Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)

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MM : 720

Mock Test for NEET-2019
Test-13

Time : 3 Hrs.

Complete Syllabus of Class XI & XII

Instructions :

(i) Use Blue/Black ballpoint pen only to darken the appropriate circle.
(ii) Mark should be dark and should completely fill the circle.
(iii) Dark only one circle for each entry.
(iv) Dark the circle in the space provided only.
(v) Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
(vi) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from total score.

PHYSICS

Choose the correct answer :

1. A student is trying to estimate value of acceleration due to gravity (g), by throwing a ball vertically upward. If maximum percentage error in the measurement of velocity of throw is 2% and in the measurement of time of ascent is 2% then maximum percentage error in the estimation of g is

(1) 10% (2) 6%
(3) 16% (4) 4%

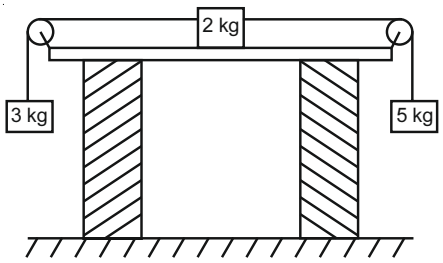
2. Two cars A and B starts from a point at the same time in a straight line and their positions at time t are $x_A = 3t + t^2$ and $x_B = 2t^2 - t$. At what time do the cars have the same velocity? (Where x_A, x_B are in meter and t is in second)

(1) 4 s (2) 6 s
(3) 1 s (4) 2 s

3. A ball is projected at some angle with horizontal under gravity, such that its time of flight is 10 s and range 100 m. The maximum height attained by the ball is (g = 10 m/s^2)

(1) 100 m
(2) 125 m
(3) 150 m
(4) 200 m

4. When the three blocks attached with light strings as shown in the figure are released from rest, they accelerate with an acceleration of 1 m/s^2. Blocks have masses 3 kg, 2 kg, 5 kg as shown in figure. The coefficient of friction between block and table is (Take g = 10 m/s^2)

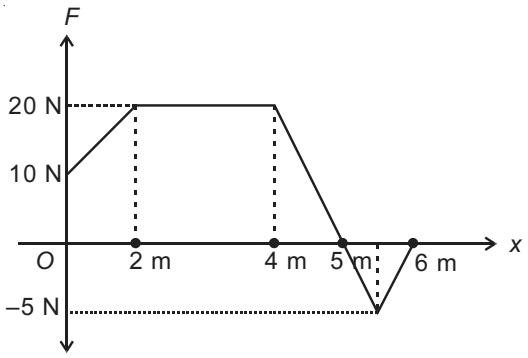


(1) 0.5 (2) 0.6
(3) 0.7 (4) 0.8

5. A pendulum in vertical plane having length of string l and mass of bob m is kept horizontal. Now the bob is released from horizontal position. The tension in string when it makes an angle of 60° with vertical is

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

6. The *x*-component of forces acting on a body of mass 10 kg kept at rest and free to move, along *x*-direction as shown in figure. The maximum speed gained by body is



(1) 4 m/s (2) 7 m/s

(3) 6 m/s (4) 5 m/s

7. A body of mass 5 kg initially at rest explodes into three fragments having mass ratio 3:1:1. Two fragments of equal mass just after explosion moves with speed of 60 m/s perpendicular to each other. The kinetic energy of third part just after explosion is

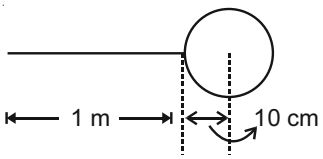
(1) 400 J

(2) 800 J

(3) 1200 J

(4) 1600 J

8. A thin uniform rod of length 1 m and mass 500 g, is attached to a uniform disc of diameter 20 cm and mass 100 g at one end as shown in figure. The distance of centre of mass of system from free end of rod is



(1) 0.8 m (2) 0.9 m

(3) 0.7 m (4) 0.6 m

9. Which of the following is correct? (where symbols have their usual meanings)

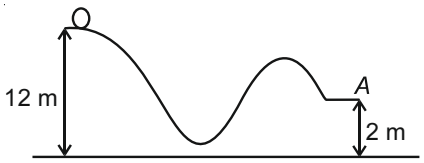
(1) $\vec{F} = \vec{r} \times \vec{\tau}$

(2) $\vec{\tau} = \vec{r} \times \vec{F}$

(3) $\vec{F} = \vec{\tau} \times \vec{r}$

(4) $\vec{\tau} = \vec{F} \times \vec{r}$

10. A solid ball rolls without slipping on a rough track, starting from rest and from height 12 m and leaves the track at height 2 m as shown in figure. The final speed of the ball at point *A* is (g = 9.8 m/s^2).



(1) $\sqrt{20}$ m/s (2) $\sqrt{130}$ m/s

(3) $\sqrt{135}$ m/s (4) $\sqrt{140}$ m/s

11. A metal wire of length 6 m area of cross-section 2 cm^2 and young's modulus 3 × 10^9 N/m^2 behaves as a spring of spring constant *K*. The spring constant *K* is

(1) 10 kN/m (2) 200 kN/m

(3) 20 kN/m (4) 100 kN/m

12. A satellite orbits a planet of unknown mass in a circle of radius 4 × 10^{7}m. The magnitude of the gravitational force on the satellite from the planet is 160 N. The kinetic energy of the satellite in this orbit is

(1) 8 × 10^8 J (2) 16 × 10^8 J

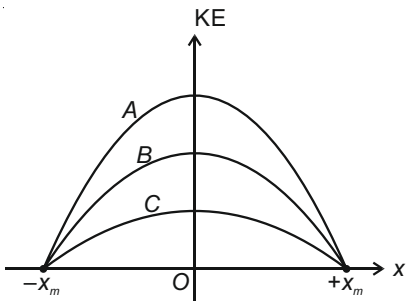
(3) 24 × 10^8 J (4) 32 × 10^8 J

13. A hollow sphere of external radius *R* and thickness *t*(<< *R*) is made of material of relative density ρ. Sphere will float in water in fully immersed condition, if

(1) $t = \frac{R}{3\rho}$ (2) $t = \frac{R}{2\rho}$

(3) $t = \frac{R}{\rho}$ (4) $t = \frac{2R}{3\rho}$

14. The kinetic energy versus position for three harmonic oscillators that have the same mass, but different time period T_A, T_B, T_C are as shown in figure. Which of the following relation is correct?



(1) $T_A < T_B < T_C$ (2) $T_A = T_B = T_C$

(3) $T_A > T_B < T_C$ (4) $T_A > T_B > T_C$

15. One of the harmonic frequency for a particular string under tension is 390 Hz. The just lower frequency is 325 Hz. The next higher frequency after the harmonic frequency 195 Hz is

(1) 225 Hz (2) 290 Hz

(3) 250 Hz (4) 260 Hz

16. The displacement equation of a sound wave travelling through air is $S_{(x,\ t)}$ = (5μm) cos[(3140 rad/s)t + (12μm^{-1})x + ϕ]. The minimum time taken for any given air molecule to move displacements from S = 5 μm to S = –5 μm is

(1) 4 ms (2) 3 ms

(3) 2 ms (4) 1 ms

17. If length and radius of a wire both are doubled then the value of Young's modulus Y

(1) Will become double (2) Will remain same

(3) Will become half (4) Will become triple

18. For an ideal gas in a container $\frac{R}{C_p} = 0.4$. The gas is made up of molecules which are

(1) Monoatomic

(2) Diatomic

(3) Triatomic

(4) Mixture of diatomic and triatomic gases

19. 5.6 litre of helium gas at STP is adiabatically compressed to 0.7 litre. Taking initial temperature of gas to be T_1. The work done by the gas in this process is

(1) $\frac{9}{8}RT_1$

(2) $-\frac{9}{8}RT_1$

(3) $\frac{15}{8}RT_1$

(4) $-\frac{15}{8}RT_1$

20. Charge q is distributed uniformly over a thin quarter ring of radius R. The electric field at the centre of ring is

(1) $\frac{1}{4\pi^2\varepsilon_0}\frac{2\sqrt{2}q}{R^2}$ (2) $\frac{1}{2\pi^2\varepsilon_0}\frac{2\sqrt{2}q}{R^2}$

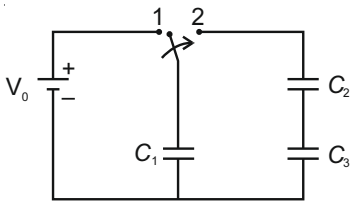
(3) $\frac{1}{4\pi\varepsilon_0}\frac{2\sqrt{2}q}{R^2}$ (4) $\frac{1}{2\pi\varepsilon_0}\frac{2\sqrt{2}q}{R^2}$

21. A spherical drop of water carrying a charge of 30 pC has potential of 500 V at its surface (when potential is zero at infinity). If three such drops of same charge and radius combine to form a single spherical drop, then the potential at the surface of the new drop is

(1) 500 V (2) $500(3)^{1/3}$ V

(3) $500(3)^{2/3}$ V (4) $\frac{500}{(3)^{1/3}}$ V

22. The circuit has 6 V battery and 3 uncharged capacitors of capacitances C_1 = 2 μF, C_2 = 3 μF and C_3 = 1.5 μF. The switch is thrown to the left side until capacitor C_1 is fully charged, then the switch is thrown to the right. The final charge on capacitor C_1 is



(1) 4 μC (2) 5 μC

(3) 6 μC (4) 8 μC

23. The electric potential $V_{(x)}$ along a platinum wire (resistivity ρ = 11 × 10^{-8} Ω m) carrying uniform current, falls from a point of higher potential V = 12 mV at x = 0 to a point of zero potential at x = 3 m. The wire has a radius of 7 mm. The current in the wire is

(1) 4.9 A (2) 6.4 A

(3) 3.6 A (4) 5.6 A

24. The root mean square speed of oxygen molecules (O_2) at a certain absolute temperature is v. If the absolute temperature of gas is increased to 4 times and oxygen gas dissociates into atomic oxygen, the new rms speed is

