



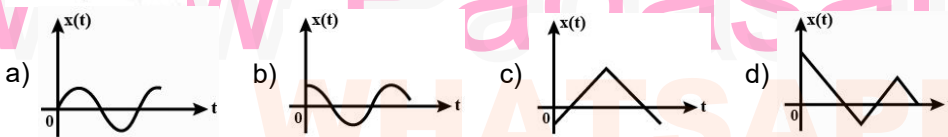
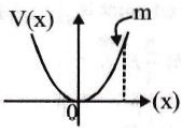
RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 200 Mins

NEET MOCK TEST 28 1

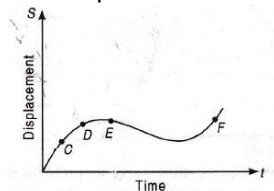
Marks : 1065

- Assertion: On reflection from a rigid boundary there takes place a complete reversal of phase.
Reason: On reflection from a denser medium, both the particle velocity and wave velocity are reversed in sign.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.
- If the nucleus of ${}_{13}\text{Al}^{27}$ has a nuclear radius of about 3.6fm, then ${}_{52}\text{Te}^{125}$ would have its radius approximately as
a) 9.6 fm b) 12 fm c) 4.8 fm d) 6 fm
- The acceleration of an electron in an electric field of magnitude 50 V/cm, if e/m value of the electron is 1.76×10^{11} C/kg, is:
a) 8.8×10^{14} m/sec² b) 6.2×10^{13} m/sec² c) 5.4×10^{12} m/sec² d) Zero
- A particle of mass m is released from rest and follows a parabolic path as shown. Assuming that the displacement of the mass from the origin is small, which graph correctly depicts the position of the particle as a function of time.



- Which of the following statements about the centripetal and centrifugal forces is correct?
a) Centripetal force balances the centrifugal force.
b) Both centripetal force and centrifugal force act on the same body.
c) Centripetal force is directed opposite to the centrifugal force.
d) Centripetal force is experienced by the observer at the centre of the circular path described by the body.
- A transistor has a current gain of 30. If the collector resistance is 6 k Ω input resistance is 1 k Ω , its voltage gain is:
a) 90 b) 180 c) 45 d) 360
- The two planets have radii r_1 and r_2 and their densities ρ_1 and ρ_2 respectively. The ratio of acceleration due to gravity on them will be:
a) $r_1\rho_1 : r_2\rho_2$ b) $r_1\rho_1^2 : r_2\rho_2^2$ c) $r_1^2\rho_1 : r_2^2\rho_2$ d) $r_1\rho_2 : r_2\rho_1$
- For a biconvex lens, an image lies at same distance as the object is from lens; image is real and inverted. What can be said about the object
a) placed at focus b) placed between f & 2f c) placed at 2f d) placed beyond 2f
- A thin lens of glass ($\mu = 1.5$) of focal length ± 10 cm is immersed in water ($\mu = 1.33$). The new focal length is
a) 20 cm b) 40 cm c) 48 cm d) 12 cm
- The phase difference between two waves, represented by:
 $y_1 = 10^{-6}\sin[100t + (x/50) + 0.5]m$ $y_2 = 10^{-6}\cos[100t + (x/50)]m$. where x is expressed in metres and t is expressed in seconds, is approximately:
a) 1.07 rad b) 2.07 rad c) 0.5 rad d) 1.5 rad

11. A body falling freely from a given height H hits an inclined plane in its path at a height h . As a result of this impact the direction of the velocity of the body becomes horizontal. For what value of (h/H) the body will take maximum time to reach the ground?
 a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{2}{5}$ d) $\frac{2}{3}$
12. Pick out the longest wavelength from the following types of radiation:
 a) blue light b) gamma rays c) X-rays d) red light
13. The displacement-time graph of moving particle is shown below.



- The instantaneous velocity of the particle is negative at the point _____
 a) D b) F c) C d) E
14. Surface tension is due to
 a) frictional forces between molecules b) cohesive forces between molecules
 c) adhesive forces between molecules d) Both (b) and (c)
15. If oxygen (O_2) has root mean square velocity of $C \text{ ms}^{-1}$, then root mean square velocity of hydrogen (H_2) will be:
 a) $C \text{ ms}^{-1}$ b) $\frac{1}{C} \text{ ms}^{-1}$ c) $4C \text{ s}^{-1}$ d) $C/4 \text{ ms}^{-1}$
16. A ball of mass 150 g starts moving at 20 ms^{-1} and is hit by a force which acts on it for 0.1 seconds. Then, the impulsive force is:
 a) 75 N b) 300 N c) 3 N d) 30 N
17. A compass needle whose magnetic moment is 60 A m^2 pointing geographical north at a certain place where the horizontal component of earth's magnetic field is $40 \times 10^{-6} \text{ Wb m}^{-2}$ experiences a torque of $1.2 \times 10^{-3} \text{ N m}$. The declination of the place is
 a) 20° b) 45° c) 60° d) 30°
18. The dimensional formula for magnetic flux is _____
 a) $[ML^2 T^{-2} A^{-1}]$ b) $[ML^3 T^{-2} A^{-2}]$ c) $[M^0 L^{-2} T^2 A^{-2}]$ d) $[ML^2 T^{-1} A^2]$
19. The thermo e.m.f E in volts of a certain thermocouple is found to vary with temperature difference θ in $^\circ\text{C}$ between the two junctions according to the relation $E = 30\theta - \frac{\theta^2}{15}$. The neutral temperature for the thermocouple will be _____.
 a) 30°C b) 450°C c) 400°C d) 225°C
20. The force $7\hat{i} - 3\hat{j} - 5\hat{k}$ acts on a particle whose position vector is $\hat{i} - \hat{j} + \hat{k}$. What is the torque of a given force about the origin?
 a) $2\hat{i} + 12\hat{j} + 10\hat{k}$ b) $2\hat{i} + 10\hat{j} + 12\hat{k}$ c) $2\hat{i} + 10\hat{j} + 10\hat{k}$ d) $10\hat{i} + 2\hat{j} + \hat{k}$
21. A plano-concave lens is made of glass of refractive index 1.5 and the radius of curvature of its curved face is 100 cm. What is the power of the lens?
 a) +0.5 D b) -0.5 D c) -2 D d) +2 D
22. At what angle the two vectors of magnitudes $(A + B)$ and $(A - B)$ must act, so that the resultant is $\sqrt{A^2 + B^2}$?
 a) $\cos^{-1} \frac{A^2 - B^2}{A^2 + B^2}$ b) $\cos^{-1} \frac{A^2 + B^2}{B^2 - A^2}$ c) $\cos^{-1} \frac{A^2 - B^2}{2(A^2 + B^2)}$ d) $\cos^{-1} \frac{A^2 + B^2}{2(B^2 - A^2)}$
23. Colours of thin soap bubbles are due to _____.
 a) refraction b) dispersion c) interference d) diffraction
24. The product of the coefficient of viscosity and volume of liquid flowing through a tube of area of cross-section A and length l in time t is x . Then, the pressure difference P between the two ends of the tube is given by:

a) $\frac{8\pi xL}{A^2}$ b) $\frac{8\pi xL}{tA^2}$ c) $\frac{8\pi^2 xL}{tA^2}$ d) $\frac{8xL}{tA^2}$

25. If a note x of unknown frequency produces 8 beats/see, with a source of 250 Hz and 12 beats/see with a source of 270 Hz, the frequency of unknown source will be:

- a) 258 Hz b) 242 Hz c) 262 Hz d) 282 Hz

26. Sir c.v. Raman got Nobel Prize in physics for

- a) refraction of light b) reflection of light c) scattering of light d) dispersion of light

27. When a constant force is applied to a body moving with constant acceleration, power does not remain constant.

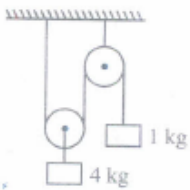
For power to be constant, the force has to vary with speed as follows:

a) $F \propto \frac{1}{v}$ b) $F \propto \frac{1}{\sqrt{v}}$ c) $F \propto v$ d) $F \propto v^2$

28. Molar specific heat at constant volume C_v for a monoatomic gas is

a) $\frac{3}{2}R$ b) $\frac{5}{2}R$ c) $\frac{6}{2}R$ d) $\frac{4}{2}R$

29. In the system shown in the figure, the acceleration of 1 kg mass is

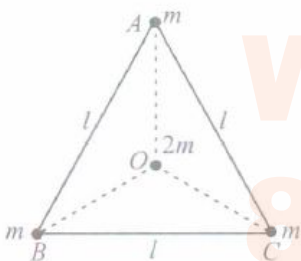


- a) $\frac{g}{4}$ downwards b) $\frac{g}{2}$ downwards c) $\frac{g}{2}$ upwards d) $\frac{g}{4}$ upwards

30. The linear momentum of a 3 MeV photon is

- a) 0.01 eV s m^{-1} b) 0.02 eV s m^{-1} c) 0.03 eV s m^{-1} d) 0.04 eV s m^{-1}

31. Three masses each of mass m are placed at the vertices of an equilateral triangle ABC of side l as shown in figure. The force acting on a mass 2m placed at the centroid O of the triangle is



- a) Zero b) $\frac{3Gm^2}{l^2}$ c) $\frac{5Gm^2}{l^2}$ d) $\frac{6Gm^2}{l^2}$

32. A raw egg and a hard boiled egg are made to spin on a table with the same angular speed about the same axis. The ratio of the time taken by the two to stop is:

- a) = 1 b) < 1 c) > 1 d) none of these

33. From a single slit, the first diffraction minima is obtained at 30° for a light of 6500 \AA wavelength. The width of the slit is

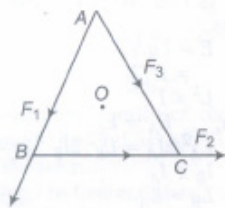
- a) 3250 \AA b) 1.3μ c) $5.4 \times 10^{-4} \text{ km}$ d) $1.2 \times 10^{-2} \text{ cm}$

34. A child is standing with folded hands at the centre of a platform rotating about its central axis. The kinetic energy of the system is K. Now, the child stretches his arms so that moment of inertia of the system doubled. Now, the kinetic energy of the system is

