1. When C, R and L represent general identity, then dimensions of C^2RL are:
   a) $[M^0L^0T^3A^0]$ b) $[ML^2T^3A^2]$ c) [ML TA] d) none of these
2. 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
3. If the units of mass, length and time are doubled, unit of angular momentum will be:
   a) doubled b) tripled c) quadrupled d) 8 times the original value
4. Match the Column I with Column II.

Column-I		Column-II	
A)	Distance between earth and sun	(p)	Micron
B)	Interatomic distance in a solid	(q)	Fermi
C)	Size of a nucleus	(r)	Light year
D)	Wavelength of infrared laser	(s)	Angstrom

   a) A - P. B - q, C - r, D - s b) A - r, B - s, C - q, D - P c) A - q, B - p, C - s, D - r d) A - s, B - r, C - p, D - q
5. Given that v is the speed, r is radius and g is acceleration due to gravity. Which of the following is dimensionless?
   a) v^2r/g b) v^2/rg c) v^2g/r d) v^2rg
6. Which of the following units is not a base unit?
   a) metre b) candela c) ampere d) pascal
7. If $x = at + bt^2$ where x is the distance travelled by the body in kilometers and t is the time in seconds, so units of b will be :
   a) km/s b) km-s c) km/s^2 d) $km\text{-}s^2$
8. The length of one rod is 2.53 em and that of the other is 1.27 cm. The least count of measuring instrument is 0.01 cm. If two rods are put together end to end, the combined length can be expressed as:
   a) (3.80± 0.01)cm b) (3.80± 0.02)cm c) (3.80±0.03)cm d) (3.80±0.04)cm
9. Given that: $y = A\sin\left[\left(\frac{2\pi}{\lambda}\right)(ct - x)\right]$ where Y and x are measured in meters. Which of the following statements is true?
   a) The unit of λ is same as that of x and A. b) The unit of λ is same as that of x but not of A.
   c) The unit of c is same as that of $2\pi/\lambda$ d) The unit of (ct - x) is same as that of $2\pi/\lambda$
10. Out of the following the only pair that does not have identical dimensions is:
    a) angular momentum and Planck's constant b) moment of inertia and moment of a force
    c) work and torque d) impulse and momentum
11. Checking the correctness of equations using the method of dimensions is based on
    a) the type of system b) equality of inertial frames of references c) principle of homogeneity of dimensions
    d) none of these
12. Dimensions of gravitational constant are:
    a) $[ML^2T^2]$ b) $[M^1L^3T^{-2}]$ c) $[M^0L^3T^2]$ d) $[M^{-1}L^3T^{-2}]$
13. 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 ± 3 cm^2 b) 163.62 ± 2.6 cm^2 c) 163.6 ± 2.6 cm^2 d) 163.62 ± 3 cm^2

14. The dimensions of capacitance are:
    a) $[ML^{-2}T^{2}Q^{-2}]$ b) $[M^{-1}L^{2}T^{-2}Q^{2}]$ c) $[M^{-1}L^{-2}T^{-2}Q^{2}]$ d) $[M^{-1}L^{-2}T^{2}Q^{2}]$

15. If velocity of light c, Planck's constant hand gravitational constant G are taken as fundamental quantities then the dimensions of length will be :
    a) $\sqrt{\frac{ch}{G}}$ b) $\sqrt{\frac{hG}{c^5}}$ c) $\sqrt{\frac{hG}{c^3}}$ d) $\sqrt{\frac{hc^3}{G}}$

16. **Assertion:** In physics, we attempt to derive the properties of a bigger, more complex system from the properties and interactions of its constituent simpler parts.
    Reason: This approach is called unification and is at the heart of physics.
    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.

17. Assertion: The units of some physical quantities can be expressed as combination of the base units.
    Reason: We need only a limited number of units for expressing the derived physical quantities.
    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

18. Assertion : Pressure cannot be subtracted from pressure gradient.
    Reason : Pressure and pressure gradient have different dimensions
    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

19. Which of the following relations for the displacement of a particle undergoing simple harmonic motion is not correct dimensionally?
    a) $y = a\sin\frac{2\pi t}{T}$ b) $y = a\cos\omega t$ c) $y = \frac{a}{T}\sin\left(\frac{t}{a}\right)$ d) $y = a\sqrt{2}\left(\sin\frac{2\pi t}{T} + \cos\frac{2\pi t}{T}\right)$

20. A student when discussing the properties of a medium (except vacuum) writes: velocity of light in vacuum = velocity of light in medium. This formula is:
    a) dimensionally correct b) dimensionally incorrect c) numerically incorrect d) both (a) and (c)

21. The dimension of $\frac{1}{2}\varepsilon_0 E^2$, where ε_0 is permittivity of free space and E is electric field, is :
    a) ML^2T^{-2} b) $ML^{-1}T^{-2}$ c) ML^2T^{-1} d) MLT^{-1}

22. In the relation: $\frac{dy}{dt} = 2\omega\sin(\omega t + \phi_0)$, the dimensional formula for $(\omega t + \phi_0)$ is:
    a) [MLT] b) $[MLT^0]$ c) $[ML^0T^0]$ d) $[M^0L^0T^0]$

23. The dimensional formula for Boltzmann's constant is:
    a) $\left[ML^2T^{-2}\theta^{-1}\right]$ b) $\left[ML^2T^{-2}\right]$ c) $\left[ML^0T^{--2}\theta^{-1}\right]$ d) $\left[ML^{-2}T^{--1}\theta^{-1}\right]$

24. If force (F), acceleration (a) and time (T) are used as the fundamental units, the dimensional formula for length will be:
    a) $[F^0aT^2]$ b) $[Fa^0T^2]$ c) $[Fa^2T^0]$ d) [FaT]

25. In International System of units, there are seven base quantities whose units are defined. Which physical quantity has a prefix with its unit?
    a) Mass b) Thermodynamic temperature c) Luminous intensity d) Amount of substance

26. If we choose velocity V, acceleration A and force F as the fundamental quantities, then the angular momentum in terms of V, A and F would be:
    a) $[FA^{-1}V]$ b) $[FV^3A^{-2}]$ c) $[FV^2A^{-1}]$ d) $[ML^2T^{-1}]$

27. **Assertion:** Electrons do not experience strong nuclear force.
    Reason: Strong nuclear force is charge-independent force.

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

28. The device used for measuring the mass of atoms and molecules is :
a) spring balance b) torsional balance c) mass spectrograph d) common balance

29. SONAR emits which of the following waves?
a) Radio waves b) Micro waves c) Ultrasound waves d) Gamma rays

30. Assertion: Parallax method is used for measuring distances of nearby stars only.
Reason : With increase of distance of star, parallactic angle becomes too small to be measured accurately.
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

31. What is full form of GMRT?
a) Ground Mobile Receive Terminal b) Geometric Mean Reciprocal Titer
c) Giant Metrewave Radio Telescope d) General Maintenance and Repair Technician

32. Which of the following is unitless quantity?
a) Pressure gradient b) Displacement gradient c) Force gradient d) Velocity gradient

33. The range of masses we study in Physics is
a) 10^{-27} kg to 10^{60} kg b) 10^{-27} kg to 10^{55} kg c) 10^{-30} kg to 10^{55} kg d) 10^{-30} kg to 10^{60} kg

34. One 'lux' is equal to :
a) lumen/m^2 b) lumen/cm^2 c) candela/m^2 d) candela/cm^2

35. The dimensions are $\frac{1}{2}\varepsilon_0 E^2$ where ϵ_o is permittivity of free space and E is eleckic field _____.
a) ML^2T^{-2} b) $ML^{-1}T^{-2}$ c) ML^2T^{-1} d) MLT^{-1}

36. Which scientist experimentally proved the existence of electromagnetic waves?
a) Sir J.C. Bose b) Maxwell c) Marconi d) Hertz