(1) v (2) 2 v

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

25. A cyclotron with dee radius 53 cm is operated at an oscillator frequency of 14 MHz to accelerate protons, the magnitude of the perpendicular magnetic field required to achieve resonance is (Take mass of proton 1.6 × 10^{-27} kg)

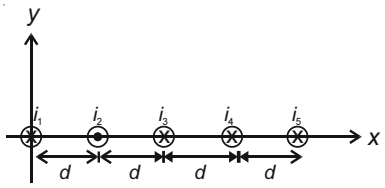
(1) 0.77 T

(2) 0.88 T

(3) 0.55 T

(4) 0.66 T

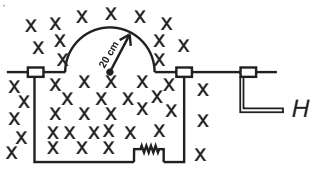
26. Five long parallel wires are separated by distance d = 50 cm as shown in figure. The currents into the page are i_1 = 2 A, i_3 = 0.25 A, i_4 = 4 A and i_5 = 2 A, the current out of the page is i_2 = 4 A. The magnitude of the net force per unit length acting on wire 3 due to the currents in the other wires is



(1) 8×10^{-7} N/m (2) 7×10^{-7} N/m

(3) 6×10^{-7} N/m (4) 9×10^{-7} N/m

27. A wire bent into a semicircle of radius 20 cm is rotated with constant angular speed 40 rev/s in a uniform magnetic field of 20 mT with the help of handle H. The average emf induced in the loop in half rotation is



(1) 16 π mV

(2) 64 π mV

(3) 8 π mV

(4) 20 π mV

28. In an series RLC circuit, the amplitude of the voltage across the inductor

(1) May be greater than source emf

(2) Always greater than source emf

(3) May be less than source emf

(4) Both (1) and (3)

29. The intensity of a travelling plane electromagnetic wave of magnetic field amplitude 2×10^{-6} T is

(1) $\frac{400}{\pi}\frac{W}{m^2}$ (2) $\frac{1500}{\pi}\frac{W}{m^2}$

(3) $\frac{600}{\pi}\frac{W}{m^2}$ (4) $\frac{700}{\pi}\frac{W}{m^2}$

30. Two coherent monochromatic light beams of intensities I and 9I are superimposed. The maximum and minimum possible intensities in the resulting beams are respectively

(1) 4I, 2I (2) 16I, 4I

(3) 10I, 8I (4) 16I, 12I

31. An electron accelerates through a potential difference of 4.9 V collides with a mercury atom and transfers it to first excited state. The wavelength of a photon corresponding to the transition of mercury atom to its ground state is about

(1) 2050 Å

(2) 2240 Å

(3) 2530 Å

(4) 2935 Å

32. A source of light of power 1.5 mW emits light of wavelength 400 nm. The emitted light is incident on a photoelectric cell. If 0.10% of the incident photons produce photoelectrons, the current in the cell is

(1) 0.28 μA (2) 0.38 μA

(3) 0.58 μA (4) 0.49 μA

33. When an unpolarized light is transmitted through two polarizing sheets oriented such that no light is transmitted, through second sheet. If a third polarizing sheet is placed between them, then

(1) No light will pass through last sheet

(2) Light may pass through last sheet

(3) No light will incident on the last sheet

(4) Light always passed through last sheet

34. In an ordinary color television, electrons are accelerated through a potential difference of 15 kV. The de-Broglie wavelength of such electrons is

(1) 0.2 Å

(2) 0.3 Å

(3) 0.4 Å

(4) 0.1 Å

35. If 10% of radioactive material decays in 5 days, then the amount of original material left after 20 days is (approximately)

(1) 50% (2) 60%

(3) 66% (4) 70%

36. The audio signal voltage across the collector resistance of 4 kΩ in common emitter transistor amplifier is 8 V. If the current amplification factor of the transistor is 98 and the base resistance is 2 kΩ, then the input signal voltage is

(1) $\frac{2}{49}$ V (2) $\frac{1}{50}$ V

(3) $\frac{1}{60}$ V (4) $\frac{2}{45}$ V

37. In reverse biasing of p-n junction diode

(1) The positive terminal of the battery is connected to p-side and negative terminal to n-side of the battery and the depletion region becomes thin

(2) The positive terminal of the battery is connected to p-side and negative terminal to n-side of the battery and the depletion region becomes thick

(3) The positive terminal of the battery is connected to n-side and negative terminal to p-side of the battery and the depletion region becomes thin

(4) The positive terminal of the battery is connected to n-side and negative terminal to p-side of the battery and the depletion region becomes thick

38. A radioactive nucleus undergoes radiactive decay according to the scheme $A \xrightarrow{2\alpha} A_1$. If the mass number and atomic number of *A* are 180 and 72 respectively, then mass number and atomic number of A_1 are respectively.

(1) 172 and 68

(2) 173 and 70

(3) 181 and 73

(4) 168 and 60

39. An object of length 10 cm is placed on principal axis along its length. If its far side is at 20 cm from the concave mirror of focal length 7.5 cm, the size of the image is

(1) 20 cm

(2) 10 cm

(3) 18 cm

(4) 9 cm

40. Due to the effect of scattering, the sun appears to be

(1) Green

(2) Oval

(3) Red

(4) Both (2) and (3)

41. A concave lens of focal length 20 cm is in contact with convex lens of focal length 50 cm. The equivalent focal length of combination is

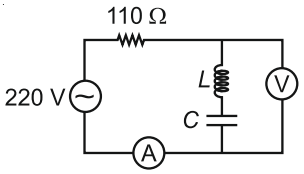
(1) 33.3 cm

(2) 44.5 cm

(3) –27.5 cm

(4) –33.3 cm

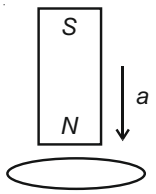
42. If voltmeter is showing zero reading then, the reading of ammeter in the circuit shown will be



(1) 3 A (2) 4 A

(3) 8 A (4) 2 A

43. A metallic ring is attached with the wall of a room. If a bar magnet is released from rest, then acceleration of the bar magnet will



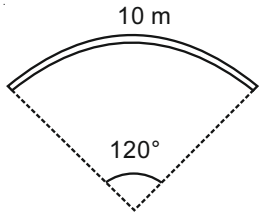
(1) $a > g$ when magnet is below the ring

(2) $a = g$ always

(3) a > g when magnet is above the ring

(4) $a < g$ when magnet is above and below the ring

44. A bar magnet of length 10 m and magnetic moment 25 Am^2 is bent in the form of an arc as shown in figure. The new magnetic dipole moment is



(1) $\frac{75}{2}\ Am^2$ (2) $\frac{75\sqrt{3}}{2\pi}\ Am^2$

(3) $\frac{25}{2}\ Am^2$ (4) $\frac{25\sqrt{3}}{2\pi}\ Am^2$

45. An air compressor is powered by a 250 rad/s electric motor using a belt driven system. The motor pulley is 10 cm in radius and the tension in the upper part of V-belt is 150 N and in lower part is 30 N. The power of the motor is

(1) 3 kW

(2) 8 kW

(3) 10 kW

(4) 12 kW

CHEMISTRY

46. Number of Cl^- ions present in 0.1 mol $CaCl_2$ is
(1) 0.1 N_A (2) 0.2 N_A
(3) 0.3 N_A (4) 0.4 N_A

47. Degeneracy of IInd excited state of He^+ ion is
(1) 1 (2) 3
(3) 5 (4) 9

48. Maximum number of electrons present in Ni for which $|m| = 1$, is
(1) 10 (2) 8
(3) 12 (4) 14

49. Pair of species of same magnetic nature (paramagnetic/diamagnetic) is
(1) N_2 and O_2 (2) N_2 and O_2^-
(3) NO and CN^- (4) CN^- and NO^+

50. Species having linear shape is
(1) XeO_4 (2) CrO_2Cl_2
(3) CN_2^{2-} (4) SO_2

51. Pair of orbitals which can not involve in bond formation (if Y-axis is internuclear axis) is
(1) $p_x + p_x$ (2) $s + p_x$
(3) $p_y + p_y$ (4) $s + p_y$

52. If temperature of 1 mol gas increase by 20% then its volume at constant pressure
(1) Increase by 20% (2) Decrease by 20%
(3) Increase by 80% (4) Decrease by 80%

53. If critical temperature of a gas is 160 K then its Boyle's temperature will be
(1) 400 K (2) 270 K
(3) 540 K (4) 600 K

54. Work done in reversible adiabatic process is numerically not equal to
(1) $-P_{ext}\Delta V$ (2) $nC_v\Delta T$
(3) $\frac{nR\Delta T}{\gamma - 1}$ (4) ΔU

55. Reaction for which enthalpy of reaction is equal to enthalpy of formation,
(1) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$
(2) $H_2(g) + Br_2(l) \rightarrow 2HBr(l)$
(3) $CaO(s) + CO_2(g) \rightarrow CaCO_3(s)$
(4) $\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) \rightarrow NH_3(g)$

56. Equilibrium constant K_P of reaction
$X(g) \rightleftharpoons Y(g) + Z(g)$, when reactant X(g) decomposes to 50% at 5 atm pressure is
(1) 4.67 (2) 2.67
(3) 1.67 (4) 3.67

57. At 25°C water is neutral and has pH 7. If temperature of water becomes 60°C then
(1) It becomes acidic
(2) It becomes basic
(3) It remains neutral with pH 7
(4) It remains neutral with pH < 7

58. n-factors of H_3PO_4, H_3PO_3 and H_3PO_2 respectively are
(1) 3, 2 and 1 (2) 1, 2 and 3
(3) 3, 3 and 2 (4) 3, 3 and 3

59. Molecule which can disproportionate is
(1) $HClO_4$ (2) H_3PO_4
(3) H_2SO_4 (4) H_3PO_3

60. Water-gas shift reaction is
(1) $C(s) + H_2O(g) \xrightarrow{1270\ K} CO(g) + H_2(g)$
(2) $CO(g) + H_2O(g) \xrightarrow[FeCrO_4]{673\ K} CO_2(g) + H_2(g)$
(3) $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$
(4) $CH_4(g) + H_2O(g) \xrightarrow[Ni]{1270\ K} CO(g) + 3H_2$

