both V_1 and V_3 (4) Both V_1 and V_2

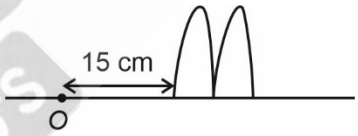
45. The output (X) of the logic circuit shown in figure will be



(1) $X = \overline{A + B}$ (2) $X = A\overline{B} + B\overline{A}$

(3) $X = \overline{A \cdot B}$ (4) $X = A \cdot B$

46. A thin lens which is cut into two equal halves are kept as shown in figure. Focal length of the original lens is 20 cm. An object is placed at a distance of 15 cm left from the system of lenses. Position of image formed by the combination is



(1) 13.33 cm on right side of system

(2) 30 cm on right side of system

(3) 13.33 cm on left side of system

(4) 30 cm on left side of system

47. If numerical aperture of a microscope is 0.12 and the wavelength of light used is 6000 Å, then the limit of resolution of the microscope will be nearly

(1) 3 mm

(2) 6 μm

(3) 3 μm

(4) 6 mm

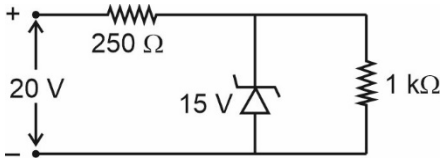
Space for Rough Work

48. After 300 days, the activity of a radioactive sample is 5000 dps. The activity becomes 2500 dps after another 150 days. The initial activity of the sample was

(1) 7,500 dps (2) 40,000 dps

(3) 20,000 dps (4) 10, 000 dps

49. A Zener diode, having breakdown voltage equal to 15 V, is used in a voltage regulator circuit as shown in the figure. The current through the diode is



(1) 15 mA (2) 5 mA

(3) 20 mA (4) 1 mA

50. Guddu and his brother Bablu race up a hill. Guddu weight twice as much as Bablu and takes twice as long as Bablu to reach the top of the hill. Compared to Bablu

(1) Guddu did more work and delivered more power

(2) Guddu did more work but delivered the same amount of power

(3) Guddu did more work and delivered less power

(4) Guddu did less work but delivered more power

CHEMISTRY

SECTION - A

51. A hypothetical metal has a bcc structure. The edge length of a unit cell of metal is 300 pm. Its density will be nearly (Given: Molar mass = 81 g mol^{-1}, $N_A = 6 \times 10^{23}$ mol^{-1})

(1) 8 g cm^{-3} (2) 10 g cm^{-3}

(3) 3 g cm^{-3} (4) 15 g cm^{-3}

52. An ideal mixture of benzene and toluene is prepared with 2 moles each at a fixed temperature T kelvin. The percentage of toluene in the vapour phase will be (Given, vapour pressure of benzene and toluene is 12 kPa and 4 kPa respectively at T kelvin)

(1) 25% (2) 30%

(3) 70% (4) 75%

53. The rate constant k of a reaction is given as $k = 10^{15}\, e^{-2000/T}$. Activation energy of this reaction is

(1) $\frac{2000}{2.303R}$ (2) 10^{15}

(3) 2000R (4) $\frac{2000}{2.303}R$

54. Ni is refined by

(1) Mond process (2) Van Arkel method

(3) Distillation (4) Liquation

55. Which complex ion has central atom with d^2sp^3 hybridization?

(1) $\left[Fe(H_2O)_6\right]^{3+}$ (2) $\left[Mn(H_2O)_6\right]^{2+}$

(3) $\left[Fe(CN)_6\right]^{3-}$ (4) $\left[Zn(NH_3)_5Cl\right]^{+}$

56. Optical isomerism can be shown by

(1) $[Fe(H_2O)_5Cl]Cl_2$

(2) $[Co(en)_2Cl_2]Br$

(3) $K[Co(en)Cl_4]$

(4) $[Co(NH_3)_4Cl_2]Cl$

57. Which among the following element has highest first ionization energy?

(1) Fe (2) Co

(3) Ni (4) Zn

Space for Rough Work

58. Halogen molecule having highest bond energy is
(1) F_2 (2) Cl_2
(3) Br_2 (4) I_2

59. 1 L of CH_4 gas at STP weighs nearly
(1) 1.42 g (2) 2.24 g
(3) 0.71 g (4) 1.12 g

60. Ratio of energy of first and second Bohr orbits of He^+ ion is
(1) 1 : 4 (2) 1 : 2
(3) 2 : 1 (4) 4 : 1

61. Total number of orbitals in fourth energy level of an atom is
(1) 4 (2) 16
(3) 9 (4) 32

62. Ratio of average molar kinetic energies of CH_4 and SO_2 at same temperature is
(1) 1 : 4 (2) 1 : 2
(3) 1 : 1 (4) 4 : 1

63. Polar molecule is
(1) PCl_5 (2) XeF_4
(3) NH_3 (4) $BeCl_2$

64. Select an option with incorrect match of given molecule/ion and its shape.
(1) SO_3 ; Trigonal planar
(2) BCl_3 ; Pyramidal
(3) I_3^- ; Linear
(4) NF_3 ; Pyramidal

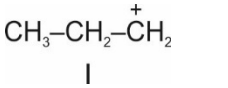
65. Oxidation state of P in Na_2HPO_3 is
(1) +3 (2) +1
(3) +5 (4) +4

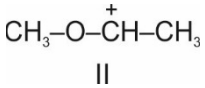
66. 33.6 volume H_2O_2 solution has its strength
(1) 3%
(2) 5.1%
(3) 10.2%
(4) 11.2%

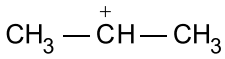
67. Number of B – O – B bonds in borax molecule is
(1) 5 (2) 4
(3) 3 (4) 2

68. Strongest +I effect is shown by
(1) $-CH_3$ (2) $-OH$
(3) $-O^-$ (4) $-CO_2^-$

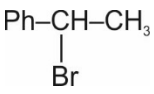
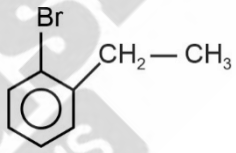
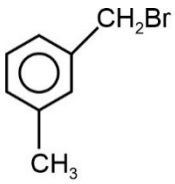
69. Correct order of stability of following carbocations is


I


II


III

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

70. Which one is most reactive towards S_N1 reaction?
(1) $Ph–CH_2–CH_2–Br$ (2) 
(3) 
(4) 

71. Glucose $\xrightarrow{Br_2 \text{ water}}$ P,
Product (P) formed is
(1) Hexanoic acid (2) Gluconic acid
(3) Saccharic acid (4) n-Hexane

72. Water soluble vitamin is
(1) Vitamin - A (2) Vitamin - D
(3) Vitamin - K (4) Vitamin - B

73. Tetrafluoroethene is the monomer of
(1) Teflon (2) Nylon - 6, 6
(3) Nylon - 6 (4) Dacron

Space for Rough Work

74. Total charge required to reduce 1 mole of MnO_4^- to Mn^{+2} ions is
(1) 5 F
(2) 3 F
(3) 2 F
(4) 4 F

75. For a reaction 2A + B $\rightarrow$ product, rate law is given as $r = K[A]^{\frac{1}{2}}[B]^1$. What will be the order of reaction if B is taken in excess?
(1) 1
(2) $\frac{1}{2}$
(3) $\frac{3}{2}$
(4) Zero

76. If equivalent mass of a metal 'M' is 12, molar mass (in g) of its sulphate MSO_4 would be
(1) 60
(2) 120
(3) 72
(4) 96

77. Temperature at which real gases obey ideal gas laws over an appreciable range of pressure is called
(1) Boyle's temperature
(2) Critical temperature
(3) Standard temperature
(4) Inversion temperature

78. pH of mixture of 500 ml 0.1 M CH_3COOH and 250 ml 0.1 M NaOH solution is (given pK_a of acetic acid is 4.74)
(1) 5.74
(2) 5.04
(3) 4.74
(4) 11.74

79. Match list-I with list-II and identify the correct match.

	List-I (Metal)		List-II Maximum prescribed limit in drinking water (in ppm)
a.	Mn	(i)	0.2
b.	Zn	(ii)	0.05
c.	Al	(iii)	5
d.	Cu	(iv)	3

(1) a(iii), b(ii), c(iv), d(i)
(2) a(ii), b(iii), c(i), d(iv)
(3) a(ii), b(iii), c(iv), d(i)
(4) a(iii), b(ii), c(i), d(iv)

80. Boron shows diagonal relationship with
(1) Lithium (2) Aluminium
(3) Silicon (4) Sodium

81. Molar solubility of AgCl at 25°C is 1×10^{-5} mol/L. Its solubility in 0.05 M NaCl solution is
(1) 10^{-5} M (2) 2×10^{-5} M
(3) 2×10^{-9} M (4) 2×10^{-3} M

82. Common ion effect is not observed in which of the following mixtures?
(1) $CH_3COOH + CH_3COONa$
(2) HCN + NaCN
(3) $NH_4OH + NH_4Cl$
(4) HCl + NaCl

83. In the following balanced equation,

$$aZn + bNO_3^- \xrightarrow[\text{medium}]{\text{Basic}} cZn^{2+} + dNH_4^+$$

ratio of b to c is
(1) 1 : 4 (2) 1 : 1
(3) 4 : 7 (4) 1 : 10

Space for Rough Work

84. Ortho and para hydrogen differ in

(1) Electron spin

(2) Nuclear spin

(3) Molar mass

(4) Density

85. Most soluble hydroxide in water is

(1) $Mg(OH)_2$

(2) $Ca(OH)_2$

(3) $Ba(OH)_2$

(4) $Sr(OH)_2$

SECTION - B

86. Select the correct match regarding composition of Portland cement.

(1) $CaO \rightarrow$ 10 to 20%

(2) $SiO_2 \rightarrow$ 20 to 25%

(3) $Al_2O_3 \rightarrow$ 30 to 40%

(4) $Fe_2O_3 \rightarrow$ 10 to 20%

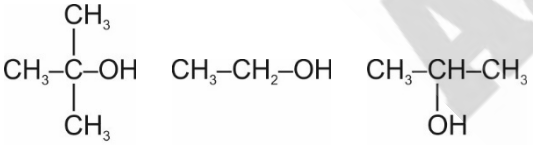
87. 0.5 g of an organic substance was kjeldahlised and the ammonia released was neutralised by 100 ml 0.1 M HCl. Percentage of nitrogen in the compound is

(1) 14 %

(2) 42 %

(3) 28 %

(4) 72 %

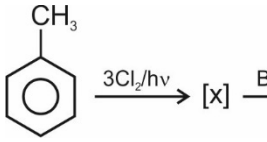
88. 