- a) $\frac{K}{4}$ b) $\frac{K}{2}$ c) 2 K d) 4 K

35. The direction of the angular velocity vector is along

- a) the tangent to the circular path b) the inward radius c) the outward radius d) the axis of rotation
36. If at 60°C and 80 cm of mercury pressure, a definite mass of a gas is compressed slowly, then the final pressure of the gas if the final volume is half of the initial volume ($\gamma = 3/2$):
 a) 120 cm of Hg b) 140 cm of Hg c) 160 cm of Hg d) 180 cm of Hg
37. A steadily flowing liquid enters a wide tube and continues to flow steadily. What will be nature of flow in the widened part of the tube?
 a) Crowded b) Widened c) Will remain same as before d) May be crowded or widened
38. A solid cylinder is rolling down on an inclined plane of angle θ . The coefficient of static friction between the plane and cylinder is μ_s . The condition for the cylinder not to slip is:
 a) $\tan \theta \geq 3\mu_s$ b) $\tan \theta > 3\mu_s$ c) $\tan \theta \leq 3\mu_s$ d) $\tan \theta < 3\mu_s$
39. If in nuclear fusion process the masses of the fusing nuclei be m_1 and m_2 and the mass of the resultant nucleus be m_3 then:
 a) $m_3 > (m_1 + m_2)$ b) $m_3 = m_1 + m_2$ c) $m_3 = |m_1 - m_2|$ d) $m_3 < (m_1 + m_2)$
40. A light body A and a heavy body B have equal linear momentum. Then the KE of the body A:
 a) is equal to that of B b) is greater than that of B c) is smaller than that of B d) is zero
41. The isothermal elasticity of a gas is equal to :
 a) Density b) Volume c) Pressure d) Specific heat
42. A body floats with one-third of its volume outside water and 3/4th of its volume outside another liquid. The density of another liquid is:
 a) $\frac{9}{4} \text{g/cc}$ b) $\frac{4}{9} \text{g/cc}$ c) $\frac{8}{3} \text{g/cc}$ d) $\frac{3}{8} \text{g/cc}$
43. The source of sound s is moving with a velocity 50 m/s towards a stationary observer. The observer measures the frequency of the source as 1000 Hz. What will be the apparent frequency of the source when it is moving away from the observer after crossing him? The velocity of sound in the medium is 350 m/s :
 a) 750 Hz b) 857 Hz c) 1143 Hz d) 1333 Hz
44. (A) If the speed of a body is constant, the body cannot have a path other than a circular or straight line path.
 (R) It is not possible for a body to have a constant speed in an accelerated motion.
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.
 e) If assertion is false but reason is true.
45. The average momentum of a molecule in an ideal gas depends on:
 a) temperature b) volume c) molecular mass d) none of these
46. Mark the correct one.
 a) Our eyes can distinguish between real and virtual image b) Virtual image can also be taken on screen
 c) If the incident rays are converging at a point, then the object is real d) None of the above
47. In an A.C. circuit the current :
 a) Always leads the voltage b) Always lags behind the voltage c) Is always in phase with the voltage
 d) May lead or lag behind or be in phase with the voltage
48. O is the centre of an equilateral triangle ABC. F_1 , F_2 and F_3 are three forces acting along the sides AB, BC and AC as shown here. What should be the magnitude of F_3 , so that the total torque about O is zero?



- a) $(F_1 + F_2)/2$ b) $2(F_1 + F_2)$ c) $(F_1 + F_2)$ d) $(F_1 - F_2)$
49. Magnifying power of a Galilean telescope is given by

$$a) \frac{f_0}{f_e} \left(1 - \frac{f_e}{D}\right) \quad b) \frac{f_0}{f_e} \left(1 + \frac{f_e}{D}\right) \quad c) \frac{f_0}{f_e} \left(1 + \frac{2f_e}{D}\right) \quad d) \frac{f_0}{f_e} \left(1 - \frac{2f_e}{D}\right)$$

50. The minimum force required to start pushing a body up a rough (frictional coefficient μ) inclined plane is F_1 while the minimum force needed to prevent it from sliding down is F_2 . If the inclined plane makes an angle θ with the horizontal such that $\tan\theta = 2\mu$, then the ratio $\frac{F_1}{F_2}$ is
 a) 4 b) 1 c) 2 d) 3
51. Total angular momentum of a rotating body is conserved, if the net torque acting on the body is
 a) zero b) maximum c) minimum d) unity
52. A boy standing at the top of a tower of 20 m height drops a stone. Assuming $g : 10 \text{ ms}^{-2}$, the velocity with which it hits the ground is _____ .
 a) 10.0 m/s b) 20.0 m/s c) 40.0 m/s d) 5.0 m/s
53. If the binding energy per nucleon in ${}_3\text{Li}^7$ and ${}_2\text{He}^4$ nuclei are respectively 5.60 MeV and 7.06 MeV, then the energy of proton in the reaction ${}_3\text{Li}^7 + p^{3/4} \rightarrow 2{}_2\text{He}^4$ is _____ .
 a) 19.6 MeV b) 2.4 MeV c) 8.4 MeV d) 17.3 MeV
54. Give the nature of work for which Prof. Albert Einstein, a physicist, was awarded the Nobel Prize in physics:
 a) Wave theory of light b) Theory of relativity c) Photo-electric equation d) Wave-particle duality
55. A point Q lies on the perpendicular bisector of an electric dipole of dipole moment p. If the distance of Q from the dipole is r, (much larger than the size of the dipole) then electric field at Q is proportional to _____.
 a) p^{-1} and r^2 b) p and r^{-2} c) p^2 and r^{-3} d) p and r^{-3}
56. A running man has the same kinetic energy as that of a boy of half his mass. The man speeds up by 2 ms^{-1} and the boy changes his speed by $x \text{ ms}^{-1}$ so that the kinetic energies of the boy and the man are again equal. Then x (in ms^{-1}) is:
 a) $-2\sqrt{2}$ b) $+2\sqrt{2}$ c) $\sqrt{2}$ d) 2 e) $1\sqrt{2}$
57. At any instant, a rolling body may be considered to be in pure rotation about an axis through the point of contact axis is translating forward with speed _____.
 a) equal to centre of mass b) zero c) twice of centre of mass d) None of the above
58. If $Z = \frac{A^4 B^{1/3}}{CD^{3/2}}$ and ΔA , ΔB , ΔC , and ΔD are their absolute errors in A, B, C and D respectively. The relative error in Z is :
 a) $\frac{\Delta Z}{Z} = 4 \frac{\Delta A}{A} + \frac{1}{3} \frac{\Delta B}{B} + \frac{\Delta C}{C} + \frac{3}{2} \frac{\Delta D}{D}$ b) $\frac{\Delta Z}{Z} = 4 \frac{\Delta A}{A} + \frac{1}{3} \frac{\Delta B}{B} - \frac{\Delta C}{C} - \frac{3}{2} \frac{\Delta D}{D}$
 c) $\frac{\Delta Z}{Z} = 4 \frac{\Delta A}{A} + \frac{1}{3} \frac{\Delta B}{B} + \frac{\Delta C}{C} - \frac{3}{2} \frac{\Delta D}{D}$ d) $\frac{\Delta Z}{Z} = 4 \frac{\Delta A}{A} + \frac{1}{3} \frac{\Delta B}{B} - \frac{\Delta C}{C} + \frac{3}{2} \frac{\Delta D}{D}$
59. An object has an image thrice of its original size when kept at 8 cm and 16 cm from a convex lens. Focal length of the lens is
 a) less than 8 cm b) 8 cm c) 16 cm d) between 8 and 16 cm
60. A body of mass 2 kg and surface area 10 cm^2 begins to slide down on inclined plane when the angle of inclination is $\pi/6$. If the surface area of the same body is made 20 cm^2 , keeping the mass unchanged, it will begin to slide down when the angle of inclination is:
 a) $\pi/2$ b) $\pi/6$ c) $\pi/3$ d) $2\pi/3$
61. An element A decays into an element C by a two step process $A \rightarrow B + {}_2\text{He}^4$ and $B \rightarrow C + 2e^-$. Then,
 a) A and C are isotopes b) A and C are isobars c) B and C are isotopes d) A and B are isobars
62. If the focal length of objective lens is increased, then magnifying power of
 a) microscope will increase but that of telescope decrease b) microscope and telescope both will increase
 c) microscope and telescope both will decrease
 d) microscope will decrease but that of telescope will increase
63. Which of the following physical quantities is not conserved?
 a) Energy b) Linear momentum c) Force d) Mass

64. A wide vessel with a small hole in the bottom is filled with water and kerosene. Neglecting viscosity, the velocity of water flow v if the thickness of water layer is h_1 and that of kerosene layer is h_2 is (density of water is ρ_1 g/cc and that of kerosene is ρ_2 gm/cc):

a) $\sqrt{2g(h_1 + h_2)}$ b) $\sqrt{2g\left(h_1 + h_2\frac{\rho_1}{\rho_2}\right)}$ c) $\sqrt{2g(h_1\rho_1 + h_2\rho_2)}$ d) $\sqrt{2g\left(h_1\frac{\rho_1}{\rho_2} + h_2\right)}$

65. The maximum speed of a car on a road turn of radius 30 m, if the coefficient of friction between the tyres and the road is 0.4, will be :

a) 10.84m/sec b) 9.84m/sec c) 8.84m/sec d) 6.84m/sec

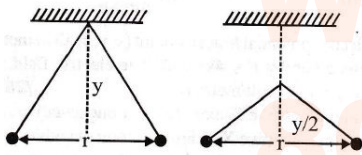
66. A solid cylinder of mass M and radius R rolls without slipping down an inclined plane making an angle θ with the horizontal. Then its acceleration is

a) $\frac{1}{3}g\sin\theta$ b) $\frac{2}{3}g\sin\theta$ c) $\frac{2}{5}g\sin\theta$ d) $\frac{2}{7}g\sin\theta$

67. What is the SI unit of permeability?

- a) Henry per metre b) Teslametre per ampere c) Weber per ampere metre
d) All the above units are correct

68. Two pith balls carrying equal charges are suspended from a common point by strings of equal length. The equilibrium separation between them is r . Now the strings are rigidly clamped at half the height. The equilibrium separation between the balls now become



a) $\left(\frac{r}{\sqrt[3]{2}}\right)$ b) $\left(\frac{2r}{\sqrt{3}}\right)$ c) $\left(\frac{2r}{3}\right)$ d) $\left(\frac{r}{\sqrt{2}}\right)^2$

69. A simple pendulum hanging freely and at rest is vertical because in that position:

- a) kinetic energy is zero b) kinetic energy is minimum c) potential energy is zero
d) potential energy is minimum

70. Two bodies M and N of equal masses are suspended from two separate springs of spring constants K_1 and K_2 respectively. If the two bodies oscillate vertically such that their maximum velocities are equal, the ratio of the amplitude of vibration of M to that of N is

a) $\frac{K_1}{K_2}$ b) $\sqrt{\frac{K_1}{K_2}}$ c) $\frac{K_2}{K_1}$ d) $\sqrt{\frac{K_2}{K_1}}$