61. Select the incorrect statement about hydrides.
(1) Metallic hydrides are conductors of heat and electricity
(2) All metallic hydrides follow law of constant composition
(3) H_2O, HF are electron rich hydrides
(4) Metals of group 7, 8 and 9 do not form hydride

62. Thermally least stable carbonate is
(1) $BeCO_3$ (2) $MgCO_3$
(3) $BaCO_3$ (4) $CaCO_3$

63. Ion having highest hydration enthalpy is
(1) Ba^{2+} (2) Na^+
(3) Be^{2+} (4) K^+

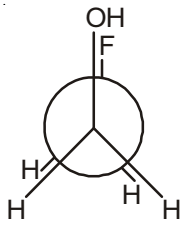
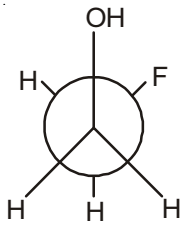
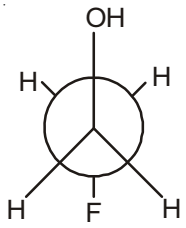
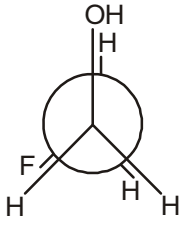
64. Select the incorrect reaction, without considering the step of balancing atoms, from the following.
(1) $Al + NaOH + H_2O \rightarrow Na[Al(OH)_4] + H_2$
(2) $Na_2B_4O_7 + HCl + H_2O \rightarrow NaCl + NaBO_2 + NaOH$
(3) $B_2H_6 + NH_3 \xrightarrow{\Delta} B_3N_3H_6 + H_2$
(4) $Na_2B_4O_7 + H_2O \rightarrow NaOH + H_3BO_3$

65. Oxide which is not acidic
(1) CO (2) CO_2
(3) GeO_2 (4) SiO_2

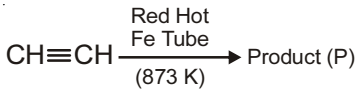
66. Zeolites are examples of
(1) Chain silicates (2) Orthosilicates
(3) Pyrosilicates (4) 3D silicates

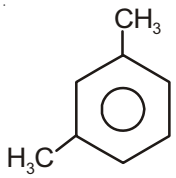
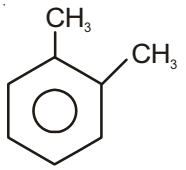
67. Strongest –I effect is shown by
(1) $-NO_2$ (2) –CN
(3) $-\overset{\oplus}{N}R_3$ (4) –F

68. Most stable carbocation in the following is
(1) $CH_3\overset{\oplus}{C}H_2$ (2) $(CH_3)_2\overset{\oplus}{C}H$
(3) $Ph\overset{\oplus}{C}H_2$ (4) $CH_2=CH-\overset{\oplus}{C}H_2$

69. Select the most stable conformer of $CH_2(OH)\ CH_2(F)$ in the
(1) 
(2) 
(3) 
(4) 

70. Product formed in the reaction



Product (P) is
(1) 
(2) 
(3) 
(4) 

71. Which of the following is/are not greenhouse gas(s)?
(1) SO_2 (2) CH_4
(3) CFCs (4) N_2O

72. The type of isomerism not shown by the complex $[Co(en)_2\ ClBr]I$ is
(1) Ionization isomerism
(2) Geometrical isomerism
(3) Linkage isomerism
(4) Optical isomerism

73. Scandium has hcp structure at room temperature. At higher temperature it transforms to bcc structure. The ratio of density of scandium at room temperature to higher temperature (assuming molar mass and atomic radius of scandium remains constant with temperature)
(1) $\frac{3\sqrt{3}}{4\sqrt{2}}$ (2) $\frac{4\sqrt{2}}{3\sqrt{3}}$
(3) $\frac{4\sqrt{3}}{2\sqrt{3}}$ (4) $\frac{1}{2}$

74. When initial concentration of reactant becomes 4 times then the half-life period of a first order reaction becomes
(1) Tripled (2) Doubled
(3) Halved (4) Same

75. Products of electrolysis of highly concentrated H_2SO_4 solution are
(1) $H_2(g)$, $O_2(g)$ (2) $H_2(g)$, $SO_2(g)$
(3) $H_2(g)$, $S_2O_8^{2-}(aq.)$ (4) $O_2(g)$, $S_2O_8^{2-}(aq.)$

76. Reaction taking place at cathode during corrosion of iron is
(1) $Fe^{2+} + 2e^- \rightarrow Fe$
(2) $O_2(g) + 4H^+(aq) + 4e^- \rightarrow 2H_2O(l)$
(3) $H_2O(l) + e^- \rightarrow 1/2\ H_2(g) + OH^-(aq)$
(4) $O_2 + 2H^+(aq) + 4e^- \rightarrow 2OH^-(aq)$

77. If $FeCl_3$ is added to excess of hot water then
(1) Positive solution of FeO/Fe^{2+} is formed
(2) Positive solution of $Fe_2O_3.xH_2O/Fe^{3+}$ is formed
(3) Negative solution of $Fe_2O_3.xH_2O/OH^-$ is formed
(4) Negative solution of $Fe_2O_3/Fe(OH)_2^-$ is formed

78. Select the correct statement in the following
(1) Blister copper is purest form of copper
(2) $CaSiO_3$ is obtained as slag during extraction of iron.
(3) Ni is purified by zone refining.
(4) Ag is extracted commercially by electrometallurgy.

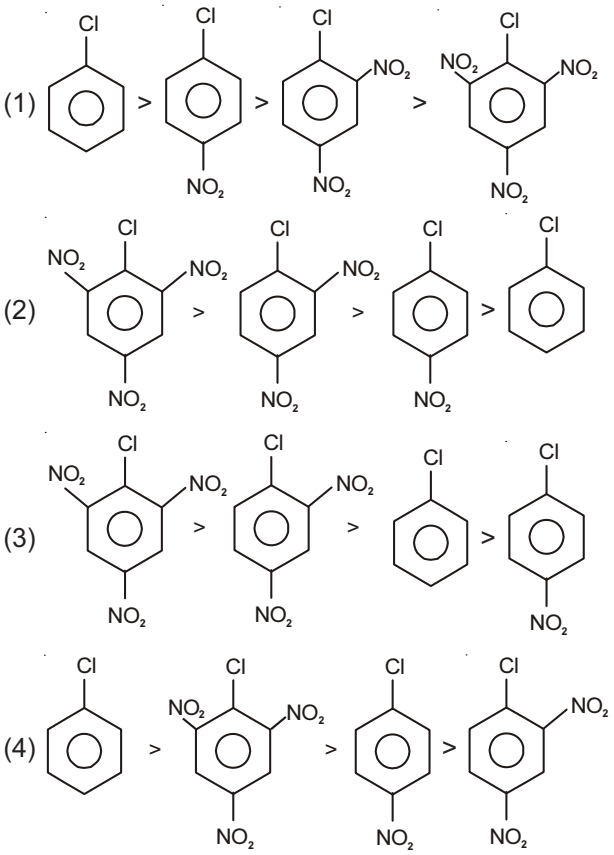
79. Compound which does not disproportionate on hydrolysis is
(1) XeF_2 (2) XeF_4
(3) Cl_2 (4) Br_2

80. Which substance is not greenish in colour?
(1) $FeSO_4$ (2) Cr_2O_3
(3) $[Ni(H_2O)_6]^{2+}$ (4) $Fe(OH)_3$

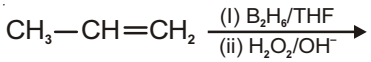
81. Complex does not show d^2sp^3 hybridization
(1) $[Co(en)_3]Cl_3$ (2) $K_3[Co(ox)_3]$
(3) $[Co(H_2O)_6]Br_3$ (4) $K_3[CoF_6]$

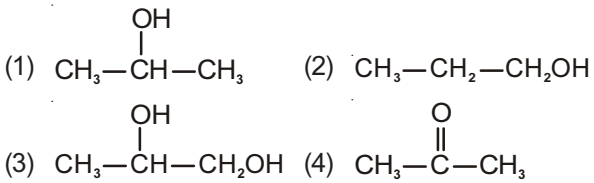
82. $CH_3Br + AgF \rightarrow CH_3F + AgBr$
Name of above reaction is
(1) Finkelstein reaction (2) Swarts reaction
(3) Hunsdiecker reaction (4) Gattermann reaction

83. Correct order of nucleophilic substitution reaction in the following is

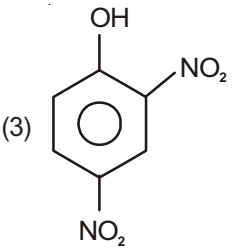


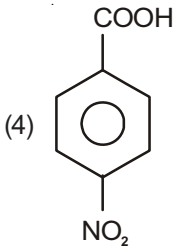
84. Major product obtained in the given reaction is



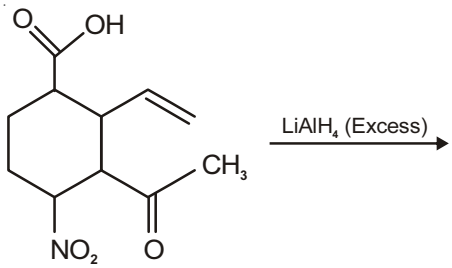


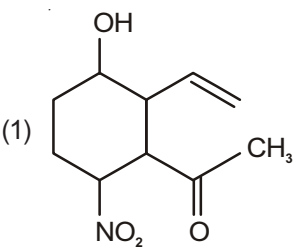
85. Compound that does not give effervescence of CO_2 on reaction with $NaHCO_3$ is
(1) $PhCH_2OH$ (2) CH_3COOH

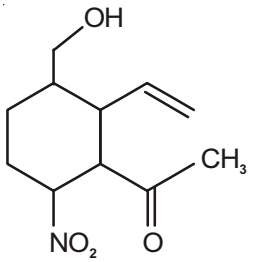


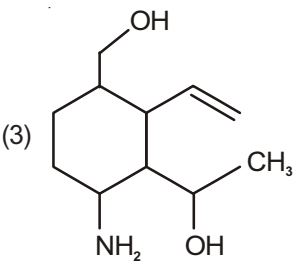


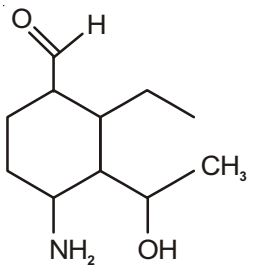
86. Major product obtained in the given reaction is