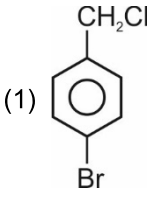
(1) (2) (3)

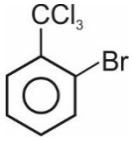
Order of ease of dehydration of above alcohols in acidic medium is

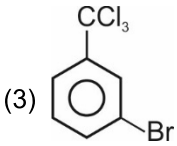
(1) 1 > 2 > 3 (2) 2 > 3 > 1

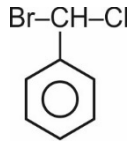
(3) 1 > 3 > 2 (4) 3 > 1 > 2

89.  [x] [y], compound (y) is

(1) 

(2) 

(3) 

(4) 

90. Given below are two statements.

Statement-I: Ethyne is more acidic than ethene.

Statement-II: Ethyne liberates hydrogen gas on reaction with sodium.

In the light of above statements, choose the most appropriate answer from option given below

(1) Statement-I is correct but statement-II is incorrect

(2) Statement-I is incorrect but statement-II is correct

(3) Both statements-I and statement-II are correct

(4) Both statement-I and statement-II are incorrect

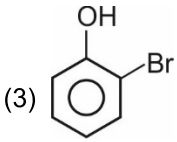
91. Strongest nucleophile among the following is

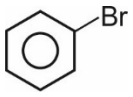
(1) CH_3^- (2) NH_2^-

(3) OH^- (4) F^-

92. In the reaction Ph – MgBr + Ph – OH $\rightarrow$ Major product formed is

(1) Ph – O – Ph (2) 

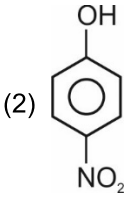
(3) 

(4) 

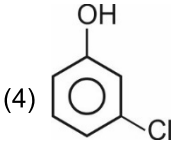
Space for Rough Work

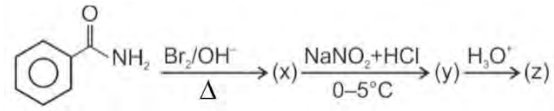
93. Most acidic compound among the following is

(1) 

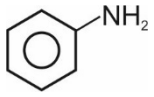
(2) 

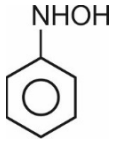
(3) 

(4) 

94. 

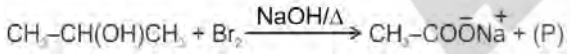
Compound (z) is

(1) 

(2) 

(3) 

(4) 

95. 

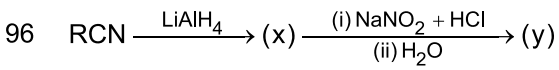
Product (P) is

(1) $CHBr_3$

(2) CH_3–Br

(3) CH_4

(4) CH_3–CH_3

96 

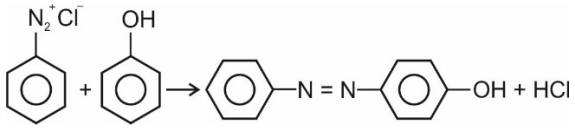
compound (y) may be

(1) An aldehyde

(2) A ketone

(3) An alcohol

(4) An ether

97. 

Suitable pH range maintained in the above reaction to get a better yield is

(1) 2 – 5

(2) 5 – 6

(3) 9 – 10

(4) 12 – 14

98. Molar conductivities $\left(\Lambda_m^\circ\right)$ at infinite dilution of NaCl, HCl and CH_3COONa are x, y and z respectively, Λ_m° for CH_3COOH will be

(1) x + y + z

(2) x + y – z

(3) y + z – x

(4) z + x – y

99. E° values for Li^+/Li, Pb^{+2}/Pb, Cu^{+2}/Cu and Sn^{2+}/Sn are –3.05 V, –0.13 V, +0.34 V and –0.14 V respectively. Least reducing power is of

(1) Li (2) Pb

(3) Sn (4) Cu

100. Which statement regarding chemisorption is not correct?

(1) Enthalpy of adsorption is high

(2) High activation energy is sometimes needed

(3) Reversible in nature

(4) Results into unimolecular layer

Space for Rough Work

BOTANY

SECTION - A

101. *Nitrosomonas* and *Nitrobacter*

a. Are autotrophs

b. Have chlorophyll

c. Use solar energy for synthesis of food

The **correct** one(s) is/are

(1) Only a (2) Only a and c

(3) Only b and c (4) All a, b and c

102. Select the **incorrect** match.

(1) Prophase I – Condensation of chromatin material

(2) Metaphase I – Formation of double metaphasic plate

(3) Anaphase I – Splitting of centromere

(4) Telophase I – Reappearance of nuclear membrane

103. Centriole duplication occurs in

(1) G_1 phase (2) S phase

(3) G_2 phase (4) M phase

104. Match the following columns and select the **correct** option.

	Column I		**Column II**
a.	Herbarium	(i)	Information of any one taxon
b.	Botanical garden	(ii)	Analytical in nature
c.	Monograph	(iii)	Quick source of reference
d.	Key	(iv)	*Ex situ* conservation strategy

(1) a(iv), b(iii), c(i), d(ii) (2) a(ii), b(iv), c(iii), d(i)

(3) a(iii), b(iv), c(i), d(ii) (4) a(iii), b(iv), c(ii), d(i)

105. Life cycle of *Fucus* and *Polysiphonia* respectively are

(1) Haplontic and Haplo-diplontic

(2) Diplontic and Haplo-diplontic

(3) Haplo-diplontic and Diplontic

(4) Haplo-diplontic and Haplontic

106. Which of the following statements is **not** correct w.r.t. life span?

(1) It is a specific trait of each species

(2) Crow has longer life span than parrot

(3) Life span are not necessarily correlated with size or complexity of organisms

(4) It is the period from birth to the natural death

107. In cymose inflorescence

(1) Peduncle has unlimited growth

(2) The main axis terminates into a flower

(3) The flowers are borne in acropetal order

(4) Younger flowers are present towards the apex

108. Pollination by water is **not** seen in

(1) *Hydrilla* (2) *Zostera*

(3) *Vallisneria* (4) Water hyacinth

109. Read the following statements and choose the **correct** option.

Statement-A: ABA inhibits gibberellin mediated amylase formation during germination of cereal grains.

Statement-B: Gibberellins can delay the ripening of fruits.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both statements A and B are correct

(4) Both statements A and B are incorrect

Space for Rough Work

110. Non-motile asexual spore formed in members of phycomycetes are called
(1) Zygospores (2) Zoospores
(3) Conidia (4) Aplanospores

111. Interflowering period is **not** seen in
(1) Orange (2) Radish
(3) Apple (4) Jackfruit

112. The thallus is dorsiventral and closely appressed to the substrate in
(1) *Polytrichum* (2) *Marchantia*
(3) *Sphagnum* (4) *Funaria*

113. Which of the following phytohormones is derived from terpenes?
(1) Gibberellic acid (2) Ethylene
(3) Indole-3-acetic acid (4) Cytokinin

114. Read the following statements.
(a) Single membrane bound minute vesicles
(b) Present in both plant and animal cells
(c) Contains various enzymes
Select the cell-organelle with above characteristics.
(1) Ribosomes (2) Centrosome
(3) Inclusion bodies (4) Microbodies

115. In grassland ecosystem, which of the pyramids are upright?
a. Pyramid of energy
b. Pyramid of number
c. Pyramid of biomass
(1) Only a (2) Only a and b
(3) Only c (4) All a, b and c

116. Which of the following component of phloem is absent in most of the monocots?
(1) Phloem parenchyma (2) Sieve tubes
(3) Companion cells (4) Phloem fibres

117. A man whose mother was colourblind marries a normal woman who had colourblind father then what percentage of their daughter would be colourblind?
(1) 25% (2) 75%
(3) 50% (4) 100%

118. Atlas 66
(1) Is a variety of wheat
(2) Is fortified with fats
(3) Is produced for resistance against hill bunt
(4) Is produced by mutation breeding

119. Leaves are modified to form tendrils for climbing in
(1) Pea (2) Pumpkin
(3) Watermelon (4) Cucumber

120. Plants which show Kranz anatomy
(1) Have PEPcase only in bundle sheath cells
(2) Show Calvin cycle in mesophyll cells
(3) Show double carboxylation
(4) Show photorespiration

121. Read the following statements and state true **(T)** and false **(F)** and select the **correct** option.
A. Ferredoxin is the most direct source of electrons for nitrite reduction.
B. Nitrite reductase does not contain copper and iron.
C. Nodules of soyabean export the fixed nitrogen as a form of degraded urea.

	A	B	C
(1)	F	T	T
(2)	T	F	T
(3)	F	T	F
(4)	F	F	F

Space for Rough Work

122. Which of the following options represent the cell organelle present in both prokaryotes and eukaryotes?
(1) Ribosome (2) Nucleoid
(3) Chromatophore (4) Mesosome

123. Solute potential of a solution is
(1) Equal to ψ_w of pure water
(2) Any positive value
(3) Negative
(4) Zero

124. If a bacterium whose doubling time is 30 mins, first allow to grow in a medium containing $^{14}NH_4Cl$ for many generations and then transferred to medium with heavy nitrogen, what will be the proportion of light, hybrid and heavy DNA after 90 mins of transfer?
(1) 0%, 25%, 75% (2) 0%, 50%, 50%
(3) 25%, 25%, 50% (4) 75%, 25%, 0%

125. Cyclosporin A is a/an
(1) Blood cholesterol lowering agent
(2) Clot buster
(3) Immunosuppressive agent
(4) Protease used for detergent formulation

126. In an interaction between two species, one species is harmed and other species remains unaffected. This relationship can be indicated by
(1) Commensalism
(2) Amensalism
(3) Parasitism
(4) Predation

127. In C_4 pathway, the primary acceptor of CO_2 is
(1) A 5C compound
(2) RuBP
(3) First stable product of Hatch and slack cycle
(4) PEP

128. Biodiversity increases from
(1) Equator to poles
(2) Poles to equator
(3) Low latitude to high latitude
(4) Low altitude to high altitude

129. Who proposed the chromosomal theory of inheritance?
(1) Morgan (2) Henking
(3) Sutton and Boveri (4) Alfred Sturtevant

130. Read the following statements,
(a) They form an aggregation, which may grow and spread over several feet, under favourable conditions.
(b) They have spores with true walls.
(c) They have heterotrophic mode of nutrition.
Identify the **correct** group based on the above characteristics.
(1) Protozoans (2) Dinoflagellates
(3) Slime moulds (4) Euglenoids

131. When genes were grouped on the same chromosome, some genes were very __A__ and show very low recombination, while others were __B__ and show higher recombination. Select the **correct** option for A and B.

	A		B
(1)	Loosely linked	,	tightly linked
(2)	Tightly linked	,	loosely linked
(3)	Tightly linked	,	completely linked
(4)	Completely linked	,	tightly linked

132. If in a dsDNA 'T' content is 30%, then what is the content of A and C, respectively?
(1) 30% and 40%
(2) 30% and 20%
(3) 20% and 30%
(4) 40% and 20%

Space for Rough Work

133. Read the following statements and choose the **incorrect** ones w.r.t. auto fuel policy in India.

(a) Stringent norms for steadily reducing the sulphur and aromatic content in petrol and diesel fuels was introduced.

