02/05/2023

Phase-I
CODE-B

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

FINAL TEST SERIES for NEET-2023

MM : 720 **Test-I3** **Time : 3 Hrs. 20 Mins.**

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

Instructions:

(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.

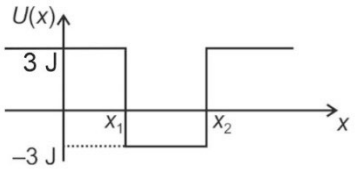
(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS

Choose the correct answer :

SECTION - A

1. The potential energy function in one dimension is given as shown in figure. If total energy of the particle is 5 J. Then in the region from x_1 to x_2, the value of its kinetic energy will be



(1) 8 J (2) 11 J

(3) 5 J (4) 0 J

2. A rope can withstand 120% weight of a monkey tries to climb up along this rope. The maximum acceleration of monkey on the rope such that the rope does not break is (take $g = 10\ m/s^2$)

(1) $10\ m/s^2$ (2) $12\ m/s^2$

(3) $2\ m/s^2$ (4) $1.2\ m/s^2$

Space for Rough Work

3. A uniform wire of length l and mass m is suspended from the ceiling and a block of mass m is suspended at the other end of wire. If A is the area of cross section of the wire, then

(1) Tensile stress at any cross section of the wire is $\frac{2mg}{A}$

(2) Tensile stress at any cross section of the wire is zero

(3) Tensile stress in wire at the point attached to the ceiling is $\frac{2mg}{A}$

(4) Tensile stress at any cross section of the wire is $2mg$

4. A travelling wave pulse is given by $y = \frac{10}{2+(x-3t)^2}$ where symbols have their usual meanings; x, y are in meter and t is in second, then

(1) The pulse is travelling along + ve y-axis

(2) The pulse is travelling along – ve y-axis

(3) The velocity of wave pulse is 2 m/s

(4) The velocity of wave pulse is 3 m/s

5. 125 identical and nearly spherical rain drops are falling through atmosphere vertically with a terminal speed of 2 m/s. If these drops coalesce to form a big drop, then terminal speed of the big drop is

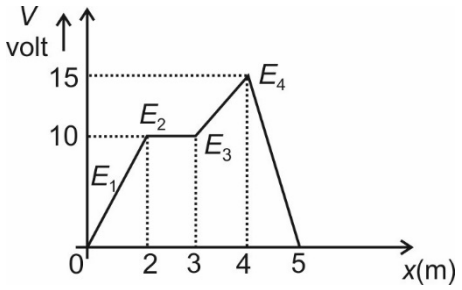
(1) 5 m/s

(2) 50 m/s

(3) 25 m/s

(4) 125 m/s

6. Electric potential (V) in a region varies with x co-ordinate as shown in figure. If E_1, E_2, E_3 and E_4 are magnitude of fields for the shown regions then



(1) $E_1 > E_2 > E_3 > E_4$ (2) $E_4 > E_3 > E_2 > E_1$

(3) $E_4 > E_3 = E_2 > E_1$ (4) $E_4 > E_3 = E_1 > E_2$

7. The law that is based on conservation of energy is

(1) Lenz's law

(2) Ist law of thermodynamics

(3) Kirchhoff's 2nd law

(4) All of these

8. Apparent dips in two planes normal to each other are 30° and 45° respectively. True dip at that place is

(1) $\tan^{-1}(\sqrt{2})$ (2) $\tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$

(3) $\tan^{-1}(2)$ (4) $\tan^{-1}\left(\frac{1}{2}\right)$

9. A cell is balanced on a length of 150 cm of a potentiometer wire. Now a resistance of 5 Ω is connected in parallel to the cell, then the balance point is obtained at 100 cm. The value of internal resistance of cell is

(1) 2.5 Ω

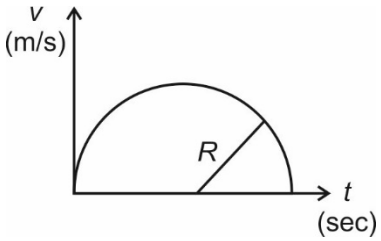
(2) 20 Ω

(3) 10 Ω

(4) 25 Ω

Space for Rough Work

10. Velocity time graph of a particle in straight line motion is in shape of a semicircle of radius R as shown in figure. Average acceleration of particle from $t = 0$ to $t = R$ is



(1) 0 m/s^2 (2) 1 m/s^2

(3) R m/s^2 (4) $2R$ m/s^2

11. A particle starts from origin move along x-axis according to equation $x = 2t^2$(m) what will acceleration of particle at $t = 1$ sec?

(1) 2 m/s^2 (2) 4 m/s^2

(3) 0 m/s^2 (4) 1 m/s^2

12. Two projectiles A and B are projected with same speed at angles 15° and 75° respectively to the horizontal on ground. Which of the following is correct?

(1) $H_A = H_B$ (2) $H_A < H_B$

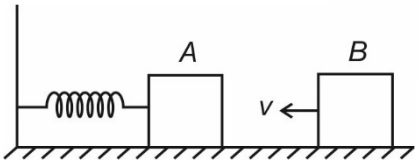
(3) $H_A > H_B$ (4) Both (2) and (3)

13. A particle is displaced from (1, 2) m to (0, 0) m. Work done by a force $\vec{F} = \left(x\hat{j} + y\hat{i}\right)$N acting on the particle will be

(1) –1.5 J (2) –3.5 J

(3) –2 J (4) –2.5 J

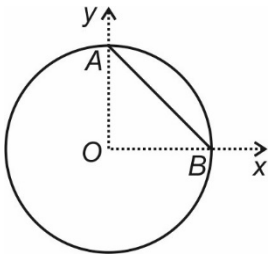
14. Maximum velocity of block A after its collision with block B as shown in figure has magnitude (assume collision to be elastic, both blocks are of mass m)



(1) v (2) $\frac{v}{2}$

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

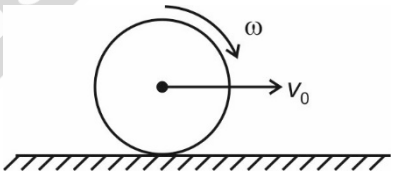
15. An object comprises of a uniform ring of radius R and its uniform chord AB (not necessarily made of the same material) as shown in the figure. Which of the following cannot be the centre of mass of the object?



(1) $\left(\frac{R}{3}, \frac{R}{3}\right)$ (2) $\left(\frac{R}{4}, \frac{R}{4}\right)$

(3) $\left(\frac{R}{\sqrt{2}}, \frac{R}{2}\right)$ (4) $\left(\frac{R}{2}, \frac{R}{2}\right)$

16. A spinning solid spherical ball having angular velocity $\frac{v_0}{2r}$ is projected on a horizontal rough surface with velocity v_0. The velocity of centre of mass of the ball when slipping ceases, will be



(1) v_0

(2) $\frac{5}{3}v_0$

(3) $\frac{6}{7}v_0$

(4) $\frac{3}{5}v_0$

Space for Rough Work

17. If radius of earth shrinks to $\frac{1}{8}$ of its initial radius then the duration of the day will be

(1) 0.375 hrs (2) 4 hrs

(3) 6 hrs (4) 1 hrs

18. A projectile is fired from the surface of earth with a velocity Kv_e ($K < 1$) where v_e is the escape velocity from surface of earth. The maximum height up to which the projectile will rise (from the centre of earth) will be

(1) KR (2) $(K^2 + 1)R$

(3) $\frac{R}{K^2+1}$ (4) $\frac{R}{1-K^2}$

19. The maximum force acting on body executing SHM is F and the total energy of the body is E. Amplitude of the motion of the particle is

(1) $\frac{E}{F}$ (2) $\frac{2E}{F}$

(3) $\frac{2F}{E}$ (4) $\frac{F}{2E}$

20. A ball is dropped from height 5 m above ground. If 60% energy is lost during collision find coefficient of restitution.

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

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

21. The vibrations of a string of length 40 cm fixed at both ends are represented by the equation $y = 4\sin\left(\frac{\pi x}{10}\right).\cos(96\pi t)$, where x and y are in cm and t is in seconds. Maximum displacement of a point at $x = 5$ cm is

(1) 4 cm (2) 2 cm

(3) 5 cm (4) Zero

22. At the top of a mountain, a thermometer reads 7°C and a barometer reads 70 cm of mercury. At the bottom of the mountain they read 27°C and 76 cm of mercury respectively. The ratio of density of air at the top to that at the bottom of the mountain is

(1) $\frac{22}{28}$ (2) $\frac{14}{18}$

(3) $\frac{32}{34}$ (4) $\frac{75}{76}$

23. One mole of an ideal gas undergoes a process P = const. If volume of gas increases from $2m^3$ to $4m^3$ then work done by gas in the process will be? Pressure of gas is 1 atm.

(1) 2×10^5 J (2) 1×10^5 J

(3) 2 J (4) 1 Cal

24. The electric field in a certain region is $\frac{A}{x^3}$. The potential at any point (x, y, z) in this region will be (potential is zero at ∞, A is a constant)

(1) $\frac{A}{2x^2}$ (2) $2Ax^2$

(3) $\frac{3A}{2x^2}$ (4) $\frac{A}{3x^2}$

25. The density of a body is $\frac{1}{6}$th of density of water. If the body is floating then the fraction of volume inside the water will be

(1) $\frac{1}{6}$

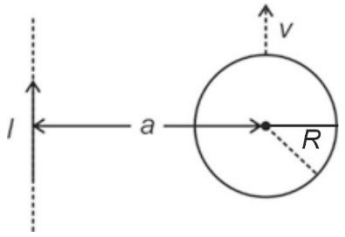
(2) $\frac{1}{3}$

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

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

Space for Rough Work

26. A circular loop of radius R is moved with a velocity v as shown in the diagram. The force needed to maintain its velocity constant is



(1) $\frac{\mu_0 IvR}{2\pi a}$ (2) $\frac{\mu_0 IvR}{2\pi(a+R)}$

(3) $\frac{\mu_0 IvR}{2\pi}\ln\left(\frac{R+a}{R}\right)$ (4) Zero

27. The angular momentum of an electron in first orbit of Li^{++} ion is

(1) $\frac{3h}{2\pi}$ (2) $\frac{9h}{2\pi}$

(3) $\frac{h}{2\pi}$ (4) $\frac{h}{6\pi}$

28. If the distance between the first maxima and fifth minima of a double slit pattern (YDSE) is 7 cm and the slits are separated by 15 μm with the screen 50 cm from the slits. Wavelength of light used in the experiment is

(1) 800 nm (2) 500 nm

(3) 600 nm (4) 466 nm

29. There are two wires A and B of same cross-section area but different length. Length of A and B are l and $2l$, and their resistivities are ρ_1 and ρ_2 respectively. Then the equivalent resistivity of combination if connected in series is

(1) $\frac{\rho_1+\rho_2}{2}$ (2) $\frac{\rho_1+2\rho_2}{2}$

(3) $\frac{\rho_1+2\rho_2}{4}$ (4) $\frac{\rho_1+2\rho_2}{3}$

30. A conductor is placed in a electric field, it is found that the drift speed is V_d m/s. If another conductor of same material but double cross-section area is placed in same electric field then drift speed will be

(1) V_d m/s (2) $\frac{V_d}{2}$ m/s

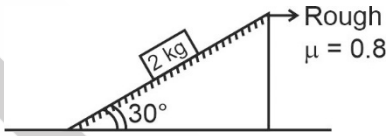
(3) $2V_d$ m/s (4) $4V_d$ m/s

31. The current in a wire varies with time according the relation $i = (3.0 + 2t^2)$ A. The average current in the time interval, $t = 0$ s to $t = 2$ s will be

(1) $\frac{17}{3}$ A (2) 17 A

(3) $\frac{15}{2}$ A (4) 15 A

32. If block is kept on rough surface shown in figure. Find friction acting on block?



(1) $8\sqrt{3}$ N (2) 10 N

(3) 16 N (4) 8 N

33. In a potentiometer circuit a cell of EMF 2 V gives balancing point at 40 cm length of wire. If another cell of EMF 3 V replaces the first cell then the balancing length will be