37. A new system of units is evolved in which the values of μ_0 and ε_0 are 2 and 8 respectively. Then the speed of light in this system will be:
a) 0.25 b) 0.5 c) 0.75 d) 1

38. The SI unit of electron mobility is:
a) $m^2s^{-1}V^{-1}$ b) msV^{-1} c) $ms^{-1}V$ d) $m^2s^{-2}V^{-2}$

39. Which two of the following five physical parameters have the same dimensions?
(A) Energy density
(B) Refractive index
(C) Dielectric constant
(D) Young's modulus
(E) Magnetic field
a) (B) and (D) b) (C) and (E) c) (A) and (D) d) (A) and (E)

40. The order of magnitude of 147 is:
a) 1 b) 2 c) 3 d) 4

41. Which of the following is the smallest unit?
a) millimetre b) angstrom c) fermi d) metre

42. The SI unit of universal gas constant (R) is :
a) Watt / K mol b) Newton / K mol c) Joule / K mol d) Erg / K mol

43. With usual notation, amongst the following, the one which does not represent the dimensions of time is:
a) $\frac{L}{R}$ b) RC c) $\sqrt{LC}$ d) $\frac{1}{\sqrt{LC}}$

44. Henry/ohm can be expressed in
a) Second b) Coulomb c) Mho d) Metre

45. The unit of angular momentum are :
a) kg-m^2/s^2 b) J/s c) J-s d) kg-ms^{-2}

46. Which of the following is the most precise instrument for measuring length?
a) Metre rod ofleast count 0.1 cm b) Vernier callipers of least count 0.01 cm
c) Screw gauge of least count 0.001 cm d) None of these

47. If C and R denote capacity and resistance respectively, the dimensions of CR are:
a) $[M^0L^0T^1]$ b) $[M^0L^2T^{-2}]$ c) $[M^0L^0T^{-2}]$ d) $[ML^0T^0]$

48. If physical quantity X is represented by $X = M^aL^bT^{-c}$ and the maximum percentage errors in M, L and T are $\alpha\%, \beta\%$ *and* $\gamma\%$ respectively, then the total maximum percentage error in X is:
a) $(\alpha a + \beta b - \gamma c)\%$ b) $(\alpha a + \beta b + \gamma c)\%$ c) $(\alpha a - \beta b - \gamma c)\%$ d) none of these

49. The dimensions of light year are:
a) $[L^{-1}]$ b) $[T^{-1}]$ c) [L] d) [T]

50. In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows:
$P = \frac{a^3b^2}{cd}$ Percentage error in P is :
a) 14% b) 10% c) 7% d) 4%

51. Assertion: The average speed of an object is greater than or equal to the magnitude of the average velocity over a given time interval.
Reason: The two are equal only if the path length is equal to the magnitude of displacement.
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.

52. A 150 m long train is moving with a uniform velocity of 45 km/h. The time taken by the train to cross a bridge of length 850 meters is :
a) 56 sec b) 68 sec c) 80 sec d) 92 sec

53. Which of the following operations will not change a vector?
a) Rotation in its own plane b) Rotation perpendicular to its plane c) Rotation about the tail
d) None of the above

54. Spot out the odd one.
a) calorie b) kilowatt hour c) joule d) watt

55. A hose lying on the ground shoots a stream of water upward at an angle of 60° to the horizontal with a velocity of 16 ms^{-1}. The height at which the water strikes the wall 8 m away is:
a) 8.96 m b) 10.96 m c) 12.96 m d) 6.96 m

56. The driver of a car moving towards a rocket launching pad with a speed of 6 m s^{-1} observed that the rocket is moving with speed of 10 m s^{-1}. The upward speed of the rocket as seen by the stationary observer is nearly
a) -1 m s^{-1} b) 6 m s^{-1} c) 8 m s^{-1} d) 11 m s^{-1}

57. Aboat is moving with a velocity $3\hat{i}+4\hat{j}$ with respect to ground. The water in the river is moving with a velocity $3\hat{i}+4\hat{j}$ with respect to ground. The relative velocity of the boat with respect to water is:
a) $8\hat{j}$ b) $6\hat{i}-8\hat{j}$ c) $6\hat{i}+8\hat{j}$ d) $5\sqrt{2}$

58. The range of a projectile is 100 m. Its kinetic energy will be maximum after covering a distance of:
a) 25 m b) 50 m c) 75 m d) 100 m

59. Two trains A and B each of length 400 mare moving on two parallel tracks with a uniform speed 72 km h^{-1} in the same direction with A ahead of B. The driver of B decides to overtake A and accelerates by 1 m s^{-2}. If after 50 s, the guard of B just brushes past A, what was the original distance between them?
a) 750 m b) 1000 m c) 1250 m d) 2250 m

60. A particle covers half of its total distance with speed v_1 and the rest half distance with speed v_2 Its average speed during the complete journey is :

a) $\frac{v_1 v_2}{v_1+v_2}$ b) $\frac{2v_1 v_2}{v_1+v_2}$ c) $\frac{2v_1 v_2^2}{v_1^2+v_2^2}$ d) $\frac{v_1+v_2}{2}$

61. Young's modulus of steel is 1.9 x 10^{11} N m^{-2}. When expressed in cgs units of dynes cm^{-2}, it will be equal to (1 N = 10^5 dyne, 1 m^2 = 10^4 cm^2)
a) 1.9 x 10^{10} b) 1.9 x 10^{11} c) 1.9 x 10^{12} d) 1.9 x 10^{13}

62. The resultant of $\vec{A}$ and $\vec{B}$ is perpendicular to$\vec{A}$. What is the angle between$\vec{A}$ and $\vec{B}$?
a) $cos^{-1}\left(\frac{A}{B}\right)$ b) $cos^{-1}\left(-\frac{A}{B}\right)$ c) $sin^{-1}\left(\frac{A}{B}\right)$ d) $sin^{-1}\left(-\frac{A}{B}\right)$

63. person moves 30 m north, then 30 m east, then $30\sqrt{2}$ m south-west. His displacement from the original position is zero
a) zero b) 28 m towards south c) 10 m towards west d) 15 m towards east

64. If a unit vectoris represented by $0.5\hat{i}$ + $0.8\hat{j}$ + $c\hat{k}$ then the value of 'c' is :
a) 1 b) $\sqrt{0.11}$ c) $\sqrt{0.01}$ d) $\sqrt{0.39}$

65. Two bullets are fired horizontally with different velocities from the same height. Which will reach the ground first?
a) Slower one b) Faster one c) Both will reach simultaneously d) It cannot be predicted

66. A motor cyclist going round in a circular track at constant speed has :
a) Constant linear velocity b) Constant acceleration c) Constant angular velocity d) Constant force

67. A sphere of mass m is tied to end of a string of length 1 and rotated through the other end along a horizontal circular path with speed v. The work done in full horizontal circle is :
a) 0 b) $\left(\frac{mv^2}{l}\right).2\pi l$ c) mg.2πl d) $\left(\frac{mv^2}{l}\right).(l)$

68. A force of $(3\hat{i}+4\hat{j})$ newton acts on a body and displaces it by $(3\hat{i}+4\hat{j})$ metres. The work done by the force is:
a) 10 J b) 12 J c) 16 J d) 25 J

69. Two resistors of resistances R_1 = (100 ± 3) Ω and R_2 = (200 ± 4) Ω are connected in parallel. The equivalent resistance of the parallel combination is :
a) (66.7 ± l.8) Ω b) (66.7 ± 4.0) Ω c) (66.7 ± 3.0) Ω d) (66.7 ± 7.0) Ω

70. A particle of unit mass undergoes one dimensional motion such that its velocity varies according to u(x) = βx^{-2n}, where β and n are constants and x is the position of the particle. The acceleration of the particle as a function of x is given by:
a) $-2\beta^2 x^{2n+1}$ b) $-2n\beta^2 e^{-4n+1}$ c) $-2n\beta^2 x^{2n-1}$ d) $-2n\beta^2 x^{-4n-1}$