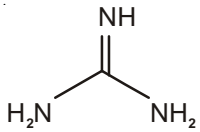








87. Most basic compound in the following is
(1) $PhCH_2NH_2$ (2) $PhNH_2$



(4) $PhCH_2CONH_2$

88. Glucose is
(1) Aldotriose (2) Ketotriose
(3) Aldohexose (4) Ketohexose

89. Elastomeric copolymer(s) is/are
(1) Buna–S (2) Buna–N
(3) Neoprene (4) Both (1) and (2)

90. Monomer units used for formation of Nylon-2-Nylon-6 polymer are
(1) Glycine and ethylene glycol
(2) Glycine and aminocaproic acid
(3) Styrene and aminocaproic acid
(4) Styrene and urea

BOTANY

91. Amongst the following, smallest cell is
(1) RBC (2) WBC
(3) *Mycoplasma* (4) Ostrich egg

92. The main arena of cellular activities is
(1) Nucleoplasm (2) Cytoplasm
(3) Nucleolus (4) Nucleosome

93. Which of the following organelles constitute an endomembrane system?
(a) Mitochondria (b) Lysosomes
(c) Vacuoles (d) Golgi complex
(e) Endoplasmic reticulum
(1) (a) only
(2) (b) and (c) only
(3) (d) and (e) only
(4) All, except (a)

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

	Column I		**Column II**
a.	G_1 phase	(i)	Separation of two homologous chromosomes from each other
b.	Interkinesis	(ii)	Duplication of centrioles
c.	Metaphase	(iii)	Synthesis of nucleotides
d.	Anaphase I	(iv)	Alignment of chromosomes at the equator

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

95. A diploid cell has 24 chromosomes. What will be number of bivalents and number of chromatids respectively in its zygotene stage?
(1) 12 and 48 (2) 12 and 24
(3) 24 and 48 (4) 24 and 12

96. Only flowering plants are included in
(1) Kingdom-Plantae
(2) Class-Pteropsida
(3) Division-Angiospermae
(4) Order-Cycadales

97. Which of the following provides useful information for identification of names of various species found in an area?
(1) Monograph (2) Manual
(3) Botanical garden (4) Museum

98. Multicellular body organisation and saprotrophic mode of nutrition are features of
(1) Monerans (2) Slime moulds
(3) Protistans (4) Fungi

99. Select the **incorrect** statement w.r.t. dinoflagellates.
(1) These are golden brown photosynthetic protists
(2) They are mostly marine and some are found in fresh water.
(3) They have reserve food in the form of carbohydrate and oils
(4) Most of them are filamentous and lack flagella except in the reproductive stage

100. *Rhizopus* differs from bacteria as the former has
(1) Cell wall
(2) Reserve food material as starch
(3) 70S ribosome
(4) Membrane bound organelles

101. Which of the following function is **not** performed by rhizome?
(1) Synthesise of food by photosynthesis
(2) Storage of food
(3) Perennation
(4) Reproduction

102. Radial symmetry of flower is not found in
(1) Mustard (2) Bean
(3) *Datura* (4) Chilli

103. Select the **odd** one w.r.t. "The lily family".
(1) *Petunia* (2) Tulip
(3) *Asparagus* (4) *Aloe*

104. In terrestrial plants, cuticle is absent on the surface of
(1) Epidermis of stem
(2) Epidermis of monocot leaf
(3) Epidermis of dicot leaf
(4) Epiblema of root

105. Lateral roots arise from
(1) Hypodermis (2) Epidermis
(3) Pericycle (4) Cork cambium

106. Dendrochronology deals with study of
(1) The age of a tree by counting the number of annual rings
(2) Morphological adaptation of a plant in its habitat
(3) The age of the fossil of a tree
(4) The structure of wood of different trees

107. Plant body is differentiated into holdfast, stipe and frond in
(1) *Ulothrix* (2) *Chara*
(3) *Laminaria* (4) *Chlamydomonas*

108. Read the following statements and choose the **incorrect** ones.
(a) The non-vascular terrestrial plants which are also called amphibians of the plant kingdom are the first embryophytes.
(b) All bryophytes are heterosporous.
(c) Mosses are thalloid and liverworts are leafy bryophytes.
(d) *Equisetum* belongs to the class Sphenopsida.
(e) *Salvinia* is a xerophytic fern.
(1) (a), (b) and (d) (2) (b), (c) and (e)
(3) (d) only (4) (a) and (d) only

109. Ploidy of endosperm in gymnosperms after fertilization is
(1) n (2) 2n
(3) 3n (4) 4n

110. How many plants given below produce non-endospermic seeds?

Pea, Bean, Castor, Coconut, Groundnut, Maize, Wheat, Rice

(1) Five (2) Three
(3) Four (4) Two

111. Absorption of mineral ions from soil to cytoplasm of root cells is
(1) Only a passive process
(2) Only an active process
(3) Passive as well as active process
(4) Due to simple diffusion only

112. Magnesium is **not** involved in the
(1) Formation of middle lamella
(2) Synthesis of chlorophyll
(3) Synthesis of DNA and RNA
(4) Anion-cation balance in cells

113. In rice plants, optimum temperature for higher rate of photosynthesis is
(1) 45-48°C (2) 30-45°C
(3) 15-20°C (4) 20-25°C

114. A three carbon molecule is the end product of
(1) Glycolysis
(2) Alcoholic fermentation
(3) Krebs cycle
(4) Oxidative phosphorylation

115. Which of the following is a natural auxin?
(1) Indole-3-butyric acid
(2) 2, 4-dichlorophenoxyacetic acid
(3) Naphthalene acetic acid
(4) 2, 4, 5-trichlorophenoxy acetic acid

116. Select the **incorrectly** matched pair.
(1) Gibberellin – Delayed ripening of fruits
(2) Cytokinin – Delay senescence of leaves
(3) Ethylene – Increase male flowers in cucumber
(4) Abscisic acid – Induce dormancy of seeds

117. Which phytohormone acts as an antagonist to auxin, w.r.t. apical dominance?
(1) Cytokinin (2) Ethylene
(3) ABA (4) Gibberellin

118. In onion, vegetative propagation occurs through
(1) Modified floral bud
(2) Modified underground stem
(3) Leaf bud
(4) Offset

119. The male reproductive structure (sex organ) in *Chara* is
(1) Nucule
(2) Globule
(3) Oogonium
(4) Archegonium

120. Which of the following is **not** a characteristic feature of water pollinated flowers?
(1) Mucilaginous covering on pollen grains
(2) Long, sticky unwettable stigma
(3) Presence of nectaries and fragrance
(4) Light and unwettable pollen grains

121. Double fertilization involves
(1) One male gamete, two female gametes and two polar nuclei
(2) Two male gametes, two female gametes and one polar nuclei
(3) One male gamete and two polar nuclei only
(4) Two male gametes, two polar nuclei and one female gamete

122. Pollen tablets are used
(1) In artificial breeding (2) In '*in vitro*' fertilization
(3) For cryopreservation (4) As food supplements

123. How many true breeding pea plant varieties were selected by Mendel?
(1) 7 (2) 4
(3) 14 (4) 21

124. When a single gene product produce more than one effect, the phenomenon is known as
(1) Incomplete dominance
(2) Pleiotropy
(3) Multiple allelism
(4) Euploidy

125. Both male and female individuals have same number of chromosomes in which sex determination is
(a) XY type (b) XO type
(c) ZW type (d) ZO type
The **correct** ones are
(1) Only (a) and (b) (2) Only (a) and (c)
(3) Only (a) and (d) (4) All, except (d)

126. Central dogma of molecular biology was proposed by
(1) H. Temin (2) Francis Crick
(3) D. Baltimore (4) Watson

127. Which one of the following is **not** a stop codon?
(1) UAA (2) UAG
(3) UAC (4) UGA

128. Arrange the following steps of DNA fingerprinting in **correct** order and choose the appropriate option
(a) Hybridisation using labelled VNTR probe
(b) Isolation of DNA
(c) Detection of hybridised DNA
(d) Blotting of DNA fragments to synthetic membrane
(1) (a), (c), (d), (b) (2) (b), (d), (a), (c)
(3) (b), (c), (a), (d) (4) (d), (b), (c), (a)

129. Pomato is an example of
(1) Intravarietal somatic hybrid
(2) Intraspecific somatic hybrid
(3) Intergeneric somatic hybrid
(4) Interspecific mutation breeding

130. The large holed Swiss cheese is ripened with the help of
(1) *Saccharomyces cerevisiae*
(2) *Propionibacterium sharmanii*
(3) *Streptococcus*
(4) *Aspergillus niger*

131. Mammals from colder climates generally have shorter ears and limbs. This is
(1) Allen's rule (2) Bergmann's rule
(3) Jordan's rule (4) Rensch's rule

132. Which of the following are structural features of ecosystem?
(a) Productivity (b) Decomposition
(c) Stratification (d) Species composition
(1) Only (a) and (b) (2) Only (c) and (d)
(3) Only (a) and (d) (4) All (a), (b), (c) and (d)

133. An example of recently extinct species in Russia is
(1) Steller's sea cow (2) Quagga
(3) Thylacine (4) Dodo

134. Amongst the following, highest DDT concentration in aquatic food chain shall occur in
(1) Phytoplankton (2) Zooplankton
(3) Fish eating birds (4) Fish

135. FOAM is associated with
(1) Noise pollution
(2) Global warming
(3) Integrated waste water treatment
(4) Forest conservation

ZOOLOGY

136. A terminal method used to prevent any more pregnancies is
(1) Medical Termination of Pregnancy (MTP)
(2) Intrauterine device (IUD)
(3) Vasectomy and tubectomy
(4) Diaphragms, cervical caps & vaults

137. Isolation of genetic material from yeast will require all, **except**
(1) Chilled ethanol (2) Protease
(3) Ribonuclease (4) Cellulase