(b) Euro III norms stipulate that sulphur be controlled at 150 ppm in diesel fuels

(c) Vehicle engines are not required to be upgraded.

(1) a and c only (2) All a, b and c

(3) b and c only (4) a only

134. Read the following assertion (A) and reason (R) and choose the **correct** option.

Assertion (A): In the transcription process, both the DNA strands are not copied to RNA.

Reason (R): One segment of the DNA would be coding for two different proteins.

(1) Both (A) and (R) are true and the (R) is the correct explanation of (A)

(2) (A) is true but (R) is false

(3) Both (A) and (R) are true but the (R) is not the correct explanation of (A)

(4) Both (A) and (R) are false

135. Museums have

(1) Collections of preserved plants only

(2) Collections of the living plants and animals

(3) Collections of insects preserved after killing and pinning

(4) Collections of skeleton only

SECTION - B

136. Dicot stem and monocot stem **cannot** be differentiated on the basis of presence of

(1) Pith

(2) Endodermis

(3) Endarch xylem

(4) Scattered vascular bundles

137. Read the following statements and choose the **correct** set of statement(s) w.r.t. ovule of angiosperms.

a. Megasporangia are commonly called as ovule

b. Hilum is the region where body of the ovule fuses with funicle.

c. Each ovule has no or one nutritive envelope

d. Chalaza represents the basal part of ovule

(1) a and b only (2) a and d only

(3) b and c only (4) a, b and d only

138. In active absorption of water

(1) A negative pressure is developed in xylem

(2) OP and energy play the major role

(3) Rate of absorption is high

(4) Movement of water is apoplastic

139. Select the plant that has monadelphous stamens.

(1) Pea (2) China rose

(3) Mustard (4) *Sesbania*

140. Which of the following process(es) take(s) place in matrix of mitochondria?

a. Formation of acetyl CoA

b. Citric acid cycle

c. Lactic acid fermentation

(1) Only a (2) Only c

(3) Only b and c (4) Only a and b

141. Read the following statements and select the **correct** option.

Statement-A: Treatment of waste water is done by heterotrophic microbes naturally present in sewage.

Statement-B: Activated sludge contains sedimented flocs.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both statements A and B are correct

(4) Both statements A and B are incorrect

Space for Rough Work

142. The organisms which are considered as key industry animals can be represented by
(1) Deer (2) Insectivorous birds
(3) Snake (4) Falcon

143. Regulation of *lac* operon by repressor is referred to as
(1) Positive regulation
(2) Negative regulation
(3) Repressible regulation
(4) Post- transcriptional regulation

144. State true **(T)** or false **(F)** for the given statements and select the **correct** option.
A. *Euglena* shows only photoautotrophic mode of nutrition.
B. *Anabaena* cause algal blooms in water bodies.
C. *E.coli* is also called as "bacteria with their coats off."

	A	B	C
(1)	T	T	F
(2)	F	T	F
(3)	F	T	T
(4)	F	F	T

145. Find the **odd** one out w.r.t. brown algae.
(1) *Ectocarpus* (2) *Dictyota*
(3) *Gracilaria* (4) *Laminaria*

146. Match the column I with column II and choose the **correct** option w.r.t biodiversity in the tropical Amazonian rain forest.

	Column I		Column II
a.	Reptiles	(i)	More than 40,000 species
b.	Plants	(ii)	3,000 species
c.	Fishes	(iii)	1,300 species
d.	Birds	(iv)	378 species

(1) a(iv), b(i), c(ii), d(iii)
(2) a(iv), b(i), c(iii), d(ii)
(3) a(iii), b(i), c(ii), d(iv)
(4) a(ii), b(i), c(iii), d(iv)

147. Which one of the following pair is **mismatched**?
(1) Migration - Siberian birds
(2) Diapause - Suspended development in phytoplanktons
(3) Hibernation - Winter sleep in bears
(4) Sun-basking - Behavioural adaptation in desert lizards

148. A fine powder of recycled modified plastic is
(1) Bitumen (2) Polyblend
(3) Plastic sacks (4) Incinerator

149. Read the given statements w.r.t *Drosophila melanogaster* as an experimental model to study genetics, and choose the **incorrect** ones.
(a) A single mating produces few numbers of offspring.
(b) It shows many types of hereditary variations.
(c) It has a short life span about two days.
(d) It has four morphologically distinct chromosomes.
(1) a and b only (2) a, c and d only
(3) c and d only (4) a and c only

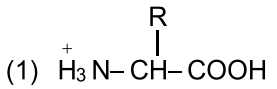
150. Who first explained that new cells are formed from pre-existing cells?
(1) Rudolf Virchow
(2) Matthias Schleiden
(3) Robert Brown
(4) Theodore Schwann

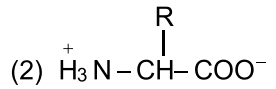
Space for Rough Work

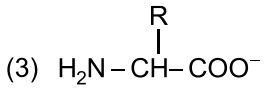
ZOOLOGY

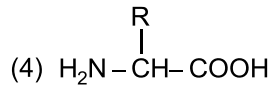
SECTION - A

151. Which of the following is a zwitterionic form?

(1) 

(2) 

(3) 

(4) 

152. Which of the following features is **not** present in *Rana*?

(1) Can live in aquatic as well as in terrestrial habitat.

(2) Body is covered by dry and cornified skin.

(3) The eyes have eyelids.

(4) Cold-blooded animals.

153. Opening of the wind pipe in pharynx through the larynx is known as

(1) Epiglottis

(2) Primary bronchus

(3) Glottis

(4) Trachea

154. **Assertion (A):** Cardiac output is a variable quantity.

Reason (R): The stroke volume depends upon the strength of ventricular systole.

In the light of above statements choose the **correct** answer from the options given below.

(1) Both (A) and (R) are correct, (R) being correct explanation of (A)

(2) Both (A) and (R) are correct, (R) being incorrect explanation of (A)

(3) Only (A) is correct, (R) is incorrect

(4) Both (A) and (R) are incorrect

155. Which of the following structures does not contain cartilage?

(1) Limbs and hands in adults

(2) Between two adjacent vertebrae of vertebral column

(3) Cranial bones of skull

(4) In embryos of vertebrate

156. The first pair of wings in *Periplaneta americana* arises from

(1) Metathorax

(2) Mesothorax

(3) Prothorax

(4) Neck

157. The unsegmented body of molluscs can be distinguished into

(1) Head, thorax and abdomen

(2) Head, muscular foot and visceral hump

(3) Head and trunk

(4) Proboscis, collar and trunk

158. Choose the **incorrect** match w.r.t. a normal human.

(1)	Glomerular filtrate formed	-	180 litres/day
(2)	Urine output	-	1.5 litres/day
(3)	GFR	-	235 mL/minute
(4)	Amount of CO_2 removed by lungs	-	200 mL/minute

159. Substances like sterols, hydrocarbons and waxes are removed from the body through

(1) Expired air (2) Sweat

(3) Sebum (4) Saliva

Space for Rough Work

160. Clavicle bone of human articulates with A process. Below the acromion is a depression called the B which articulates with the head of the humerus.

Identify A and B by choosing the **correct** option.

	A	B
(1)	Spine	Radius
(2)	Scapular	Ulna
(3)	Acromion	Glenoid cavity
(4)	1st Rib	Socket of vertebra

161. The cerebral cortex contains large regions that are neither clearly sensory nor motor in function. These regions are called
(1) Sensory areas only
(2) Only neurosecretory areas
(3) Motor areas only
(4) Association areas

162. How many of the functions given in the box below are mediated by the secretion of pineal gland?

Diurnal rhythm, pigmentation, defence capacity, body temperature, metabolism

Choose the **correct** option.
(1) Four (2) Three
(3) Five (4) One

163. Receptors of glucagon hormone are present mainly on
(1) Liver cells (2) RBCs
(3) Bone (4) Spleen

164. Which one of the following is not a parameter of senescence?
(1) End of reproductive phase
(2) Attainment of maturity
(3) Slowing of the metabolic rate
(4) Menopause

165. Urethra from urinary bladder extends through the penis to its external opening that is called
(1) Ureter (2) Prepuce
(3) Foreskin (4) Urethral meatus

166. The structural difference between tertiary *follicle* and Graafian follicle could be the presence of _____ in Graafian follicle.

Choose the option to fill the blank correctly.
(1) Follicular cavity
(2) Zona *pellucida*
(3) Theca layer
(4) Primary oocyte

167. Which of the following is not an indicative of improved reproductive health of a society?
(1) Decreased per capita income of society
(2) Better detection and cure of STI
(3) Increase in medically assisted deliveries
(4) Better awareness about sex related issues

168. According to the census 2011, the world population was
(1) 2 billion (2) 6 billion
(3) 7.2 billion (4) 1.2 billion

169. If more than one adaptive radiations appeared to have occurred in an isolated geographical area, one can call this
(1) Disruptive selection
(2) Genetic drift
(3) Co-evolution
(4) Convergent evolution

170. Term saltation was coined by de Vries, means
(1) Darwinian variation
(2) Multiple step point mutation
(3) Random and directional change
(4) Single step large mutation

Space for Rough Work

171. "Excess use of herbicides in selection of resistant varieties in much lesser time scale."

What do you infer from the above statement?

(1) Mutation and co-evolution

(2) Artificial selection

(3) Anthropogenic actions

(4) Adaptive convergence

172. Monomeric antibody molecule can be represented as

(1) H_1L_2 (2) H_2L_2

(3) H_2L_1 (4) H_1L_1

173. In a plasmid, specific region of DNA responsible for initiating replication is

(1) Antibiotic resistance site

(2) Recognition site

(3) '*ori*' gene

(4) Recombinant site

174. The coiled portion of Labyrinth is called

(1) Cochlea

(2) Oval window

(3) Vestibular apparatus

(4) Otolith

175. Early Greek thinkers thought that the unit of life is

(1) Spore (2) Cell

(3) Individual (4) Population

176. Read statements w.r.t. gestation in a human female and choose the **correct** option.

Statement A: During 5th month of gestation, foetus starts to move within uterus.

Statement B: Foetal ejection reflex triggers release of oxytocin from foetal pituitary gland to induce labor pain.

(1) Both statements A and B are correct.

(2) Both statements A and B are incorrect.

(3) Statement A is correct and B is incorrect.

(4) Statement A is incorrect and B is correct.