71. The component of vector $\vec{A} = 2\hat{i}+3\hat{j}$ along the direction of $(\hat{i}-\hat{j})$ is :
a) $\frac{1}{\sqrt{2}}$ b) $-\frac{1}{\sqrt{2}}$ c) $\frac{1}{2}$ d) $-\frac{1}{2}$

72. Forces F_1 and F_2 act on a point mass in two mutually perpendicular directions. The resultant force on the point mass will be:
a) F_1+F_2 b) F_1-F_2 c) $\sqrt{F_1^2+F_2^2}$ d) $F_1^2+F_2^2$

73. If $|\vec{P}| = |\vec{Q}|$ and the angle between $\vec{P}$ and $\vec{Q}$ is neither 0° nor 180°, then what is the angle between $\vec{P}+\vec{Q}$ and $\vec{P}-\vec{Q}$?
a) 0° b) 30° c) 60° d) 90°

74. Assertion : A number 2.746 rounded off to three significant figures is 2.75, while the number 2.743 would be 2.74.
Reason : In rounding off the uncertain digits, the preceding digit is raised by 1if the insignificant digit to be dropped is more than 5 and is left unchanged if the latter is less than 5.
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.

75. The velocity of projection of a body is increased by 2%. Keeping other factors as constant, what will be the percentage change in the maximum height attained?
a) 1% b) 2% c) 4% d) 8%

76. Which one of the following statements is true?
a) A scalar quantity is the one that is conserved in a process.
b) A scalar quantity is the one that can never take negative values.
c) A scalar quantity is the one that does not vary from one point to another in space.
d) A scalar quantity has the same value for observers with different orientations of the axes.

77. The minimum number of vectors of equal magnitude required to produce a zero resultant is:
a) 2 b) 3 c) 4 d) more than 4

78. A body is projected at such an angle that the horizontal range is three times the greatest height. The angle of projection is:
a) 25°8' b) 33°7' c) 42°8' d) 53°8'

79. The angle between $\vec{A} = \hat{i} + \hat{j}$ and $\vec{B} = \hat{i} - \hat{j}$ is;
a) 45° b) 90° c) -45° d) 180°

80. A vector $\vec{Q}$ which has a magnitude of 8 is added to the vector $\vec{P}$ which lies along x-axis. The resultant of two vectors lies along y-axis and has magnitude twice that of P. The magnitude of $\vec{P}$ is:
a) $\frac{6}{\sqrt{5}}$ b) $\frac{8}{\sqrt{5}}$ c) $\frac{12}{\sqrt{5}}$ d) $\frac{16}{\sqrt{5}}$

81. Three vectors $\vec{A}, \vec{B}$ and $\vec{C}$ add upto zero. Find which is false:
a) $\left(\vec{A} \times \vec{B}\right) \times \vec{C}$ is not zero unless $\vec{B}, \vec{C}$ are parallel b) $\left(\vec{A} \times \vec{B}\right) \times \vec{C}$ is not zero unless $\vec{B}, \vec{C}$ are parallel
c) If $\vec{A}, \vec{B}, \vec{C}$ define a plane, $(\vec{A} \times \vec{B}) \times \vec{C}$ is in that plane d) $\left(\vec{A} \times \vec{B}\right).\vec{C} = |\vec{A}||\vec{B}||\vec{C}| \Rightarrow C^2 = A^2 + B^2$

82. An object falling through a fluid is observed to have acceleration given by a = g - bv where g = gravitational acceleration and b is constant. After a long time of release, it is observed to fall with constant speed. The value of constant speed is :
a) $\frac{g}{b}$ b) $\frac{b}{g}$ c) bg d) b

83. The order of magnitude of the diameter of the earth is (Diameter of the earth is 1.28 x 10^7m)
a) 5 b) 6 c) 7 d) 8

84. Assertion: A dimensionally wrong or inconsistent equation must be wrong.
Reason: A dimensionally consistent equation is an exact or a correct equation.
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.

85. If unit vectors $\hat{A}$ and $\hat{B}$ are inclined at an angle θ then $|\hat{A}-\hat{B}|$ is
a) $2\sin\frac{\theta}{2}$ b) $2\cos\frac{\theta}{2}$ c) $2\tan\frac{\theta}{2}$ d) $\tan\theta$

86. A particle experiences a constant acceleration for 20 sec after starting from rest. If it travels a distance S_1 in the first 10 see and a distance S_2 in the next 10 sec, then
a) $S_1 = S_2$ b) $S1 = \frac{S_2}{3}$ c) $S1 = \frac{S_2}{2}$ d) $S1 = \frac{S_2}{4}$

87. A police party is moving in a jeep at a constant speed v They saw a thief at a distance x on a motorcycle which is at rest. At the same moment the thief saw the police and he started at constant acceleration a. Which of the following relations is true, if the police is able to catch the thief?
a) v^2 b) $v^2 < 2\alpha x$ c) $v^2 \geq 2\alpha x$ d) $v^2 = \alpha x$

88. Which of the following is the smallest unit?
a) millimetre b) angstrom c) fermi d) metre

89. In Latin, the word vector means
a) magnitude b) direction c) carrier d) cap

90. A vehicle travels half the distance L with speed v_1 and the other half with speed v_2 then its average speed is
a) $\frac{v_1+v_2}{2}$ b) $\frac{2v_1+v_2}{v_1+v\ 2}$ c) $\frac{2v_1v_2}{v_1+v\ 2}$ d) $\frac{L(v_1+v_2)}{v_1v\ 2}$

91. Which of the following is not a unit of time?
a) Parsec b) Year c) Second d) Hour

92. A truck and a car are moving with equal velocity. On applying the brakes both will stop after certain distance, then
a) Truck will cover less distance before rest b) Car will cover less distance before rest
c) Both will cover equal distance d) None

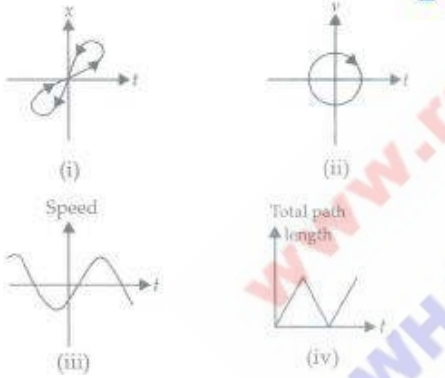
93. From the top of a tower 19.6 m high, a ball is thrown horizontally. Ifthe line joining the point of projection to the point where it hits the ground makes an angle of 45° with the horizontal, then the initial velocity of the ball is:
a) 9.8 ms^{-1} b) 4.9 ms^{-1} c) 14.7 ms^{-1} d) 2.8 ms^{-1}

94. A man of 50 kg mass is standing in a gravity free space at height of 10m above the floor. He throws a stone of 0.5 kg mass downwards with speed of 2 m/s. When the stone reaches the floor the distance of the man above the floor will be :
a) 9.9 m b) 10.1 m c) 10.0 m d) 20 m

95. The time of flight of a projectile on an upward inclined plane depends upon:
a) angle of projection b) angle of inclination of the plane c) air resistance d) both (a) and (b)

96. Which of the following is not a scalar quantity?
a) Temperature b) Coefficient of friction c) Charge d) Impulse

97. Which of the following graphs cannot possibly represent one dimensional motion of a particle?



a) (i) and (ii) b) (ii) and (iii) c) (i) (ii) and (iii) d) All four

98. The horizontal range of a projectile fired at an angle of 15° is 50 m. Ifit is fired with the same speed at an angle of 45°, then range will be :
a) 60 m b) 71 m c) 100 m d) 141 m

99. Galileo writes that for angles of projection of a projectile at angles (45 + ∝) and (45 - ∝). The horizontal ranges described by the projectile are in the ratio of:
a) 2 : 1 b) 1 : 2 c) 1 : 1 d) 2 : 3