138. The following immunoglobulins may be present in a newly born because of transfer from mother to child
(1) IgA and IgG (2) IgG and IgM
(3) IgA and IgM (4) IgG and IgE

139. In rDNA technology, *Agrobacterium tumefaciens* can be used as vector for
(1) Monocot plant cells only
(2) Dicot plant cells only
(3) Monocot and dicot plant cells
(4) Animal cells

140. A patient underwent surgery for kidney transplant. However, within days the transplanted kidney got rejected. Which mechanism is responsible for the graft rejection?
(1) Dialysis
(2) Humoral immune response
(3) Cell-mediated immune response
(4) Auto-immune response

141. Select the **incorrect** statement w.r.t evolution
(1) Stochastic process
(2) Based on chance events in nature
(3) Direct process in the sense of determinism
(4) Based on chance mutations in the organism

142. A 20-year old boy reports to the hospital with fever, chills, cough and headache along with bluish-gray discoloration to lips and fingernails. He is most likely to be diagnosed with
(1) Common cold (2) Typhoid fever
(3) Pneumonia (4) Malaria

143. Respiration takes place through gills in all **except**
(1) *Delphinus* (2) *Balanoglossus*
(3) *Hippocampus* (4) *Scoliodon*

144. Glucose and amino acids are absorbed by
(1) Facilitated transport using carrier proteins only
(2) Active transport only
(3) Active transport and facilitated transport
(4) Only by simple diffusion

145. Point-to-point coordination is provided by
(1) Endocrine system (2) Neural system
(3) Skeletal system (4) Muscular system

146. Select the **correct** statement w.r.t. events occuring in cardiac cycle.
(1) Simultaneous closure of auriculoventricular valves and semilunar valves
(2) Simultaneous opening of auriculoventricular valves and semilunar valves
(3) Simultaneous contraction of all the four chambers of heart
(4) Simultaneous relaxation of all the four chambers of heart

147. Which of the following substances can be absorbed directly by the gastric mucosa?
(1) Simple sugars and amino acids
(2) Alcohol, simple sugars and medicines
(3) Alcohol, simple aminoacids and medicines
(4) Medicines, simple amino acids and sugars

148. Select the **incorrect** function w.r.t glucagon.
(1) Mainly acts on the liver cells i.e hepatocytes
(2) Stimulates glycogenolysis and gluconeogenesis
(3) Increases cellular glucose uptake and utilisation
(4) Contributes to hyperglycemia

149. Increased production of how many of the the following hormones is essential during pregnancy?
(a) Prolactin (b) Cortisol
(c) Thyroxine (d) Estrogen
(e) Progesterone (f) hCG
(g) hPL
(1) Four (2) Five
(3) Six (4) Seven

150. Which of the following groups of gases **correctly** mimics the primitive atmosphere in the Urey Miller experiment?
(1) CH_4, NO_2, H_2O (gas), CO_2
(2) CH_4, NH_3, H_2O (gas), H_2
(3) H_2, NO_2, CH_4, CO_2
(4) H_2S, NO_2, CH_4, CO_2

151. The tympanic membrane is
(1) A sound drum with fine hair and wax secreting gland.
(2) Formed of a soft cartilaginous material which cannot be replaced if damaged.
(3) Composed of connective tissue covered with skin outside and mucus membrane inside.
(4) The first part of the middle ear which also contains three ear ossicles.

152. The following structure gets embedded in the endometrium of the uterus of a conceiving mother to grow into the foetus.
(1) Zygote (2) Morula
(3) Blastocyst (4) Blastomere

153. In restriction enzymes such as *Eco*RI and *Hin*d II, the roman numeral indicates
(1) The specific base sequence known as recognition sequence.
(2) The number of multiple cloning sites.
(3) Order in which the enzyme was isolated.
(4) Copy number of the origin of replication.

154. Choose the **odd** one w.r.t. striated muscles.
(1) Voluntary in nature
(2) Closely attached to skeletal system
(3) Present in visceral organs of the body
(4) Primarily involved in locomotory action

155. A 30 year old female has menstrual cycle of 32 days. How many days before the start of menstruation would ovulation occur?
(1) 18 days (2) 14 days
(3) 16 days (4) 12 days

156. The average amount of haemoglobin is __X__ in every __Y__ of blood.
Choose the options to fill the blanks **correctly**.

	X	Y
(1)	12 – 16 gms	10 ml
(2)	12 – 16 gms	100 ml
(3)	12 – 16 gms	1000 ml
(4)	14 – 18 gms	1000 ml

157. The peak of ECG that leads to the atrial systole is
(1) P-wave
(2) QRS complex
(3) T wave
(4) ST segment

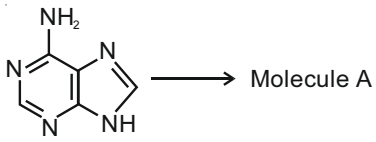
158. Teeth of sharks and rays are modified
(1) Bones with strong attachment.
(2) Placoid scales.
(3) Bones with superficial attachment.
(4) Ctenoid scales.

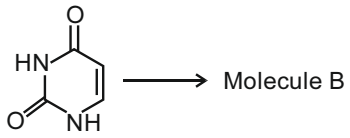
159. The component which forms the largest percentage of the total cellular mass in animals is
(1) Lipids (2) Carbohydrates
(3) Proteins (4) Water

160. How many PCR cycles and required to produce 32 copies of a dsDNA piece?
(1) 3 (2) 4
(3) 5 (4) 6

161. Specific palindromic nucleotide sequences in the DNA are recognized by
(1) Restriction exonucleases
(2) Restriction endonucleases
(3) All restriction enzymes
(4) DNA ligases

162. The function of nitrogenous waste conversion i.e NH_3 to urea is performed in vertebrates by
(1) Kidneys
(2) Liver
(3) Gall bladder
(4) Ureotelic animals do not produce ammonia at any stage of metabolism

163. 

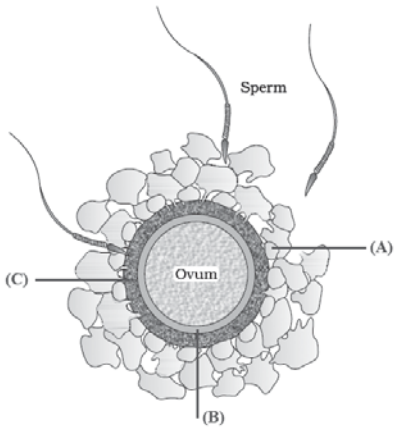


Identify molecule (A) and molecule (B).

	A	B
(1)	Uracil	Adenine
(2)	Adenine	Uracil
(3)	Adenosine	Uridine
(4)	Uridine	Adenosine

164. pCO_2 of blood present in aorta is equal to pO_2 of blood present in
(1) Renal artery (2) Hepatic artery
(3) Pulmonary artery (4) Pulmonary vein

165. Study following diagram carefully.



Identify labelled regions A, B and C of the ovum.

	A	B	C
(1)	Perivitelline space	Zona pellucida	Corona radiata
(2)	Corona radiata	Perivitelline space	Zona pellucida
(3)	Perivitelline space	Corona radiata	Zona pellucida
(4)	Zona pellucida	Perivitelline space	Corona Radiata

166. Out of the following which movements are possible by some cells of the human body?

(a) Cilliary movement

(b) Amoeboid movement

(c) Flagellar movement

(1) (a) and (c) only

(2) (a) and (b) only

(3) (c) and (a) only

(4) (a), (b) and (c)

167. If protein energy malnutrition is accompanied by calorie deficiency in children, it is characterized as

(1) Kwashiorkor

(2) Pellagra

(3) Marasmus

(4) Beri-Beri

168. Select the **incorrect** option w.r.t the alimentary canal of *Periplaneta americana*?

(1) Crop is followed by gizzard or proventriculus.

(2) Hepatic caecae are present at the junction of midgut and hindgut.

(3) Malpighian tubules help in removal of excretory products from haemolymph.

(4) Entire foregut is lined by cuticle

169. The junction whose primary function is to prevent substances from leaking across a tissue are

(1) Gap junctions

(2) Tight junctions

(3) Adhering junctions

(4) Hemidesmosomes

170. Excretory product excreted by the adult frog is:

(1) Ammonia

(2) Uric acid

(3) Urea

(4) Ammonia and urea

171. Which of the following articulates with head of humerus to form the shoulder joint?

(1) The depression above the acromion

(2) The depression below the acromion process

(3) A cavity in pelvic bone called the acetabulum

(4) A cavity called the foramen magnum

172. The scala vestibuli ends at the ___X___ whereas the scala tympani terminates at the ___Y___.

Choose the options that fill the blanks **correctly**.

	X	Y
(1)	Round window	Oval window
(2)	Oval window	Round window
(3)	Eustachian tube	Tympanum
(4)	Tympanum	Eustachian tube

173. In the kidneys, many of the straight tubes called _____ converge and open into the renal pelvis through medullary pyramids in the calyces.

Choose the option that fills the blank.

(1) Proximal convoluted tubule

(2) Henle's loop

(3) Distal convoluted tubule

(4) Collecting ducts

174. Which of the following is **not** a function of the neural system of the body?

(1) Receiving and interpretation of stimuli.

(2) Does not contain adhering junction.

(3) Innervation of all the cells of the body and their continuous regulation.

(4) Co-ordinating and integrating homeostatic activities of the organs.

175. The **correct** description of the sino-atrial node (SAN) is
   (1) A specialized neural tissue which generates action potential without external stimulus.
   (2) Present in the lower left corner of the right atrium.
   (3) A specialized cardiac musculature which can generate action potential without external stimulus
   (4) A nodal tissue which can autonomously generate action potential but with regular external stimuli.