71. The length and breadth of a rectangular sheet are 16.2 cm and 10.1 cm, respectively. The area of the sheet in appropriate significant figures and error is

a) $164 \pm 3 \text{ cm}^2$ b) $163.62 \pm 2.6 \text{ cm}^2$ c) $163.6 \pm 2.6 \text{ cm}^2$ d) $163.62 \pm 3 \text{ cm}^2$

72. When an elastic material with Young's modulus Y is subjected to stretching stress S , elastic energy stored per unit volume of the material is _____

a) $YS/2$ b) $S^2Y/2$ c) $S^2/2Y$ d) $S/2Y$

73. The potential energy of a particle varies with distance x from a fixed origin as $V = \left(\frac{A\sqrt{x}}{x+B}\right)$; where A and B are $x +$

B constants. The dimensions of AB are:

a) $[ML^{5/2}T^{-2}]$ b) $[ML^2T^{-2}]$ c) $[M^{3/2}L^{3/2}T^{-2}]$ d) $[ML^{7/2}T^{-2}]$

74. A ball of mass m is dropped from a cliff of height H . The ratio of its kinetic energy to the potential energy when it is fallen through a height $3/4 H$ is

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

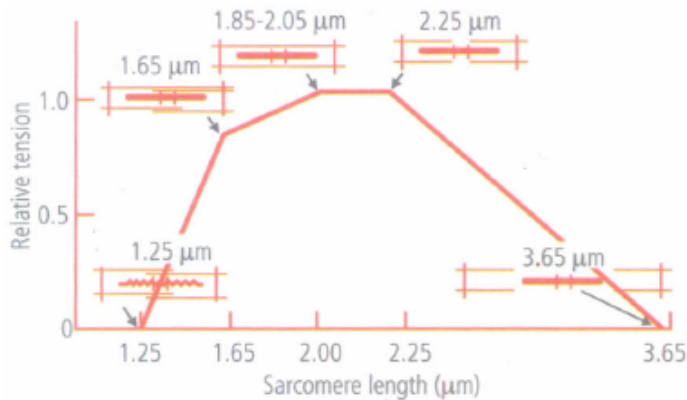
75. A hoop of radius 2 m weighs 100 kg. It rolls along a horizontal floor so that its centre of mass has a speed of 20 cm s⁻¹. How much work has to be done to stop it?
a) 2 J b) 4 J c) 6 J d) 8 J
76. Water from a tap (at the end of a horizontal pipe) emerges vertically downwards with an initial speed of 1.0 m s⁻¹. The cross-sectional area of the tap is 10⁻⁴ m². Assume that the pressure is constant throughout the stream of water and the flow is steady. The cross-sectional area of the stream 0.15 m below the tap is:
a) 5.0 x 10⁻⁴ m² b) 1.0 x 10⁻⁵ m² c) 5.0 x 10⁻⁵ m² d) 2.0 x 10⁻⁵ m²
77. Which waves are used in sonography?
a) Microwaves b) Infrared rays c) Radio waves d) Ultrasonic waves
78. The kinetic energy and potential energy of a particle executing S.H.M. will be equal, when displacement is : (amplitude = a)
a) a/2 b) a√2 c) a/√2 d) a/√2/3
79. The radius of a sphere is 1.41 cm. Its volume to an appropriate number of significant figures is
a) 11.73 cm³ b) 11.736 cm³ c) 11.7 cm³ d) 117 cm³
80. A metal rod of length 10cm and a rectangular cross section of 1 cm x $\frac{1}{2}$ cm is connected to a battery across opposite faces. The resistance will be
a) maximum when the battery is connected across 1 cm x $\frac{1}{2}$ cm faces
b) maximum when the battery is connected across 10 cm x $\frac{1}{2}$ cm faces.
c) maximum when the battery is connected across 10 cm x $\frac{1}{2}$ cm faces
d) same irrespective of the three faces.
81. The amount of scattering is inversely proportional to the fourth power of the wavelength. This is known as
a) Rayleigh scattering b) Maxwell scattering c) Oersted scattering d) Reynold scattering
82. Match the column I with column II
- | Type of processes | Feature |
|-------------------|--------------------------|
| (A) Isothermal | (p) ΔQ = 0 |
| (B) Isobaric | (q) Volume constant |
| (C) Isochoric | (r) Pressure constant |
| (D) Adiabatic | (s) Temperature constant |
- a) (A) - (s), (B) - (r), (C) - (q), (D) - (p) b) (A) - (p), (B) - (s), (C) - (r), (D) - (q)
c) (A) - (q), (B) - (r), (C) - (p), (D) - (s) d) (A) - (r), (B) - (p), (C) - (q), (D) - (s)
83. Under minimum deviation condition in a prism, if a ray is an incident at an angle 30°, then the angle between the emergent ray and the second refracting surface of the prism is
a) 0° b) 30° c) 45° d) 60°
84. (A) To empty an oil tank, two holes are made.
(R) Oil will come out of two holes so it will be emptied faster.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false
e) If assertion is false but reason is true
85. In p-type semiconductor, the majority charge carriers are:
a) Holes b) Electrons c) Protons d) Neutrons

86. A proton and an α -particle moving with same velocity enter into a uniform magnetic field, acting normal to the plane of their motion. The ratio of radii of the circular paths described by the proton and α -particle is
 a) 1 : 2 b) 1 : 4 c) 1 : 16 d) 4 : 1
87. The magnitude of a vector, on the addition of two vectors $6\vec{i} + 7\vec{j}$ and $3\vec{i} + 4\vec{j}$ is:
 a) $\sqrt{132}$ b) $\sqrt{136}$ c) $\sqrt{160}$ d) $\sqrt{202}$
88. If a small sphere is let fall vertically in a large quantity of still liquid of density smaller than that of the material of the sphere:
 a) at first its velocity increases, but soon approaches a constant value
 b) it falls with a constant velocity all along from the very beginning
 c) at first it falls with a constant velocity which after some time goes on decreasing
 d) nothing can be said about its motion
89. A body is projected upwards with a kinetic energy of 100 J. Taking the friction of air into account, when it returns to the earth, its kinetic energy will be:
 a) 100 J b) < 100 J c) > 100 J d) none of these
90. Two particles of masses 4 kg and 8 kg are separated by distance of 12 m. If they are moving towards each other under the influence of a mutual force of attraction, then the two particles will meet each other at a distance of:
 a) 6 m from 8 kg mass b) 2 m from 8 kg mass c) 4 m from 8 kg mass d) 8 m from 8 kg mass
91. Polarisation of light proves
 a) corpuscular nature of light b) quantum nature of light. c) transverse wave nature of light
 d) longitudinal wave nature of light.
92. A man of mass 80 kg is riding on a small cart of mass 40 kg which is rolling along a level floor at a speed of 2 m/s. He is running on the cart so that his velocity relative to the cart is 3 m/s in the direction opposite to the motion of the cart. What is the speed of the centre of mass of the system?
 a) 1.5 m/s b) 1 m/s c) 3 m/s d) Zero
93. **Assertion:** The elastic spring force arises due to the net attraction or repulsion between the neighbouring atoms of the spring when it is elongated or compressed.
Reason: The laws of derived forces such as spring force, friction force are independent of the laws of fundamental forces in nature.
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.
94. **Assertion:** Naturally, thermonuclear fusion reaction is not possible on earth.
Reason: For thermonuclear fusion to take place, extreme condition of temperature and pressure are required.
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.
95. A projectile is projected with a linear momentum p making angle θ with the horizontal. The change in momentum of the projectile on return to the ground state will be
 a) $2p$ b) $2p \cos \theta$ c) $2p \sin \theta$ d) $2p \tan \theta$
96. Three sound waves of equal amplitudes have frequencies $(n - 1)$, n , $(n + 1)$. They superimpose to give beats. The number of beats produced per second will be :
 a) 1 b) 4 c) 3 d) 2
97. A solenoid has a core of a material with relative permeability of 500. The windings of the solenoid are insulated from the core and carry a current of 2 A. If the number of turns is 1000 per meter, then magnetisation is:
 a) $7.78 \times 10^5 \text{ A m}^{-1}$ b) $8.88 \times 10^5 \text{ A m}^{-1}$ c) $9.98 \times 10^5 \text{ A m}^{-1}$ d) $10.2 \times 10^5 \text{ A m}^{-1}$
98. Two tubes of same material but of different radii in a liquid. The height which liquid rises in tube is 22 cm. The height in the other is 6.6 cm. The ratio of their radii is

- a) 9:1 b) 1:9 c) 3:1 d) 1:3
99. A wire is stretched by 0.01 m by a certain force F. Another wire of same material whose diameter and length are double to the original wire is stretched by the same force. Then its elongation will be:
a) 0.005 m b) 0.01 m c) 0.02 m d) 0.002 m
100. Which of the following electromagnetic radiations has the least wavelength?
a) gamma rays b) infra-red c) ultraviolet d) X-rays
101. In photosynthesis energy from light reaction to dark reaction is transferred in the form of ____
a) ADP b) ATP c) RUDP d) Chlorophyll
102. A self-fertilising trihybrid plant forms _____.
a) 8 different gametes and 64 different zygotes b) 4 different gametes and 16 different zygotes
c) 8 different gametes and 16 different zygotes d) 8 different gametes and 32 different zygotes
103. Which of the following statements is not true of two genes that show 50% recombination frequency?
a) The genes are tightly linked b) The genes show independent assortment
c) If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis
d) The genes may be on different chromosomes
104. Ozone depletion is occurring widely in
a) troposphere b) stratosphere c) ionosphere d) all of these
105. Which one of the following is the correct matched-pair of an endangered animal and National park?
a) Rhinoceros - Kaziranga National park b) Wild ass - Dudhwa National park
c) Great Indian - Keoladeo National park d) Lion - Corbett National park
106. During gamete formation, the enzyme recombinase participates during _____.
a) Metaphase - I b) Anaphase - II c) Prophase - I d) Prophase - II
107. A patient brought to a hospital with myocardial infarction is normally immediately given:
a) Cyclosporin A b) Statins c) Penicillin d) Streptokinase
108. Cell recognition and adhesion are facilitated by components of plasma membrane. These components are generally
a) protein molecules alone b) lipids alone c) both lipids and proteins d) glycolipids and glycoproteins
109. Which of the following flowers only once in its lifetime?
a) Mango b) Jackfruit c) Bamboo species d) Papaya
110. During meiosis I, chromosome number
a) is reduced to half b) doubles up c) remains the same d) either (a) or (b)
111. Select the correct option that represents examples of the following types of animals.
(i) Cold blooded animal
(ii) Warm blooded animal
(iii) Animal possessing dry and cornified skin
(iv) Hermaphrodite animal
- a)
- | (i) | (ii) | (iii) | (iv) |
|------|--------|-------------|-----------|
| Frog | Pigeon | Wall lizard | Earthworm |
- b)
- | (i) | (ii) | (iii) | (iv) |
|--------|------|-----------|-------|
| Pigeon | Frog | Crocodile | Hydra |
- c)
- | (i) | (ii) | (iii) | (iv) |
|--------|------|-------|-----------|
| Rabbit | Fish | Frog | Earthworm |
- d)
- | (i) | (ii) | (iii) | (iv) |
|------|------|-------------|----------|
| Fish | Frog | Wall lizard | StarFish |
112. Nomenclature is governed by certain universal rules. Which of the following is contrary to the rules of nomenclature?
a) The first word in a biological name represents the genus name and the second is a specific epithet.
b) The names are written in Latin and are italicized.
c) When written by hand, the names are to be underlined.
d) Biological names can be written in any language.
113. Net gain of ATP molecules during aerobic respiration is _____.
a) 36 molecules b) 38 molecules c) 40 molecules d) 48 molecules