(1) 30 cm (2) 20 cm

(3) 10 cm (4) 60 cm

34. Select the correct statement among the following.

(1) Metals have negative temperature coefficient of resistance

(2) Only semiconductors have negative temperature coefficient of resistance

(3) Only insulators have negative temperature coefficient of resistance

(4) Insulators and semiconductors both have negative temperature coefficient of resistance

Space for Rough Work

35. A filament bulb (300 W, 150 V) is to be used in a 200 V main supply, with a resistance R connected in series. If it works perfectly and bulb consumes 300 W then the value of R is

(1) 25 Ω (2) 20 Ω

(3) 35 Ω (4) 40 Ω

SECTION - B

36. Charge $2q$ is uniformly spread on a thin ring of radius R. The ring rotates about its axis with constant angular speed ω. The magnitude of magnetic induction at the centre of ring is

(1) $\frac{\mu_0 q\omega}{2\pi R}$

(2) $\frac{\mu_0 q\omega}{\pi R}$

(3) $\frac{2\mu_0 q\omega}{\pi R}$

(4) $\frac{4\mu_0 q\omega}{\pi R}$

37. A wire of length L_m carrying current i_A, is bent in the form of a equilateral triangle. The magnetic moment is

(1) $\frac{i_A L_m^2}{12\sqrt{3}}$ (2) $\frac{i_A L_m^2}{6\sqrt{3}}$

(3) $\frac{i_A L_m^2}{\sqrt{3}}$ (4) $\frac{i_A L_m^2}{2\sqrt{3}}$

38. A magnetic needle suspended parallel to a magnetic field requires 4 J of work to turn it through 45°. The torque needed to maintain the needle in this position will be

(1) $4\left(\sqrt{2}-1\right)$

(2) $4\left(\sqrt{2}+1\right)$

(3) $4\sqrt{2}$

(4) 4

39. The temperature of a thermodynamic system having monoatomic gas, is changed by ΔT through isochoric process and it is found that system absorbed 100 J energy. If same change in temperature is achieved by isobaric process then the heat absorbed by the gas will be

(1) $\frac{500}{3}$ J (2) 300 J

(3) $\frac{2500}{9}$ J (4) 400 J

40. 20 g of ice at 0°C is mixed with X g of steam at 100°C so that finally both convert in to water at 0°C then the value of X will be

(1) 1 g (2) 4 g

(3) 2.5 g (4) 5 g

41. A carnot heat engine is working between 27°C and 627°C. If θ amount of heat is supplied and 50 J of work is done then θ will be

(1) 80 J (2) 95 J

(3) 75 J (4) 60 J

42. A parallel plate capacitor of plate area A and plate separation d is filled with a dielectric of dielectric constant K = 2 and thickness $d/3$. The effective capacitance of the capacitor will be

(1) $6\frac{A\varepsilon_0}{d}$ (2) $3\frac{A\varepsilon_0}{2d}$

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

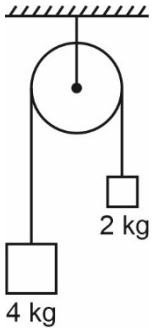
43. Two rods of different material have same length (l) and area of cross section (A) if the thermal conductivity of these materials are $2K$ and $3K$ then equivalent thermal resistance of the composite rod if connected in parallel will be

(1) $\frac{l}{4KA}$ (2) $\frac{l}{6KA}$

(3) $\frac{l}{3KA}$ (4) $\frac{l}{5KA}$

Space for Rough Work

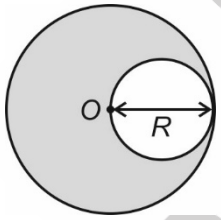
44. Acceleration of center of mass for the pulley mass arrangement shown in the diagram given below when released from rest will be



(1) $\frac{g}{9}$ m/s^2 (2) $\frac{g}{10}$ m/s^2

(3) $\frac{g}{8}$ m/s^2 (4) $\frac{g}{7}$ m/s^2

45. A circular plate of radius $\frac{R}{2}$ is cut from one edge of thin circular plate of radius R and mass M. The moment of inertia of remaining portion about an axis through 'O' and perpendicular to plane of plate is



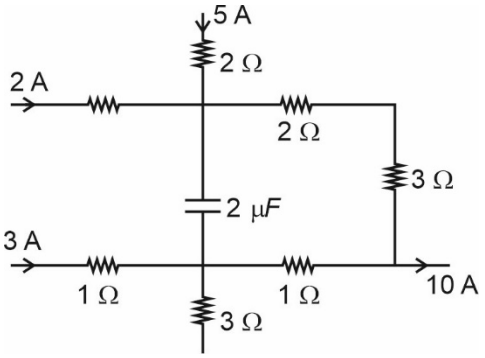
(1) $\frac{11MR^2}{24}$

(2) $\frac{7MR^2}{12}$

(3) $\frac{13MR^2}{32}$

(4) $\frac{15MR^2}{7}$

46. Given below is a part of network with various values shown. The energy stored in capacitor is



(1) 1.024×10^{-3} J (2) 1.024×10^{-2} J

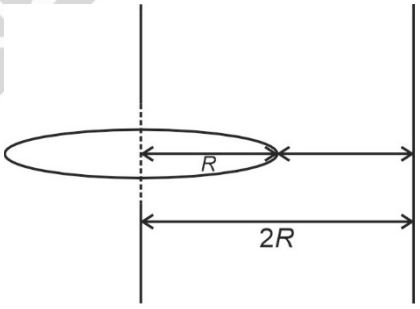
(3) 1.024 J (4) 0.1024 J

47. A body of mass m is moving with velocity v. If we increase the kinetic energy eight times by increasing the mass and velocity both. If percent change in velocity and mass both are equal then numerical value of percent change in velocity is

(1) 50% (2) 100%

(3) 200% (4) 150%

48. Radius of gyration of a disc mass m and radius R about an axis parallel to axis passing through centre of mass and perpendicular to the plane of a disc, at a distance $2R$ from the center of disc will be



(1) $\sqrt{\frac{5}{2}}R$ (2) $\sqrt{\frac{7}{2}}R$

(3) $\sqrt{\frac{3}{2}}R$ (4) $\sqrt{\frac{9}{2}}R$

Space for Rough Work

49. If speed of the particle in circular motion is decreasing with time then angle between velocity vector and acceleration vector will be

(1) Acute

(2) Obtuse

(3) $\frac{\pi}{2}$

(4) π

50. A copper rod of length 0.19 m is moving with a uniform velocity 10 m/s parallel to a long straight wire carrying current of 5.0 A. The rod itself is perpendicular to wire with its ends at distance 0.01 m and 0.2 m from it. The e.m.f induced in rod is (approximately) (Take ln20 = 2.99)

(1) 20 μV (2) 30 μV

(3) 40 μV (4) 50 μV

CHEMISTRY

SECTION - A

51. Charge required to produce 120 g of Ca from molten $CaCl_2$ is (1 F = 1 faraday)

(1) 1 F (2) 2 F

(3) 6 F (4) 8 F

52. Given below are two statements.

Statement-I: Compound $[CoCl_4]^{2-}$ having 3 unpaired electron and sp^3 hybridisation.

Statement-II: $[Fe(CN)_6]^{3-}$ is paramagnetic in nature.

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

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

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

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

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

53. Nylon 6, 6 is an example of

(1) Fibre

(2) Thermoplastic polymer

(3) Thermosetting polymer

(4) Elastomers

54. Number of term(s) among following that will have positive value for a solution showing +ve deviation is/are

ΔH_{mix}, ΔV_{mix}, ΔS_{mix}, ΔG_{mix}.

(1) 3 (2) 4

(3) 1 (4) 2

55. The difference of the number of lone pairs of electron on central atom in BrF_5 and XeF_2

(1) 2 (2) 1

(3) 0 (4) 3

56. $CH_3CH_2COONa \xrightarrow[CaO, \Delta]{NaOH} A \xrightarrow[h\nu]{1\ eq.\ Cl_2} B \xrightarrow[Ether]{Na} C$

The product C is

(1) CH_3CH_2Cl (2) CH_4

(3) C_2H_6 (4) C_4H_{10}

57. Which of the following aqueous solution has highest osmotic pressure?

(1) 0.05 M sucrose (2) 0.02 M $CaCl_2$

(3) 0.02 M NaCl (4) 0.005 M $CaCl_2$

58. The IUPAC name of

$N \equiv C - CH_2 - CH_2 - CH_2 - \overset{\overset{O}{\|}}{C} - OH$ is

(1) 5-cyanopentanoic acid

(2) 4-cyanobutanoic acid

(3) 3-cyano-1-carboxypropane

(4) 5-carboxypentanenitrile

Space for Rough Work

59. Match list-I with list-II.

	List-I (Quantum number)		List-II (Orbital)
a.	n = 3, l = 1	(i)	3*s*
b.	n = 3, l = 0	(ii)	2*p*
c.	n = 2, l = 1	(iii)	3*p*
d.	n = 3, l = 2	(iv)	3*d*

Choose the correct match from the options given below:

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

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

60. The mass of CO_2 produced by the combustion of 75 g of C_2H_6 in excess of oxygen is

(1) 44 g (2) 176 g

(3) 132 g (4) 220 g

61. Both natural and synthetic samples of cupric carbonate contain same percentage of copper and carbon by mass. This fact is based on

(1) Law of conservation of mass

(2) Law of definite proportion

(3) Law of multiple proportion

(4) Avogadro law

62. Maximum number of electrons associated with $\ell = 1$, m = 0 in sodium atom is

(1) 1 (2) 2

(3) 6 (4) 8

63. Atomic number of element Unununnium is

(1) 101 (2) 110

(3) 111 (4) 100

64. Polar molecule among the following is

(1) BF_3 (2) CO_2

(3) H_2O (4) SO_3

65. Shape of I_3^- molecule is

(1) Trigonal bipyramidal (2) See saw

(3) Linear (4) Pyramidal

66. The volume occupied by 80 g of methane at 5 atm pressure and 300 K temperature is

(1) 12.3 L (2) 49.2 L

(3) 24.6 L (4) 123 L

67. Unit of surface tension is

(1) N (2) Nm

(3) Nm^{-1} (4) $N^{-1}m$

68. 2 mol of ideal gas expand reversibly and isothermally to triple its volume at 300 K. The work done during the process is approximately (in L atm)

(1) –8.9 (2) –54.4

(3) –28.5 (4) –42.0

69. If $\Delta_{fus}H^\circ$ for H_2O is 6 kJ mol^{-1} then heat required to melt 54 g of H_2O is

(1) 3 kJ (2) 6 kJ

(3) 18 kJ (4) 24 kJ

70. Among the following, planar species is

(1) CH_4 (2) XeF_4

(3) $SiCl_4$ (4) SF_4

71. Most basic among the following is

(1) $Ce(OH)_3$ (2) $Pr(OH)_3$

(3) $Nd(OH)_3$ (4) $Eu(OH)_3$

72. Intensity of red colour in following equilibrium can be increased

$$Fe^{3+}(aq) + SCN^-(aq) \rightleftharpoons [Fe(SCN)]^{2+}(aq)$$

(1) By adding $H_2C_2O_4$

(2) By adding potassium thiocyanate

(3) By adding aq. $HgCl_2$

(4) By adding KCl

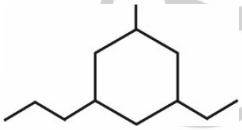
Space for Rough Work

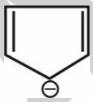
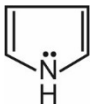
73. Oxidation number of sulphur in $H_2S_2O_7$ is
(1) –2 (2) 2
(3) 6 (4) 8

74. On hydrolysis of KO_2 the product formed is/are
(a) KOH (b) O_2
(c) H_2O_2 (d) H_2
and choose the correct option.
(1) (a) & (b) only
(2) (a), (b) & (d) only
(3) (b) & (c) only
(4) (a), (b) & (c) only