176. Which of the following drugs is native to South America?
   (1) *Papaver somniferum*
   (2) *Cannabis sativa*
   (3) *Erythroxylum coca*
   (4) *Atropa belladona*

177. The antrum first appears prominently in the
   (1) Primary follicle (2) Secondary follicle
   (3) Tertiary follicle (4) Graafian follicle

178. The Nobel prize for discovering and establishing penicillin as an effective antibiotic was awarded to
   (1) Louis Pasteur
   (2) Alexander Fleming
   (3) Fleming, Chain and Florey
   (4) Ernst Chain and Howard Florey

179. The most abundant protein of the animal world is
   (1) RuBisCo (2) Collagen
   (3) Albumin (4) Fibrinogen

180. Choose the **odd** one w.r.t. chemical nature.
   (1) Insulin (2) Cortisol
   (3) Glucagon (4) Pituitary hormone

❑ ❑ ❑

02/05/2019

Code-B

Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)

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

MM : 720

Mock Test for NEET-2019
Test-13

Time : 3 Hrs.

ANSWERS

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

02/05/2019

Code - B

Aakash
Medical | IIT-JEE | Foundations
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Regd. Office : Aakash Tower, 8, Pusa Road, New Delhi-110005; Ph.: 011-47623456

MM : 720

Mock Test for NEET-2019
Test-13

Time : 3 Hrs.

Hints and Solutions

PHYSICS

1. Answer (4)

2. Answer (4)

$$v_A = \frac{dx_A}{dt} = 3 + 2t$$

$$v_B = \frac{dx_B}{dt} = 4t - 1$$

then $v_A = v_B$

$3 + 2t = 4t - 1$

$4 = 2t$

$t = 2$ s

3. Answer (2)

$$T = \frac{2u_y}{g}$$

$$10 = \frac{2u_y}{g}$$

$$H = \frac{u_y^2}{2g} = \frac{1}{2}\left(\frac{u_y}{g}\right)^2 g = \frac{1}{2}(5)^2 \times 10$$

$= 125$ m

4. Answer (1)

$$a = \frac{(5 - 3 - 2\mu_k)g}{(5 + 3 + 2)}$$

$1 \times 10 = (2 - 2\mu_k)10$

then $\mu_k = 0.5$

5. Answer (4)

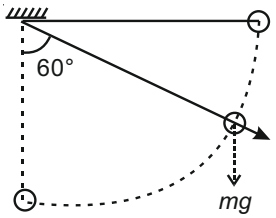
$$T - mg\cos 60° = \frac{mv^2}{l}$$

$v^2 = 2gl\,(1 - \cos 60°)$

$v^2 = gl$

$$T = \frac{mg}{2} + mg$$

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



6. Answer (1)

7. Answer (3)

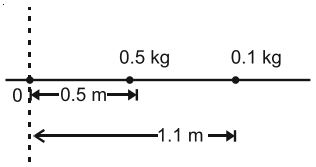
According to conservation of momentum

$$5 \times 0 = 3\vec{v}_3 + 60\sqrt{2}$$

$$\vec{v}_3 = \frac{60\sqrt{2}}{3} = 20\sqrt{2}\ \text{m/s}$$

$$K = \frac{1}{2} \times 3 \times 400 \times 2 = 1200\ \text{J}$$

8. Answer (4)



then $x_{cm} = \frac{(0.1)(1.1) + (0.5)(0.5)}{0.6}$

$$= \frac{0.11 + 0.25}{0.6}$$

$$= \frac{0.36}{0.6}\ \text{m}$$

$$x_{cm} = \frac{6}{10}\text{ m}$$

$$\boxed{x_{cm} = 0.6\text{ m}}$$

$$x_{cm} = \frac{500\times 0.5 + 100\times 1.1}{600}$$

$$= \frac{250+110}{600} = 0.6\text{ m}$$

9. Answer (2)

$$\vec{\tau} = \vec{r}\times\vec{F}$$

10. Answer (4)

$$mg(12-2) = K_T + K_R$$

$$= K_T\left(1+\frac{K_R}{K_T}\right)$$

$$mg(10) = K_T\left(1+\frac{2}{5}\right)$$

$$m(98) = \frac{1}{2}mv^2\left(\frac{7}{5}\right)$$

$$\frac{980}{7} = v^2$$

then $v = \sqrt{140}$ m/s

11. Answer (4)

$$K = \frac{YA}{L} = \frac{3\times 10^9 \times 2\times 10^{-4}}{6}$$

$= 10^5$ N/m

12. Answer (4)

$$160 = \frac{GMm}{r^2}$$

$$160 = \left(\frac{GMm}{2r}\right)\frac{2}{r}$$

KE = 80 × 4 × 10^7 m

KE = 32 × 10^8 J

13. Answer (1)

If floats $4\pi R^2 t\rho g \le \frac{4}{3}\pi R^3\times 1\times g$

$$t \le \frac{R}{3\rho}$$

14. Answer (1)

$$\text{KE} = \frac{1}{2}KA^2$$

KE $\propto$ spring constant $\propto \frac{1}{T^2}$

15. Answer (4)

The common factor

325 Hz, 390 Hz is 65 Hz

then next higher = 195 + 65

= 260 Hz

16. Answer (4)

$$\frac{2\pi}{T} = 3140$$

then $\frac{T}{2} = \frac{\pi}{3140}$

$$= \frac{3.14}{3140}$$

= 1 m s

17. Answer (2)

y is the property of material.

18. Answer (1)

$C_p = \frac{R}{0.4} \Rightarrow \frac{10}{4}R \Rightarrow \frac{5}{2}R$, then $\boxed{f = 3}$

19. Answer (2)

$$T_1V_1^{\gamma-1} = T_2V_2^{\gamma-1}$$

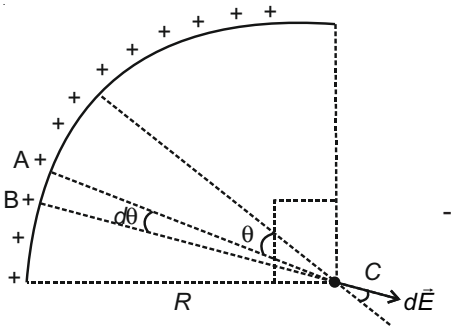
$$T_1(5.6)^{\frac{5}{3}-1} = T_2(0.7)^{\frac{5}{3}-1}$$

$$T_1(8)^{\frac{2}{3}} = T_2$$

$T_2 = 4T_1$

$$W = \frac{\frac{1}{4}R[T_1 - 4T_1]}{\frac{5}{3}-1} = -\frac{9}{8}RT_1$$

20. Answer (1)



Charge on element AB

$$dq = \frac{2q}{\pi R}(dl)$$

$$dq = \frac{2q}{\pi R}(Rd\theta)$$

$$= \frac{2q}{\pi}d\theta$$

$$E = \int dE\cos\theta = \frac{1}{4\pi\varepsilon_0}\frac{2q}{\pi R^2}\int_{\frac{-\pi}{4}}^{\frac{\pi}{4}}\cos\theta d\theta$$

$$E = \frac{2q}{4\pi^2\varepsilon_0}\frac{\sqrt{2}}{R^2}$$

$$E = \frac{1}{4\pi^2\varepsilon_0}\frac{2\sqrt{2}q}{R^2}$$

21. Answer (3)

$$r_{new} = (n)^{\frac{1}{3}} r_0$$

$$V = K\frac{q}{r_0}$$

$$V' = K\frac{3q}{(3)^{\frac{1}{3}} \times r_0}$$

$$V' = (3)^{\frac{2}{3}}\ 500\ V$$

$$= 500(3)^{\frac{2}{3}}\ V$$

22. Answer (4)

Charge stored on C_1

$q_1 = C_1V = 12\mu C$

When switch turned right common potential

$$V = \frac{12}{3} = 4\ V$$

Final charge on C_1 $q_1' = 4\times 2 = 8\ \mu C$

23. Answer (4)

Resistance of wire $R = \frac{\rho l}{A} = \frac{3}{14}\times 10^{-2}\Omega$

$$i = \frac{V}{R} = \frac{12\times 10^{-3}\times 14}{3\times 10^{-2}}$$

= 5.6 A

24. Answer (3)

Initial r.m.s speed $v = \sqrt{\frac{3RT}{M}}$

New r.m.s speed in atomic stale $v' = \sqrt{\frac{3R\times 4T\times 2}{M}}$

$$v' = 2\sqrt{2}\ \text{v}$$

25. Answer (2)

$$n = \frac{qB}{2\pi m}$$

$$B = \frac{2\pi mn}{q}$$

= 0.88 T

26. Answer (1)

$$F_3 = F_{31}(-\hat{i}) + F_{32}\hat{i} + F_{34}\hat{i} + F_{35}\hat{i}$$

$$= \frac{\mu_0 i_3}{2\pi d}\left[-\frac{2}{2} + \frac{4}{1} + 4 + \frac{2}{2}\right]\hat{i}$$

$$= \frac{8\times(2\times 10^{-7})\times 0.25}{0.5}$$

= 8 × 10^{-7} N/m

27. Answer (2)

$$e = \frac{-\Delta\phi}{\Delta t}$$

$$= \frac{\pi\times(2\times 10^{-1})^2\times 20\times 10^{-3}}{\frac{1}{80}}$$

= 64π mV

28. Answer (4)

29. Answer (2)

$$I = \frac{B_0^2}{2\mu_0}c$$

$$= \frac{4\times 10^{-12}\times 3\times 10^8}{2\times 4\pi\times 10^{-7}}$$

$$= \frac{1500}{\pi}\frac{W}{m^2}$$

30. Answer (2)

$$I_{max} = \left(\sqrt{9I} + \sqrt{I}\right)^2$$

= 16*I*

$$I_{min} = \left(\sqrt{9I} - \sqrt{I}\right)^2$$

= 4*I*

31. Answer (3)

$$eV = \frac{hc}{\lambda}$$

$$\lambda = \frac{6.6\times10^{-34}\times3\times10^{8}}{1.6\times10^{-19}\times4.9}$$