114. How many fragments will be generated on the digestion of a closed circular DNA molecule with a restriction enzyme having six recognition sites on the DNA?
a) 5 b) 7 c) 6 d) 9
115. Activated sludge should have the ability to settle quickly so that it can:
a) be rapidly pumped back from sedimentation tank to aeration tank.
b) absorb pathogenic bacteria present in wastewater while sinking to the bottom of the settling tank.
c) be discarded and anaerobically digested. d) absorb colloidal organic matter.
116. Swelling of wooden plants and door-panels during the rainy season is due to
a) Imbibition b) Endosmosis c) Deplasmolysis d) Diffusion
117. According to IUCN, when a taxon is facing an extremely high risk of extinction in the intermediate future, it is
a) Extinct in wild b) Endangered c) Critically endangered d) Vulnerable
118. In stratosphere, which of the following elements acts as a catalyst in degradation of ozone and release of molecular oxygen
a) Fe b) Cl c) Carbon d) Oxygen
119. Collar bone is known as
a) scapula b) clavicle c) pelvic girdle d) chevron bone.
120. Hormone primarily concern with cell division is
a) IAA b) NAA c) cytokinin d) gibberellic acid
121. The theory of natural selection was given by
a) Lamarck b) Alfred Wallace c) Charles Darwin d) Oparin and Haldane.
122. Xylem translocates____
a) Water and mineral salts only b) Water, mineral salts and some organic nitrogen only
c) Water, mineral salts, some organic nitrogen and hormones d) Water only
123. Which of the following is the use of lichens in case of pollution?
a) Lichens are not related with pollution b) They act as bioindicators of pollution
c) They treat the polluted water d) They promote pollution
124. Amphistomatic leaf, with stomata distributed equally on both the surfaces, is an example of
a) isobilateral leaf b) dorsiventral leaf c) xerophytic leaf d) hydrophytic leaf.
125. Given below are four statements each with one or two blanks. Select the option which correctly fills up the blanks in any two statements.
(A) The embryo with 8 to 16 blastomeres is called a (i).
(B) Embedding of the (i) in the endometrium of the uterus is called implantation and it leads to (ii).
(C) After implantation, finger like projections appear on the trophoblast called (i) which are surrounded by the (ii) and maternal blood.
(D) Inner cell mass contains certain cells called (i) cells which have the potency to give rise to all the tissues and organs.
a) (A)-(i) blastula, (C)-(i) chorionic villi, (ii)-uterine tissue b) (B)-(i) blastocyst, (ii) pregnancy, (D)-(i) stem
c) (A)-(i) morula, (D)-(i) Sertoli d) (B)-(i) morula, (ii) parturition, (C)-(i) fimbriae, (ii)-embryonic tissue
126. In which one of the following habitats does the diurnal temperature of soil surface vary most?
a) Shrub land b) Forest c) Desert d) Grassland

127. The given graph shows length-tension curve for a typical vertebrate sarcomere.



By analysing the graph, what can you deduce regarding the muscle contraction?

- (i) Neither the myosin filaments nor the actin thin filaments change in length when a sarcomere shortens or is stretched. Instead, it is the extent of overlap between actin and myosin filaments that changes.
- (ii) The total tension produced by a sarcomere is proportional to the total number of cross-bridges that can interact with actin filaments, and this number in turn is proportional to the amount of overlap between thick and thin filaments.
- (iii) The tension produced by the muscle is maximal when the overlap between thick and thin filaments allows the largest number of myosin cross-bridges to bind to actin.
- (iv) Tension drops off with increased length, because the thick and thin filaments overlap less and fewer cross-bridges can bind.
- (v) Tension drops off with decreased length, because thin filaments at the two ends of the sarcomere begin to collide with each other, preventing further shortening.

a) (ii) only b) (i), (iii) and (iv) c) (i), (iii), (iv) and (v) d) (i), (ii), (iii), (iv) and (v)

128. Hormone responsible for growth of the root in micropropagation is

- a) auxin b) gibberellin c) cytokinin d) abscisic acid.

129. Crossing over occurs during

- a) Pachytene b) Diplotene c) Diakinesis d) Zygotene

130. **Assertion:** Pairing and separation of pair of chromosomes would lead to segregation of a pair of factors they carried.

Reason: Two alleles of a gene pair are located on similar sites on non-homologous chromosomes.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true but reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If both assertion and reason are false

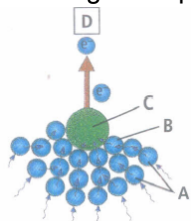
131. Forest near equator region are called -

- a) Deciduous b) Tropical rain forests c) Coniferous forests d) Temperature forest

132. The ventilation movements of the lungs in mammals are governed by

- a) muscular walls of lung b) diaphragm c) costal muscles d) both (b) and (c).

133. Given figure depicts the light harvesting complex (LHC) of photosystem I (PS I).



Select the correct identification for A, B, C and D

a)

A	B	C	D
Core molecules	Antenna molecule	P ₆₈₀	Primary eacceptor

b)

A	B	C	D
Antenna molecules	Core molecule	P ₇₀₀	Primary e- acceptor

c)

A	B	C	D
Antenna molecules	Core	P ₇₀₀	Plastocyanin molecule

d)

A	B	C	D
Core molecules	Reaction center	P ₆₈₀	Plastocyanin

134. Which of the following sequences is recognised by restriction enzyme BamHI?

- a) $5' - \overset{\downarrow}{GAATTC} - 3'3' - CTAA\uparrow G - 5'$ b) $5' - \overset{\downarrow}{AAGCTA} - 3'3' - TTCGA\uparrow T - 5'$
 c) $5' - \overset{\downarrow}{GGATCC} - 3'3' - CCTAGG\uparrow - 5'$ d) $5' - \overset{\downarrow}{CCCAAT} - 3'3' - GGG\uparrow TTA - 5'$

135. Tablets to prevent contraception contain _____

- a) progesterone b) FSH c) LH d) Both (b) and (c)

136. Uric acid is nitrogenous waste in _____

- a) mammals and molluscs b) birds and lizards c) frog and cartilaginous fishes d) insects and bony fishes

137. From the sexually transmitted diseases mentioned below, identify the one which does not specifically affect the sex organs.

- a) Syphilis b) AIDS c) Gonorrhoea d) Genital warts

138. Match column I with column II and select the correct option from the given codes.

Column I	Column II
A. Eurythermal	(i) Able to tolerate narrow range of temperature
B. Stenothermal	(ii) A stage of suspended development
C. Conformers	(iii) Body temperature changes with ambient temperature
D. Diapause	(iv) Able to tolerate wide range of temperature

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

139. In E.coli during lactose metabolism repressor/binds to _____.

- a) promoter gene b) regulator gene c) operator gene d) structural gene

140. Which of the following steps should be performed by a person in order to visualise the bands of DNA fragments obtained from gel electrophoresis?

- a) Exposure of DNA fragments to UV radiations.
 b) Staining with bromophenol blue followed by exposure to UV radiations.
 c) Staining with ethidium bromide followed by exposure to UV radiations.
 d) Person can see the bands without staining.

141. Which of the following is not a lymphoid tissue?

- a) Spleen b) Tonsils c) Pancreas d) Thymus

142. Painful skeletal deformities called itai-itai is caused due to

- a) Cd b) Hg c) CO d) NO₂

143. Koch's postulates are not applicable to _____

- a) cholera b) leprosy c) TB d) diphtheria

144. Which one of the following pairs is not correctly matched?

- a) Dengue fever - Flavi-ribo virus b) Syphilis - Trichuris trichiura c) Plague - Yersinia pestis
 d) Filariasis - Wuchereria bancrofti

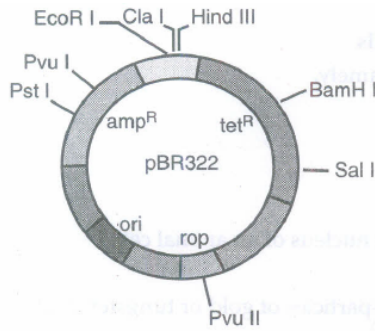
145. Which one of the following generates new genetic combinations leading to variation?