100. During a projectile motion if the maximum height equals to the horizontal range, then the angle of projection with the horizontal is:
a) $\tan^{-1}(1)$ b) $\tan^{-1}(2)$ c) $\tan^{-1}(3)$ d) $\tan^{-1}(4)$

101. Which of the following are likely to be present in deep sea water?
a) Eubacteria b) Blue-green algae c) Saprophytic fungi d) Archaebacteria

102. _____are important decomposers that cause decay and decomposition of dead bodies of plants and animals.
a) Saprophytic bacteria b) Saprotrophic fungi c) Plants, like Sarracenia d) Both (a) and (b)

103. The sporozoa are all internal _____ that typically have an infective cyst stage in their life cycle. An example of sporozoa is the genus _____which causes malaria.
a) ciliates, Plasmodium b) flagellates, Plasmodium c) parasites, Plasmodium d) parasites, Trypanosoma

104. Absorptive heterotrophic nutrition is exhibited by _____ .
a) Algae b) Fungi c) Bryophytes d) Pteridophytes

105. In which group of organisms the cell walls form two thin overlapping shells which fit together?.
a) Chrysophytes b) Euglenoids c) Dinoflagellates d) Slime moulds

106. Membrane-bound organelles are absent in :
a) Plasmodium b) Saccharomyces c) Streptococcus d) Chlamydomonas

107. Some members are saprophytes or parasites whereas a large number of members are decomposers of litter and help in nutrient cycling in case of
a) Phycomycetes b) Deuteromycetes c) Ascomycetes d) Basidiomycetes

108. Select the mismatch.
a) Gas vacuoles - Green bacteria Cells b) Large central vacuoles - Animal cells c) Protists - Eukaryotes
d) Methanogens - Prokaryotes

109. Consider following features
(A) Organ system level of organisation
(B) Bilateral symmetry
(C) True coelomates with segmentation of body
Select the correct option of animal groups which possess all the above characteristics
a) Annelida, Arthropoda and Mollusca b) Arthropoda, Mollusca and Chordata
c) Annelida, Mollusca and Chordata d) Annelida, Arthropoda and Chordata

110. The motile bacteria are able to move by :
a) Fimbriae b) Flagella c) Cilia d) Pili

111. Genophore bacterial genome or nucleoid is made of _____ .
a) Histones and non-histones b) RNA and histones c) A single double stranded DNA
d) A single stranded DNA

112. Mark the incorret match
a) Lichen-Symbiotic association b) T_2phage -ds-DNA c) TMV-ss-RNA d) Viroid-Free DNA

113. Which of the following kingdoms has no well-defined boundaries?
a) Monera b) Protista c) Fungi d) None of these

114. Which group of organisms is represented by the given figure?

a) Diatoms b) Dinoflagellates c) Bacteria d) Euglenoids

115. Ustilago caused plant diseases are called smuts because _____ .
a) They parasitise cereals b) Mycelium is black c) They develop sooty masses of spores
d) Affected parts become completely black

116. Which of the following organisms possesses characteristics of both a plant and an animal?
a) Bacteria b) Mycoplasma c) Euglena d) Paramecium

117. Which one of the following statements about viruses is correct?
a) Viruses possess their own metabolic system b) Viruses contain either DNA or RNA
c) Viruses are facultative parasites d) Viruses are readily killed by antibiotics

118. Influenza virus has _____ .
a) DNA b) RNA c) Both (a) and (b) d) Only proteins and no nucleic acids

119. An association between roots of higher plants and fungi is called

a) lichen b) fern c) mycorrhiza d) BGA

120. **Assertion:** Methanogens are present in the gut of several ruminant animals.
Reason: Methanogens help in the production of methane from dung of ruminants.
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.

121. Virion is
a) nucleic acid of virus b) antiviral agent c) protein of virus d) completely assembled virus outside host.

122. Escherichia coli is used extensively in biological research as it is _____ .
a) Easily cultured b) Easily available c) Easy to handle d) Easily rnultiplied in host

123. Select the mismatched pair
a) W.M. Stanley - Viruses could be crystallised b) D.J. Ivanowsky - Coined term virus
c) M.W Beijerinck - Extract of the infected plants of tobacco cause infection in healthy plants
d) None of these

124. The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals include the :
a) Eubacteria b) Halophiles c) Thermoacidophiles d) Methanogens

125. What is true for cyanobacteria?
a) Oxygenic with nitrogenase b) Oxygenic without nitrogenase c) Non-oxygenic with nitrogen
d) Non-oxygenic without nitrogenase

126. Methanogens belong to :
a) Eubacteria b) Archaebacteria c) Dinoflagellates d) Slime moulds

127. In lichen, the fungus provides:
a) Protection, anchorage and absorption for alga b) Food for alga c) Oxygen for alga
d) Fixes nitrogen for alga

128. The structures that help some bacteria to attach to rocks and / or host tissues are:
a) Fimbriae b) Mesosomes c) Holdfast d) Rhizoids

129. In five kingdom classification, Chlamydomonas and Chlorella have been included in :
a) Protista b) Monera c) Plantae d) Algae

130. Which of the following groups of organisms are included under chrysophytes?
a) Diatoms and desmids (golden algae) b) Diatoms and dinoflagellates c) Euglenoids d) Slime moulds

131. Which of the following environmental conditions are essential for optimum growth of Mucor on a piece of bread?
A. Temperature of about 25^{o}C
B. Temperature of about 5^{o} C
C. Relative humidity of about 5%
D. Relative humidity of about 95%
E. A shady place
F. A brightly illuminated place
Choose the answer from the following options :
a) A, D and E only b) B, D and E only c) B, C and F only d) A, C and E only

132. Virus envelope is known as :
a) Capsid b) Virion c) Nucleoprotein d) Core

133. Choose the wrong statements
a) Neurospora is used in the study of biochemical genetics.
b) Morels and truffles are poisonoues mushrooms. c) Yeast is unicellular and useful in fermentation.
d) Penicillium is multicellular and produces antibiotics.

134. **Assertion:** Sporozoans may have silica shells on their surface.
Reason: Shells of sporozoans help in protection from acidic environment of the host.
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.

135. Members of Phycomycetes are found in
(i) aquatic habitats
(ii) on decaying wood
(iii) moist and damp places
(iv) as obligate parasites on plants.
Choose from the following options.
a) None of the above b) (i) and (iv) c) (ii) and (iii) d) All of the above

136. Which of the following are found in extreme saline condition?
a) Archaebacteria b) Eubacteria c) Cyanobacteria d) Mycobacteria

137. In Amoeba and Paramecium osmoregulation occurs through _____ .
a) Pseudopodia b) Nucleus c) Contractile vacuole d) General surface

138. In five-kingdom classification system, the kingdom that includes the blue-green algae, nitrogen-fixing bacteria, and methanogenic archaebacteria is
a) Plantae b) Fungi c) Protista d) Monera.

139. Which of the following statements regarding viruses are correct?
(i) These are cellular, infectious, nucleoprotien particles.
(ii) They can be grown in culture medium.
(iii) Genetic material is either DNA or RNA, but never both.
(iv) They can be crystallised.
a) (i) and (ii) b) (ii) and (iii) c) (iii) and (iv) d) (i), (ii), (iii) and (iv)

140. Which one of the following statements is wrong?
a) Phycomycetes are also called algai fungi b) Cyanobacteria are also called blue-green algae
c) Golden algaeare are also called desmids d) Eubacteria are also called false bacteria

141. Read the following statements regarding methanogens and select the correct option.
(i) They are included in the group Archaebacteria.
(ii) They are responsible for the production of biogas in gobar gas plants.
(iii) They live in hot sulphur springs.
(iv) They are strictly anaerobic.
a) Statements (i) and (ii) are correct b) Statements (i), (ii) and (iv) are correct
c) Statements (ii), (iii) and (iv) are correct d) All statements are correct.