177. When the heart muscle is suddenly damaged by inadequate blood supply, it is called

(1) Heart block

(2) Heart failure

(3) Cardiac arrest

(4) Myocardial infraction

178. Select the mismatch w.r.t. Theories of evolution.

(1) Charles Darwin – Branching descent and theory of natural selection

(2) Lamarck – Theory of use and disuse of organs

(3) Hugo de Vries – Mutation theory

(4) A.R Wallace – Theory of Panspermia

179. Which of the following is **not** a contraceptive function of IUDs?

(1) Stop the release of sperm in vagina

(2) Increase phagocytosis of sperms

(3) Suppress the sperm motility

(4) Suppress the fertilising capacity of sperms

180. Match column **A** with column **B** and select the option containing all **correct** matches.

	Column-A		**Column-B**
(i)	B-lymphocytes	a.	Primary immune response
(ii)	T-lymphocytes	b.	Colostrum
(iii)	IgM	c.	Humoral immunity
(iv)	IgA	d.	Cell mediated immunity

(1) (i) – a, (ii) – b, (iii) – c, (iv) – d

(2) (i) – d, (ii) – c, (iii) – b, (iv) – a

(3) (i) – c, (ii) – d, (iii) – b, (iv) – a

(4) (i) – c, (ii) – d, (iii) – a, (iv) – b

Space for Rough Work

181. The process by which organisms with common ancestry and same evolutionary history evolve different phenotypic adaptations in response to different environmental challenges is called
(1) Convergent evolution
(2) Divergent evolution
(3) Adaptive convergence
(4) Saltation

182. Choose the **correct** match w.r.t plants and drugs obtained from them.
(1) *Papaver somniferum* – Opioids
(2) *Erythroxylum coca* – Atropine
(3) *Atropa belladona* – Marijuana
(4) *Cannabis sativa* – Crack

183. Select the **incorrect** statement w.r.t *Homo habilis.*
(1) They were the first human like being, the hominid.
(2) The brain capacities were between 650 – 800cc.
(3) They probably did not eat meat.
(4) They used hides to protect their body and buried their dead.

184. The key tools used in construction of recombinant DNA are
(1) Exonucleases only
(2) Restriction endonucleases and ligases
(3) Restriction endonucleases only
(4) DNA polymerase only

185. In a patient, the parietal cells of gastric mucosa are damaged. Which of the following is **not** likely to occur?
(1) Iron deficiency anaemia
(2) Vitamin B_{12} deficiency
(3) Chances of peptic ulcer
(4) Impaired protein digestion in stomach

SECTION - B

186. Which of the following is **wrong** for Bt toxin?
(1) Crystals of Bt toxin produced by some bacteria kill the bacteria themselves.
(2) *cryIAb* is effective against corn borer.
(3) Bt toxin is protein that exists as inactive protoxins.
(4) *cryIAc* is effective against cotton bollworms.

187. Read the following statements carefully and choose the **correct** option.

Statement A : Zygote is the vital link that ensures continuity of species between organisms of one generation to the next generation.

Statement B : For normal fertility in humans, at least 40% of total sperms in each ejaculate must have normal shape and size and at least 60% of them must show vigorous motility.
(1) Both statements A and B are correct
(2) Both statements A and B are incorrect
(3) Only statement A is correct
(4) Only statement B is correct

188. Study the following statements and select the **incorrect** option.
(1) The substrate binds to the active site of an enzyme.
(2) A triglyceride molecule is made up of one glycerol and three fatty acid molecules.
(3) The active site of enzyme breaks the chemical bonds of substrate.
(4) Co-enzymes are tightly bound to the apoenzyme.

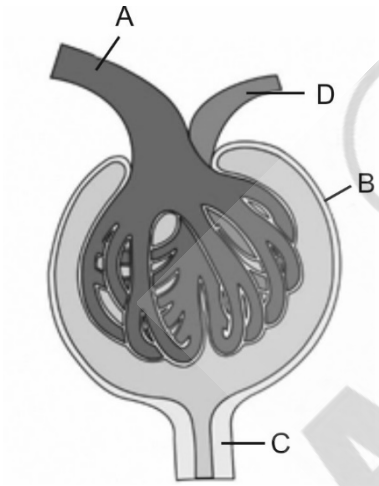
189. In which of the following phylum all the animals are exclusively marine?
(1) Chordata
(2) Mollusca
(3) Porifera
(4) Ctenophora

Space for Rough Work

190. Dissociation of CO_2 from carbamino-haemoglobin takes place due to which of the following factors?
(1) pCO_2 is high and pO_2 is low
(2) pCO_2 is high and pO_2 is high
(3) pCO_2 is low and pO_2 is high
(4) pCO_2 is high and pO_2 is normal

191. Select the **incorrect** statement among the following.
(1) Brain stem does not include hypothalamus.
(2) Breathing centre is not located in medulla oblongata.
(3) Cerebral cortex has motor areas to regulate movement of voluntary muscles.
(4) Cerebral aqueduct occurs as a narrow passage in midbrain.

192. In the below given figure of Malpighian body, identify A, B, C and D.



Choose option which **correctly** represent A, B, C and D.

	A	B	C	D
(1)	Afferent arteriole	Efferent arteriole	Bowman's capsule	PCT
(2)	Afferent arteriole	Bowman's capsule	PCT	Efferent arteriole
(3)	J.G cells	Renal capsule	Ciliated cuboidal epithelium	Efferent arteriole
(4)	Afferent arteriole	Malpighian body	Loop of Henle	Efferent arteriole

193. Aquatic animals are mostly ammonotelic because
(1) Ammonia helps in checking inflow of water into body.
(2) Excretion of ammonia requires large amount of water which is available to these animals.
(3) Water contains less nitrogen.
(4) They all have protonephric kidney.

194. Read the following statements carefully and select the **incorrect** option.
(1) Schwann cells are microglia in CNS which are responsible for the formation of myelin sheath.
(2) In neural system, action potential is in fact termed as a nerve impulse
(3) Electrical synapses are rare in our system.
(4) Neurilemma is present around both myelinated and unmyelinated nerve fibres in PNS.

195. Eustachian tube connects the
(1) Middle ear cavity with the larynx
(2) External ear cavity with the pharynx
(3) Middle ear cavity with the pharynx
(4) Inner ear cavity with the oval window

196. Choose **mismatch** w.r.t hormones and diseases related with them.
(1) Growth hormone – Exopthalmic goitre
(2) Parathormone – Tetany
(3) Thyroxine – Graves' disease
(4) Vasopressin – Diabetes insipidus

Space for Rough Work

197. Read the following statements carefully.

Statement-A: Age related disorder characterised by decreased bone mass and increased chances of fracture.

Statement-B: Its causative factors include deficiency of calcium, imbalance of hormones like calcitonin, PTH and sex steroids.

These above statements are associated with which disease?

(1) Gout (2) Osteoporosis

(3) Arthritis (4) Muscular dystrophy

198. The juxta glomerular cells of kidney produce a peptide hormone called

(1) Secretin (2) Erythropoietin

(3) Cholecystokinin (4) Gastrin

199. Choose the **incorrect** statement.

(1) Cutaneous respiration is found in earthworm and frog.

(2) Both insects and birds have wings for flight and crop for storage and digestion of food.

(3) Polyp and medusa forms are exhibited by *Hydra*.

(4) The adult echinoderms are radially symmetrical.

200. Who among the following exhibits oviparity?

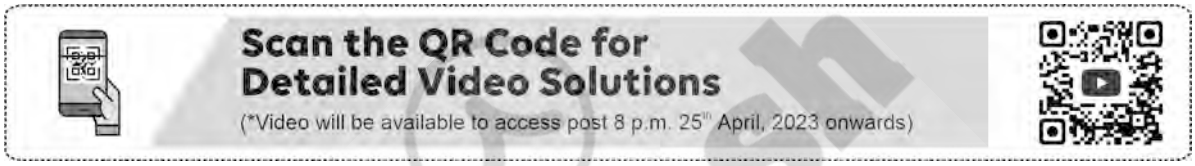
(1) *Neophron*

(2) *Canis*

(3) *Camelus*

(4) *Elephas*

❑ ❑ ❑



Aakash BYJU'S

Space for Rough Work

25/04/2023

Phase-1
CODE-B

Corporate Office: Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

FINAL TEST SERIES for NEET-2023

MM : 720 **Test-II** **Time : 3 Hrs. 20 Mins.**

Answers

1. (3)	41. (1)	81. (3)	121. (2)	161. (4)
2. (2)	42. (1)	82. (4)	122. (1)	162. (3)
3. (2)	43. (1)	83. (1)	123. (3)	163. (1)
4. (3)	44. (4)	84. (2)	124. (1)	164. (2)
5. (4)	45. (4)	85. (3)	125. (3)	165. (4)
6. (3)	46. (2)	86. (2)	126. (2)	166. (2)
7. (1)	47. (3)	87. (3)	127. (4)	167. (1)
8. (1)	48. (3)	88. (3)	128. (2)	168. (3)
9. (4)	49. (2)	89. (3)	129. (3)	169. (4)
10. (2)	50. (2)	90. (3)	130. (3)	170. (4)
11. (3)	51. (2)	91. (1)	131. (2)	171. (3)
12. (2)	52. (1)	92. (2)	132. (2)	172. (2)
13. (1)	53. (3)	93. (2)	133. (3)	173. (3)
14. (1)	54. (1)	94. (3)	134. (1)	174. (1)
15. (3)	55. (3)	95. (1)	135. (3)	175. (1)
16. (3)	56. (2)	96. (3)	136. (3)	176. (3)
17. (1)	57. (4)	97. (3)	137. (4)	177. (4)
18. (1)	58. (2)	98. (3)	138. (2)	178. (4)
19. (1)	59. (3)	99. (4)	139. (2)	179. (1)
20. (2)	60. (4)	100. (3)	140. (4)	180. (4)
21. (3)	61. (2)	101. (1)	141. (3)	181. (2)
22. (1)	62. (3)	102. (3)	142. (1)	182. (1)
23. (2)	63. (3)	103. (2)	143. (2)	183. (4)
24. (2)	64. (2)	104. (3)	144. (2)	184. (2)
25. (4)	65. (1)	105. (2)	145. (3)	185. (3)
26. (3)	66. (3)	106. (2)	146. (1)	186. (1)
27. (2)	67. (1)	107. (2)	147. (2)	187. (3)
28. (2)	68. (3)	108. (4)	148. (2)	188. (4)
29. (1)	69. (2)	109. (3)	149. (2)	189. (4)
30. (2)	70. (2)	110. (4)	150. (1)	190. (3)
31. (3)	71. (2)	111. (2)	151. (2)	191. (2)
32. (2)	72. (4)	112. (2)	152. (2)	192. (2)
33. (1)	73. (1)	113. (1)	153. (3)	193. (2)
34. (2)	74. (1)	114. (4)	154. (1)	194. (1)
35. (4)	75. (2)	115. (4)	155. (3)	195. (3)
36. (2)	76. (2)	116. (1)	156. (2)	196. (1)
37. (3)	77. (1)	117. (3)	157. (2)	197. (2)
38. (3)	78. (3)	118. (1)	158. (3)	198. (2)
39. (1)	79. (2)	119. (1)	159. (3)	199. (3)
40. (4)	80. (3)	120. (3)	160. (3)	200. (1)

25/04/2023

Phase-1
CODE-B

Corporate Office: Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

FINAL TEST SERIES for NEET-2023

MM : 720 | **Test-II** | Time : 3 Hrs. 20 Mins.