- a) Sexual reproduction b) Nucellar polyembryony c) Vegetative reproduction d) Parthenogenesis

146. How many vertebro - chondral ribs are present in the human?
a) 7 pairs b) 2 pairs c) 3 pairs d) 12 pairs
147. Botanical gardens mainly serve the purpose of providing
a) beautiful area for recreation b) reservoir for tropical plan c) ex situ conservation of germplasm
d) natural habitat for wildlife.
148. Guanylic acid also termed as:-
a) Guanine monophosphate b) Gunanosine monphosphate c) Ribonucleoside d) Deoxyibouncleoside
149. If distance between gene on chromosome is then gene shows:
a) Weak linkage b) Strong linkage c) Less crossing d) 1 & 3 both
150. Macromolecule chitin is:
a) Phosphorus containing polysaccharide b) Sulphur containing polysaccharide c) Simple polysaccharide
d) Nitrogen containing polysaccharide
151. Bright colour of petals is due to the presence of
a) chloroplast b) anthocyanin c) elaioplast d) amyoplast.
152. Read the given statements and select the correct option.
Statement 1 : Reforestation is the process of restoring a forest that once existed but was removed at some point of time in the past.
Statement 2 : Reforestation may occur naturally in a deforested' area, however it can be speeded up by planting trees with due consideration to biodiversity that earlier existed in that area.
a) Both statements 1 and 2 are correct. b) Statement 1 is correct but statement 2 is incorrect.
c) Statement 1 is incorrect but statement 2 is correct. d) Both statements 1 and 2 are incorrect.
153. The population growth is generally described by the following equation
$$\frac{dN}{dt} = rN \left(\frac{K-N}{K} \right)$$

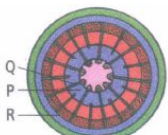
What does 'r' represent in the given equation?
a) Population density at time 't' b) Intrinsic rate of natural increase c) Carrying capacity
d) The base of natural logarithm
154. There is no result of 'Girdling Experiment' in monocot plants, due to:
a) Presence of wax layer on the surface of its stem b) Stem is comparatively thin c) Phloem is inside xylem
d) Vascular bundles are not in specific position
155. Areolar connective tissue joins _____.
a) Integument with muscles b) Bones with muscles c) Bones with bones d) Fat body with muscles
156. Outcross represents
a) AA x BB b) Aa x aa c) aa x AA d) Aa x AA
157. Read the following four statements (i) - (iv) having certain mistakes in two of them.
(i) Adipose tissue is a type of dense connective tissue located beneath the skin.
(ii) Compound epithelium has extensive role in absorption and secretion.
(iii) Most of the cartilages in vertebrate embryos are replaced by bones in adults.
(iv) Smooth muscles are 'involuntary' as their functioning cannot be directly controlled.
Which of the above statements have mistakes?
a) (ii) and (iii) b) (iii) and (iv) c) (i) and (iii) d) (i) and (ii)
158. Water potential can be obtained by _____.
a) OP + TP b) OP = WP c) $\psi_S + \psi_P$ d) OP - DPD
159. Carcinoma refers to _____.
a) benign tumours of the connective tissue b) malignant tumours of the connective tissue
c) malignant tumours of the skin or mucous membrane d) malignant tumours of the colon

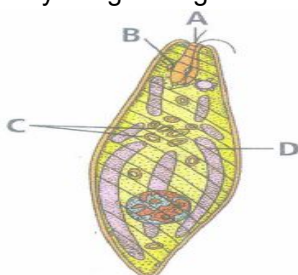
160. The given figure is the diagrammatic representation of E.coli vector pBR 322.



Which one of the given options correctly identifies its certain component(s)?

- a) Ori - original restriction enzyme b) Rop - Reduced osmotic pressure
 c) Hind III, EcoR I - selectable markers d) AmpR, tetR - antibiotic resistance genes
161. Which of the following statements are correct?
 (i) Restriction enzymes cut the strand of DNA a little away from the centre of the palindrome site, but between the same two bases on the opposite strands.
 (ii) Hind II always cuts DNA molecules at a particular point by recognising a specific sequence of six base pairs.
 (iii) Separated DNA fragments cannot be visualised without staining on an agarose gel electrophoresis.
 (iv) 'Ori' is the sequence responsible for controlling the copy number.
 (v) DNA is a positively charged molecule.
 a) (i), (iii) and (v) b) (i), (ii), (iii) and (iv) c) (iii), (iv) and (v) d) (i), (ii), (iii), (iv) and (v)
162. Which of the following cranial nerves has the highest number of branches?
 a) Vagus nerve b) Trigeminal nerve c) Facial nerve d) None of these
163. Motor vehicles equipped with catalytic converter are advised to use unleaded petrol because
 a) lead is a heavy metal b) lead causes inactivation of catalyst c) lead decreases the efficiency of vehicle
 d) lead increases burning of petrol.
164. In which of the following situations, there is a risk factor for children acquiring erythroblastosis foetalis?
 a) Mother is Rh -ve and father is Rh -ve. b) Mother is Rh -ve and father is Rh +ve.
 c) Mother is Rh +ve and father is Rh +ve d) Mother is Rh +ve and father is Rh -ve.
165. Which one of following does not follow the central dogma of molecular biology?
 a) Chlamydomonas b) HIV c) Pea d) Mucor
166. Synthesis of DNA on RNA template was first observed in
 a) Bacteria b) Plant c) Virus d) Both (1) & (2)
167. Which one of these is not a eukaryote?
 a) Euglena b) Anabaena c) Spirogyra d) Agaricus
168. Which one of the following is exalbuminous seed?
 a) Wheat seed b) Maize seed c) Castor seed d) Pea seed
169. Leydig cells produce a group of hormones called
 a) androgens b) estrogens c) aldosterone d) gonadotropins
170. Which one of the following statements is wrong?
 a) Cyanobacteria are also called blue-green algae b) Golden algae are also called desmids
 c) Eubacteria are also called false bacteria d) Nitrococcus Phycomycetes are also called algal fungi
171. Inner membrane convolutions of a mitochondrion are known as _____ .
 a) Lamellae b) Thylakoids c) Grana d) Cristae
172. Lichens are a well known combination of an alga and a fungus where fungus has _____ .
 a) A saprophytic relationship with the alga. b) An epiphytic relationship with the alga.
 c) A parasitic relationship with the alga. d) A symbiotic relationship with the alga.
173. In Ulothrix/Spirogyra a, reduction division (meiosis) occurs at the time of _____ .
 a) gamete formation b) zoospore formation c) zygospore germination d) vegetative reproduction

174. The cell functionally associated with sieve element is-
 a) Phloem fibres b) Phloem Parenchyma c) Companion cell d) Collenchyma
175. Which compound is formed by acetylation of morphine?
 a) Heroin b) Cocaine c) Tobacco d) Marijuana
176. A person with 47 chromosomes due to an additional Y chromosome suffers from a condition called_____.
 a) Down's syndrome b) Super female c) Turner's syndrome d) Klinefelter's syndrome
177. Catalogues
 a) list or register containing names of all the species found in a particular place
 b) booklet containing all the characters and their alternates which are helpful in identifying all the taxa
 c) handy book containing instruction of a species d) treatise having all informations about a particular taxon.
178. Choose the correct statement from the following
 a) Cleistogamous flowers always exhibit autogamy b) Chasmogamous flowers always exhibit geitonogamy
 c) Cleistogamous flowers exhibit both autogamy and geitonogamy
 d) Chasmogamous flowers never exhibit autogamy
179. The sperms undergo physiological maturation, acquiring increased motility and fertilising capacity in
 a) seminiferous tubules b) vasa efferentia c) epididymis d) vagina
180. Which one of the following animals has two separate circulatory pathways?
 a) Frog b) Lizard c) Whale d) Shark
181. Select the correct combination of the statement (a-d) regarding the characteristics of certain organisms:
 (a) Methanogens are Archaeobacteria which produce methane in marshy areas
 (b) Nostoc is filamentous blue-green alga which atmospheric nitrogen
 (c) Chemosynthetic autotrophic bacteria synthesis cellulose from glucose
 (d) Mycoplasma lack a cell wall and can survive without oxygen
 The correct statements are:
 a) (a), (b), (c) b) (b), (c), (d) c) (a), (b), (d) d) (b), (c)
182. Basis of DNA fingerprinting is:
 a) Relative proportion of purines and pyrimidines
 b) Relative difference in DNA occurrence in blood skin and saliva
 c) Relative amounts of DNA in ridges and grooves of fingerprints
 d) Satellite DNA occurring as highly repeated short DNA segments
183. During the secondary growth in a dicotyledonous stem, the fusiform initials of vascular cambium give rise to which of the given labelled part?

 a) P b) R c) Q d) both (a) and (b).
184. Which one of the following is an incorrect statement regarding mycoplasma?
 a) They lack a cell wall b) They are the smallest living cells. c) They cannot survive without oxygen.
 d) They are pathogenic in plants and animals.
185. Genes with multiple phenotypic effects are known as
 a) hypostatic genes b) duplicate genes c) pleiotropic genes d) complementary genes
186. Study the given figure showing structure of Euglena and select the option that correctly identifies A, B, C and D.



a)

A	B	C	D
Cytostome	Photoreceptor	Paramylum bodies	Myonemes

b)

A	B	C	D
Contractile vacuole	Photoreceptor	Paramylum bodies	Chloroplast

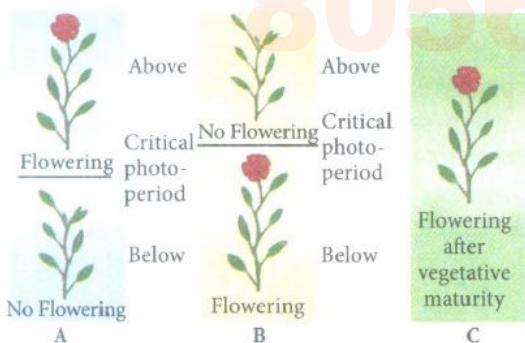
c)

A	B	C	D
Cytostome	Stigma	Paramylum bodies	Chloroplast

d)

A	B	C	D
Cytostome	Stigma	Myonemes	Chloroplast

187. Blood which leaves liver and passes towards heart has higher concentration of
 a) Bile b) Oxygen c) RBCs d) Urea
188. The common bile duct in human is formed by the joining of
 a) pancreatic duct and bile duct b) cystic duct and hepatic duct c) cystic duct and pancreatic duct
 d) hepatic duct and pancreatic duct.
189. The purpose of biological treatment of waste water is to
 a) reduce BOD b) increase BOD c) reduce sedimentation d) increase sedimentation.
190. GnRH stimulates _____ to release _____.
 a) Hypothalamas, gonadotropins b) Pituitary gland, gonadotropins c) Pituitary gland, growth hormone
 d) Hypothalamus, growth hormone
191. How do parasympathetic neural signals affect the working of the heart?
 a) Reduce both heart rate and cardiac output b) Heart rate is increased without affecting the cardiac output
 c) Both heart rate and cardiac output increase d) Heart rate decreases but cardiac output increases
192. India constitutes _____ percent of the world's land area and contributes _____ percent of the global species diversity.
 a) 1.0, 5.5 b) 5.5, 1.0 c) 8.1, 2.4 d) 2.4, 8.1
193. Which one of the following statements for pyramid of energy is incorrect, whereas the remaining three are correct?
 a) Its base is broad. b) It shows energy content of different trophic level organisms.
 c) It is inverted in shape. d) It is upright in shape
194. The given figure shows flowering responses of three plants A, B and C to the photoperiod. Select the correct option regarding this.



a)

A	B	C
Long day plant	Day neutral plant	Short day plant

b)

A	B	C
Short day plant	Day neutral plant	Long day plant

c)

A	B	C
Long day plant	Short day plant	Day neutral plant

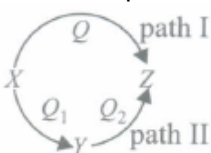
d)

A	B	C
Short day plant	Long day plant	Day neutral plant

195. If most individuals in a population are young, why is the population likely to grow rapidly in the future?
 a) Many individuals will begin to reproduce soon b) Death rates will be low
 c) Immigration and emigration can be ignored d) All of these