75. Thermally least stable carbonate among the following is
(1) $BeCO_3$ (2) $MgCO_3$
(3) $CaCO_3$ (4) $BaCO_3$

76. $B_2H_6 + NH_3 \rightarrow A \xrightarrow{\Delta} B$. The product B is
(1) $(BN)_x$ (2) $2BH_3.NH_3$
(3) $[BH_2(NH_3)_2]^+[BH_4]^-$ (4) $B_3N_3H_6$

77. The IUPAC name of  is
(1) 1-Propyl-3-ethyl-5-methylcyclohexane
(2) 1-Ethyl-3-methyl-5-propylcyclohexane
(3) 1-Methyl-3-propyl-5-ethylcyclohexane
(4) 1-Methyl-3-ethyl-5-propylcyclohexane

78. Anti-aromatic species among the following is
(1)  (2) 
(3)  (4) 

79. Laxative effect is caused by excess of
(1) Nitrate (2) Fluoride
(3) Sulphate (4) Cadmium

80. If anion C make ccp and cation A is in half of octahedral voids while cation B is in half of tetrahedral voids then the formula of the compound is
(1) AB_2C_2 (2) A_2BC
(3) AB_2C (4) ABC_2

81. **Assertion (A):** Fluorine is a stronger oxidising agent than chlorine.
Reason (R): F-F bond has a low enthalpy of dissociation and fluoride ion (F^-) has high hydration enthalpy.
In the light of above statements choose the most appropriate answer from options given below
(1) Both (A) & (R) are true and (R) is the correct explanation of (A)
(2) Both (A) & (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true and (R) is false
(4) (A) and (R) both are false

82. In the decomposition of H_2O_2, evidences suggest following mechanism:
Step (1) $H_2O_2 + I^- \rightarrow H_2O + IO^-$ (Slow)
Step (2) $H_2O_2 + IO^- \rightarrow H_2O + I^- + O_2$ (Fast)
Overall reaction
$$2H_2O_2 \xrightarrow[\text{alkaline medium}]{I^-} 2H_2O + O_2$$
The order of the reaction with respect to H_2O_2 is
(1) 2 (2) 1
(3) Zero (4) 3

83. Example of aerosol is
(1) Cheese (2) Butter
(3) Foam rubber (4) Fog

84. Which of the following techniques is used for refining of silicon?
(1) Zone refining (2) Liquation
(3) van Arkel method (4) Mond process

Space for Rough Work

85. Which of the following is not a method for preparation of nitrogen?

(1) $NH_4Cl(aq) + NaNO_2(aq)$

(2) Heating of $(NH_4)_2 Cr_2O_7$

(3) Thermal decomposition of $Ba(N_3)_2$

(4) $NH_2CONH_2 + H_2O$

SECTION - B

86. Cl_2 on reaction with hot and concentrated NaOH majorly gives

(1) NaOCl

(2) $NaClO_2$

(3) $NaClO_3$

(4) $NaClO_4$

87. For which of the following equilibrium $K_P = K_C$ at any temperature?

(1) $2NOCl(g) \rightleftharpoons 2NO(g) + Cl_2(g)$

(2) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

(3) $Ni(s) + 4CO(g) \rightleftharpoons Ni(CO)_4(g)$

(4) $2HI(g) \rightleftharpoons H_2(g) + I_2(g)$

88. Which of the following has lowest enthalpy of atomisation?

(1) Fe (2) Co

(3) Ni (4) Cu

89. pH of 2×10^{-4} M $Ba(OH)_2$ aqueous solution is nearly

(1) 1.7 (2) 2

(3) 10.6 (4) 13.6

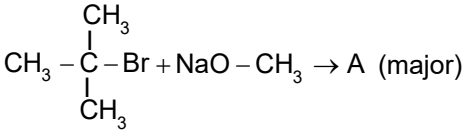
90. The facial and meridional isomers are shown by

(1) $[CrCl_2(ox)_2]^{3-}$

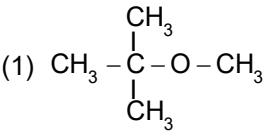
(2) $[Fe(NH_3)_2(CN)_4]^-$

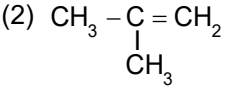
(3) $[Co(NH_3)_3Cl_3]$

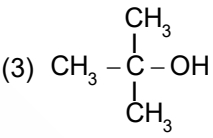
(4) $[Co(NH_3)_5(NO_2)]Cl_2$

91. 

Product A is

(1) 

(2) 

(3) 

(4) $CH_3 - O - CH_3$

92. $C_6H_5CHO \xrightarrow[\Delta]{\text{conc. NaOH}}$ Benzyl alcohol + B

Product B is

(1) Benzaldehyde

(2) Sodium benzoate

(3) Benzoic acid

(4) Benzene

93. $C_2H_5 - Cl \xrightarrow{KCN} A \xrightarrow{H_3O^+} B \xrightarrow[(ii)\,\Delta]{(i)\,NH_3} C \xrightarrow[NaOH]{Br_2} D$

The product D is

(1) C_2H_5CN

(2) $C_2H_5NH_2$

(3) $C_2H_5CONH_2$

(4) CH_3CH_2COOH

94. The disaccharide held together by a glycosidic linkage between C1 of α-D-glucose and C4 of α-D-glucose is

(1) Sucrose (2) Maltose

(3) Lactose (4) Amylose

Space for Rough Work

95. Choose the correct statements.

(a) If salt bridge is removed, potential falls to zero.

(b) KCl cannot be used as electrolyte in salt bridge in case of silver electrode.

(c) Salt bridge helps to maintain the electrical neutrality of the solution in the two half cells.

(d) The electrolytes used to make salt bridge should not be inert.

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

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

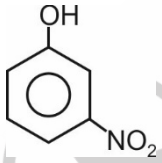
96. Derivative(s) of barbituric acid is/are

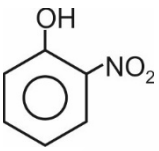
(1) Veronal (2) Amytal

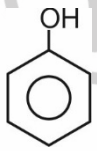
(3) Nembutal (4) All of these

97. Least acidic among the following is

(1) 

(2) 

(3) 

(4) 

98. Most stable carbanion among the following is

(1) $\overset{\ominus}{C}H_3$

(2) $CH_3\overset{\ominus}{C}H_2$

(3) $CH_2{=}\overset{\ominus}{C}H$

(4) $HC \equiv C^{\ominus}$

99. $CH_3 - C \equiv C - CH_3 \xrightarrow[BaSO_4]{H_2/Pd\,(C)} P;$

Major product P is

(1) But-1-ene (2) Butane

(3) trans-But-2-ene (4) cis-But-2-ene

100. An ideal solution is made by mixing 10 mol of X and 20 mol of Y. The vapour pressure of the solution in torr is $(P_X^\circ = 200 \text{ torr}, P_Y^\circ = 100 \text{ torr})$

(1) 100

(2) 200

(3) $\frac{200}{3}$

(4) $\frac{400}{3}$

BOTANY

SECTION - A

101. Select the feature which is **not** true for Pteridophytes.

(1) The main plant body is sporophyte differentiated into true root, stem and leaves.

(2) Most of the species produce similar types of spores.

(3) The spores germinate to produce prothallus which is multicellular, free living and photosynthetic.

(4) The sporophyte is totally or partially dependent on gametophyte for its anchorage

102. Who concluded that presence of cell wall is unique characteristic of the plant cells?

(1) Matthias Schleiden

(2) Theodore Schwann

(3) Rudolf Virchow

(4) Robert Brown

Space for Rough Work

103. Match the following columns and choose the **correct** option.

	Column I		**Column II**
A.	Friedrich Miescher	(i)	Performed experiment with bacteria responsible for pneumonia
B.	Maurice Wilkins & Rosalind Franklin	(ii)	Proposed Central dogma in molecular biology
C.	Frederick Griffith	(iii)	He named DNA as nuclein
D.	Francis Crick	(iv)	Produced X-ray diffraction data of DNA

	A	B	C	D
(1)	(i)	(iii)	(iv)	(ii)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(ii)	(iii)	(iv)	(i)
(4)	(iii)	(i)	(iv)	(ii)

104. In angiosperms, ground tissue does **not** include
(1) Mesophyll tissue (2) Cortex
(3) Epidermis (4) Endodermis

105. Cells remain metabolically active but no longer proliferate in which of the given phase/stage of cell cycle?
(1) Mitotic phase (2) Synthesis phase
(3) Quiescent stage (4) Gap 1 phase

106. Select the **incorrect** statement for the molecule that is used as an immunosuppressive agent?
(1) It is obtained from a eukaryotic organism
(2) It is produced by a multicellular organism
(3) It is produced by a heterotrophic organism
(4) It is obtained from a fungi that belongs to class Basidiomycetes

107. N_2 fixing microbes can fix nitrogen because
(1) They all are obligate anaerobes
(2) They contain nitrogenase
(3) They are eukaryotes
(4) They are chemoautotrophs

108. In which plant, the placenta is axial and the ovules are attached to it in a multilocular ovary?
(1) Lemon
(2) Pea
(3) *Argemone*
(4) *Primrose*

109. Select the **correct** sequence of stages involved in primary succession of plants in water.
A. Submerged plant stage
B. Reed-swamp stage
C. Phytoplanktons
D. Marsh-meadow stage
E. Submerged free floating plant stage
(1) C → E → A → B → D
(2) C → E → B → A → D
(3) C → A → B → D → E
(4) C → A → E→ B → D

110. Select the **correct** sequence of tissues for water transport in the root.
(1) Epidermis → Pericycle → Endodermis → Cortex → Xylem
(2) Epidermis → Cortex → Endodermis → Pericycle → Xylem
(3) Xylem → Endodermis → Pericycle → Cortex → Epidermis
(4) Cortex → Pericycle → Epidermis → Xylem → Endodermis

Space for Rough Work

111. Match the column I with column II and choose the **correct** option.

	Column I		Column II
A.	Grasshopper	(i)	Third trophic level
B.	Grasses	(ii)	Top carnivore
C.	Wolf	(iii)	Second trophic level
D.	Lion	(iv)	Primary producers

	A	B	C	D
(1)	(ii)	(iv)	(i)	(iii)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(iii)	(i)	(ii)	(iv)
(4)	(ii)	(iv)	(iii)	(i)

112. The site for lactic acid and alcoholic fermentation is

(1) Inter membrane space of mitochondria

(2) Cytoplasm of the cell

(3) Matrix of mitochondria

(4) Inner membrane of mitochondria

113. Consider the following statements and choose the **correct** option.

Statement-A: Eurythermal organisms are restricted to narrow range of temperature.

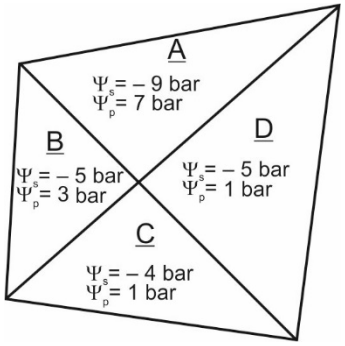
Statement-B: All colour components of visible spectrum are not available for marine plants living at different depth of oceans.

(1) Only statement A is incorrect

(2) Only statement B is incorrect

(3) Both statements A and B are correct

(4) Both statements A and B are incorrect

114. 

In the given diagram, four cells A, B, C and D are interconnected. In which of the given pair of cells, net movement of water will be zero?

(1) A and B

(2) A and D

(3) B and C

(4) C and D

115. _____ refers to the number of births during given period in the population that are added to initial density.

Select **correct** option to fill in the blank.