Answers and Solutions

PHYSICS

SECTION - A

1. Answer (3)

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$= \frac{6.237}{3.5}$$

$$= 1.782$$

In this question density should be reported to two significant figures.

As rounding off the number, we get density = 1.8 g/cm^3

2. Answer (2)

$\vec{A}+\vec{B}=\vec{E}$ …(i)

$\vec{A}+\vec{C}=\vec{D}$

$-\vec{A}-\vec{C}=-\vec{D}$ …(ii)

(i) + (ii)

$\vec{B}-\vec{C}=\vec{E}-\vec{D}$

$\vec{B}=\vec{E}-\vec{D}+\vec{C}$

3. Answer (2)

$$\frac{R^2}{8h}+2h = \frac{\left(\frac{u^2\sin 2\theta}{g}\right)^2}{\frac{8u^2\sin^2\theta}{2g}}+2\frac{u^2\sin^2\theta}{2g}$$

$$= \frac{u^2\cos^2\theta}{g}+\frac{u^2\sin^2\theta}{g}$$

$$= \frac{u^2}{g}$$

$$= R_{max}$$

4. Answer (3)

$P_{net} = P + eP + eP + e^2P + \ldots\ldots\ldots$

$= P + 2eP + 2e^2P + \ldots\ldots\ldots$

$= P + 2eP(1 + e + e^2 + \ldots\ldots\ldots)$

$$= P + 2eP\left(\frac{1}{1-e}\right)$$

$$= P\left(\frac{1+e}{1-e}\right)$$

$$P_{net} = P\left(\frac{1+\frac{1}{2}}{1-\frac{1}{2}}\right)$$

$P_{net} = 3P$

5. Answer (4)

$k_1 = 24$ cm, $r = 7$ cm

$I = I_G + Mr^2$

$I_G = Mk_1^2$

$I = Mk^2$

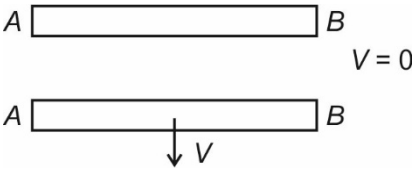
$Mk^2 = Mk_1^2 + Mr^2$

$k = \sqrt{k_1^2 + r^2}$

$= \sqrt{(24)^2 + (7)^2}$

= 25 cm

6. Answer (3)



By conservation of angular momentum about point *A*.

$$mva = \frac{m(2a)^2}{3}\omega$$

$$\omega = \frac{3v}{4a}$$

7. Answer (1)

$\omega = 2\pi f$

$\omega = 2\pi \times 10$

$= 20\pi$

$A = 0.05$ m

Equation of SHM

$x = 0.05 \sin(20\pi t + \delta)$

$-0.05 = 0.05 \sin(20\pi t + \delta)$

$\sin\delta = -1$

$$\delta = \left(\frac{3\pi}{2}\right)$$

$$x = 0.05\sin\left(20\pi t + \frac{3\pi}{2}\right)$$

8. Answer (1)

$$\vec{F} = m\vec{g}$$

$$= 2\left(3\hat{i} + 4\hat{j}\right)$$

$$= 6\hat{i} + 8\hat{j}$$

$$|\vec{F}| = \sqrt{6^2 + 8^2}$$

$= 10$ N

$$\tan\theta = \frac{8}{6}$$

$$\theta = \tan^{-1}\left(\frac{4}{3}\right)$$

$= 53°$

9. Answer (4)

Doppler effect in sound is asymmetric and in light is symmetric.

10. Answer (2)

Given process is isobaric. So,

$W = nR\Delta T$

$$\Delta U = \frac{nR\Delta T}{\gamma - 1}$$

$$\frac{\Delta U}{W} = \frac{1}{\gamma - 1}$$

$$= \frac{1}{\frac{5}{3} - 1}$$

$$= \frac{3}{2}$$

11. Answer (3)

$R \propto \Delta\theta$

$R = k(\theta - \theta_0)$

12. Answer (2)

Expansion of liquid on heating is much more than solid because molecular spacing in them is more.

13. Answer (1)

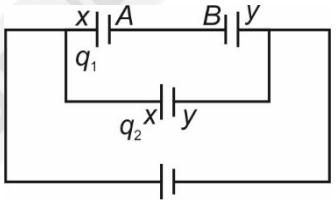
$$\frac{Q_1}{4\pi R^2} = \frac{Q - Q_1}{4\pi(3R)^2}$$

$9Q_1 = Q - Q_1$

$10Q_1 = Q$

$$Q_1 = \frac{Q}{10}$$

14. Answer (1)



$$C_{eff} = \frac{3A\varepsilon_0}{2d}$$

$= 3\ \mu F$

$Q = C_{eff} \times V$

$= 3 \times 10$

$= 30\ \mu C$

$q_1 = 10\ \mu C$ and $q_2 = 20\ \mu C$

$q = q_1 + q_2$

$= 30\ \mu C$

15. Answer (3)

$$\tau_{max} = NiAB = 1 \times i \times (\pi r^2) \times B$$

$$= \pi i\left(\frac{L}{2\pi}\right)^2 B = \frac{L^2 iB}{4\pi}$$

16. Answer (3)

$Q = \frac{\Delta\phi}{R}$

$Q = \frac{NBA}{R}$

$5 \times 10^{-4} = \frac{50 \times B \times 5 \times 10^{-4}}{100}$

$B = 2$

17. Answer (1)

$P_{output} = 150$ W

$P_{input} = 240 \times 0.8$

$= 192$ W

$n = \frac{P_{output}}{P_{input}} \times 100$

$= \frac{150}{192} \times 100$

$= 78\%$

18. Answer (1)

Power factor of circuit is 1

$X_L = X_C$

$\frac{R}{\sqrt{R^2 + X_L^2}} = \frac{1}{\sqrt{3}}$

$\sqrt{3}R = \sqrt{R^2 + X_L^2}$

$X_L = \sqrt{2}\,R$

$\sqrt{2}\,R = X_C$

$R = \left(\frac{1}{4\sqrt{2}C}\right)$

$Z = \sqrt{R^2 + X_L^2}$

$= \sqrt{\left(\frac{1}{4\sqrt{2}C}\right)^2 + \left(\frac{1}{4C}\right)^2}$

$= \frac{\sqrt{3}}{4\sqrt{2}C}$

19. Answer (1)

$\frac{nhc}{\lambda} = P$

$n = \frac{P \times \lambda}{hc}$

$= \frac{60 \times 5000}{12400 \times 1.6 \times 10^{-19}} = 1.5 \times 10^{20}$

20. Answer (2)

$N = \frac{N_0}{2^n}$

$\frac{N_0}{64} = \frac{N_0}{2^n}$

$n = 6$

$T_{\frac{1}{2}} = \frac{24}{6}$

$= 4$ days

21. Answer (3)

Let u_1 and v_1 be initial and final velocities of ball 1. u_2 and v_2 be the similar quantities for ball 2. Here, $u_2 = 0$ and $v_1 = 0$

$\therefore$ initial KE, $K_i = \frac{1}{2}mu_1^2 + \frac{1}{2}mu_2^2 = \frac{1}{2}mu_1^2$

and final KE, $K_f = \frac{1}{2}mv_1^2 + \frac{1}{2}mv_2^2 = \frac{1}{2}mv_2^2$

Loss of KE, $\Delta K = K_i - K_f = \frac{1}{2}mu_1^2 - \frac{1}{2}mv_2^2$

Acc. to question, $\frac{1}{2}\left(\frac{1}{2}mu_1^2\right) = \frac{1}{2}mu_1^2 - \frac{1}{2}mv_2^2$

or $u_1^2 = 2v_2^2$ or $v_2 = \frac{u_1}{\sqrt{2}}$

$\therefore$ Coefficient of restitution, $e = \left|\frac{v_2 - v_1}{u_1 - u_2}\right|$

$= \frac{v_2}{u_1} = \frac{1}{\sqrt{2}}$

22. Answer (1)

A rod of length L is bent to form a semi-circular ring of radius R.

$\therefore$ $\pi R = L$ or $R = \frac{L}{\pi}$

Mass of semi-circular ring = mass of rod = M

Moment of Inertia of ring about its diameter $= \frac{2MR^2}{2} = MR^2$

Moment of inertia about $XY = \frac{1}{2}(MR^2)$

$= \frac{1}{2}M\left(\frac{L}{\pi}\right)^2 = \frac{ML^2}{2\pi^2}$

23. Answer (2)

By conservation of energy, we get

$$\frac{1}{2}mv^2 = \frac{mgh}{\left(1+\frac{h}{R}\right)}$$

Acc. to problem,

$$v = \frac{3}{4}v_e = \frac{3}{4}\sqrt{2gR}$$

$$\frac{1}{2}\times\frac{9}{16}\times 2gR = \frac{gh}{\left(1+\frac{h}{R}\right)}$$

or $\frac{9}{16} = \frac{h}{(R+h)}$

$\therefore \quad h = \frac{9R}{7}$

24. Answer (2)

As Young's modules,

$$Y = \frac{\text{Force} \times \text{original legnth}}{\text{Area} \times \text{Increase in length}}$$

$$= \frac{FL}{\pi r^2 l} \qquad \ldots(1)$$

For the same material, Young's modulus is the same.

$$\therefore \quad Y = \frac{2F\times 2L}{\pi(2r)^2\times l'}$$

$$= \frac{FL}{\pi r^2 l'}$$

From (1) and (2)

$$\frac{FL}{\pi r^2 l} = \frac{FL}{\pi r^2 l'}$$

or $l' = l$

25. Answer (4)

Acc. to Archimedes principle weight of body = weight of liquid displaced

Let V be volume of the block,

In water $V\rho_{block}g = \left(\frac{4}{5}\right)V\rho_{water}g$

or $\rho_{block} = \frac{4}{5}\rho_{water} \qquad \ldots(1)$

In liquid, $V\rho_{block}g = V\rho_{liquid}g$

$\rho_{block} = \rho_{liquid} \qquad \ldots(2)$

From (1) and (2)

$$\rho_{liquid} = \frac{4\rho_{water}}{5} = 800 \text{ kg m}^{-3}$$

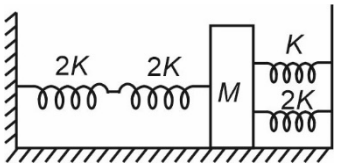
26. Answer (3)