142. Pick up the wrong statement.
a) Nuclear numbrane is present is Monera b) Cell wall is absent in Animalia
c) Protista have photosynthetic and heterotrophic modes of nutrition d) Some fungi are edible.

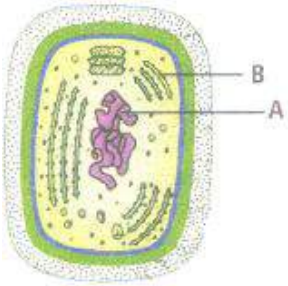
143. Chemosynthetic autotrophs are included in how many kingdoms according to whittaker's system?
a) Four b) Three c) Two d) One

144. The guts of cow and buffalo possess:
a) Cyanobacteria b) Fucus spp. c) Chiarella spp. d) Methanogen

145. Which of the following is a mismatched pair of protozoan group and its example?
a) Amoeboid protozoan - Entamoeba histolytica b) Flagellated protozoan - Giardia intestinalis
c) Ciliated protozoan - Paramecium caudatum d) Sporozoan - Leishmania donovani

146. Coenocytic mycelium is
a) uninucleate, septate b) multinucleate, septate c) multinucleate, septate d) both (b) and (c).

147. Given figure represents the ultrastructure of a typical cyanobacterial cell. Identify the different parts and select the correct option for A and B.



a)

A	B
Naked DNA	Thylakoid

b)

A	B
Thylakoid	Naked DNA

c)

A	B
DNA + Histones	Thylakoid

d)

A	B
DNA + Histones	80S ribosomes

148. Viruses that infect bacteria, multiply and cause their lysis, are called _____ .
a) Lysozymes b) Lipolytic c) Lytic d) Lysogenic

149. Which one is an incorrectly matched pair?
a) Phycomycetes - Mucor, Albugo b) Ascomycetes - Penicillium, Aspergillus
c) Basidiomycetes - Puccinia, Agaricus d) Deuteromycetes - Ustilago, Colletotrichum

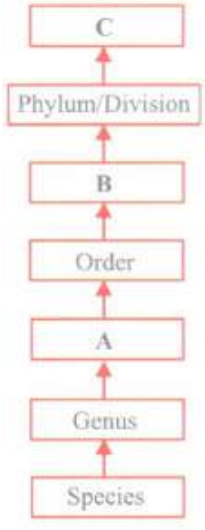
150. The most abundant prokaryotes helpful to humans in making curd from milk and in production of antibiotics are the ones categorised as:
a) Cyanobacteria b) Archaebacteria c) Chemosynthetic autotrophs d) Heterotrophic bacteria

151. Which of the following taxonomic categories includes one or more related orders?
a) Phylum/Division b) Genus c) Family d) Class

152. Homeostasis is _____ .
a) Tendency to change with change in environment b) Tendency to resist change
c) Disturbance in regulatory control d) Plants and animals extracts used in homeopathy

153. It is much easier for a small animal to run uphill than for a large animal, because _____ .
a) It is easier to carry a small body weight. b) Smaller animals have a higher metabolic rate.
c) Small animals have a lower O_2 requirement.
d) The efficiency of muscles in large animals is less than in the small animals

154. The given flow chart represents the hierarchy of various taxonomic categories. Identify the missing categories (A, B and C) and select the correct statements regarding these.
(i) A is the taxonomic category which contains a number of related genera.
(ii) Examples of category B are Monocotyledonae, Dicotyledonae, Mammalia, etc.
(iii) C represents the basic unit of taxonomic hierarchy.
(iv) Examples of category C are Fungi, Monera, Protista, etc.



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

155. **Assertion:** Keys are analytical in nature.
Reason: Keys are based on couplet.
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.

156. Select the mismatched pair.
a) Panthera lea - Belongs to Class Mammalia b) Musca domestica - The common house lizard, a reptile
c) Entamoeba coli - Commonly occurring protozoan in human intestine
d) Solanum tuberosum - A dicotyledonous plant

157. _____ is the branch of science dealing with identification, nomenclature and classification of organisms.
a) Morphology b) Anatomy c) Ecology d) Taxonomy

158. Which one of the following is common to multicellular fungi, filamentous algae and protonema of mosses?
a) Mode of Nutrition b) Multiplication by fragmentation c) Diplontic life cycle
d) Members of kingdom Plantae

159. Phenetic classification is based on _____ .
a) Sexual characteristics b) The ancestral lineage of existing organisms
c) Observable characteristics of existing organisms d) Dendograms based on DNA characteristics

160. Study the following statements regarding significance of botanical gardens and select the incorrect one.
a) These help in growing important plants of local flora and keeping their record.
b) These help in providing living plant material for research work.
c) These help in growing and maintaining rare and endangered plants d) None of these

161. Herbaria are useful in
a) Understanding the distribution of plants b) Observing the habitat of plants c) Identification of plants
d) Indicating list of plants in a particular area

162. Founder of binomial nomenclature was
a) Linnaeus b) Mendel c) Darwin d) Lamarck.

163. Mango belongs to this order
a) Anacardiales b) Poales c) Sapindales d) Polymoniales

164. Floral features are commonly used for identification of angiosperms because
a) reproductive parts are more conservative b) flowers can be safely preserved
c) flowers are nice to work with d) flowers have various colours and scents.

165. In plants, growth occurs _____ whereas in animals, it occurs_____.
a) only upto a certain age, continuously b) continuously, only upto a certain age
c) continuously, continuously d) only upto a certain age, only upto a certain age

166. Amongst all the kingdoms, the only taxon that exists in nature as a biologically cohesive unit is the
a) species b) genus c) phylum or division d) kingdom

167. Match the items given in column I with those in column II and select the correct option given below:

Column I	Column II
A.Herbarium	(i) It is a place having a collection of preserved plants and animals.
B. Key	(ii) A list that enumerates methodically all the species found in an area with brief description.
C. Museum	(iii) Is a place where dried and pressed plants specimens mounted on sheets are kept
D.Catalogue	(iv) A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.

a)

A	B	C	D
(i)	(iv)	(iii)	(ii)

b)

A	B	C	D
(iii)	(iv)	(i)	(ii)

c)

A	B	C	D
(ii)	(iv)	(iii)	(i)

d)

A	B	C	D
(iii)	(ii)	(i)	(iv)

168. The earliest classifications were based on
a) Reproduction of plants b) Uses of plants c) Diversity of plants d) Evolutionary relationship of plants

169. Read the following statements regarding biological museums
(i) Biological museums are generally set up in educational institutes such as schools and colleges.
(ii) Museums have collections of preserved plant and animal specimens for study and reference.
(iii) Specimens are preserved in the containers or jars in preservative solutions.
(iv) Insects are preserved in insect boxes after collecting, killing and pinning.
(v) Larger animals like birds and mammals are usually stuffed and preserved.
(vi) Skeletons of mammals are not allowed to be kept in museums.
Which of the above statements is/are not correct?
a) (ii) and (iii) b) (i) and (vi) c) (v) only d) (vi) only

170. 'Aves' taxonomically represent a
a) family b) order c) class d) phylum

171. 'Key' is a taxonomical aid used for the identification of organisms. Each statement in key is called a_____.
a) couplet b) lead c) both (a) and (b) d) none of these

172. Identify the correct sequence of taxonomi categories
a) Species ⟶phylum ⟶ class ⟶ kingdom b) Genus ⟶ species ⟶ order ⟶kingdom
c) Species ⟶ Genus ⟶order⟶ class d) Division c⟶Family⟶ order⟶e Genus

173. National Zoological Park is situated at
a) Delhi b) Lucknow c) Jaipur d) Darjeeling

174. Which of the following represents the correct sequence of various taxonomic categories?
a) Class-Phylum- Iribe-Order-Family-Genus- Species b) Division-Class-Family-Tribe-Order-Genus- Species
c) Division-Class-Order-Family-Tribe-Genus- Species d) Phylum-Order-Class-Tribe-Family-Genus-Species

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

Column I	**Column II**
A. Binomial nomenclature	(i) Hippocrates
B. The Darwin of the 20th century	(ii) Ernst Mayr
C. Father of botany	(iii) Linnaeus
D. Father of medicine	(iv) Theopharastus

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

176. **Assertion:** System of providing name with two components is called binomial nomenclature.
Reason: Each name consists first of a specific name and second of a generic name.
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.