(1) Immigration (2) Mortality

(3) Natality (4) Emmigration

116. Which among the following is **incorrectly** matched pair?

(1)	Environment (protection) Act	–	1986, to protect and improve the quality of our environment
(2)	Water Act	–	1974, to safeguard our water resources
(3)	Montreal protocol	–	Signed in Canada in 1987 to control the emission of ozone depleting substances
(4)	Air Act	–	Amended in 1981 to include noise as an air pollutant

Space for Rough Work

117. Read the following statements and mark the **incorrect** one.
(1) Mesophyll cells possess chloroplast and carry out photosynthesis
(2) Cuticle is found on both stem and roots of all plants
(3) Stomata regulates gaseous exchange
(4) Cork cambium is involved in secondary growth

118. Choose the feature which is **not** true for RNA polymerase in prokaryotes.
(1) It is the single enzyme which catalyses transcription of all types of RNA
(2) It facilitates opening of DNA helix
(3) It is capable of catalysing all process of initiation, elongation and termination without involvement of any factors
(4) It polymerises RNA in a template dependent fashion

119. Select the **incorrect** match.
(1) Indole compounds - Auxin
(2) Terpenes - Ethylene
(3) Adenine derivatives - Kinetin
(4) Derivatives of carotenoids - ABA

120. Which of the following statements is **not** true?
(1) Tapetum is innermost wall layer of microsporangium and it helps in dehiscence of anther
(2) Sporogenous tissue in anther is a group of compactly arranged homogenous cells
(3) Cells of middle layer of the anther wall degenerate at maturity
(4) Pollen grains represents male gametophyte

121. Asexual reproduction does not
(1) Involve single parent
(2) Lead to variations among offsprings
(3) Involve gamete formation
(4) Produce morphologically and genetically similar organisms

122. The capacity to generate a whole plant from any cell/explant is called
(1) Totipotency
(2) Somatic hybridisation
(3) Biofortification
(4) Plant breeding

123. Based on dihybrid crosses conducted by Morgan on *Drosophila*, what percent of offsprings were recombinant type in F_2 generation when yellow bodied and white eye female were crossed with wild type male?
(1) 37.2% (2) 62.8%
(3) 98.7% (4) 1.3%

124. Consider the following statements and choose the **incorrect** one(s).
a. Higher plant cells contain non-membrane bound organelle called centrosome which helps in cell division.
b. Gas vacuole is a type of inclusion body found in blue-green, purple and green photosynthetic bacteria.
c. Fimbriae are known to attach the bacteria to rocks.
d. Contractile vacuole is important for osmoregulation and excretion.
e. Lysosomes are important site of formation of glycolipids and glycoproteins.
(1) a, c and d only
(2) b, d and e only
(3) a and e only
(4) c and e only

Space for Rough Work

125. In acrocentric chromosome,
(1) Its appearance is I shaped during anaphase
(2) The centromere is situated close to its end forming one extremely short and one very long arm.
(3) The centromere is slightly away from the middle of the chromosome.
(4) Two equal arms are present

126. Among vertebrates which one of the following have maximum species diversity?
(1) Mammals (2) Birds
(3) Amphibians (4) Fishes

127. If 2 Kcal energy is trapped by grass then what will be the amount of energy available for primary carnivores?
(1) 20 Kcal (2) 20 cal
(3) 2 Kcal (4) 0.2 cal

128. Which of the given is smallest living organism and can survive without oxygen?
(1) *Mycoplasma* (2) *Trypanosoma*
(3) *Paramoecium* (4) *Euglena*

129. Consider the following statements and choose the correct option.
Statement-A: The C_4 plants respond to higher temperature and show higher rate of photosynthesis than C_3 plants.
Statement-B: Both C_3 and C_4 plants show similar effect for CO_2 concentration at high light intensities *i.e.*, similar saturation level.
(1) Both the statements are correct.
(2) Both the statements are incorrect.
(3) Only statement 'A' is correct.
(4) Only statement 'B' is correct.

130. Which among the following is eukaryotic organism and acts as biofertilizer?
(1) *Nostoc* (2) *Oscillatoria*
(3) *Azotobacter* (4) *Glomus*

131. The parasitic fungus on mustard plant causing white rust belongs to which class of fungi?
(1) Phycomycetes
(2) Ascomycetes
(3) Basidiomycetes
(4) Deuteromycetes

132. In capping,
(1) A nucleotide is added to 3′ end of hnRNA.
(2) A nucleotide, methyl guanosine triphosphate is added to 5′ end of hnRNA.
(3) Adenylate residues are added to 3′ end of hnRNA.
(4) 200-300 unusual nucleotides are added at 5' end of hnRNA.

133. According to R.H. Whittaker system of classification, how many kingdom(s) show heterotrophic mode of nutrition?
(1) Three (2) One
(3) Four (4) Five

134. Which of the given is primary CO_2 acceptor in C_4-plants?
(1) PEP (2) OAA
(3) PGA (4) RuBP

135. Thinning of egg shells in fish eating birds and their premature breaking is due to
(1) Eutrophication
(2) Biomagnification of DDT
(3) Accumulation of calcium
(4) Thermal pollution

SECTION - B

136. Which among the following algae has stored food very similar to amylopectin and glycogen in structure?
(1) *Dictyota* (2) *Fucus*
(3) *Gracilaria* (4) *Ectocarpus*

Space for Rough Work

137. Which of the following is **incorrect** for the first step of glycolysis?
(1) It is conversion of glucose to glucose - 6 - phosphate
(2) It is catalysed by hexokinase
(3) This reaction requires ATP
(4) This reaction require Mo as a cofactor

138. Viroids differ from prions as in the former
(1) Single stranded DNA is present
(2) Genetic material is present
(3) Infectious property is present
(4) Protein coat is present

139. Select the **incorrect** match.
(1) Family – Muscidae
(2) Class – Primata
(3) Order – Sapindales
(4) Genus – *Triticum*

140. How many biosphere reserves and wildlife sanctuaries India has respectively?
(1) 14 and 448 (2) 41 and 96
(3) 98 and 448 (4) 25 and 14

141. Which of the given pair of hormones show their synergistic effect on cell division?
(1) Auxin and Cytokinin
(2) Ethylene and ABA
(3) Auxin and GA_3
(4) Ethylene and Cytokinin

142. Consider the following flowers and select the **correct** option w.r.t flowers showing radial symmetry.
a. Pea b. Gulmohur
c. Mustard d. *Cassia*
e. Chilli
(1) a, b and c only (2) c and e only
(3) d and e only (4) a, c and e only

143. In angiosperms, male gametes are formed by A which B .
Complete the above statement by choosing the **correct** option.

	A	B
(1)	Vegetative cell	Is small in size
(2)	Generative cell	Has large irregularly shaped nucleus
(3)	Vegetative cell	Has abundant food reserves
(4)	Generative cell	Is spindle shaped

144. Select the **incorrect** match.
(1) Rhizome – Banana
(2) Offset – *Eichhornia*
(3) Conidia – *Chlamydomonas*
(4) Bulbil – *Oxalis*

145. Ring arrangement of vascular bundles is characteristic of
(1) Monocot stem (2) Dicot root
(3) Monocot root (4) Dicot stem

146. In which of the following organisms, female can produce two types of gametes?
(1) Humans (2) Grasshopper
(3) Butterflies (4) *Drosophila*

147. Consider the following assertion (A) and reason (R) and choose the **correct** option.
Assertion (A): An individual inflicted with phenylketonuria shows mental retardation due to accumulation of phenylalanine.
Reason (R): Phenylketonuria is inherited as the autosomal recessive trait which is transmitted from both the parents to the offspring.
(1) Both (A) and (R) are true and (R) is correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not correct explanation of (A)
(3) Only (A) is true
(4) Both (A) and (R) are false

Space for Rough Work

148. The stage of cell division in which exchange of genetic material between non-sister chromatids of homologous chromosomes occurs is also characterised by
(1) Dissolution of synaptonemal complex
(2) Terminalisation of chiasmata
(3) Clear appearance of chiasmata
(4) Involvement of recombinase enzyme

149. Consider the following statements and choose the correct option stating them as true **(T)** or false **(F)**.
A. Both thorns and spines are modifications of stem which protect plants from browsing animals.
B. In flowers of peach, gynoecium occupies the highest position.
C. In silk cotton, the leaflets are attached at a common point.
D. China rose has alternate phyllotaxy.

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

150. Denitrification is carried by which of the following bacteria?
(1) *Nitrococcus* (2) *Pseudomonas*
(3) *Nitrobacter* (4) *Nitrosomonas*

ZOOLOGY

SECTION - A

151. Choose the **correct** match.

(1)	Compound epithelium	–	Single layer of cells
(2)	Gap junctions	–	Facilitate the cells to communicate with each other
(3)	Adipocytes	–	Secrete fibres
(4)	Areolar tissue	–	Specialised connective tissue

152. Proboscis gland in hemichordates is associated with the function of
(1) Digestion (2) Respiration
(3) Excretion (4) Bioluminescence

153. In *Periplaneta americana*, each Malpighian tubule is lined by
(1) Non-glandular and ciliated cells
(2) Glandular and ciliated cells
(3) Non-glandular and non-ciliated cells
(4) Glandular and non-ciliated cells

154. Choose the option which **correctly** states the type of joint present between the following
a. Atlas and axis
b. Femur and acetabulum
c. Cranial bones
d. Phalanges

	a	b	c	d
(1)	Hinge	Pivot	Sutures	Saddle
(2)	Pivot	Ball and socket	Sutures	Hinge
(3)	Pivot	Gliding	Fibrous	Saddle
(4)	Hinge	Ball and socket	Saddle	Hinge

Space for Rough Work

155. Choose the **odd** one w.r.t urochordates.
(1) *Ascidia* (2) *Salpa*
(3) *Doliolum* (4) *Branchiostoma*

156. Alimentary canal is complete with a well developed pharynx and sexes are separate in
(1) *Taenia* (2) *Pheretima*
(3) *Ancylostoma* (4) *Physalia*

157. Person with blood group 'O' is considered as universal donor because he has
(1) Antigens A and B on RBCs and no antibodies in plasma
(2) Antigen A on RBCs and anti-B antibody in plasma
(3) Antigen B on RBCs and anti-A antibody in plasma
(4) Neither A nor B antigen on RBCs

158. How many animals given in the box are ureotelic?

Frog, Pigeon, Lizards, Humans, Cockroach

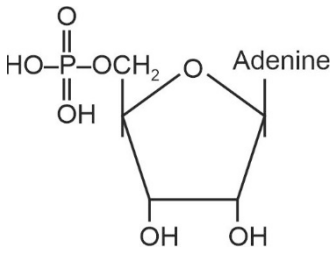
Select the correct option.
(1) Two
(2) Three
(3) Four
(4) Five

159. Consider the following equation.
$S - G + S' \rightarrow S + S' - G$
The enzyme catalysing the following reaction belongs to class
(1) Dehydrogenases (2) Transferases
(3) Hydrolases (4) Lyases

160. Corpora quadrigemina which consists mainly of four round swellings is located in the dorsal portion of
(1) Thalamus (2) Midbrain
(3) Pons (4) Medulla

161. Vital capacity can be represented by all, **except**
(1) IRV + TV + ERV (2) ERV + IC
(3) TLC – RV (4) RV + TV

162. Identify the structure given below and select the **incorrect** option w.r.t. it.



(1) The bond between adenine and sugar is a glycosidic bond.
(2) The bond between the phosphate and hydroxyl group of sugar is a phosphoester bond.
(3) It is present in DNA.
(4) Adenine exhibits a heterocyclic ring.