Work done in cyclic process = Area of the loop

$$= \frac{1}{2}2\times 4 = 4\,\text{J}$$

W_{cycle} = – 4 J (ACW loop)

27. Answer (2)



Two springs on the L.H.S of mass M are in series and two springs on the R.H.S of mass M are in parallel. These combination of springs will be considered is parallel to mass M. Thus effective spring constant.

$$K_{eff} = \frac{2K\times 2K}{2K+2K} + (K+2K) = 4K$$

$\therefore$ Frequency $\nu = \frac{1}{2\pi}\sqrt{\frac{K}{M}} = \frac{1}{2\pi}\sqrt{\frac{4K}{M}}$

28. Answer (2)

When the observer moves towards the stationary source, apparent frequency of emitted note,

$$F_1 = \left(\frac{v+v_1}{v}\right)n$$

When the observer moves away from the stationary source, apparent frequency of emitted note.

$$F_2 = \left(\frac{v-v_1}{v}\right)n$$

$\because \quad \frac{F_1}{F_2} = 2(\text{given}) \quad \therefore \quad \frac{v+v_1}{v-v_1} = 2$

$\Rightarrow \quad v + v_1 = 2v - 2v_1 \Rightarrow v = 3v_1$ or $\frac{v}{v_1} = 3$

29. Answer (1)

According to Gauss's theorem

$$\oint \vec{E}\cdot d\vec{s} = \frac{1}{\varepsilon_0}Q_{enclosed}$$

$$E\cdot 4\pi x^2 = \frac{Q}{\varepsilon_0}$$

$$E = \frac{Q}{4\pi\varepsilon_0 x^2}$$

30. Answer (2)

The given system is equivalent to spherical capacitor of inner radius b and outer radius c. Hence, the capacity of the system will be $4\pi\varepsilon_0\left(\frac{bc}{c-b}\right)$.

31. Answer (3)

Total flux linked with the cube of side $L = \frac{Q}{\varepsilon_0}$

$\therefore$ flux with one face of cube $\phi_{face} = \frac{Q}{6\varepsilon_0}$

32. Answer (2)

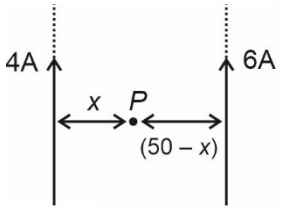
$E_1 + E_2 = KI_1 = 180$ K ...(I)

$E_1 - E_2 = KI_2 = 60$ K ...(II)

$\therefore \quad \frac{E_1 + E_2}{E_1 - E_2} = 3$

$\frac{E_1}{E_2} = 2$

33. Answer (1)



At point P

$\vec{B}_1 + \vec{B}_2 = 0$

$|\vec{B}_1| = |\vec{B}_2|$

$\Rightarrow \quad \frac{\mu_0}{4\pi}\frac{2I_1}{x} = \frac{\mu_0}{4\pi}\frac{2I_2}{(50-x)}$

$\Rightarrow \quad \frac{4}{x} = \frac{6}{50-x}$

$\Rightarrow \quad 100 - 2x = 3x$

$x = 20$ cm

34. Answer (2)

For ferromagnetic substance susceptibility is positive and large.

35. Answer (4)

$\eta = \frac{P_{out}}{P_{in}} = \frac{3}{4}$

$\Rightarrow \quad V_s \cdot I_s = \frac{3}{4} \times 6 \times 10^3$

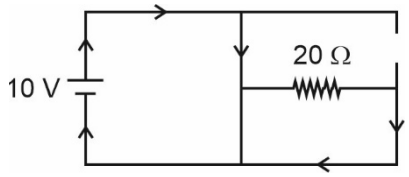
$\Rightarrow \quad I_s = \frac{18000}{4 \times 240} = \frac{18000}{960} = 18.75$ A

SECTION - B

36. Answer (2)

In moderately doped p-type semiconductor, the fermi level lies in the forbidden energy gap nearer to valance bond.

37. Answer (3)

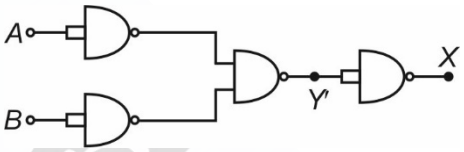


$I = \frac{V}{R}$

$I = \frac{10}{20}$

$= 0.5$

38. Answer (3)



$Y' = \overline{\overline{A} \cdot \overline{B}} = \overline{\overline{A + B}}$

$= A + B$

$X = \overline{Y'} = \overline{A + B}$

39. Answer (1)

$t = \frac{d}{\frac{c}{\mu}}$

$= \frac{\frac{3}{2} \times 50 \times 10^{-3}}{3 \times 10^8}$

$= 25 \times 10^{-11}$

$t = 250$ ps

40. Answer (4)

$W = \frac{\lambda D}{d}$

$\frac{\lambda_1 D_1}{d_1} = \frac{\lambda_2 D_2}{d_2}$

$\frac{d_1}{d_2} = \frac{\lambda_1}{\lambda_2} \times \frac{D_1}{D_2}$

$= \frac{400}{500} \times \frac{1.2}{1.6}$

$= \frac{4}{5} \times \frac{3}{4} = \frac{3}{5}$

41. Answer (1)

$$\left(\frac{dQ}{dt}\right)_1 = \left(\frac{dQ}{dt}\right)_2$$

$$\frac{K_1 A\Delta T}{l_1} = \frac{K_2 A\Delta T}{l_2}$$

$$\frac{K_1}{K_2} = \frac{l_1}{l_2}$$

$$= \frac{\pi R}{2R}$$

$$= \pi : 2$$

42. Answer (1)

The latent heat of vaporisation of water is more than latent heat of fusion of ice because on vaporisation much larger increase in volume takes place.

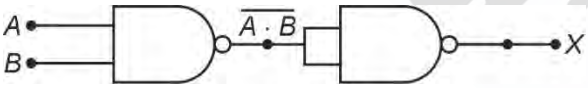
43. Answer (1)

Lyman series lie in ultraviolet region of electromagnetic spectrum.

44. Answer (4)

At resonance net potential drop across inductor and capacitor will be zero potential drop will be only across resistor therefore reading of voltmeter V_1 and V_2 will be non-zero.

45. Answer (4)



$X = A \cdot B$

46. Answer (2)

Focal length of the system of lenses

$$f = \frac{20}{2} = 10 \text{ cm}$$

Now, $u = -15$ cm, $f = 10$ cm

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

$$\Rightarrow \frac{1}{10} = \frac{1}{v} + \frac{1}{15}$$

$v = 30$ cm

47. Answer (3)

Limit of resolution is given by

$$x = \frac{0.61\lambda}{\mu \sin\theta}$$

$$= \frac{0.61 \times 6000 \times 10^{-10}}{0.12}$$

$= 3.05 \times 10^{-6}$ m

$\approx 3\ \mu$m

48. Answer (3)

Activity of samples becomes 2500 from 5000 in 150 days.

Therefore its half life is 150 days.

So, $R = \frac{R_0}{2^{\frac{t}{T}}}$

$$\Rightarrow R_0 = R \times 2^{\frac{t}{T}}$$

$$= 5000 \times 2^{\frac{300}{150}}$$

= 20,000 dps

49. Answer (2)

Current in 1 kΩ resistor

$$I = \frac{15}{1000} = 15 \text{ mA}$$

Current in 250 Ω resistor

$$I' = \frac{20 - 15}{250} = 20 \text{ mA}$$

Hence, current through diode = 20 – 15 = 5 mA

50. Answer (2)

- The work is done against gravity so it is equal to change in potential energy

  ∴ Guddu did more work as compared to Bablu

- Power is work done per unit time

  $$P = \frac{\text{work}}{\text{time}}$$

  ∴ Both deliver same amount of power.

CHEMISTRY

SECTION - A

51. Answer (2)

$$\text{Density} = \frac{Z \times M_0}{a^3 \times N_A}$$

$$= \frac{2 \times 81}{(300 \times 10^{-12} \times 10^2 \text{cm})^3 \times 6 \times 10^{23}}$$

$$= 10 \text{ g cm}^{-3}$$

52. Answer (1)

$$\text{In liquid phase, } X_{\text{benzene}} = \frac{1}{2} X_{\text{toluene}}$$

$$\text{Vapour pressure of solution} = P_b^\circ X_b + P_t^\circ X_t$$

$$= \left[12 \times \frac{1}{2} + 4 \times \frac{1}{2}\right] \text{kPa} = 8 \text{ kPa}$$

$$\text{In vapour phase, } X_t = \frac{\text{V.P due to only toluene}}{\text{V.P}_{\text{solution}}}$$

$$= \frac{4 \times \frac{1}{2}}{8} = \frac{1}{4} = 25\%$$

53. Answer (3)

$$k = Ae^{-E_a/RT}$$

On comparing it with $k = 10^{15} e^{-2000/T}$

$$\frac{E_a}{R} = 2000$$

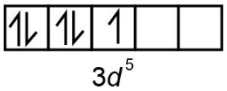
$E_a = 2000\ R$

54. Answer (1)

Mond process is used for refining of Ni.

55. Answer (3)

$Fe^{+3} - [Ar]3d^5$

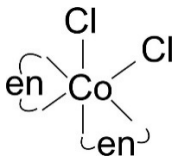


$3d^5$

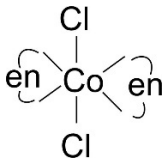
due to strong field ligand pairing of electron will happen

So, it is d^2sp^3 hybridised.

56. Answer (2)



optically active



optically inactive

57. Answer (4)

Order of $I.E_1$: Zn > Fe > Co > Ni

58. Answer (2)

Order of bond energy of halogen: $Cl_2 > Br_2 > F_2 > I_2$

59. Answer (3)

22.4 L $CH_4(g)$ at STP weighs 16 g

$\therefore$ 1 L $CH_4(g)$ at STP weighs $= \frac{16}{22.4} = 0.71\,\text{g}$

60. Answer (4)

$$E_n = -13.6 \frac{z^2}{n^2}, \quad \frac{E_1}{E_2} = \frac{n_2^2}{n_1^2} = \frac{2^2}{1^2} = 4:1$$

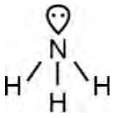
61. Answer (2)

Number of orbitals $= 4^2 = 16$

62. Answer (3)

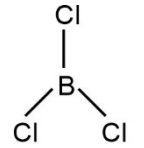
Molar K.E depends on temperature only.

63. Answer (3)



has pyramidal structure.