196. Which of the following symptoms indicate radiation sickness?
 a) Red and ulcerated skin b) Nausea and anaemia c) Nausea and loss of hair
 d) Ulcerated skin, nausea and loss of hair
197. Which one of the following statements is wrong?
 a) Phycomycetes are also called algal fungi b) Cyanobacteria are also called blue-green algae
 c) Golden algae are also called desmids d) Eubacteria are also called false bacteria
198. In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: Nitrate present in the soil is reduced to nitrogen by the process of denitrification.
Reason: Denitrification is carried by bacteria *Pseudomonas* and *Azotobacter*.
 a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false
199. The net pressure gradient that causes the fluid to filter out of the glomeruli into the capsule is _____ .
 a) 50 mm Hg b) 75 mm Hg c) 20 mm Hg d) 30 mm Hg
200. Which one of the following pairs is mismatched?
 a) *Bombyx mori* - Silk b) *Pila globosa* - Pearl c) *Apis indica* - Honey d) *Laccifer lacca* - Lac
201. Few pairs of molecules are given below. Which bond of the molecule of the pairs is more polar?
 (i) $\text{H}_3\text{C} - \text{H}$, $\text{H}_3\text{C} - \text{Br}$
 (ii) $\text{H}_3\text{C} - \text{NH}_2$, $\text{H}_3\text{C} - \text{OH}$
 (iii) $\text{H}_3\text{C} - \text{OH}$, $\text{H}_3\text{C} - \text{SH}$
 (iv) $\text{H}_3\text{C} - \text{Cl}$, $\text{H}_3\text{C} - \text{Br}$
 a) C - Br, C - N, C - O, C - Br b) C - Br, C - O, C - O, C - Cl c) C - Br, C - O, C - O, C - Cl
 d) C - Br, C - O, C - S, C - Br
202. The electron in Bohr's model of hydrogen atom is pictured as revolving around the nucleus in order for it to
 a) possess energy b) emit protons c) keep from being pulled into the nucleus
 d) keep from being repelled by the nucleus
203. Assertion: Rate of reaction increases with increase in temperature.
 Reason: Number of effective collisions increases with increase in temperature.
 a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false
204. The salts of Cu in +1 oxidation state are unstable because
 a) Cu^+ has $3d^{10}$ configuration b) Cu^+ disproportionates easily to $\text{Cu}(\text{O})$ and Cu^{2+}
 c) Cu^+ disproportionates easily to Cu^{2+} and Cu^{3+} d) Cu^+ is easily reduced to Cu^{2+} .
205. The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence:
 a) $\text{Tl} < \text{In} < \text{Ga} < \text{Al}$ b) $\text{In} < \text{Tl} < \text{Ga} < \text{Al}$ c) $\text{Ga} < \text{In} < \text{Al} < \text{Tl}$ d) $\text{Al} < \text{Ga} < \text{In} < \text{Tl}$
206. The quantity of charge required to obtain one mole of aluminium from Al_2O_3 is _____
 a) 1 F b) 6 F c) 3 F d) 2 F
207. **Assertion:** An exothermic process which is nonspontaneous at high temperature may become spontaneous at low temperature.
Reason: Spontaneous process is an irreversible process and may be reversed by some external agency.
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false
208. Arrange the following hydrogen halides in order of their decreasing reactivity with propene.
 a) $\text{HCl} > \text{HBr} > \text{HI}$ b) $\text{HBr} > \text{HI} > \text{HCl}$ c) $\text{HI} > \text{HBr} > \text{HCl}$ d) $\text{HCl} > \text{HI} > \text{HBr}$
209. Which of the following statements is true?

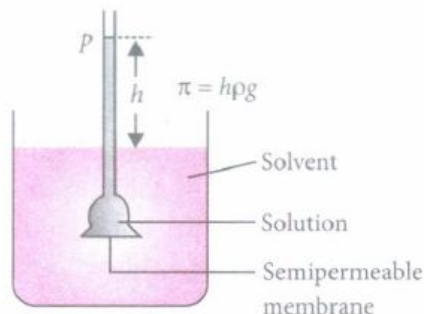
- a) When an aqueous solution of NaCl is electrolysed, sodium metal is deposited at cathode.
 b) There is no difference between specific conductivity and molar conductivity.
 c) Silver nitrate solution can be stored in a copper container.
 d) The addition of liquid bromine to iodide solution turns it violet.
210. Which of the carbonates given below is unstable in air and is kept in CO₂ atmosphere to avoid decomposition?
 a) BeCO₃ b) MgCO₃ c) CaCO₃ d) BaCO₃
211. If the rate constant for a first order reaction is k, the time (t) required for the completion of 99% of the reaction is given by
 a) $t = 6.909/k$ b) $t = 4.606/k$ c) $t = 2.303/k$ d) $t = 0.693/k$
212. Under what conditions gases generally deviate from ideal behaviour?
 a) At high temperature and low pressure b) At low temperature and high pressure
 c) At high temperature and high pressure d) At low temperature and low pressure
213. Aluminium is extracted from alumina (Al₂O₃) by electrolysis of a molten mixture of:
 a) Al₂O₃ + HF + NaAlF₄ b) Al₂O₃ + CaF₂ + NaAlF₄ c) Al₂O₃ + Na₃AlF₆ + CaF₂ d) Al₂O₃ + KF + Na₃AlF₆
214. Hot conc. HNO₃ converts graphite into:
 a) graphite oxide b) benzene hexa-carboxylic acid c) Both (a) and (b) d) None of the above
215. Which of the following is responsible for depletion of the ozone layer in the upper strata of the atmosphere?
 a) Polyhalogens b) Ferrocene c) Fullerenes d) Freons
216. An element belongs to group 17 with atomic number is 17. What is the atomic number of the element belonging to same group and present in fifth period:
 a) 25 b) 33 c) 35 d) 53
217. The correct order of atomic radii in group 13 elements is :
 a) B < Al < In < Ga < Tl b) B < Al < Ga < In < Tl c) B < Ga < Al < Tl < In d) B < Ga < Al < In < Tl
218. A reaction proceeds through two paths I and II to convert X → Z.



What is the correct relationship between Q, Q₁ and Q₂?

- a) $Q = Q_1 \times Q_2$ b) $Q = Q_1 + Q_2$ c) $Q = Q_2 - Q_1$ d) $Q = Q_1/Q_2$
219. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
- Assertion** : 0.2 percent solution of phenol is an antiseptic while its one percent solution is disinfectant.
Reason: Antiseptics are also called disinfectant.
- a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false
220. Which of the following are not state functions?
 (I) q + w
 (II) q
 (III) w
 (IV) H - TS
 a) (I) and (IV) b) (I), (III) and (IV) c) (I),(II) and (III) d) (II) and (III)
221. Which of the following acts as the best coagulating agent for ferric hydroxide sol?
 a) Potassium ferrocyanide b) Potassium chloride c) Potassium oxalate d) Aluminium chloride
222. The edge length of a centred unit cubic cell is 508 pm. If the radius of the cation is 100 pm, the radius of the anion is
 a) 288 pm b) 398 pm c) 154 pm d) 618 pm

223. A solution contains 2.675 g of $\text{CoCl}_3 \cdot 6\text{NH}_3$ (molar mass = 267.5 g mol^{-1}) is passed through a cation exchanger. The chloride ions obtained in solution were treated with excess of AgNO_3 to give 4.78 g of AgCl (molar mass = 143.5 g mol^{-1}). The formula of the complex is (At. mass of Ag = 108 u)
 a) $[\text{CoCl}(\text{NH}_3)_5]\text{Cl}_2$ b) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ c) $[\text{CoCl}_2(\text{NH}_3)_4]\text{Cl}$ d) $[\text{CoCl}_3(\text{NH}_3)_3]$
224. The ions O^{2-} , F^- , Na^+ , Mg^{2+} and Al^{3+} are isoelectronic. Their ionic radii show :
 a) A decrease from O^{2-} to F^- and then increase from Na^+ to Al^{3+} b) A significant increase from O^{2-} to Al^{3+}
 c) A significant decrease from O^{2-} to Al^{3+} d) An increase from O^{2-} to F^- and then decrease from Na^+ to Al^{3+}
225. If semipermeable membrane is placed between the solvent and solution as shown in the given figure then



- a)
 the flow of the solvent from its side to solution side across a semipermeable membrane can be stopped if some extra pressure (called osmotic pressure) is applied on the solution.
 b) both (b) and (c). c) the solvent molecules will flow through the membrane from solution to pure solvent
 d) the solvent molecules will flow continuously till the equilibrium is attained
226. $\text{CH}_3 - \text{CHBr} - \text{CH}_3 \xrightarrow{\text{alc. KOH}} X \xrightarrow{\text{HBr}} \text{Peroxide Y} \xrightarrow{\text{NaI}} \text{Acetone Z}$
 In the given reaction what will be the final product?
 a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{I}$ b) $\text{CH}_3\text{CHICH}_2\text{I}$ c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ d) $\text{CH}_3\text{CH}_2\text{CHI}_2$
227. **Assertion** : One atomic mass unit is defined as one twelfth of the mass of one carbon -12 atom.
Reason : Carbon-12 isotope is the most abundant isotope of carbon and has been chosen as standard.
 One atomic mass unit is defined as one twelfth of the mass of one carbon - 12 atom.
 a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
 b) Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion
 c) Assertion is correct but Reason is incorrect d) Both Assertion and Reason are incorrect
228. The correct order of decreasing acidic strength of trichloroacetic acid (A) trifluoroacetic acid (B) acetic acid (C) and formic acid (D) is :
 a) $B > A > D > C$ b) $B > D > C > A$ c) $A > B > C > D$ d) $A > C > B > D$
229. Assertion: Precipitation of silver chloride occurs instantaneously by mixing of aqueous solutions of silver nitrate and sodium chloride.
 Reason: Ionic reactions occur very fast.
 a) If both assertion and reason are true and reason is the correct explanation of assertion
 b) If both assertion and reason are true but reason is not the correct explanation of assertion
 c) If assertion is true but reason is false d) If both assertion and reason are false
230. Considering the formation, breaking and strength of hydrogen bond, predict which of the following mixtures will show a positive deviation from Raoult's law?
 a) Methanol and acetone b) Chloroform and acetone c) Nitric acid and water d) Phenol and aniline
231. What is tincture of iodine?
 a) 2-3% solution of iodine in alcohol-water mixture. b) A mixture of iodine in chloroxylenol.
 c) A mixture of 0.2% phenol and 2-3% iodine in water d) 2-3% solution of iodine in potassium iodide.
232. The correct order of the decreasing ionic radii among the following isoelectronic species are
 a) $\text{Ca}^{2+} > \text{K}^+ > \text{S}^{2-} > \text{Cl}^-$ b) $\text{Cl}^- > \text{S}^{2-} > \text{Ca}^{2+} > \text{K}^+$ c) $\text{S}^{2-} > \text{Cl}^- > \text{K}^+ > \text{Ca}^{2+}$ d) $\text{K}^+ > \text{Ca}^{2+} > \text{Cl}^- > \text{S}^{2-}$
233. For the reaction $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ how are the rate of reaction expressions inter-related $\frac{d[\text{H}_2]}{dt}$ and $\frac{d[\text{NH}_3]}{dt}$?

$$\text{a) } -\frac{1}{3} \frac{d[H_2]}{dt} = +\frac{1}{2} \frac{d[NH_3]}{dt} \quad \text{b) } -\frac{1}{2} \frac{d[H_2]}{dt} = +\frac{1}{3} \frac{d[NH_3]}{dt} \quad \text{c) } +\frac{1}{2} \frac{d[H_2]}{dt} = -\frac{1}{3} \frac{d[NH_3]}{dt}$$

$$\text{d) } +\frac{1}{3} \frac{d[H_2]}{dt} = -\frac{1}{2} \frac{d[NH_3]}{dt}$$

234. The IUPAC name of tertiary butyl chloride is

- a) 2-chloro-2-methylpropane b) 3-chlorobutane c) 4-chlorobutane d) 1,2-chloro-3-methylpropane.