163. The hormone which remains at its lowest concentration during ovulation is
(1) LH (2) FSH
(3) Estrogen (4) Progesterone

164. Which one of the following pairs is **incorrectly** matched w.r.t hormone and its deficiency diseases/disorders?
(1) GH – Pituitary dwarfism
(2) Thyroxine – Graves' disease
(3) Adrenal cortical hormones – Addison's disease
(4) ADH – Diabetes insipidus

165. Which of the following digestive enzymes is present in succus entericus?
(1) Amylase
(2) Nuclease
(3) Procarboxypeptidase
(4) Maltase

Space for Rough Work

166. A sexually transmitted infection which is completely curable if detected early and treated properly, is
(1) Syphilis
(2) Hepatitis-B
(3) Genital herpes
(4) HIV infection

167. The normal site for completion of meiotic division of the secondary oocyte in a human female is
(1) Fallopian tube (2) Ovary
(3) Vagina (4) Cervix

168. Select the **incorrect** statement.
(1) pCO_2 in deoxygenated blood is more than pO_2 in tissues
(2) pO_2 in alveoli is less than pCO_2 in tissues
(3) pCO_2 in alveoli is less than pCO_2 in tissues
(4) pO_2 in oxygenated blood is more than that of pCO_2 in atmospheric air

169. In patients suffering from malaria, a toxic substance haemozoin, is released due to rupture of
(1) WBCs in humans
(2) RBCs in humans
(3) Gametocytes in mosquito
(4) Sporozoites in humans

170. Which of the following methods of birth control is considered as non-medicated IUD?
(1) Lippes loop (2) Condoms
(3) Progestasert (4) Implants

171. Select the **correct** option to complete the analogy.
Cardiac arrest : Heart stops beating :: Heart failure: ____
(1) Deposition of fat and cholesterol in arteries of heart
(2) A symptom of acute chest pain
(3) Heart muscles are damaged by an inadequate blood supply
(4) Heart does not pump blood effectively enough to meet the needs of the body

172. A novel strategy of RNA interference is adopted for tobacco plants to control infestation of
(1) *Meloidogyne incognita*
(2) *Bacillus thuringiensis*
(3) Bollworms
(4) Corn borer

173. All of the following gases were present in the Miller's experiment **except**
(1) CH_4 (2) O_2
(3) NH_3 (4) H_2

174. The neurons with one axon and two or more dendrites are present mainly in
(1) Retina of eye
(2) Embryo
(3) Cerebral cortex
(4) Dorsal root ganglion of spinal cord

175. Bt toxin genes are isolated from ____A____ and encode for protein which when activated cause death of ____B____. Here A and B are

	A	**B**
(1)	*Agrobacterium*	Cotton plant
(2)	*Bacillus thuringiensis*	Insects
(3)	*Agrobacterium*	*Bacillus thuringiensis*
(4)	*E. coli*	Insects

176. The part of brain stem that contains the centre for regulation of gastric secretions also contains the centre for regulation of
(1) Temperature
(2) Cardiovascular reflexes
(3) Sexual behaviour
(4) Sleep and wake cycle

Space for Rough Work

177. *Meloidogyne incognita* which infects the roots of tobacco plants is a
(1) Bacterium (2) Fungus
(3) Nematode (4) Protozoan

178. All of the following are functions associated with PTH, **except**
(1) Mineralisation of bones
(2) Reabsorption of Ca^{+2} by the renal tubules
(3) Increased blood concentration of calcium
(4) Increased absorption of Ca^{+2} from digested food

179. The first human – like being, the hominid is called
(1) *Homo sapiens* (2) *Homo habilis*
(3) *Homo erectus* (4) Neanderthal man

180. Chromosome number in meiocytes of 'X' are 3 times that of chromosome number of gametes of 'Y'.
Select the option which **correctly** identifies the organisms X and Y respectively.
(1) Fruit fly and housefly
(2) Butterfly and housefly
(3) Butterfly and fruit fly
(4) Housefly and fruit fly

181. Choose the **incorrectly** matched pair.
(1) DNA – Exists as a double helix
(2) Cellulose – Plant cell wall
(3) Uridylic acid – Nucleotide
(4) Chlorophyll – Secondary metabolite of plant cell

182. **Assertion (A):** Secondary oocytes are haploid in nature.
Reason (R): Primary oocytes undergo meiosis-I.
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(3) (A) is true, (R) is false
(4) (A) is false, (R) is true

183. Select the **odd** one among the following w.r.t. analogous structures.
(1) Eyes of octopus and eyes of mammals
(2) Flippers of penguins and dolphins
(3) Root of sweet potato and stem tuber of potato
(4) Forelimbs of whale and bats

184. Which of the following does not disturbs the Hardy-Weinberg equilibrium?
(1) Migration of a set of population
(2) Change in gene frequency by chance
(3) Absence of mutations for years
(4) Non-random mating

185. Hydrochloric acid in stomach and tears from eyes are
(1) Physical barriers
(2) Physiological barriers
(3) Cellular barriers
(4) Cytokine barriers

SECTION - B

186. Read the statements **A** and **B** and choose the **correct** option.
Statement-A : Proteinaceous enzymes exhibit substrate specificity and require optimum temperature and pH for maximal activity.
Statement-B : Inorganic catalysts work efficiently at high temperatures and high pressures, while most enzymes get damaged at high temperatures.
(1) Statements A and B are correct
(2) Statements A and B are incorrect
(3) Only statement A is correct
(4) Only statement B is correct

Space for Rough Work

187. Pneumotaxic centre that regulates the activity of respiratory rhythm centre is present in
(1) Pons (2) Medulla
(3) Cerebellum (4) Hypothalamus

188. When bile pigments like bilirubin increase in blood it causes A . In this disorder, B is affected.
Choose the **correct** option for filling the blanks A and B.

	A	**B**
(1)	Indigestion	Kidney
(2)	Diarrhoea	Liver
(3)	Constipation	Gall bladder
(4)	Jaundice	Liver

189. Choose the option which **correctly** identifies the enzyme responsible for breakdown of triglycerides into fatty acids and glycerol.
(1) Sucrase
(2) Maltase
(3) Lipase
(4) Nuclease

190. Select the **incorrect** statement.
(1) Smack is obtained by acetylation of morphine.
(2) Crack is a very effective sedative.
(3) Marijuana and hashish are cannabinoids.
(4) Excessive dosage of cocaine causes hallucinations.

191. Given below are four statements (a – d).
(a) Coronary artery disease is referred to as atherosclerosis.
(b) The P-wave of ECG represents the electrical excitation of the ventricles.
(c) Annelids and chordates have a closed circulatory system.
(d) The cardiac output is defined as the volume of blood pumped out by each ventricle per stroke.
Which two of the above statements are **correct**?
(1) b and c (2) a and c
(3) c and d (4) b and d

192. In humans, the number of disulfide bonds in pro-insulin and mature insulin respectively are
(1) 2 and 2 (2) 3 and 2
(3) 3 and 3 (4) 2 and 3

193. Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as
(a) Lepidopterans like tobacco budworm
(b) Dipterans like beetles
(c) Coleopterans like mosquitoes
Select the **correct** option.
(1) (a) and (b) (2) (a) only
(3) (c) only (d) (b) and (c)

194. Select the **correct** statement.
(1) Maximum number of transgenic animals are sheep.
(2) Golden rice is enriched with β carotene.
(3) RNAi takes place in all prokaryotic organisms as a method of cellular defence.
(4) Ribonucleases can be used to digest nucleotides.

195. The first restriction endonuclease isolated was 'X' and it recognises a specific sequence of 'Y' base pairs.
Select the **correct** option for 'X' and 'Y' respectively.
(1) *Hin*d II and 4 (2) *Hin*d III and 6
(3) *Hin*d II and 6 (4) *Hin*d III and 4

196. Select the **odd** one among the following w.r.t. vector borne diseases.
(1) Chikungunya (2) Dengue
(3) Malaria (4) Tetanus

Space for Rough Work

197. Select the **correct** set of organisms that excrete same type of nitrogenous waste.
(1) Bony fishes and birds
(2) Land snails and reptiles
(3) Marine fishes and bony fishes
(4) Aquatic amphibians and insects

198. Consider the following features
(a) Closed circulatory system
(b) Devoid of scales
(c) Spawning in fresh water
Which among the following organisms exhibits the above given characters?
(1) *Myxine*
(2) *Exocoetus*
(3) *Labeo*
(4) *Scoliodon*

199. Select the **correct** match.

(1)	Collagen	–	Intracellular ground substance
(2)	Lectins	–	Vinblastine and ricin
(3)	GLUT-4	–	Enables glucose transport into cells
(4)	Alkaloids	–	Carotenoids and anthocyanins

200. Which of the following methods of birth control cannot be used as an emergency contraceptive?
(1) Lippes loop
(2) Condoms
(3) Progestasert
(4) Implants

❑ ❑ ❑

Space for Rough Work

02/5/2023

Phase-I
CODE-B

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

FINAL TEST SERIES for NEET-2023

MM : 720 **Test-I3** **Time : 3 Hrs. 20 Mins.**

Answers

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

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FINAL TEST SERIES for NEET-2023

MM : 720 **Test-I3** **Time : 3 Hrs. 20 Mins.**

Answers and Solutions

PHYSICS

SECTION - A

1. Answer (1)

$\because \quad E = K + U$

$5 = K - 3$

$\Rightarrow \quad K = 8$ J

2. Answer (3)

When the monkey accelerates up along the rope with acceleration '*a*' then tension in the rope is

$T = m(g + a)$

For rope, not to break

$T \le T_{max}$

$m(g + a) \le (1.2)mg$

$a \le (1.2)g - g$

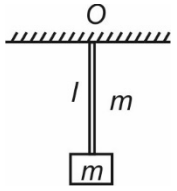
$a \le 2$

$a_{max} = 2$ m/s^2

3. Answer (3)

Tension at the point '*O*' is

$T = 2$ mg



Therefore, corresponding stress $= \frac{2mg}{A}$

At different points on the wire tension is different hence tensile stress is also different.

4. Answer (4)

Wave velocity $v = \frac{\omega}{K}$

$= \frac{3}{1} = 3$ m/s

5. Answer (2)

$v_T = \frac{2r^2(\rho - \sigma)g}{9\eta}$

$v_T \propto r^2$

Radius of big drop $R = n^{1/3} r$

$R = (125)^{1/3} \times r$

$\boxed{R = 5r}$

$\Rightarrow \frac{(v_T)_1}{(v_T)_2} = \frac{r^2}{(5r)^2} = \frac{1}{25}$

$\Rightarrow v_{T_2} = 25 \times v_{T_1} = 25 \times 2$

$= 50$ m/s

6. Answer (4)

$|\vec{E}| = \left|\frac{\Delta V}{\Delta x}\right|$

$E_1 = \frac{10}{2} = 5$ V/m

$E_2 = \frac{0}{1} = 0$ V/m

$E_3 = \frac{15-10}{4-3} = 5$ V/m

$E_4 = \frac{15}{5-4} = 15$ V/m

7. Answer (4)

All options are correct

8. Answer (4)

$\tan 30° = \frac{\tan\delta}{\cos\alpha}$

$\sqrt{3}\tan\delta = \cos\alpha$ ...(1)

$\tan 45° = \frac{\tan\delta}{\cos(90+\alpha)}$

$= \frac{\tan\delta}{-\sin\alpha}$

$\Rightarrow \sin\alpha = -\tan\delta$ ...(2)

$(1)^2$ and $(2)^2$ gives

$1 = \left[(\sqrt{3})^2 + 1^2\right]\tan^2\delta$

$\tan\delta = \frac{1}{2}$

$\delta = \tan^{-1}\left(\frac{1}{2}\right)$

9. Answer (1)

Internal resistance

$r = \left(\frac{I_1 - I_2}{I_2}\right) \times R$

Putting the values I_1, I_2 and R we have,

$r = \frac{150-100}{100} \times 5$

$= 2.5\ \Omega$

10. Answer (2)

$\left|\vec{a}_{avg}\right| = \frac{|\Delta\vec{v}|}{\Delta t} = \frac{R-0}{R} = 1$ m/s^2

11. Answer (2)

$x = 2t^2$(m)

$\frac{dx}{dt} = 4t$

$\frac{d^2x}{dt^2} = 4$ m/s^2

12. Answer (2)

$\theta_1 + \theta_2 = 90$

$15 + 75 = 90$

Therefore $H_A < H_B$, $R_A = R_B$

13. Answer (3)

$W = \int \vec{F}.d\vec{r} = \int xdy + \int ydx \Rightarrow [xy]_{1,2}^{(0,0)} = 0 - 2 = -2$ J

14. Answer (1)

Just after collision block velocity will be maximum.