64. Answer (2)



Trigonal planar

65. Answer (1)

Na_2HPO_3; $2 + 1 + x - 6 = 0$

$\therefore$ $x = +3$

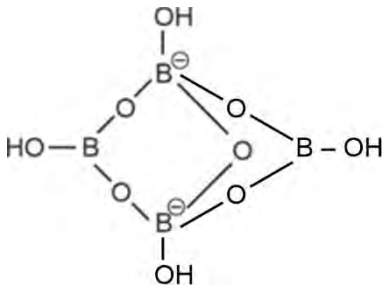
66. Answer (3)

33.6 volume $H_2O_2 = \frac{33.6}{11.2}M$

$= \frac{33.6}{11.2} \times \frac{34}{10} g/100\ mL$ of solution

= 10.2%

67. Answer (1)



Number of B — O — B bonds = 5

68. Answer (3)

$+I$ effect : $O^- > C\bar{O}_2 > \bar{C}H_3 > \bar{O}H$

69. Answer (2)

$CH_3-\ddot{\underset{\ddot{}}{O}}-\overset{+}{C}H-CH_3 \longleftrightarrow CH_3-\overset{+}{\ddot{O}}=CH-CH_3$

is resonance stabilized (back bonding).

70. Answer (2)

Greater is the stability of carbocation formed greater is rate of S_N1 reaction.

71. Answer (2)

- Glucose $\xrightarrow{Br_2 water}$ Gluconic acid
- $(CHOH)_4$ (CHO and CH_2OH) $\xrightarrow{Br_2\ water}$ $(CHOH)_4$ ($COOH$ and CH_2OH)

Gluconic acid

72. Answer (4)

- B group vitamins and vitamin C are water soluble.
- Vitamins A, D, E and K are fat soluble.

73. Answer (1)

Tetrafluoroethene is monomer of teflon.

74. Answer (1)

$\overset{+7}{M}nO_4^- + 5e^- + 8H^+ \rightarrow \overset{+2}{M}n^{+2} + 4H_2O$

75. Answer (2)

Order w.r.t. B become zero at excess concentration of B.

$r = k[A]^{1/2}[B]^0$

76. Answer (2)

In MSO_4, Valency of metal = 2

$\therefore$ Molar mass of MSO_4 = (12 × 2) + 96

= 120 g/mol

77. Answer (1)

At Boyle's temperature, real gas behaves ideally.

78. Answer (3)

	CH_3COOH + $NaOH$ $\rightleftharpoons$	CH_3COONa +	H_2O
t = 0	50 meq	25 meq	0	0
at eq	25 meq	0	25 meq	0

$\therefore$ $pH = pK_a + \log\frac{[salt]}{[acid]} \Rightarrow pH = pK_a = 4.74$

79. Answer (2)

Maximum prescribed concentration of some metal in drinking water is

Mn → 0.05 ppm

Al → 0.2 ppm

Cu → 3 ppm

Zn → 5 ppm

80. Answer (3)

B → Si shows diagonal relationship.

81. Answer (3)

$K_{sp} = s^2 = (10^{-5})^2 = 10^{-10}$

Now, new solubility of AgCl in 0.05 M NaCl solution is $\frac{K_{sp}}{0.05} = \frac{10^{-10}}{0.05} = 2 \times 10^{-9}$ M

82. Answer (4)

Strong acid/base are not affected by presence of common ion.

83. Answer (1)

$4Zn + NO_3^- + 7H_2O \rightarrow 4Zn^{2+} + NH_4^+ + 10\bar{O}H$

84. Answer (2)

- Nuclear (proton) spins are different for ortho and para H_2.
- More electron withdrawing groups on ortho and para position increase the acidity of phenol derivative.

85. Answer (3)

Basic strength of alkaline earth metal hydroxides increases down the group.

SECTION - B

86. Answer (2)

In cement, % of CaO is 50-60%.

% of Al_2O_3 is 5-10%, % of Fe_2O_3 is 1-2%.

87. Answer (3)

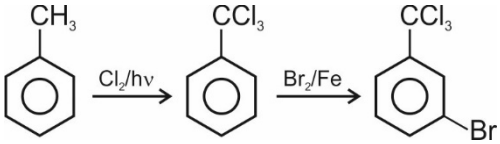
$$\% N = \frac{1.4NV}{W} = \frac{1.4 \times 10}{0.5} = 28\%$$

88. Answer (3)

Ease of dehydration will increases with increase in stability of alkene produced.

Hence order is 1 > 3 > 2.

89. Answer (3)



90. Answer (3)

(i) Acidic nature of *sp* carbon is more than sp^2 carbon.

(ii) $HC \equiv CH + Na \rightarrow HC \equiv C^{\ominus}Na^{\oplus} + \frac{1}{2} H_2$

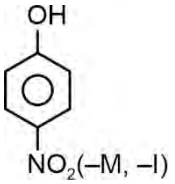
91. Answer (1)

$\bar{F}$ is weakest while CH_3^- is strongest nucleophile.

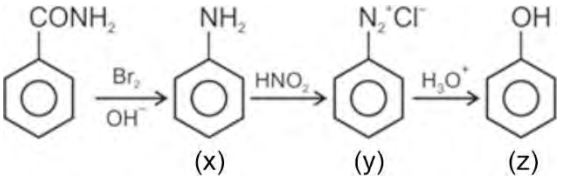
92. Answer (2)

$PhMgX \xrightarrow{H^+}$ Benzene

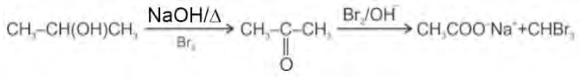
93. Answer (2)

- More electron withdrawing groups at ortho and para position increase the acidity of phenol derivatives.
- Hence  is most acidic.

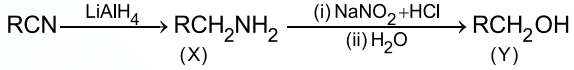
94. Answer (3)



95. Answer (1)



96. Answer (3)



97. Answer (3)

Slightly alkaline medium (pH = 9 – 10) is required for the reaction.

98. Answer (3)

$$\Lambda^{\circ}_{CH_3COOH} = \Lambda^{\circ}_{CH_3COONa} + \Lambda^{\circ}_{HCl} - \Lambda^{\circ}_{NaCl}$$

= z + y – x

99. Answer (4)

More the reduction potential, lesser will be reducing power.

100. Answer (3)

Chemisorption is irreversible in nature.

BOTANY

SECTION - A

101. Answer (1)

Nitrosomonas and *Nitrobacter* are chemoautotrophs.

102. Answer (3)

Splitting of centromere takes place in anaphase II.

103. Answer (2)

Both DNA and centriole duplication occur in S phase.

104. Answer (3)

Herbaria serve as quick source of reference. Botanical garden is an *ex-situ* conservation strategies of plants. Monograph contains information of any one taxon. Key is analytical in nature.

105. Answer (2)

Fucus – Diplontic

Polysiphonia – Haplo-diplontic

106. Answer (2)

Parrot (140 years) has longer life span than crow (15 years).

107. Answer (2)

In cymose inflorescence the flowers are borne in a basipetal order.

108. Answer (4)

Water hyacinth and water lily are pollinated by insects or wind.

109. Answer (3)

ABA inhibits gibberellin mediated amylase formation. Ripening of fruits can be delayed by using gibberellins.

110. Answer (4)

Asexual non-motile spores formed in class phycomycetes are aplanospores

111. Answer (2)

Radish is biennial and monocarpic plant. It does not show inter flowering period.

112. Answer (2)

Liverworts have thalloid plant body, which is dorsiventral and closely appressed to the substrate. *e.g.*, *Marchantia*.

113. Answer (1)

Gibberellic acids are the phytohormones that are derived from terpenes.

114. Answer (4)

Microbodies are single membrane bound minute vesicles that contains various enzymes, They are present in both plant and animal cells.

115. Answer (4)

Pyramid of energy is always upright. In grassland ecosystem, pyramids of number and biomass are also upright.

116. Answer (1)

Phloem parenchyma is absent in the most monocotyledons.

117. Answer (3)

Parents : $X^CY \times X^CX$

Gametes : $(X^C)\ (Y)\ (X^C)\ (X)$

Offspring : X^CX^C, X^CX, X^CY, XY

Colourblind daughter — Colourblind son

118. Answer (1)

Atlas 66, is a wheat variety with high protein content.

119. Answer (1)

In pea plant some leaves modified to form tendrils. All others are the examples of stem tendril.

120. Answer (3)

C_4 plants show Kranz anatomy. In these plants, double fixation of CO_2 occur.

121. Answer (2)

Ferredoxin is the most direct source of electrons for nitrite reduction. Nitrite reductase does not require molybdenum but contains copper and iron. The nodules of soyabean export the fixed nitrogen as ureides.

122. Answer (1)

Ribosome is present in both prokaryotes and eukaryotes.

123. Answer (3)

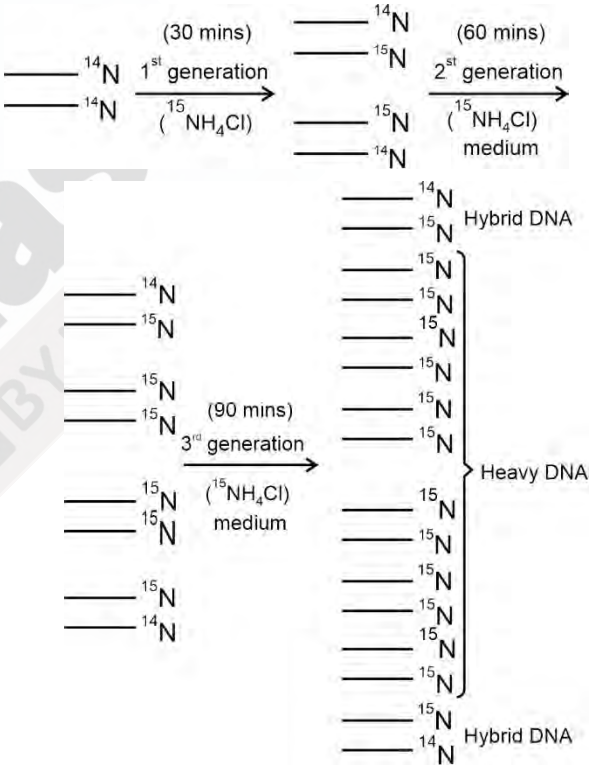
Solute potential is always negative.

124. Answer (1)

Bacterium replicates in 30 mins.

When allowed to grew in medium ^{14}N for many generations, as a result ^{14}N was incorporated into newly synthesised DNA,

Then transferred to medium containing $^{15}NH_4Cl$,



Light DNA = 0%

Hybrid DNA = 25%

Heavy DNA =75%

125. Answer (3)

Cyclosporin A is a bioactive molecule used as an immunosuppressive agent.

126. Answer (2)

In amensalism interaction, one species is harmed and other species remains unaffected.

127. Answer (4)

Phosphoenolpyruvate is the primary acceptor of CO_2 in C_4 pathway.

128. Answer (2)

Biodiversity is normally higher in lower latitudes. Biodiversity increases when we move from poles to equator.

129. Answer (3)

Sutton and Boveri united the knowledge of chromosomal segregation with Mendelian principles and called it chromosomal theory of inheritance.