235. Alkene (X) (C₅H₁₀) on ozonolysis gives a mixture of two compounds (Y) and (Z). Compound (Y) gives positive Fehling's test and iodoform test. Compound (Z) does not give Fehling's test but give iodoform test. Compounds (X), (Y) and (Z) are

a)

X	Y	Z
C ₆ H ₅ COCH ₃	CH ₃ CHO	CH ₃ COCH ₃

b)

X	Y	Z
CH ₃ -CH=C(CH ₃)-CH ₃	CH ₃ CHO	CH ₃ COCH ₃

c)

X	Y	Z
CH ₃ CH ₂ CH=CH ₂	CH ₃ CH ₂ CHO	HCHO

d)

X	Y	Z
CH ₃ -CH=CH-CH ₃	CH ₃ CHO	CH ₃ CHO

236. In the preparation of HNO₃, we get NO gas by catalytic oxidation of ammonia. The moles of NO produced by the oxidation of two moles of NH₃ will be:

- a) 2 b) 3 c) 4 d) 6

237. The total energy of electron in an atom is a combination of potential energy (P.E) and kinetic energy (K.L). If total energy is -E for an electron in an atom, then, its (K.E) and (P.E) respectively are

- a) 2E, -E b) 2E, E c) E, -2E d) E, -E

238. When 0.1 mole of MnO₄²⁻ is oxidized, the quantity of electricity required to completely oxidize MnO₄²⁻ to MnO₄⁻ is :

- a) 96500 C b) 2 x 96500 C c) 9650 C d) 96.50 C

239. The molar heat capacity of water at constant pressure is 75 JK⁻¹ mol⁻¹. When 1 kJ of heat is supplied to 100 g of water, which is free to expand, the increase in temperature of water is :

- a) 6.6 K b) 1.2 K c) 2.4 K d) 4.8 K

240. In a buffer solution containing equal concentration of B⁻ and HB, K_b for B⁻ is 10⁻¹⁰. The pH of buffer solution is:

- a) 10 b) 7 c) 6 d) 4

241. The preservation of meat by salting and of fruits by adding sugar protects them from bacterial action because?

- a) bacteria die of eating sugar or salt
 b) due to osmosis bacteria lose water on salted meat or candid fruit and die
 c) due to osmosis bacteria gain water on salted meat or candid fruit and die
 d) bacteria get stuck to the salt and sugar layers and die.

242. Match List-I with List-II for the compositions of substances and select the correct answer using the code given below the lists:

Epsomite

- a) CaSO₄.2H₂O b) CaSO₄. $\frac{1}{2}$ H₂O c) MaSO₄. 7H₂O d) MgSO₄.H₂O

243. Both geometrical and optical isomerism are shown by

- a) [Co(en)₂Cl₂]⁺ b) [Co(NH₃)₅Cl]²⁺ c) [Co(NH₃)₄Cl₂]⁺ d) [Cr(ox)₃]³⁻

244. Which of the following will not yield acetic acid on strong oxidation?

- a) Butanone b) Propanone c) Ethyl ethanoate d) Ethanol

245. Oxidation number of carbon in CH₂Cl₂ is

- a) 0 b) +1 c) +2 d) +4

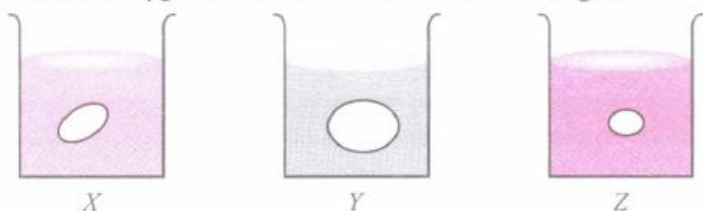
246. The ratio of energies of two photons of wavelengths 2000 Å and 4000 Å

- a) 1:4 b) 4:1 c) 1:2 d) 2:1

247. Lanthanoid contraction is due to increase in

- a) atomic number b) effective nuclear charge c) atomic radius d) valence electrons.

248. Grapes placed in three beakers X, Y and Z containing different type of solutions are shown in figures.



If beaker X contains water, Y and Z contain

- a) Y - hypotonic solution, Z - hypertonic solution b) Y - hypertonic solution, Z - hypotonic solution
c) Y and Z - isotonic solutions d) Y and Z - hypotonic solutions

249. In the final answer of the expression $\frac{(29.2 - 20.2) (1.79 \times 10^5)}{1.37}$ The number of significant figures is :

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

250. The antibiotic which is effective against certain strains of cancer cells,

- a) dysidazirine b) sulphanilamide c) vancomycin d) ofloxacin.

251. If the density of a solution is 3.12 g mL^{-1} , the mass of 1.5 mL solution in significant figures is _____.

- a) 4.7 g b) $4680 \times 10^{-3} \text{ g}$ c) 4.680 g d) 46.80 g

252. **Assertion** : Molecular formula shows the exact number of different types of atoms present in a molecule of a compound.

Reason: Molecular formula can be obtained directly from empirical formula which represents the simplest whole number ratio of various atoms present in a compound.

- a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
b) Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion
c) Assertion is correct but Reason is incorrect d) Both Assertion and Reason are incorrect

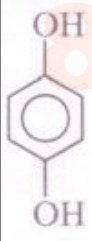
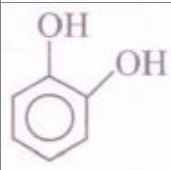
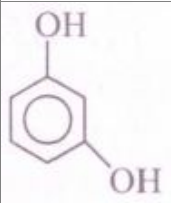
253. The compound A on heating gives a colorless gas and a residue that is dissolved in water obtain B. Excess of CO_2 is bubbled through aqueous solution of B. C is formed which is recovered in the solid form. Solid C on gentle heating gives back A. The compound 'X' is?

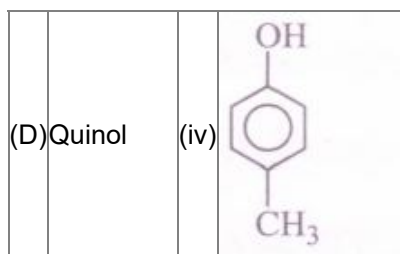
- a) $\text{CaSi}_4\text{2H}_2\text{O}$ b) CaCO_3 c) Na_2CO_3 d) K_2CO_3

254. Dimer formation can take place with

- a) BH_3 b) AlCl_3 c) NO_2 d) All of these

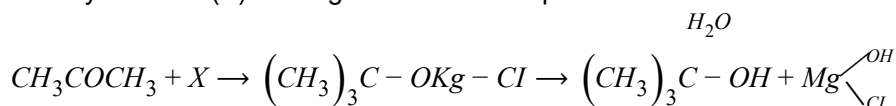
255. Match the column I with column II and mark the appropriate choice

	Column I	Column II
(A)	Catechol	(i) 
(B)	Resorcinol	(ii) 
(C)	p-Cresol	(iii) 



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

256. Identify reactant (X) in the given reaction sequence.



- a) CH_3MgCl b) $CH_3COCl + Mg$ c) $MgCl_2$ d) CH_3CH_2MgCl

257. Units of the properties measured are given below. Which of the properties has not been matched correctly?

- a) Molar conductance = $S \text{ m}^2 \text{ mol}^{-1}$ b) Cell Constant = m^{-1} c) Specific conductance = $S \text{ m}^2$
 d) Equivalent conductance = $S \text{ m}^2 (\text{g eq})^{-1}$

258. For an isothermal reversible expansion process, the value of q can be calculated by the expression

- a) $q = 2.303nRT \log \frac{V_2}{V_1}$ b) $q = -2.303nRT \log \frac{V_2}{V_1}$ c) $q = 2.303nRT \log \frac{V_1}{V_2}$ d) $q = -P_{\text{exp}}nRT \log \frac{V_1}{V_2}$

259. Which of the following reactions is not a part of Solvay's process for preparation of sodium carbonate?

- a) $2NH_3 + H_2O + CO_2 \rightarrow (NH_4)_2CO_3$ b) $(NH_4)_2CO_3 + H_2O + CO_2 \rightarrow 2NH_4HCO_3$
 c) $2NH_4HCO_3 \rightarrow (NH_4)_2CO_3 + H_2O + CO_2$ d) $NH_4HCO_3 + NaCl \rightarrow NH_4Cl + NaHCO_3$

260. Ethyl chloride is converted into diethyl ether by _____.

- a) Williamson's synthesis b) Wurtz synthesis c) Grignard reaction d) Perkin's reaction

261. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give diethyl ether. A, B and C are in the order:

- a) C_2H_5Cl , C_2H_6 , C_2H_5OH b) C_2H_5OH , C_2H_5Cl , C_2H_5ONa c) C_2H_5OH , C_2H_6 , C_2H_5Cl
 d) C_2H_5OH , C_2H_5ONa , C_2H_5Cl

262. Two particles A and B are in motion. If the wavelength associated with particle A is $8 \times 10^{-7} \text{ m}$. calculate the wavelength associated with particle B if its momentum is $1/4$ of A.