15. Answer (3)

Centre of mass of the object will lie on the line joining the centre of the ring and mid points of chord *AB*.

16. Answer (3)

Applying conservation of angular momentum about any point on surface

$mv_0 r + \frac{2}{5}mr^2.\frac{v_0}{2r} = mvr + \frac{2}{5}mr^2.\frac{v}{r}$

$\Rightarrow \quad \frac{6mv_0 r}{5} = \frac{7}{5}mvr \ \Rightarrow v = \frac{6}{7}v_0$

17. Answer (1)

$\frac{2}{5}MR^2\omega = \frac{2}{5}M\left(\frac{R}{8}\right)^2.\omega'$

$\omega' = 64\omega$

Then duration of day $= \frac{24}{64} = 0.375$ hrs

18. Answer (4)

Applying energy conservation

$\frac{1}{2}mv^2 + \left[-\frac{GMm}{R}\right] = -\frac{GMm}{r}$

$\Rightarrow \quad \frac{1}{2}m.K^2.\frac{2GM}{R} - \frac{GMm}{R} = -\frac{GMm}{r}\frac{R}{R}$

$\Rightarrow \quad K^2 - 1 = \frac{-R}{r}$

$\Rightarrow \quad r = \frac{R}{1-K^2}$

19. Answer (2)

$E = \frac{1}{2}m\omega^2A^2$ …(i)

$F = m\omega^2A$ …(ii)

From (i) and (ii)

$\Rightarrow \quad \frac{E}{F} = \frac{A}{2}$

$\Rightarrow \quad A = \frac{2E}{F}$

20. Answer (1)

$V_{bc} = \sqrt{2g \times 5}$

$V_{ac} = \sqrt{2g\ 0.4 \times 5}$

$\boxed{e = \sqrt{\frac{2}{5}}}$

21. Answer (1)

Maximum displacement at $x = 5$

$y = 4\sin\left(\frac{5\pi}{10}\right) = 4\sin\frac{\pi}{2} = 4$ cm

22. Answer (4)

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \Rightarrow \frac{P_1M}{\rho_1T_1} = \frac{P_2M}{\rho_2T_2} \Rightarrow \frac{P_1}{\rho_1T_1} = \frac{P_2}{\rho_2T_2}$

$\therefore \frac{P_1}{P_2} = \frac{P_1}{P_2}.\frac{T_2}{T_1} = \frac{70}{76} \times \frac{(273+27)}{(273+7)} = \frac{70}{76} \times \frac{300}{280}$

$= \frac{75}{76}$

23. Answer (1)

$W = P\Delta V = 10^5 \times 2 = 2 \times 10^5$ J

24. Answer (1)

$V_A - V_B = \int_A^B \vec{E}.d\vec{r}$

25. Answer (1)

$v'\rho g = v\frac{\rho}{6}g$

$v' = \frac{v}{6}$

$\boxed{\frac{v'}{v} = \frac{1}{6}}$

26. Answer (4)

As there is no current in circular loop, So, no force is required to move it.

27. Answer (3)

Angular momentum = $\frac{nh}{2\pi} = \frac{h}{2\pi}$ $\{n = 1\}$

28. Answer (3)

$\frac{9\lambda D}{2d} - \frac{\lambda D}{d} = 7 \times 10^{-2}$

$\frac{\lambda D}{d} \times \frac{7}{2} = 7 \times 10^{-2}$

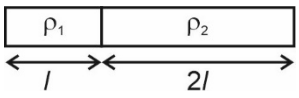
$\frac{\lambda \times 50 \times 10^{-2}}{30 \times 10^{-6}} = 1 \times 10^{-2}$

$\lambda = \frac{3 \times 10^{-6}}{5}$

$\lambda = 6 \times 10^{-7}$

$\lambda = 600$ nm

29. Answer (4)



$R_1 = \frac{\rho_1 l}{A}$

$R_2 = \frac{\rho_2(2l)}{A}$

$R_{eq} = R_1 + R_2$

$R_{eq} = \frac{l(\rho_1 + 2\rho_2)}{A}$

$\rho = \frac{RA}{l}$

$= \frac{l(\rho_1 + 2\rho_2)A}{A\ \ 3l}$

$\rho = \frac{\rho_1 + 2\rho_2}{3}$

30. Answer (1)

Drift velocity will not change in given situation

31. Answer (1)

$i_{avg} = \int_0^t \frac{idt}{t}$

$= \frac{\left|3t + \frac{2t^3}{3}\right|_0^2}{2}$

$= \frac{6 + \frac{16}{3}}{2}$

$= \frac{17}{3}$ A

32. Answer (2)

$\mu > \tan 30°$ *i.e.,* no slipping

$fr = mg\sin 30°$

$= 10$ N

33. Answer (4)

Balancing length will be 60 cm

34. Answer (4)

Insulator and semiconductors both have negative temperature coefficient of resistance.

35. Answer (1)

$P = VI$

$300 = 150i$

$i = 2$ A

Voltage drop across $R = 50$ V

$i = 2$ A

$$R = \frac{V}{i} = \frac{50}{2} = 25\ \Omega$$

SECTION - B

36. Answer (1)

$$i = \frac{\omega}{2\pi} \times 2q$$

$$B = \frac{\mu_0 i}{2R} = \frac{2\mu_0 q\omega}{2\pi R \times 2} = \frac{\mu_0 q\omega}{2\pi R}$$

37. Answer (1)

Side of $\Delta = \frac{L_m}{3}$

$$A = \frac{l_m^2}{12\sqrt{3}}$$

$M = i_A A$

$$M = \frac{i_A L_m^2}{12\sqrt{3}}$$

38. Answer (2)

$w = MB(1 - \cos\theta)$

$$4 = MB\left(1 - \frac{1}{\sqrt{2}}\right) \quad \ldots(1)$$

$\tau = MB\sin\theta$

At $\theta = 45°$

$$\tau = \frac{MB}{\sqrt{2}} \quad \ldots(2)$$

$$\tau = \frac{4\sqrt{2}}{\sqrt{2} - 1 \times \sqrt{2}}$$

$$= \frac{4}{\sqrt{2} - 1} = 4(\sqrt{2} + 1)$$

39. Answer (1)

$Q_V = nC_V \Delta T$

$Q_P = nC_P \Delta T$

$$\frac{Q_V}{Q_P} = \frac{C_V}{C_P} = \frac{\frac{3}{2}}{\frac{5}{2}} = \frac{3}{5}$$

$$\frac{100}{Q_P} = \frac{3}{5}$$

$$Q_P = \frac{500}{3}$$

40. Answer (3)

$20 \times 80 = 540X + X \times 100$

$$X = \frac{1600}{640} = 2.5\ \text{g}$$

41. Answer (3)

$$\eta = 1 - \frac{300}{900}$$

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

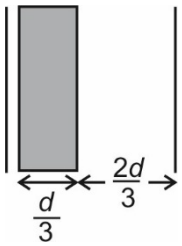
$$\eta = \frac{2}{3}$$

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

$$\frac{50}{\theta} = \frac{2}{3}$$

$$\theta = \frac{50 \times 3}{2} = 75\ \text{J}$$

42. Answer (3)



$$C_1 = \frac{KA\varepsilon_0}{d/3},\ C_2 = \frac{3A\varepsilon_0}{2d}$$

$$\therefore\ C_{eq} = \frac{C_1 C_2}{C_1 + C_2}$$

$$= \frac{6 \times \frac{3}{2}\left(\frac{A\varepsilon_0}{d}\right)^2}{\left(6 + \frac{3}{2}\right)\frac{A\varepsilon_0}{d}}$$

$$= \frac{18}{15}\frac{A\varepsilon_0}{d} = \frac{6}{5}\frac{A\varepsilon_0}{d}$$

43. Answer (4)

$$R_1 = \frac{l}{2KA}$$

$$R_2 = \frac{l}{3KA}$$

$$\frac{1}{R_{eq}} = \frac{3KA}{l} + \frac{2KA}{l}$$

$$\frac{1}{R_{eq}} = \frac{5KA}{l}$$

$$\boxed{R_{eq} = \frac{l}{5KA}}$$

44. Answer (1)

$$a = \frac{4g - 2g}{6} = \frac{2g}{6} = \frac{g}{3}$$

$$a_{cm} = \frac{4 \times \frac{g}{3} - 2 \times \frac{g}{3}}{6}$$

$$= \frac{2g}{18} = \frac{g}{9}\ \text{m/s}^2 \qquad \text{(In downward direction)}$$

45. Answer (3)

$I_{remain} = I_{main} - I_{cut}$

$$= \frac{1}{2}MR^2 - \left\{\frac{1}{2}M'\frac{R^2}{4} + M'\frac{R^2}{4}\right\}$$

$$= \frac{1}{2}MR^2 - \frac{3}{2}\frac{M}{4}\frac{R^2}{4} = \frac{13MR^2}{32}$$

46. Answer (1)

ΔV across capacitor

$\Delta V = -14 - 21 + 3$

$|\Delta V| = 32$

$$E = \frac{1}{2}CV^2$$

$$= \frac{1}{2} \times 2 \times 10^{-6} \times (32)^2$$

$= 1.024 \times 10^{-3}$ J

47. Answer (2)

Let x is the percent change then

$$\frac{1}{2}\left(m + \frac{xm}{100}\right)\left(V + \frac{xv}{100}\right)^2 = 8\frac{1}{2}mv^2$$

$$\left(1 + \frac{x}{100}\right)^3 = 8$$

$$1 + \frac{x}{100} = 2$$

$$\frac{x}{100} = 1$$

$$\boxed{x = 100}$$

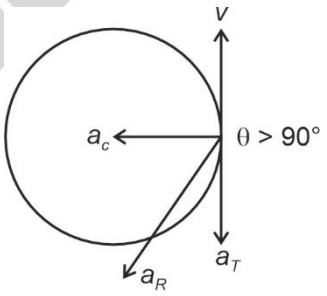
48. Answer (4)

$$I = \frac{MR^2}{2} + M(2R)^2$$

$$= \frac{MR^2}{2} + 4MR^2$$

$$= \frac{9MR^2}{2}$$

49. Answer (2)



50. Answer (2)

$$e = \int_{0.01}^{0.2} vBdx = v\frac{\mu_0}{2\pi}i\int_{0.01}^{0.2}\frac{dx}{x}$$

$$e = 2 \times 10^{-7} \times 5 \times 10 \log e\left[\frac{0.2}{0.01}\right]$$

$= 10^{-5} \times 2.303 \log_{10} 20$

$= 29.96 \times 10^{-6}$ V

$\simeq 30\ \mu$V

CHEMISTRY

SECTION - A

51. Answer (3)

m = ZQ

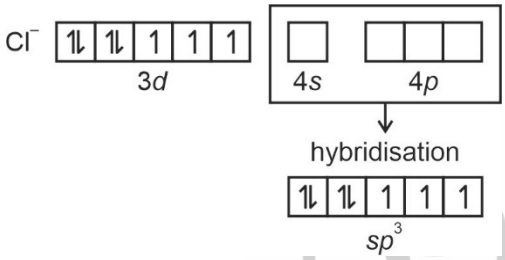
$$120 = \frac{40 \times Q}{2 \times 96500}$$

$$Q = \frac{120 \times 2 \times 96500}{40} = 6\,F$$

52. Answer (3)

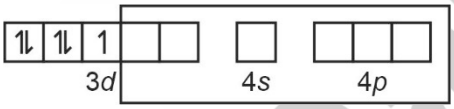
$Co^{+2} = 1s^2 2s^2 2p^6 3s^2 3p^6 \boxed{3d^7 4s\ 4p\ 4d}$

- Due to weak ligand



- In $[Fe(CN)_6]^{3-}$, CN^- is a strong ligand, so it causes pairing of electrons, but one unpaired electron is left.