130. Answer (3)

Slime moulds form an aggregation called plasmodium in favourable condition. Their spores have cellulosic cell wall.

131. Answer (2)

Genes which showed very low recombination were tightly linked *i.e.* high linkage.

132. Answer (2)

According to Chargaff's rule,

Equimolar concentration of A = T and G = C

A = T = 30

A + T = 30 + 30 = 60%

Thus G + C amount is 40% with 20% C and 20% G

So, A = 30%

C = 20%

133. Answer (3)

Euro III norms, stipulate that sulphur be controlled at 350 ppm in diesel and 150 ppm in petrol.

Vehicle engines are needed to be upgraded as well.

134. Answer (1)

If both the DNA strands act as template, they would code different sequence of RNA which, and in turn, they code two different proteins from same segment of DNA molecule.

135. Answer (3)

Biological museums have collections of preserved plant and animal specimens for study and reference. Insects are collected, killed and pinned before preserving them in special insect boxes.

SECTION - B

136. Answer (3)

Endarch xylem is found in both dicot and monocot stems.

137. Answer (4)

Each ovule has one or two protective envelops called integuments.

138. Answer (2)

In active absorption of water OP and energy play the major role, the rate of absorption is low movement of water is symplastic and a positive pressure is developed in xylem.

139. Answer (2)

The stamens united into one bundle, monoadelphous as in china rose.

Pea and *Sesbania* shows diadelphous stamen.

140. Answer (4)

Lactic acid fermentation takes place in cytosol.

141. Answer (3)

Waste water treatment is done by the heterotrophic microbes. Activated sludge is composed of sedimented flocs.

142. Answer (1)

Primary consumers or herbivores belong to second trophic level and generate secondary productivity *e.g.*, deer. All other are carnivores.

143. Answer (2)

Regulation of *lac* operon by repressor is referred to as negative regulation.

144. Answer (2)

Euglena shows mixotrophic mode of nutrition, *i.e* photoautotrophic and heterotrophic, *Anabaena* cause algal blooms in water bodies. *Mycoplasma* lack cell wall, hence called "Bacteria with their coats off".

145. Answer (3)

Gracilaria belongs to Rhodophyceae while *Ectocarpus*, *Dictyota* and *Laminaria* are brown algae.

146. Answer (1)

The largely tropical Amazonian rain forest in South America has the greatest biodiversity on earth it is home to more than 40,000 species of plants, 3,000 of fishes, 1,300 of birds, 427 of mammals, 427 amphibians, 378 of reptiles and of more than 1,25,000 invertebrates.

147. Answer (2)

Diapause, a stage of suspended development is found in many zooplanktons species in lakes and ponds.

148. Answer (2)

Ahmed Khan's company developed a fine powder of recycled modified plastic, called polyblend and it was mixed with bitumen that is used to lay roads.

149. Answer (2)

Drosophila melanogaster is suitable as experimental model because it produces hundreds of offspring by single mating with high degree of genetic variations possess by four pair of chromosomes

150. Answer (1)

Rudolf Virchow first explained that cells divided and new cells are formed from pre – existing cells.

ZOOLOGY

SECTION - A

151. Answer (2)

Zwitterionic form would always have positive and negative groups. $H_3^+N-\underset{\displaystyle R}{\underset{|}{CH}}-COO^-$

152. Answer (2)

All reptiles have dry and cornified skin, epidermal scales or scutes.

153. Answer (3)

Glottis is the opening of trachea through larynx.

Epiglottis is a cartilaginous fold which covers the glottis during food swallowing.

154. Answer (1)

The cardiac output is the amount of blood pumped out by each ventricle/min. The body has the ability to alter the stroke volume as well as the heart rate and there by the cardiac output.

155. Answer (3)

Cartilage is present in all the given sites but cranial bones of skull are dermal bones.

156. Answer (2)

Forewings (mesothoracic) called tegmina, arise from mesothorax.

157. Answer (2)

The body of typical mollusc can be divided into head, muscular foot and visceral hump.

Head, thorax and abdomen could be seen in insects.

Proboscis, collar and trunk are found in hemichordates.

158. Answer (3)

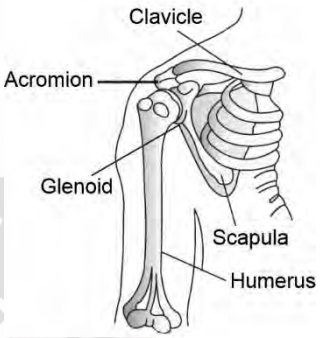
Glomerular filtration rate in normal healthy individual is 125 mL/min.

159. Answer (3)

Lungs remove large amount of CO_2 while sweat removes salt, urea and lactic acid.

Small amount of urea is also excreted from saliva.

160. Answer (3)



161. Answer (4)

The cerebral cortex contains motor area, sensory area and large regions called the association areas responsible for complex functions like intersensory association, memory and communication.

162. Answer (3)

Melatonin is secreted by pineal gland which plays important role in the regulation of diurnal rhythm of the body. Other functions such as sleep-wake cycle, body temperature, metabolism, pigmentation and menstrual cycle are also influenced.

163. Answer (1)

This hormone promotes glycogenolysis resulting in hyperglycemia. The receptors for this hormone are present on the hepatocytes.

164. Answer (2)

Attainment of maturity leads to start of reproductive phase, while senescence imparts old age.

165. Answer (4)

Glans penis is covered by a loose fold of skin called foreskin. The urethra originates from the urinary bladder and extends through the penis to its external opening called urethral meatus.

166. Answer (2)

The secondary oocyte forms a new membrane around itself, known as zona pellucida in Graafian follicle.

167. Answer (1)

Decrease in GDP and per capita income is not the indication of reproductive health of society.

168. Answer (3)

The world population which was around 2 billion in 1900, rocketed to about 6 billion by 2000 and 7.2 billion in 2011.

169. Answer (4)

In disruptive selection, extremes are selected by nature.

Genetic drift happens by chance (Founder effect)

Co-evolution is related with evolution of predator with prey.

170. Answer (4)

de Vires believed mutation caused speciation and hence called it saltation (single step large mutation).

171. Answer (3)

Natural selection is any selection that occurs as a result of an organism's ability to adapt to its surrounding. On the other hand artificial selection is a selective breeding that is imposed by an external entity usually humans, in order to enhance the frequency of desirable features.

172. Answer (2)

H_2L_2 indicates that antibody molecule comprises of 2 heavy chains and 2 light chains.

173. Answer (3)

The *ori* is a sequence of gene where replication begins, enabling a plasmid to reproduce itself as it must survive within cells.

174. Answer (1)

The inner ear also contains a complex system called vestibular apparatus, located above the cochlea.

175. Answer (1)

Unit of natural selection is individual and unit of evolution is population.

176. Answer (3)

Foetal ejection reflex triggers maternal pituitary to release oxytocin. Receptors for oxytocin are situated in myometrium. It acts on uterine muscle fibres for forceful contractions to induce labor pain.

177. Answer (4)

Myocardial infarction or heart attack occurs when the heart muscle is suddenly damaged by inadequate blood supply.

178. Answer (4)

Theory of Panspermia for origin of life was proposed by Arrhenius. Wallace along with Darwin supported "struggle for existence and survival of the fittest".

179. Answer (1)

Barrier methods prevents the conception by blocking the entry of sperms through the cervix.

180. Answer (4)

B-lymphocytes are responsible for humoral immunity and T-lymphocytes for CMI (Cell Mediated Immunity). IgM is first formed antibody against any antigen in our body.

181. Answer (2)

When similar organisms evolve in to different species due to different external factors, such a type of evolution is termed as adaptive radiation or divergent evolution.

182. Answer (1)

Erythroxylum coca – Cocaine or crack

Atropa belladonna – Atropine

Cannabis sativa – Marijuana

183. Answer (4)

Neanderthal man used hides to protect their body and buried their dead.

184. Answer (2)

Restriction endonucleases are used to cut DNA at particular palindromic sequences whereas ligases are used to join sticky ends. So, they are used as a tools in making recombinant DNA.

185. Answer (3)

Hypersecretion of oxyntic cells may cause peptic ulcer. HCl is helpful in absorption of iron by converting Fe^{+3} into Fe^{+2} state. Parietal cells synthesize Castle's intrinsic factor which helps in absorption of vit-B12.

SECTION - B

186. Answer (1)

Endotoxins produced and accumulated in bacteria are protoxins so do not harm them. After ingestion by insects, it is cleaved by proteases in alkaline medium to form a toxic derived protein that damages gut epithelium. It is quickly digested in mammals. So, it is not harmful for them.

187. Answer (3)

For normal fertility in humans, at least 60% of total sperms in each ejaculate must have normal shape and size and at least 40% of them must show vigorous motility.

188. Answer (4)

Co-enzymes are also organic compounds but their association with the apoenzyme is only transient.

189. Answer (4)

All ctenophores are exclusively marine. *Spongilla* is a fresh water sponge.

190. Answer (3)

When pCO_2 is high and pO_2 is low as in the tissues, more binding of carbon dioxide occurs whereas, when the pCO2 is low and pO_2 is high as in the alveoli, dissociation of CO_2 from carbamino-haemoglobin takes place, *i.e.*, CO_2 delivered at the alveoli.

191. Answer (2)

Breathing centre is situated in medulla oblongata and brainstem consists of midbrain, pons and medulla oblongata. Cerebral aqueduct/iter occurs as a narrow passage in midbrain to connect 3rd ventricle with 4th ventricle.

192. Answer (2)

A – Afferent arteriole

B – Bowman's capsule formed by simple squamous cells.

C – PCT Formed by simple cuboidal epithelium containing microvilli giving brush border appearance.

D – Efferent arteriole.

193. Answer (2)

Ammonia is most toxic and highly soluble nitrogenous waste. It requires more water for its elimination than urea.

194. Answer (1)

Schwann cells are macroglia in PNS responsible for formation of myelin sheath. Neurotransmitters are not required in electrical synapse. Transmission of impulse takes place across synapses through gap junctions.

195. Answer (3)

Eustachian tube connects the middle ear cavity with the pharynx.

196. Answer (1)

Acromegaly is caused due to hypersecretion of growth hormone in adulthood. Exophthalmic goitre is a disease caused due to hypersecretion of thyroid gland hormone.

197. Answer (2)

Gout is a metabolic disorder in which uric acid crystals are deposited in the region of joints. Inflammation of joints is called arthritis. Muscular dystrophy is a genetic disorder.

198. Answer (2)

Gastro intestinal tract secretes four major peptide hormones, such as gastrin, secretin, CCK and gastric inhibitory peptide (GIP).

199. Answer (3)

Hydra exists only in polyp form.

200. Answer (1)

Neophron belongs to class aves. The unique features of mammals are the presence of mammary glands and hair on the skin. They commonly exhibit viviparity.

❑ ❑ ❑