177. Employment of hereditary principles in the improvement of human race is _____ .
a) Euthenics b) Eugenics c) Euphenics d) Ethnology

178. Which of the following statements is incorrect regarding the modern taxonomy?
a) It deals with biological species b) It is based on the study of all types of variations in the species.
c) Speciesis considered to be static. d) It has a biosystematic concept.

179. Which one of the following statements is incorrect?
a) indica, tuberosum and lea represent the specific epithets.
b) Physalia, Apis and Helianthus represent the generic epithets
c) Monocotyledonae and Dicotyledonae are the two classes of division Angiospermae.
d) Phylum Chordata is the largest phylum of Kingdom Animalia.

180. Which of the following statements regarding the response of living organisms to external stimuli is correct?
a) The external environmental stimuli can be physical, chemical or biological.
b)
All organisms, from the prokaryotes to the most complex eukaryotes can sense and respond to environmental stimuli.
c) Consciousness and response to external stimuli is the defining property of living organisms d) All of these

181. The third name in trinomial nomenclature is
a) species b) subgenus c) subspecies d) ecotype

182. A true species consists of a population which is
a) sharing the same niche b) interbreeding c) feeding over the same food d) geographically isolated

183. **Assertion:** Living organisms show internal as well as external growth.
Reason: Living organisms undergo the process known as accretion
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.

184. The internationally recognised binomial nomenclature was developed by Linnaeus in his book
a) Philosophia Botanica b) Historia Plantarum c) Species Plantarum d) none of these

185. Basic unit or smallest taxon of classification is
a) species b) kingdom c) family d) variety

186. Angiosperms have dominated the land flora primarily because of their _____ .
a) Power of adaptability in diverse habitat b) Property of producing large number of seeds
c) Nature of self Pollination d) Domestication by man

187. According to binomial nomenclature, two words used for naming a plant or animal are
a) Family and genus b) Species and family c) Class and family d) Genus and species

188. 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.

189. Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of
a) monographs b) flora c) both (a) and (b) d) none of these.

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

Column I	Column II
A. Ecology	(i) Relationships of organisms and environment
B. Herbarium	(ii) Original specimen cited by an author
C. Holotype	(iii) A hierarchial unit
D. Taxon	(iv) Collection of wild and domestic plants

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

191. Taxon ending with a suffix ales
a) Species b) Order c) Taxonomy d) Classes

192. The term 'systematics' refers to
a) identification and study of organ systems b) identification and preservation of plants and animals
c) diversity of kinds of organisms and their relationship
d) study of habitats of organisms and their classification.

193. Which of the following sets does not contain defining characteristics of living organisms?
a) Growth and reproduction b) Metabolism and cellular level of organisation
c) Response to stimuli and consciousness d) All of these

194. Which two of the below given points are known as the twin characteristics of growth?
(i) Increase in mass
(ii) Increase in number of individuals
(iii) Cellular organisation
(iv) Cellular differentiation
a) (i) and (ii) b) (i) and (iii) c) (ii) and (iii) d) (iii) and (iv)

195. Select the correct option for biological names.
a) They are binomial b) They are descriptive c) They are universal d) All of these

196. Select the correctly written botanical/zoological name.

a) Homo Sapiens b) Panthera tigris c) Pisum sativum d) Mangifera Indica

197. Which of the following 'suffixes' used for units of classification in plants indicates a taxonomic category of 'family'?
a) -Ales b) -Onae c) -Aceae d) -Ae

198. Which among the following is INCORRECT with respect to the universal rules of biological nomenclature?
a) The first word in a biological name represents the genus while the second name denotes the species
b)
The specific epithet starts with a capital letter while the generic epithet starts with a small letter. It can be illustrated with the example of mangifera indica
c) Biological names are either derived from Latin language or Latinised.
d)
Both the words in a biological name, when handwritten are separately underlined or printed in italics to indicate their Latin origin.

199. Read the following statements and select the correct option.
Statement 1: Zoological parks are the places where wild animals are kept in protected environments under human care and which enable us to learn about their food habits and behaviour.
Statement 2: Adequate arrangements for the treatment, medication, regular check up and pathological investigations are absolutely necessary to be made for the health, care, and upkeep of the animals
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

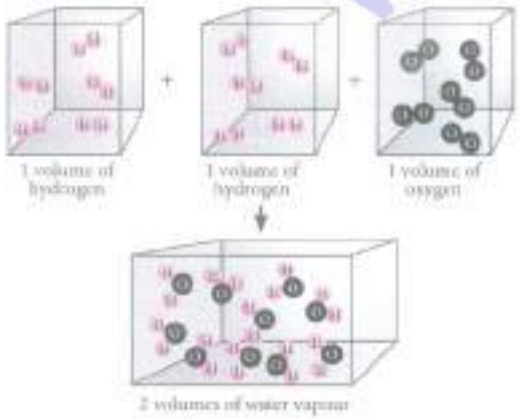
200. A taxonomic category refers to
a) the basic unit of classification b) a rank or level in a taxonomic hierarchy
c) a group of related organisms able to interbreed
d) a group of related organisms but unable to interbreed freely

201. 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 x 10^{-3} g c) 4.680 g d) 46.80 g

202. Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc. Following reaction takes place:
$Zn + 2HCl \rightarrow ZnCl_2 + H_2$
What would be the volume of hydrogen gas liberated at STP when 32.65 g of zinc reacts with HCl?
a) 10.03 L b) 11.35 L c) 11.57 L d) 9.53 L

203. One mole of any substance contains 6.022 x 10^{23} atoms/molecules. Number of molecules of H_2SO_4 present in 100 mL of 0.02 M H_2SO_4 solution is _____ molecules.
a) 12.044 x 10^{20} b) 6.022 x 10^{23} c) 1 x 10^{23} d) 12.044 x 10^{23}

204. Which of the following law of chemical combination is satisfied by the figure?



a) Law of multiple proportion b) Dalton's law c) Avogadro law d) Law of conservation of mass

205. How many moles of oxygen gas can be produced during electrolytic decomposition of 180 g of water?
a) 2.5 moles b) 5 moles c) 10 moles d) 7 moles

206. What is the concentration of copper sulphate (in mol L^{-1}) if 80 g of it is dissolved in enough water to make a final volume of 3L?
a) 0.0167 b) 0.167 c) 1.067 d) 10.67

207. How much mass of sodium acetate is required to make 250 mL of 0.575 molar aqueous solution?
a) 11.79 g b) 15.38 g c) 10.81 g d) 25.35g

208. Boron has two stable isotopes, ^{10}B (19%) and ^{11}B (81%). Average atomic weight for boron in the periodic table is:
a) 10.8 b) 10.2 c) 11.2 d) 10.0

209. A metal oxide has the formula Z_2O_3. It can be reduced by hydrogen to give free metal and water. 0.1596 g of the metal oxide requires 6 mg of hydrogen for complete reduction. The atomic weight of the metal is :
a) 27.9 b) 159.6 c) 79.8 d) 55.8

210. 1.0 g of magnesium is burnt with 0.56 g of oxygen in a closed vessel. Which reactant is left in excess and how much? (At. weight of Mg = 24, O= 16)
a) Mg, 0.16 g b) O_2, 0.16 g c) Mg, 0.44 g d) O_2, 0.28 g

211. Molarity equation of a mixture of solutions of same substance is given by
a) $M_1 + V_1 \times M_2 + V_2 \times M_3 + V_3 + ... = M_1 + M_2 + M_3$ b) $M_1V_1 + M_2V_2 + M_3V_3 + ...= M(V_1+V_2+V_3)$

c) $\frac{M_1}{V_1} + \frac{M_2}{V_2} + \frac{M_3}{V_3} + \ldots = M\left(\frac{1}{V_1} + \frac{1}{V_2} + \frac{1}{V_3}\right)$ d) $\frac{M_1}{V_1} + \frac{M_2}{V_2} + \frac{M_3}{V_3} + \ldots = M_1\left(\frac{1}{V_1} + \frac{1}{V_2} + \frac{1}{V_3}\right)$

212. Which of the following statements is correct about the reaction given below? $4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(g)$
a) The total mass of reactants = Total mass of the products. It follows the law of conservation of mass.
b) Total mass of reactants = total mass of product; therefore, law of multiple proportions is followed.
c) Amount of Fe_2O_3 can be increased by taking anyone of the reactants (iron or oxygen) in excess.
d)
Amount of Fe_2O_3 produced will decrease if the amount of anyone of the reactants (iron or oxygen) is taken in excess.