$Fe^{+3} = 1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$



Hybridisation: d^2sp^3

It is paramagnetic in nature

53. Answer (1)

Nylon 6, 6 is a fibre.

54. Answer (1)

For positive deviation

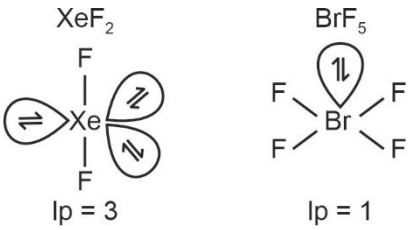
$(\Delta H)_{mix} > 0$

$(\Delta V)_{mix} > 0$

$(\Delta S)_{mix} > 0$

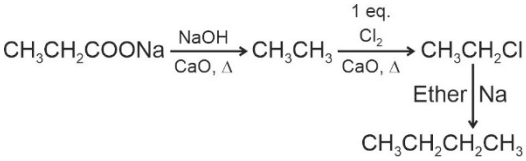
$(\Delta G)_{mix} < 0$

55. Answer (1)



Difference = 3 – 1 = 2.

56. Answer (4)



57. Answer (2)

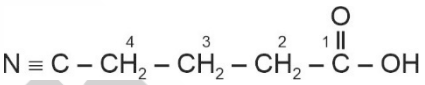
$\pi = iCRT$ i for NaCl = 2

So, $\pi \propto iC$ i for $CaCl_2$ = 3

So, π is maximum i for sucrose = 1

for 0.02 M $CaCl_2$

58. Answer (2)



4-cyanobutanoic acid

59. Answer (2)

l = 0	l = 1	l = 2	l = 3
↓	↓	↓	↓
s	*p*	*d*	*f*

∴ n = 3, l = 1 ⇒ 3*p*

n = 3, l = 0 ⇒ 3*s*

n = 2, l = 1 ⇒ 2*p*

n = 3, l = 2 ⇒ 3*d*

60. Answer (4)

$$n_{C_2H_6} = \frac{75}{30} = 2.5 \text{ mol}$$

1 mol C_2H_6 : 2 mol CO_2

2.5 mol C_2H_6 : 5 mol CO_2

= 5 × 44 g CO_2 = 220 g

61. Answer (2)

According to law of definite proportion, given compound always contains exactly the same proportion of elements by weight.

62. Answer (2)

Na : $1s^2\,2s^2\,2p^6\,3s^1$

$\ell = 1, m = 0 \Rightarrow p$ orbital = 2 electrons

63. Answer (3)

	Un	un	unnium
Z = 1	1	1	

So, atomic number is 111.

64. Answer (3)

In H_2O, $\mu_{net} \neq 0$, therefore, a polar molecule.

65. Answer (3)

In I_3^-, I has 2 bond pairs and 3 lone pairs so shape of molecule will be linear.

66. Answer (3)

$$V = \frac{nRT}{P} = \frac{80 \times R \times 300}{16 \times 5} = 300\,R$$

67. Answer (3)

Surface tension is force acting per unit length.

68. Answer (2)

$$W_{rev} = -2.303nRT\log\frac{V_f}{V_i}$$

$$= -2.303 \times 2 \times R \times 300\log\frac{3V}{V}$$

Use R = 0.0821 L atm mol^{-1} K^{-1}

W_{rev} = –54.4 L atm

69. Answer (3)

1 mol H_2O = 18 g H_2O : 6 kJ heat

54 g H_2O : $\frac{6\text{ kJ}}{\text{mol}} \times \left(\frac{54}{18}\right)\text{mol} = 18\text{ kJ heat}$

70. Answer (2)

XeF_4 has 4 bp and 2 lp so, it has square planar shape.

71. Answer (1)

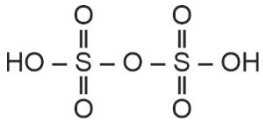
In Lanthanoids basic character of hydroxide decreases from left to right due to lanthanoid contraction.

72. Answer (2)

$$\underset{\text{yellow}}{Fe^{3+}(aq)} + \underset{\text{colourless}}{SCN^-(aq)} \rightleftharpoons \underset{\text{deep red}}{[Fe(SCN)]^{2+}(aq)}$$

	Addition of	Effect
(1)	$H_2C_2O_4$	Fe^{3+} is removed as $[Fe(C_2O_4)_3]^{3-}$
(2)	Potassium thiocyanate (KSCN)	More $[Fe(SCN)]^{2+}$(aq.) is formed
(3)	aq. $HgCl_2$	SCN^- is removed as $[Hg(SCN)_4]^{2-}$

73. Answer (3)

Structure of $H_2S_2O_7$: 

74. Answer (4)

$2KO_2 + 2H_2O \rightarrow 2K^+ + 2OH^- + H_2O_2 + O_2$

75. Answer (1)

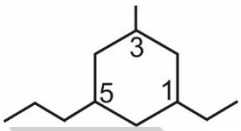
The thermal stability increases with increasing cationic size.

76. Answer (4)

$3B_2H_6 + 6NH_3 \rightarrow 3[BH_2(NH_3)_2]^+ [BH_4]^-$

$\xrightarrow{\Delta} 2B_3N_3H_6 + 12H_2$

77. Answer (2)



Correct IUPAC name is :

1-Ethyl-3-methyl-5-propylcyclohexane

78. Answer (4)

Cyclic planar species having $(4n)\,\pi$ electrons in complete delocalisation is anti-aromatic.

79. Answer (3)

Excessive sulphate (> 500 ppm) in drinking water causes laxative effect.

80. Answer (1)

$$A_{\frac{N}{2}}B_{\frac{2N}{2}}C_N \Rightarrow AB_2C_2$$

81. Answer (1)

$$X_{2(g)} \xrightarrow[\text{endothermic}]{\Delta H \text{ diss.}} 2X_{(g)} \xrightarrow[\substack{\text{electron}\\\text{gain enthalpy}\\\text{exothermic}}]{e^-} X^-_{(g)} \xrightarrow[\substack{\Delta H\\\text{hydration}\\\text{energy}\\\text{(exothermic)}}]{H_2O} X^-_{(aq)}$$

By adding these values more energy is released for fluorine due to low bond dissociation enthalpy and high hydration enthalpy.

82. Answer (2)

Slowest step is the rate determining step.

$r = k[H_2O_2][I^-]$

Order of reaction with respect to H_2O_2 is 1

83. Answer (4)

In fog, dispersion medium is gas and dispersed phase is liquid.

84. Answer (1)

Zone refining is very useful for producing semiconductor and other metals of very high purity *e.g.*, germanium, silicon, boron, gallium and indium.

85. Answer (4)

$NH_2CONH_2 + 2H_2O \rightarrow (NH_4)_2CO_3 \rightleftharpoons 2NH_3 + H_2O + CO_2$

SECTION - B

86. Answer (3)

$6NaOH + 3Cl_2 \rightarrow 5NaCl + NaClO_3 + 3H_2O$

(Hot and conc.)

87. Answer (4)

For $2HI(g) \rightleftharpoons H_2(g) + I_2(g)$

$\Delta n_g = 0 \Rightarrow K_p = K_c(RT)^o = K_c$

88. Answer (4)

Atom	Fe	Co	Ni	Cu
Enthalpy of atomisation ($kJ\ mol^{-1}$)	416	425	430	339

89. Answer (3)

$[OH^-] = 4 \times 10^{-4} M$

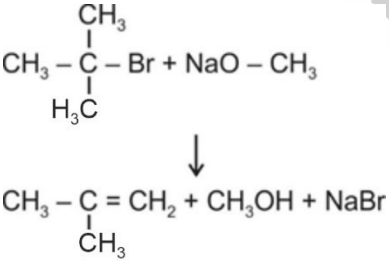
pOH = 4 – log 4 = 3.4

pH = 10.6

90. Answer (3)

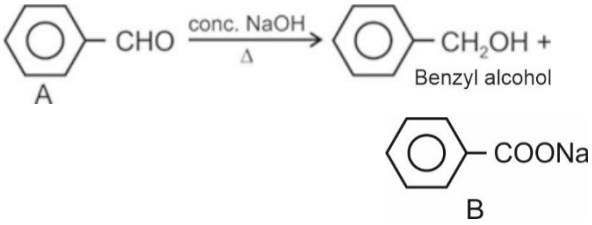
Complex like $[Ma_3b_3]$ can show facial and meridional isomers.

91. Answer (2)

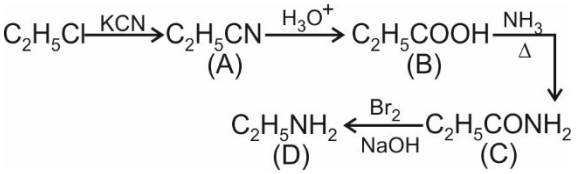


92. Answer (2)

Cannizzaro reaction



93. Answer (2)



94. Answer (2)

Maltose is made up by glycosidic linkage between C1 of α-D-glucose and C4 of α-D-glucose.

95. Answer (1)

The function of salt bridge in an electrolytic cell is to maintain electrical neutrality in solutions and prevent voltage drop once the salt bridge is removed, the voltage drops to zero.

- KCl cannot be used in salt bridge in case of silver electrode because they form insoluble metal chloride salts and metal salts get precipitated.
- Electrolytes used to make salt bridge should be inert.

96. Answer (4)

Veronal, Amytal and Nembutal are barbiturates.

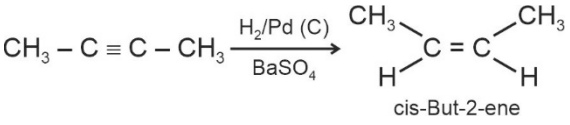
97. Answer (1)

Electron withdrawing group increases the strength of acid and electron donating group decreases the acidic strength.

98. Answer (4)

Negative charge is more stable on *sp* hybridised carbon atom.

99. Answer (4)



100. Answer (4)

$$x_x = \frac{n_x}{n_x + n_y} = \frac{10}{10+20} = \frac{1}{3}; x_y = \frac{2}{3}$$

$$P_{sol} = P_x^\circ \cdot x_x + P_y^\circ x_y$$

$$= \frac{1}{3} \times 200 + \frac{2}{3} \times 100 = \frac{400}{3}$$

BOTANY

SECTION - A

101. Answer (4)

In pteridophytes, the diploid sporophyte alternates with multicellular mostly photosynthetic, independent but short-lived haploid gametophyte.

102. Answer (2)

Theodore Schwann concluded that the presence of cell wall is unique characteristic of the plant cells.

103. Answer (2)

DNA as an acidic substance present in the nucleus was first identified by Friedrich Miescher and named it as Nuclein.

X-ray diffraction data was produced by Maurice Wilkins and Rosalind Franklin.

Frederick Griffith performed a series of experiments with *Streptococcus*, a bacterium responsible for pneumonia.

Francis Crick proposed central dogma in molecular biology.

104. Answer (3)

Epidermis is a part of epidermal tissue system.

105. Answer (3)

Quiescent stage is also known as G_0 phase.

106. Answer (4)

Cyclosporin A is used as an immunosuppressive agent in organ transplant patients and is produced by fungus *Trichoderma polysporum*.

This fungi belongs to class Deuteromycetes.

107. Answer (2)

Nitrogen fixing microbes can fix nitrogen because they all contain nitrogenase enzyme.

They can be aerobic or anaerobic and autotrophic or heterotrophic.

108. Answer (1)

When the placenta is axial and the ovules are attached to it in a multilocular ovary, the placentation is said to be axile, as in lemon, tomato and China rose.

109. Answer (4)

The correct sequence of stages in primary hydrarch succession is

Phytoplanktons $\rightarrow$ Submerged plant stage $\rightarrow$ Submerged free floating plant stage $\rightarrow$ Reed-swamp stage $\rightarrow$ Marsh-meadow stage $\rightarrow$ Scrub stage $\rightarrow$ Forest.