- a) $32 \times 10^{-7} \text{ m}$ b) $2 \times 10^{-7} \text{ m}$ c) $4 \times 10^{-7} \text{ m}$ d) $0.5 \times 10^{-8} \text{ m}$

263. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant K is:

- a) $\Delta G^\circ = -RT \ln K$ b) $\Delta G = RT \ln K$ c) $\Delta G = -RT \ln K$ d) $-\Delta G^\circ = RT \ln K_C$

264. A tertiary butyl carbocation is more stable than a secondary butyl carbocation because of which of the following

- a) Hyperconjugation b) -I effect of $-CH_3$ groups c) +R effect of $-CH_3$ groups d) -R effect of $-CH_3$ groups

265. Hess's law is applicable for the determination of heat of

- a) transition b) formation c) reaction d) all of these.

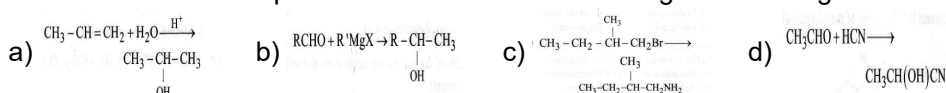
266. When sodium reacts with excess of oxygen, the oxidation number of oxygen changes from:

- a) 0 to -1 b) 0 to -2 c) -1 to -2 d) No change

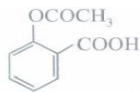
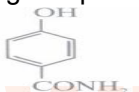
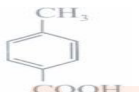
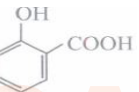
267. Which of the following statements is not true about enzyme inhibitors?

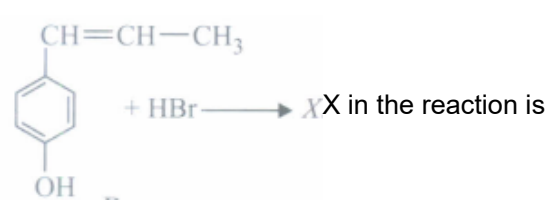
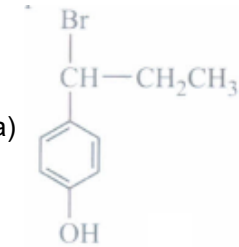
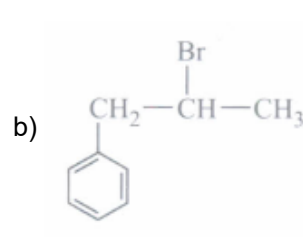
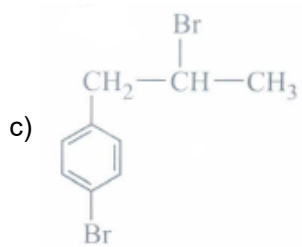
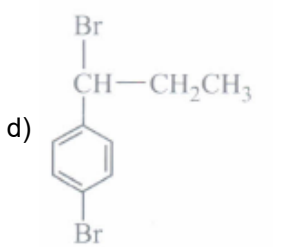
- a) Inhibit the catalytic activity of the enzyme b) Prevent the binding of substrate
 c) Generally a strong covalent bond is formed between an inhibitor and an enzyme.
 d) inhibitor can be competitive or non-competitive

268. Which one is a nucleophilic substitution reaction among the following?



269. Which one of the following statements is not true?

- a) In vulcanization the formation of sulphur bridges between different chains make rubber harder and stronger.
 b) Natural rubber has trans-configuration at every double bond
 c) Buna-S is a copolymer of butadiene and styrene d) Natural rubber is a 1, 4-polymer of isoprene
270. $3A \rightarrow 2B$, rate of reaction $+\frac{d[B]}{dt}$ is equal to :
- a) $-\frac{3}{2}\frac{d[A]}{dt}$ b) $-\frac{2}{3}\frac{d[A]}{dt}$ c) $-\frac{1}{3}\frac{d[A]}{dt}$ d) $+2\frac{d[A]}{dt}$
271. The electro negativity of carbon from the following data is : $E_{H-H} = 104.2 \text{ kcal mol}^{-1}$, $E_{C-C} = 83.1 \text{ kcal mol}^{-1}$, $E_{C-H} = 98.8 \text{ kcal mol}^{-1}$. $X_H = 2.1$
 a) 3.0 b) 2.1 c) 2.5 d) 3.1
272. Which of the following compounds is found abundantly in nature?
 a) Fructose b) Starch c) Glucose d) Cellulose
273. Bases common to RNA and DNA are
 a) adenine, guanine, cytosine b) adenine, uracil, cytosine c) adenine, guanine, thymine
 d) guanine, uracil, thymine.
274. Which of the following compounds represents an analgesic?
 a)  b)  c)  d) 
275. In reference to biological role, Ca^{2+} ions are important in _____.
 a) triggering the contraction of muscles b) generating the right electrode potential across cell membrane
 c) hydrolysis of ATP d) defence mechanism
276. Which one of the following is used to make 'non-stick' cookware?
 a) Poly-ethylene terephthalate b) Polytetrafluoroethylene c) PVC d) Polystyrene
277. The name of the metal which is extracted from the ore is given below. Mark the example which is not correct.
 a) Malachite - Cu b) Calamine - Zn c) Chromite - Cr d) Dolomite - Al
278. Blister copper is
 a) impure copper b) obtained in self-reduction process during bessemerisation c) both are correct
 d) none is correct
279. Dinucleotide is obtained by joining two nucleotides together by phospho diester linkage. Between which carbon atoms of pentose sugars of nucleotides are these linkages present?
 a) 5' and 3' b) 1' and 5' c) 5' and 5' d) 3' and 3'
280. Light elements B, Al, C and Si are
 a) oxaphiles (high affinity for oxygen) b) fluorophiles (high affinity for fluorine) c) both type
 d) none of the types given
281. Oxidation number of Fe in Fe_3O_4 are:
 a) +2 and +3 b) +1 and +2 c) +1 and +3 d) None
282. The number of moles of MnO_4^- and $Cr_2O_7^{2-}$ separately required to oxidise 1 mole of FeC_2O_4 each in acidic medium respectively are:
 a) 0.5, 0.6 b) 0.6, 0.4 c) 1.2, 0.5 d) 0.6, 0.5
283. In acidic medium, the rate of reaction between $[BrO_3^-]$ and $[Br^-]$ ions is given by the expression $-\frac{d[BrO_3^-]}{dt} = k[BrO_3^-][Br^-][H^+]^2$ It means
 (i) rate constant of the reaction depends upon the concentration of H^+ ions
 (ii) rate of reaction is independent of the concentration of acid added
 (iii) the change in pH of the solution will affect the rate of reaction
 (iv) doubling the concentration of H^+ ions will increase the reactions rate by 4 times.
 a) Only (ii) b) Only (iii) c) Only (i) and (ii) d) Only (iii) and (iv)
284. For the reaction, $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$, the reaction rate $=k[H_2][Br_2]^{1/2}$. Which statement is true about this reaction?

- a) The reaction is of second order b) Molecularity of the reaction is 3/2. c) The unit of k is sec^{-1}
 d) Molecularity of the reaction is 2
285. Name the type of the structure of silicate in which one oxygen atom of $[\text{SiO}_4]^{4-}$ is shared?
 a) Three dimensional b) Linear chain silicate c) Sheet silicate d) Pyrosilicate
286. Boric acid has a polymeric layer structure in which planar BO_3 units are joined by:
 a) covalent bonds b) two centre - two electron bonds c) coordinate bonds d) hydrogen bonds.
287. The addition of HCN to carbonyl compounds is an example of
 a) nucleophilic addition b) electrophilic addition c) free radical addition d) elimination addition.
288. The total pressure of a mixture of 8g of oxygen and 14g of nitrogen contained in a 11.2L vessel at 0°C is
 a) 0.5 atm b) 1 atm c) 1.5 atm d) 2 atm
289. **Assertion:** $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ is sp^3d^2 hybridised and paramagnetic complex ion.
Reason: $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ has four unpaired electrons as H_2O is a weak field ligand.
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.
290. The maximum number of electrons in a sub-shell is given by the expression.
 a) $(l + 2)$ b) $(2l + 2)$ c) $(4l + 2)$ d) $(l + 1)$
291. Among the following which is not the π -bonded organometallic compound?
 a) $\text{K}[\text{PtCl}_3(n^2 - \text{C}_2\text{H}_4)]$ b) $\text{Fe}(n^5 - \text{C}_5\text{H}_5)_2$ c) $\text{Cr}(n^6 - \text{C}_6\text{H}_6)_2$ d) $(\text{CH}_3)_4\text{Sn}$
292. The dissociation equilibrium of a gas AB_2 can be represented as
 $2\text{AB}_2(\text{g}) \rightleftharpoons 2\text{AB}(\text{g}) + \text{B}_2(\text{g})$
 The degree of dissociation is x, and is small compared to 1. The expression relating the degree of dissociation (x) with equilibrium constant K_p and total pressure p is:
 a) $(2K_p/P)$ b) $(2K_p/P)^{1/3}$ c) $(2K_p/P)^{1/2}$ d) (K_p/P)
293. ${}_{92}\text{U}^{235} + {}_0n^1 \rightarrow$ fission product + neutron + 3.2×10^{-11} J The energy released, when 1 g of ${}_{92}\text{U}^{235}$ finally undergoes fission, is:
 a) 12.75×10^8 kJ b) 18.60×10^9 kJ c) 8.21×10^7 kJ d) 6.55×10^6 kJ
294. Positive deviation from ideal behaviour takes place because of:
 a) Molecular interaction b/w atoms and $\frac{PV}{nRT} > 1$ b) Molecular interaction b/w atoms and $\frac{PV}{nRT} < 1$
 c) Finite size of atoms and $\frac{PV}{nRT} > 1$ d) Finite size of atoms and $\frac{PV}{nRT} < 1$
295. 
 X in the reaction is
 a)  b)  c)  d) 
296. Which of the following alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy?
 a) CaSO_4 b) BeSO_4 c) BaSO_4 d) SrSO_4

297. The value of ΔH and ΔS for the reaction, $C_{(\text{graphite})} + CO_{2(g)} \rightarrow 2CO_{(g)}$ are 170 kJ and 170 JK^{-1} , respectively. This reaction will be spontaneous at:
a) 710 K b) 910 K c) 1010 K d) 510 K
298. Which one of the following is not a common component of Photochemical smog?
a) Ozone b) Acrolein c) Peroxyacetyl nitrate d) Chlorofluorocarbons
299. The reaction quotient (Q) for reaction
$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$$
 is given by $Q = \frac{[NH_3]^2}{[N_2][H_2]^3}$ The reaction will proceed from right to left
a) $Q=0$ b) $Q = K_c$ c) $Q < K_c$ d) $Q > K_c$
300. Assertion: Superoxides of alkali metals are paramagnetic.
Reason: Superoxides contain O_2 ion which has one unpaired electron.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

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