32. Answer (4)

$$\frac{n}{t}\frac{hc}{\lambda} = 1.5\times10^{-3}$$

$$\frac{n}{t} = \frac{1.5\times10^{-3}\times4\times10^{-7}}{6.6\times10^{-34}\times3\times10^{8}}$$

$$\frac{n}{t} = \frac{6}{20}\times10^{+16}$$

$\Rightarrow$ Number of photo electrons per second = $\frac{6}{20}\times10^{+13}$

$$i = \frac{6}{20}\times1.6\times10^{-6}$$

i = 0.49 μA

33. Answer (2)

34. Answer (4)

$$\lambda = \frac{12.27}{\sqrt{V}}A^{\circ} = 0.1\,A^{\circ}$$

35. Answer (3)

$N = N_0e^{-\lambda t}$

$9N_0 = N_0e^{-\lambda\times5}$

$$5\lambda = \log e\frac{1}{0.9} \qquad \ldots(i)$$

After 20 days

$$20\lambda = \log e\frac{1}{x} \qquad \ldots(ii)$$

Devide (1) by (2)

$$\frac{1}{4} = \frac{\log_{10}\left(\frac{1}{0.9}\right)}{\log_{10}\left(\frac{1}{x}\right)} = \frac{\log_{10}(0.9)}{\log_{10}x}$$

$\log_{10}x = 4\log_{10}(0.9)$

x = 0.658

= 65.8%

36. Answer (1)

$$A = \frac{V_0}{V_{in}} = \beta\frac{R_L}{R_{in}}$$

$$\frac{8}{V_{in}} = 98\times\frac{4}{2}$$

$$V_{in} = \frac{8}{196} = \frac{2}{49}$$

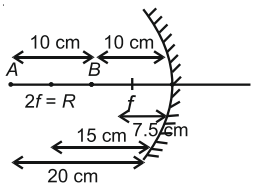
37. Answer (4)

38. Answer (1)

Mass number = 180 – 8 = 172

Atomic number = 72 – 4 = 68

39. Answer (3)



For object side (A)

$$\frac{1}{V_A} + \frac{1}{(-20)} = \frac{1}{-7.5}$$

$$\frac{1}{V_A} = \frac{-2}{15} + \frac{1}{20}$$

$$= \frac{-40+15}{15\times20}$$

$$= \frac{-25}{15\times20}$$

$$V_A = -\frac{15\times20}{25} \Rightarrow -12 \text{ cm}$$

For side (B) of object

$$\frac{1}{V_B} + \frac{1}{-10} = -\frac{2}{15}$$

then $\frac{1}{V_B} = \frac{1}{10} - \frac{2}{15}$

$$\frac{1}{V_B} = \frac{-5}{15\times10}$$

V_B = –30 cm

then image size along the principle axis is

$|\Delta V|$ = 30 – 12 $\Rightarrow$ 18 cm

40. Answer (3)

41. Answer (4)

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}$$

$$\frac{1}{f}=\frac{1}{-20}+\frac{1}{50}$$

$$=\frac{-5+2}{100}$$

f = – 33.3 cm

42. Answer (4)

At resonance condition V_{LC} = 0

$$i_{rms}=\frac{V_{rms}}{R}$$

$$=\frac{220\ V}{110\ \Omega}$$

= 2 A

43. Answer (4)

44. Answer (2)

$$\frac{2\pi}{3}R=10$$

$$R=\frac{30}{2\pi}$$

$L = 2\ R\sin 60°$

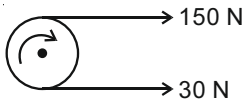
$$=R\sqrt{3}$$

$$M=\frac{25}{10}\times R\sqrt{3}$$

$$=2.5\times\frac{30}{2\pi}\sqrt{3}$$

$$=\frac{75\sqrt{3}}{2\pi}A\times m^2$$

45. Answer (1)



$P = \tau.\omega$

= (120) (0.10) (250)

P = 120 × 25

= 3 kW

CHEMISTRY

46. Answer (2)

Number of Cl^- ions = 0.1 × 2 × N_A = 0.2 N_A.

47. Answer (4)

Degeneracy of 'n = 3' is 9.

48. Answer (3)

49. Answer (4)

Both CN^- and NO^+ are having 14 electrons and are diamagnetic in nature.

50. Answer (3)

$(\overset{\ominus}{N}{=}C{=}\overset{\ominus}{N})$ Linear shape.

51. Answer (2)

52. Answer (1)

$$\frac{V_1}{T_1}=\frac{V_2}{T_2}$$

$$\Rightarrow\ \frac{V_1}{T}=\frac{V_2}{1.2T}$$

$\Rightarrow$ V_2 = 1.2 V_1

53. Answer (3)

$$\frac{T_c}{T_b}=\frac{\frac{8a}{27Rb}}{\frac{a}{Rb}}=\frac{8}{27}$$

$$\frac{160}{T_b}=\frac{8}{27}$$

$\Rightarrow$ T_b = 20 × 27 = 540 K

54. Answer (1)

In adiabatic process, Q = 0.

$\Delta U = Q + W$

$\Delta U = W$

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

55. Answer (4)

Enthalpy of formation is valid for 1 mole of product formation by using reactants at respective standard states.

56. Answer (3)

$$\underset{1}{X(g)}\rightleftharpoons\underset{0}{Y(g)}+\underset{0}{Z(g)}$$
$$\underset{0.5}{}\qquad\underset{0.5}{}\qquad\underset{0.5}{}$$

P : Total pressure

At equilibrium

$$K_p=\frac{P\alpha^2}{1-\alpha^2}=\frac{5\times0.5^2}{1-0.5^2}=\frac{5}{3}=1.67\ atm$$

57. Answer (4)

On increase in temperature, pH and pOH of water both decrease because pK_w decreases.

58. Answer (1)

$H_3PO_4(n_f = 3)$, $H_3PO_3(n_f = 2)$ and H_3PO_2 $(n_f = 1)$

59. Answer (4)

$$4H_3PO_3 \xrightarrow{\Delta} 3H_3PO_4 + PH_3$$

60. Answer (2)

61. Answer (2)

Metallic hydrides such as $TiH_{1.73}$, $VH_{0.56}$, etc. are non-stoichiometric.

62. Answer (1)

63. Answer (3)

Hydration energy decreases as charge density decreases.

64. Answer (2)

$Na_2B_4O_7 + 2HCl + 5H_2O \rightarrow 2NaCl + 4H_3BO_3$

65. Answer 1)

CO_2, SiO_2 and GeO_2 are acidic in nature.

66. Answer (4)

Zeolites are example of 3D silicates.

67. Answer (3)

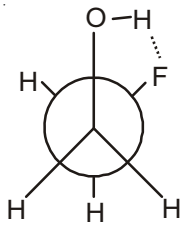
Order of –I effect is : $-\overset{\oplus}{N}R_3 > -NO_2 > -CN > -F$

68. Answer (3)

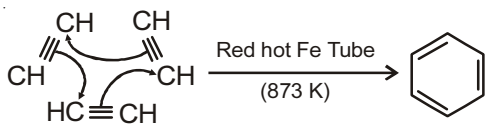
$Ph\overset{\oplus}{C}H_2 \rightarrow$ Most stable carbocation among the given carbocations due to more resonance.

69. Answer (2)

Due to H-bonding, gauche form becomes most stable.



70. Answer (4)



71. Answer (1)

Greenhouse gases : CFCs, N_2O, CH_4.

SO_2 is not a greenhouse gas.

72. Answer (3)

Complex containing ambidentate ligands will show linkage isomerism.

73. Answer (2)

74. Answer (4)

Half life of first order reaction is independent of initial reactant concentration.

75. Answer (3)

$$2SO_4^{2-} - 2e^- \xrightarrow{\text{at anode}} S_2O_8^{2-}$$

76. Answer (2)

In corrosion :

Cathode : $O_2 + 4H^+ + 4e^- \rightarrow 2H_2O(l)$

Anode : $2Fe(s) \rightarrow 2Fe^{2+} + 4e^-$

77. Answer (2)

If $FeCl_3$ is added to excess of hot water, positively charged solution of hydrated ferric oxide is formed $Fe_2O_3.xH_2O/Fe^{3+}$

78. Answer (2)

79. Answer (1)

- $XeF_6 + 3H_2O \rightarrow XeO_3 + 6HF$ (non redox)
- $6XeF_4 + 12H_2O \rightarrow 2XeO_3 + 4Xe + 24HF + 3O_2$
- $Cl_2 + H_2O \rightarrow HOCl + HCl$
- $Br_2 + H_2O \rightarrow HOBr + HBr$

80. Answer (4)

All are greenish except $Fe(OH)_3$, which is reddish brown.

81. Answer (4)

In $K_3[CoF_6]$ hybridization is sp^3d^2.

82. Answer (2)

Alkyl fluoride is formed by halide exchange. This is known as Swarts reaction.

83. Answer (2)

Electron withdrawing group makes aryl halides more susceptible to nucleophilic substitution.

84. Answer (2)

Anti-markovnikov's addition takes place.

85. Answer (1)

Compounds having pKa < 6.35, give $CO_2(g)$ on reaction with $NaHCO_3$.

86. Answer (3)

$LiAlH_4$ will reduce – ketones, carboxylic acid and $–NO_2$ group.

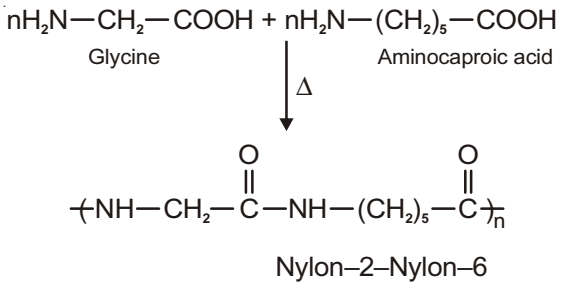
87. Answer (3)

Guanidine is considered as one of the most basic organic bases.

88. Answer (3)

89. Answer (4)

90. Answer (2)



Nylon–2–Nylon–6

BOTANY

91. Answer (3)

Mycoplasma is the smallest cell and are only 0.3 μm in length while bacteria could be 3 to 5 μm.

92. Answer (2)

93. Answer (4)

Mitochondria are endosymbiont organelles and rest constitute an endomembrane system.

94. Answer (1)

Nucleotide synthesis occurs in G_1 phase

In metaphase, chromosomes align themselves at the equator.

95. Answer (1)

A pair of synapsed chromosome is called bivalent.

96. Answer (3)

Angiosperms - all flowering plants.

97. Answer (2)

Manual contains complete listing and description of the plants.