213. **Assertion**: Scientific notation for the number 100 is expressed as 1×10^2.
Reason: The number 1×10^2 has two significantfigures
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.

214. **Assertion:** On heating, a solid usually changes to a liquid and the liquid on further heating changes to the gaseous state.
Reason : Arrangement of constituent particles is different in solid, liquid and gaseous state.
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.

215. In the reaction, $4NH_3$ (g) + $5O_2$ (g)$\longrightarrow$ 4NO (g) + $6H_2O$ (l) When 1 mole of ammonia and 1 mole of O_2 are made to react to completion, then:
a) 1.0mole of H_2O is produced b) 1.0mole of NO will be produced c) all the oxygen will be consumed
d) all the ammonia will be consumed

216. The mass of carbon anode consumed (giving only carbon dioxide) in the production of 1279 kg of aluminium metal from bauxite by the hall process is (Atomic mass: A1= 27)
a) 270 kg b) 540 kg c) 90 kg d) 180 kg

217. Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of 1.80 g mL^{-1}. Volume of acid required to make one litre of 0.1 M H_2SO_4 solution is
a) 16.65 mL b) 22.20 mL c) 5.55 mL d) ll.l0 mL

218. Calcium carbonate decomposes on heating to give calcium oxide and carbon dioxide. How much volume of CO_2 will be obtained at STP by thermal decomposition of 50 g of $CaCO_3$?
a) 1 L b) 11.2 L c) 44 L d) 22.4 L

219. **Assertion:** In laboratory, a solution of a desired concentration is prepared by diluting a stock solution.
Reason : Stock solution is the solution of higher concentration.

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 will make basic buffer?
a) 100 mL of 0.1 MCH_3COOH+ 100ml of 0.l MNaOH b) 100 mL of 0.1 M HCI + 200 mL of 0.1 MNH_4OH
c) 100 mL of 0.1 MHCI + 100ml of 0.l MNaOH d) 50 mL of 0. 1 MNaOH + 25 mL of 0. I MCH_3COOH

221. What mass of sodium chloride would be decomposed by 9.8 g of sulphuric acid if 12 g of sodium bisulphate and 2.75 g of hydrogen chloride were produced in a reaction?
a) 14.75 g b) 3.8 g c) 4.95 g d) 2.2 g

222. An element, X has the following isotopic composition ^{200}X : 90%, ^{199}X: 8.0%, ^{202}X: 2.0%. The weighted average atomic mass of the naturally occurring element X is closest to :
a) 201 amu b) 202 amu c) 199 amu d) 200 amu

223. Atomic masses of elements are usually fractional because:
a) they are mixtures of isotopes b) they contain impurities of other atoms c) they are mixtures of isobars
d) atomic masses cannot be weighed accurately

224. At STP, the density of CCL_4 vapour in g/Lwill be nearest
a) 6.87 b) 3.42 c) 10.26 d) 4.57

225. Which has the maximum number of molecules among the following?
a) 44 g CO_2 b) 48 g O_3 c) 8gH_2 d) 64gSO_2

226. What will be the weight of CO having the same number of oxygen atoms as present in 22 g of CO_2?
a) 28 g b) 22 g c) 44 g d) 72 g

227. If 500 mL of a 5 M solution is diluted to 1500 ml, what will be the molarity of the solution obtained?
a) 1.5 M b) 1.66 M c) 0.017 M d) 1.59 M

228. Which of the following correctly represents 180 g of water?
(i) 5 moles of water
(ii) 10 moles of water
(iii) 6.023 x 10^{23}molecules of water
(iv) 6.023 x 10^{24}molecules of water
a) (i) b) (ii) c) (iii) d) (iv)

229. **Assertion:** The reactant which is present in larger amount limits the amount of product formed is called limiting reagent.
Reason : Amount of product formed does not depend upon the amount of reactants taken.
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

230. The number of oxygen atoms in 4.4 g of CO_2 is :
a) 1.2 x 10^{23} atoms b) 6 x 10^{23} atoms c) 6 x 10^{23} atoms d) 12 x 10^{23} atoms

231. If the concentration of glucose ($C_6H_{12}O_6$) in blood is 0.9 g L^{-I}, what will be the molarity of glucose in blood?
a) 5 M b) 50 M c) 0.005 M d) 0.5 M

232. An organic compound on analysis gave the following results: C = 54.5%, O = 36.4%, H = 9.1%. The Empirical formula of the compound is
a) CHO_2 b) CH_2O c) C_2H_8O d) C_2H_4O

233. The percentage weight of Zn in white vitriol ($ZnSO_4.7H_2O$) is approximately equal to (at. mass of Zn = 65, S = 32, O = 16 and H = 1) :
a) 33.65% b) 32.65% c) 23.65% d) 22.65%

234. One atom of an element weighs 3.32 x 10^{-23} g. How many number of gram atoms are there in 20 kg of the element?
a) 2000 b) 20 c) 200 d) 1000

235. Volume occupied by one molecule of water (density = 1 g cm-3) is :

a) $9.0 \times 10^{-23} cm^3$ b) $6.023 \times 10^{-23} cm^3$ c) $3.0 \times 10^{-23} cm^3$ d) $5.5 \times 10^{-23} cm^3$

236. How much mass of silver nitrate will react with 5.85 g of sodium chloride to produce 14.35 g of silver chloride and 8.5 g of sodium nitrate if law of conservation of mass is followed?
a) 22.85g b) 108g c) 17.0g d) 28.70g

237. If 40 g of $CaCO_3$ is treated with 40 g of HCl, which of the reactants will act as limiting reagent?
a) $CaCO_3$ b) HCl c) Both (a) and (b) d) None of these

238. In which case is the number of molecules of water maximum?
a) 18 mL of water b) 0.18 g of water c) 0.00224 L of water vapours at 1 atm and 273 K
d) 10^{-3} mol of water

239. What quantity of copper oxide will react with 2.80 L of hydrogen at NTP?
a) 79.5 g b) 2 g c) 9.9 g d) 22.4 g

240. A solution is made by dissolving 49 g of H_2S0_4 in 250 mL of water. The molarity of the solution prepared is
a) 2 M b) 1 M c) 4 M d) 5 M

241. Which set of figures will be obtained after rounding up the following up to three significant figures?
34.216,0.04597, 10.4107
a) 34.3,0.0461,10.4 b) 34.2, 0.0460, 10.4 c) 34.20,0.460,10.40 d) 34.21,4.597, 1.04

242. How much oxygen is required for complete combustion of 560 g of ethene?
a) 6.4 kg b) 1.92 kg c) 2.8 kg d) 9.6 kg

243. Which of the following statements about a compound is incorrect?
a) A molecule of a compound has atoms of different elements
b) A compound cannot be separated into its constituent elements by physical methods of separation.
c) A compound retains the physical properties of its constituent elements.
d) The ratio of atoms of different elements in a compound is fixed.