110. Answer (2)

The correct sequence of tissues during water movement in the root is

Epidermis $\rightarrow$ Cortex $\rightarrow$ Endodermis $\rightarrow$ Pericycle $\rightarrow$ Xylem.

111. Answer (2)

Grasses are primary producers. Grasshoppers occupy second trophic level. Wolf occupies third trophic level. Lion is a top carnivore.

112. Answer (2)

The site for latic acid and alcoholic fermentation is cytoplasm.

113. Answer (1)

A few organisms can tolerate and thrive in wide range of temperature, they are called eurythermal.

Stenothermal organisms are restricted to narrow range of temperature.

114. Answer (1)

Cell A and B have equal ψ_w and net movement of water between them will be zero.

115. Answer (3)

Natality refers to the number of births during given period in the population that are added to the initial density.

116. Answer (4)

In India, the Air Act came into force in 1981, but was amended in 1987 to include noise as an air pollutant.

117. Answer (2)

Epidermis is covered with waxy thick layer called cuticle which prevent loss of water.

Cuticle is absent in roots.

118. Answer (3)

RNA polymerase (core enzyme) is only capable of catalysing the process of elongation. It associate transiently with initiation factor and termination factor to initiate and terminate the transcription respectively.

119. Answer (2)

Terpenes are precursor of gibberellins.

120. Answer (1)

Tapetum is the innermost layer of anther wall which surrounds the sporogenous tissue and it nourishes the developing pollen grains.

121. Answer (2)

The offsprings that are produced by asexual reproduction are identical to one another and are exact copy of their parents.

Asexual reproduction does not produce any variation among offsprings.

122. Answer (1)

The capacity to generate a whole plant from any cell/explant is called totipotency.

123. Answer (4)

Based on Morgan dihybrid cross on *Drosophila*, 1.3% of offsprings obtained in F_2 generation were recombinant type when yellow bodied and white eye female are crossed with wild type male.

124. Answer (3)

Golgi apparatus is the important site for formation of glycoproteins and glycolipids.

Animal cells contain non-membrane bound organelle called centrosome which helps in cell division.

125. Answer (2)

In acrocentric chromosome, the centromere is situated close to its end forming one extremely short and one very long arm.

126. Answer (4)

Among vertebrates fishes have maximum number of species.

127. Answer (2)

Primary carnivore occupy secondary consumer level, that is T_3

2 Kcal = 2000 cal

$$T_1 \rightarrow T_2 \rightarrow T_3$$

2000 cal 200 cal 20 cal

128. Answer (1)

Mycoplasma is the smallest living cell known and can survive without oxygen.

129. Answer (3)

At higher light intensities, the C_3 and C_4 plants respond differently to CO_2 concentration. C_4 plants show saturation at about 360 μL while C_3 plants respond to increased CO_2 concentration and saturation is seen only beyond 450 μL.

130. Answer (4)

Glomus is a fungus, an eukaryotic organism, act as biofertilizer.

131. Answer (1)

The parasitic fungus on mustard plant is *Albugo* and it belongs to Phycomycetes.

132. Answer (2)

In capping, an unusual nucleotide (methyl guanosine triphosphate) is added to the 5′ end of hnRNA.

133. Answer (3)

According to five kingdom classification proposed by R.H. Whittaker, four kingdoms shows heterotrophic mode of nutrition.

134. Answer (1)

The primary CO_2 acceptor in C_4 pathway is a 3 carbon molecule, phosphoenol pyruvate (PEP).

135. Answer (2)

High concentration of DDT due to biomagnification disturb calcium metabolism in fish eating birds which causes thinning of eggs shells and their premature breaking.

SECTION - B

136. Answer (3)

In members of Rhodophyceae, food stored is floridean starch which is very similar to amylopectin and glycogen in structure. *Gracilaria* is a red algae.

137. Answer (4)

In glycolysis, glucose is phosphorylated to glucose - 6 - phosphate by using ATP with the help of hexokinase.

138. Answer (2)

Viroids are infectious free RNA, they lack protein coat that is found in viruses.

139. Answer (2)

Primata is an order of humans.

140. Answer (1)

In India, 14 biosphere reserves and 448 wildlife sanctuaries are present.

141. Answer (1)

Auxin and cytokinin show synergistic effect on cell division.

142. Answer (2)

Mustard, datura and chilli have actinomorphic flowers. *i.e.*, they show radial symmetry.

143. Answer (4)

In Angiosperms, male gametes are formed by generative cell which is spindle shaped with dense cytoplasm and nucleus.

144. Answer (3)

Conidia are asexual spores formed in fungi such as *Penicillium*.

145. Answer (4)

The ring arrangement of vascular bundles is a characteristic feature of dicot stems.

146. Answer (3)

In butterflies, female produces two types of eggs.

147. Answer (2)

An individual inflicted with phenylketonuria lacks an enzyme that converts the amino acid phenylalanine into tyrosine.

Accumulation of phenylalanine in brain results in mental retardation.

148. Answer (4)

Crossing over is exchange of genetic material between the non-sister chromatids of homologous chromosomes and it occurs during pachytene stage. Crossing over involves recombinase enzyme.

149. Answer (2)

Thorns are modification of stem and spines are modified leaves. Peach plants have perigynous flowers.

150. Answer (2)

Denitrification is carried by bacteria *Pseudomonas* and *Thiobacillus*.

ZOOLOGY

SECTION - A

151. Answer (2)

Compound epithelium is made of more than one layer of cells (multi layered).

Fibroblasts secrete fibres. Cartilage, bone and blood are various types of specialised connective tissue.

152. Answer (3)

The body of hemichordates is cylindrical and is composed of an anterior proboscis, a collar and a long trunk. Excretory organ is proboscis gland.

153. Answer (2)

Excretion in cockroaches is performed by Malpighian tubules.

154. Answer (2)

Sutures are fibrous joints and do not allow any movement.

155. Answer (4)

In cephalochordates like *Branchiostoma* (Amphioxus or Lancelet), notochord persists throughout their life. In Urochordates like *Ascidia*, *Salpa* and *Doliolum*, notochord is present only in the larval tail.

156. Answer (3)

Taenia, *Pheretima* and *Physalia* are hermaphrodites.

157. Answer (4)

Blood group 'O' can be donated to persons with any other blood group and hence 'O' group individuals are called 'Universal donors'.

158. Answer (1)

Frogs and humans are ureotelic. Pigeons, lizards, cockroaches are uricotelic.

159. Answer (2)

Dehydrogenases : S reduced + S′ oxidised $\rightarrow$ S oxidised + S′ reduced

Lyases : $C-C \rightarrow X-Y + C=C$ (X and Y attached to the two carbons)

160. Answer (2)

Principle structures of corpora quadrigemina are superior colliculi and inferior colliculi.

161. Answer (4)

TLC = IRV + TV + ERV + RV

VC = IRV + TV + ERV

IC = IRV + TV

EC = ERV + TV

162. Answer (3)

Given is the structure of adenylic acid which is present in RNA.

163. Answer (4)

Peak of LH, FSH and estrogen is seen just before ovulation. Progesterone concentration increases during luteal phase.

164. Answer (2)

Graves' disease/exophthalmic goitre is a form of hyperthyroidism.

165. Answer (4)

Nucleases are present in pancreatic juice.

166. Answer (1)

Syphilis is a bacterial disease which can be cured if detected early and treated properly.

167. Answer (1)

Fertilisation induces the completion of the meiotic division of the secondary oocyte. The fertilisation takes place in the ampullary region of fallopian tube.

168. Answer (2)

Respiratory Gas	Atmospheric Air	Alveoli	Blood (Deoxygenated)	Blood (Oxygenated)	Tissues
O_2	159	104	40	95	40
CO_2	0.3	40	45	40	45

169. Answer (2)

Haemozoin is responsible for chills and fever in patients suffering from malaria.

170. Answer (1)

Condoms are barriers made of thin rubber/latex sheath that are used to cover the penis in the male or vagina and cervix in the female just before coitus. Lippes loop is a non-medicated IUD.

171. Answer (4)

Heart failure means the state of heart when it is not pumping blood effectively enough to meet the needs of the body. It is sometimes called congestive heart failure because congestion of the lungs is one of the main symptoms of this disease. Heart failure is not the same as cardiac arrest (when the heart stops beating) or a heart attack (when the heart muscle is suddenly damaged by an inadequate blood supply).

172. Answer (1)

RNA interference involves silencing of a specific mRNA in nematode (parasite) due to which the parasite does not survive.

173. Answer (2)

Atmosphere of primitive Earth was reducing and did not contain oxygen.

174. Answer (3)

Retina of eye – Bipolar neurons

Cerebral cortex – Multipolar neurons

175. Answer (2)

Bt plants make their own insecticidal protein. The activated toxin binds to the surface of midgut epithelial cells and create pores that cause cell swelling and lysis and eventually cause death of the insect.

176. Answer (2)

The medulla contains centres which control respiration, cardiovascular reflexes and gastric secretions.

Mid brain, pons and medulla constitute brain stem.

177. Answer (3)

Meloidogyne incognita is a nematode which parasitises the roots of tobacco plants and causes a great reduction in yield.

178. Answer (1)

PTH stimulates the process of demineralisation of bones.

179. Answer (2)

The brain capacity of *Homo habilis* was between 650 to 800 cc.

180. Answer (4)

Organism	Chromosome number in meiocytes	Chromosome number in gamete
Fruit fly	8	4
House fly	12	6
Butterfly	380	190

181. Answer (4)

Chlorophyll is a primary metabolite in plant cell.

182. Answer (1)

Primary oocyte within the tertiary follicle grows in size and completes its 1st meiotic division.

It is an unequal division resulting in the formation of a large haploid secondary oocyte and 1st polar body.

183. Answer (4)

Forelimbs of whales and bats is an example of homologous structures.

184. Answer (3)

Mutations affect the Hardy-Weinberg equilibrium.

185. Answer (2)

Acid in the stomach, saliva in the mouth, and tears from eyes are physiological barriers.

SECTION - B

186. Answer (1)

Enzymes isolated from thermophilic organisms retain their catalytic power even at high temperatures (upto 80° – 90°C).

187. Answer (1)

Respiratory rhythm centre is situated in medulla oblongata.

188. Answer (4)

In jaundice, bile pigments like bilirubin increases in blood causing yellowing of skin and eyes.

189. Answer (3)

Sucrase acts on sucrose, maltase on maltose whereas nucleases are responsible for breakdown of nucleic acids into nucleotides.

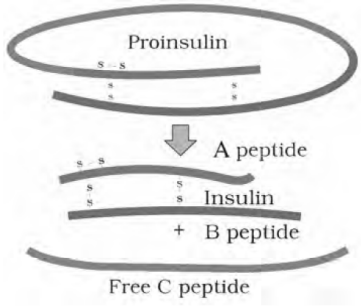
190. Answer (2)

Morphine is a very effective sedative and pain killer.

191. Answer (2)

The P-wave of ECG represents electrical excitation of the atria. Volume of blood pumped out by each ventricle per minute is called cardiac output.

192. Answer (3)



193. Answer (2)

Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes).

194. Answer (2)

Maximum number of transgenic animals are mice. RNAi takes place in all eukaryotes as a method of cellular defense.

195. Answer (3)

The first restriction endonuclease *Hin*d II recognises a specific sequence of 6 base pairs.

196. Answer (4)

Aedes mosquitoes are the vectors of dengue and chikungunya.

197. Answer (2)

Many bony fishes, aquatic amphibians and aquatic insects are ammonotelic.

Reptiles, birds, land snails and insects excrete nitrogenous wastes as uric acid.

198. Answer (1)

Scales are present in *Exocoetus*, *Labeo* and *Scoliodon*.

199. Answer (3)

Concanavalin A is a lectin.

200. Answer (2)

Condoms are barriers made of thin rubber/latex sheath that are used to cover the penis in the male or vagina and cervix in the female just before coitus. They cannot be used as emergency contraceptives.

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