98. Answer (4)

Slime moulds — unicellular

Fungi — multicellular

99. Answer (4)

Most of the dinoflagellates are unicellular, motile and biflagellate.

100. Answer (4)

Rhizopus is a fungus

Fungi have, 70S and 80S ribosomes, chitinous cell wall, glycogen as reserve food material and membrane bound organelles.

Bacteria lack membrane bound organelles.

101. Answer (1)

Rhizome is underground stem

102. Answer (2)

Bean - zygomorphic flower

103. Answer (1)

Petunia - solanaceae

104. Answer (4)

Cuticle is absent in roots and hydrophytes.

105. Answer (3)

The cells of pericycle gives rise to lateral roots.

106. Answer (1)

The age of tree can be known by counting the number of annual rings in the T.S. of stem. This is known as Dendrochronology.

107. Answer (3)

Brown algae shows body differentiation into holdfast, stipe and frond.

108. Answer (2)

Bryophytes are homosporous.

Mosses are leafy bryophytes.

Salvinia is an aquatic fern.

109. Answer (1)

Endosperm of gymnosperms formed before fertilization and it is haploid(n).

110. Answer (2)

Non-endospermic seeds - Pea, Bean, Gram.

111. Answer (3)

112. Answer (4)

Na^+, $Cl^–$ and K^+ are involved in the anion-cation balance in cells.

113. Answer (4)

Rice is a C_3 plant

114. Answer (1)

Pyruvic acid is a three carbon molecule.

115. Answer (1)

Natural auxins – Indole-3-acetic acid
Indole-3-butyric acid

116. Answer (3)

Ethylene increase female flower in cucumber.

117. Answer (1)

118. Answer (2)

Bulb of onion is modified underground stem.

119. Answer (2)

Oogonium/nucule – female sex organ

120. Answer (3)

Presence of nectaries is a feature of flowers pollinated by insects.

121. Answer (4)

122. Answer (4)

In recent years, pollen tablets are used as food supplements. Because pollen grains are rich in nutrients.

123. Answer (3)

Mendel selected 14-true-breeding pea plant varieties.

124. Answer (2)

125. Answer (2)

Same number of chromosomes in male and female occur in XX – XY type of sex determination and ZZ – ZW type of sex determination.

126. Answer (2)

Central dogma – unidirectional flow of information from DNA to RNA

127. Answer (3)

UAC codes for Tyrosine.

128. Answer (2)

129. Answer (3)

130. Answer (2)

Swiss cheese is ripened with the help of a bacterium.

131. Answer (1)

132. Answer (2)

Productivity and decomposition are functional aspects of ecosystem.

133. Answer (1)

134. Answer (3)

Highest concentration will occur in top carnivore

135. Answer (3)

FOAM – Friends of Arcata Marsh

ZOOLOGY

136. Answer (3)

Sterilisation i.e. Tubectomy or vasectomy is advised as a terminal method to prevent any more pregnancies because these techniques are highly effective (but reversibility is poor)

137. Answer (4)

To dissolve membranes and release DNA we use lysozyme in animals, cellulase in plants and chitinase in fungus.

RNA in removed with ribonuclease and proteins with protease.

Chilled ethanol helps precipitate out purified DNA

138. Answer (1)

IgG can cross placenta and enters foetal circulation. (eg anti-D antibodies are of IgG type)

IgA is present in mother's milk.

IgM cannot cross placenta (eg Anti-A and anti B are IgM type) and both are not present in mother's milk.

139. Answer (2)

Agrobacterium tumefaciens is a pathogen of only dicot plants and can therefore be used as a vector in them.

140. Answer (3)

T-lymphocytes which mediate cell mediated immunity are responsible for graft rejection as it differentiates self from non-self. Immunosuppressants are used to suppress their activity in organ transplantation

141. Answer (3)

Examples of evolution by anthropogenic action tell us that evolution is not a directed process in the sense of determinism.

142. Answer (3)

Disease		**Key symptoms**
Common cold	-	Nasal congestion, discharge, cough headache, sore throat
Typhoid	-	Stomach pain, high fever, headache, loss of appetite, weakness, constipation
Pneumonia	-	Fever, chills, cough, headache, gray to bluish discoloration of lips and nails
Malaria	-	Cyclic fever and chills recurring every 3 to 4 days.

143. Answer (1)

Delphinus (common dolphin) is a mammal and mammals respire through lungs.

144. Answer (3)
Small amounts of glucose and amino acid are absorbed by simple diffusion but it is not the only mechanism.
Both active transport and facilitated transport play a role in absorption of glucose

145. Answer (2)
The neural system provides an organized network of point-to-point connections for a quick coordination.

146. Answer (4)
It is impossible for all four chambers to contract simultaneously i.e. atrial systole and ventricular systole do not occur simultaneously. All 4 valves of heart are never open simultaneously.

147. Answer (2)
Absorption of simple sugars, alcohol and medicines takes place is stomach. Mainly protein digestion occurs in stomach.

148. Answer (3)
Insulin increases the cellular glucose uptake and utilization where as glucagon reduces it.

149. Answer (4)
hCG and hPL are exclusively produced by women during pregnancy.
Also, during pregnancy levels of other hormones like oestrogens, progesterone, cortisol, prolactin thyroxine etc increase several fold in the maternal blood because these are essential for supporting fetal growth, metabolic changes in mother and maintenance of pregnancy.

150. Answer (2)
The reducing atmosphere of primitive Earth was composed of CH_4, NH_3, H_2 and water vapour. It was completely devoid of free O_2.

151. Answer (3)
Tympanum (ear drum) is an inward extension of the external auditory meatus and is the last part of the outer ear. A partition between external ear and middle ear.

152. Answer (3)
After attachment of the trophoblast layer the blastocyst gets embedded in the endometrium of the uterus. This is called implantation. The inner cell mass of this structure gets differentiated as the embryo.

153. Answer (3)
Roman numerals following the names indicates the order in which the enzyme was isolated from that strain of bacteria.

154. Answer (3)

155. Answer (2)
Post-ovulatory period is always 14 days. However, ovulation would occur on (14 + extra days of cycle) after the 1st day of menstruation *i.e* 14 + 4 = 18th day.

156. Answer (2)
Average haemoglobin of a healthy individual is 12-16 gm per 100 ml.

157. Answer (1)
P-wave represents the electrical excitation (or depolarisation) of the atria which leads to contraction (systole) of both the atria.

158. Answer (2)
Teeth of chondrichthyes (Acrodont type) are modified placoid scales which are backwardly directed.
Chondrichthyes are cartilaginous fishes and have no bones.

159. Answer (4)
Average Composition of Cells

Component	% of the total cellular mass
Water	70-90
Proteins	10-15
Carbohydrates	3
Lipids	2
Nucleic acids	5-7
Ions	1

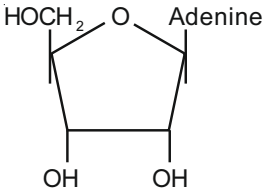
160. Answer (3)
Total number of copies formed = 2^n
where $\boxed{n = \text{number of cycles}}$
$\boxed{2^5 = 32 \text{ cycles}}$

161. Answer (2)
Restriction endonuclease functions by inspecting the length of a DNA sequence and recognizes specific palindromic nucleotide sequence in the DNA.

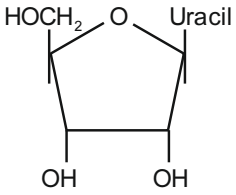
162. Answer (2)
Ureotelic animals like mammals, terrestrial amphibian and marine fishes convert the ammonia produced by metabolism into urea in the liver. It is then released into blood which is filtered and excreted out by kidneys

163. Answer (2)
Molecule (A) is bicyclic, therefore it is a purine i.e. adenine.
Molecule (B) is monocyclic, therefore it is a pyrimidine *i.e* uracil.

Adenosine and uridine are as follows:



Adenosine



Uridine

164. Answer (3)

165. Answer (2)

Corona radiata is the outermost layer followed by zona pellucida and perivitelline space.

166. Answer (4)

Macrophages and leucocytes of blood exhibit amoeboid movement.

Ciliary movement (not locomotion) is performed by cells lining the fallopian tubes and bronchi. Flagellar movement helps in swimming of spermatozoa.

167. Answer (3)

Kwashiorkor is caused due to protein deficiency unaccompanied by calorie deficiency.

168. Answer (2)

A ring of 6-8 blind tubules called hepatic caecae are present at the junction of foregut and midgut, which secrete digestive juices.

169. Answer (2)

Gap junctions	-	Facilitate intercellular communication
Adhering junctions	-	Perform intercellular cementation
Tight junctions	-	Stop substances from leaking across a tissue

170. Answer (3)

The frog excretes urea and is thus a ureotelic animal.

171. Answer (2)

The head of the humerus articulates below the acromion in a depression called the glenoid cavity to form the shoulder joint.

172. Answer (2)

At the base of the cochlea, the scala vestibuli ends at the oval window while the scala tympani terminates at round window.

173. Answer (4)

The DCTs of many nephrons open into a straight tube called the collecting duct, many of which converge and open into renal pelvis.

174. Answer (3)

As the nerve fibres do not innervate all the cells of the body and the cellular functions need to be continuously regulated, a special kind of control and co-ordination is provided by hormones (endocrine system).

175. Answer (3)

SAN is a specialized cardiac musculature present in the right upper corner of the right atrium.

It is auto-excitable which means it can generate action potentials without external stimuli.

AVN is present in lower left corner of the right atrium.

176. Answer (3)

Coca alkaloid or cocaine obtained from coca plant *Erythroxylum coca* is native to South America.

177. Answer (3)

Antrum appears in tertiary follicle.

178. Answer (2)

Penicillin was the first antibiotic to be discovered by Sir Alexander Fleming. It's full potential as an effective antibiotic used to treat soldiers in World War II was established by Ernst Chain and Howard Florey.

Therefore all three scientists were together awarded the Nobel prize in 1945 for this discovery.

179. Answer (2)

RuBisCo (Ribulose Bisphosphate Carboxylase Oxygenase) is the most abundant protein in the whole of the biosphere.

Collagen is most abundant protein in the animal world.

180. Answer (2)

Cortisol is a steroid hormone.

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