244. What mass of hydrochloric acid is needed to decompose 50 g of limestone?
a) 36.5g b) 73 g c) 50 g d) 100 g

245. Which one of the following has maximum number of atoms :
a) 1 g of Ag (s) Atomic mass of Ag = 108 b) 1 g of O_2 (g) Atomic mass of O = 16
c) 1 g of Li (s) Atomic mass of Li = 7 d) 1 g of Mg (s) Atomic mass of Mg = 24

246. What is the mass per cent of oxygen in ethanol?
a) 52.14% b) 13.13% c) 16% d) 34.73%

247. The molecular weight of O_2 and SO_2 are 32 and 64 respectively. At 15°C and 150 mm Hg pressure, I L of O_2 contains 'N' molecules. The nunber of molecules in 2 L of SO_2 , under the same conditions of temperature and pressure will he
a) N/2 b) N c) 2N d) 4N

248. The number of moles of $KMnO_4$ reduced by 1 mol of KI in alkaline medium is:
a) 1/5 b) 2 c) 3/2 d) 4

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

	Column - I		**Column - II**
(A)	Mass of H_2 produced when 0.5 mole of zinc reacts with excessof HCl	(i)	3.01×10^{23} molecules
(B)	Mass of all atoms of a compound with formula $C70H_{22}$	(ii)	6.023×10^{23} molecules
(C)	Number of molecules in 35.5 g of Cl_2	(iii)	1.43×10^{-21}g
(D)	Number of molecules in 64 g of SO_2	(iv)	1g

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

250. The number of oxygen atoms present in 1 mole of oxalic acid dihydrate is :
a) 6×10^{23} b) $6..022 \times 10^{34}$ c) 7.22×10^{23} d) 36.13×10^{23}

251. The maximum number of electrons that can be present in an orbital with s = +1/2 and l = 2
a) 1 b) 2 c) 5 d) 7

252. The ratio of charge to mass of an electron in coulombs per gram was determined by J.J. Thomson. He determined this ratio by measuring the deflection of cathode rays in electric and magnetic fields. What value did he find for this ratio?
a) -1.76×10^{8} coulombs/g b) 1.76×10^{-8} coulombs/g c) -1.76×10^{10} coulombs/g
d) -1.76×10^{-10} coulombs/g

253. What is the atomic number of the element which has $3d^6$ as its outermost configuration?
a) 12 b) 32 c) 26 d) 24

254. Which of the following are true for cathode rays?
a) It travels along a straight line b) It emits X-rays when strikes a metal c) It is an electromagnetic wave
d) It is not deflected by magnetic field

255. Number of nodal spaces in 4s orbital is
a) 0 b) 1 c) 3 d) 4

256. The incorrect electronic arrangement is:
a) 2, 8, 13, 1 b) 2, 8, 12, 2 c) 2, 8, 8, 1 d) 2, 8, 8, 2

257. If uncertainty in position and momentum are equal, then uncertainty in velocity is :
a) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$ b) $\sqrt{\frac{h}{2\pi}}$ c) $\frac{1}{m}\sqrt{\frac{h}{\pi}}$ d) $\sqrt{\frac{h}{\pi}}$

258. The wavelength of radiation required to remove the electron of hydrogen atom (Ionisation energy 21.7×10^{-12}erg) from n = 2 orbit to n =∞ is
a) 3.664×10^{-4} cm b) 3.66×10^{-5} cm c) 3.66×10^{-6} cm d) 3.66×10^{-7} cm

259. The kinetic energy of the photo electrons does not depend upon
a) Intensity of incident radiation b) Frequency of incident radiation c) Wavelength of incident radiation
d) Wave number of the incident radiation

260. An orbital is described with the help of a wave function. Since many wave functions are possible for an electron, there are many atomic orbitals. When atom is placed in a magnetic field the possible number of orientations for an orbital of azimuthal quantum number 3 is:
a) three b) two c) five d) seven

261. For an e^- in a hydrogen atom, the wave function Ψ.If is proportional to $e^{-(r/a_0)}$ where a_0 as Bohrs radius; what is the ratio of probability of finding the e^- at the nucleus to the probability of finding it at a_0 the wave function is Ψ

$$= \frac{1}{\sqrt{\pi}}\left(\frac{1}{a_0}\right)^{3/2} e^{-(r/a_0)}$$

a) e b) e^2 c) $1/e^2$ d) Zero

262. What is the electronic configuration of O^{2-} ion?
a) $1s^2\ 2s^2\ 2p^6$ b) $1s^2\ 2s^2\ 2p^4$ c) $1s^2\ 2s^2\ 2p^5$ d) $1s^2\ 2s^2\ 2p^3$

263. The energy of the electron in a hydrogen atom has a negative sign for all possible orbits because:
a)
when the electron is attracted by the nucleus and is present in orbit n, the energy is emitted and its energy is lowered.
b)
when the electron is attracted by the nucleus and is present in orbit n, the energy is absorbed and its energy is increased.
c) when the electron is repelled by the nucleus, the energy is released and its energy is lowered.
d) none of these.

264. Assertion: When an iron rod is heated in a furnace, the radiation emitted goes from a lower frequency to a higher frequency as the temperature increases.
Reason: The energy of a quantum of radiation is proportional to its frequency.

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

265. A hydrogen like species(atomic number Z) is present in a higher exited state of quantum number n. This excited atom can make a transition to the first excited state by successive emission of two photons of energies 10.20 eV and 17.0 eV respectively. Alternatively, the atom from the same excited state can make a tranition to the second excited state by sucessive emission of two photons of energy 4.25 eV and 5.95 eV respectively. Determine the value of Z,
a) 1 b) 2 c) 3 d) 4

266. If n = 6, the correct sequence for filling of electrons will be:
a) $ns \rightarrow (n-1)f \rightarrow (n-1)d \rightarrow np$ b) $ns \rightarrow (n-1)f \rightarrow (n-2)d \rightarrow np$ c) $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$
d) $ns \rightarrow np(n-1)d \rightarrow (n-2)f$

267. The electrons, identified by n & l; (i) n = 4,l = 1 (ii) n = 4, l = 0(iii) n = 3, l = 2 (iv) n = 3, l = 1 can be placed in order of increasing energy, from the lowest to highest as :
a) (iv) < (ii) < (iii) < (i) b) (ii) < (iv) < (i) < (iii) c) (i) < (iii) < (ii) < (iv) d) (iii) < (i) < (iv) < (ii)

268. The number of photons of light wave number 'x' in 10 J of energy source is:
a) 10 hcx b) $\frac{hc}{10x}$ c) $\frac{10}{hcx}$ d) $\frac{hcx}{10}$

269. An electron has magnetic quantum number as '-3'. Its principal quantum number is
a) 3 b) 2 c) 1 d) 4

270. A nuclide of an alkaline earth metal undergoes radioactive decay by emission of the α – particles is succession. The group of the periodic table to which the resulting daughter element would belong to:
a) Gr.4 b) Gr.16 c) Gr.14 d) Gr.16

271. Total number of orbitals associated with third shell will be _____ .
a) 2 b) 4 c) 9 d) 3

272. If ionisation potential for hydrogen atom is 13.6 eY, then ionisation potential for He^+ will be:
a) 54.4 eV b) 6.8 eV c) 13.6 eV d) 24.5 eV

273. The number of neutrons in the dipositive zinc ion (Mass number or Zn = 65)
a) 35 b) 33 c) 65 d) 67

274. The mass of a praticle is 10^{-10}g and its radius is $2x10^{-4}$ cm. If its velocity is 10^{-6} cm sec^{-1} with 0.0001% uncertainity in measurement. the uncertainty in its position is:
a) 5.2 x 10^{-8}m b) 5.2 x 10^{-7}m c) 5.2 x 10^{-6}m d) 5,2 x 10^{-9}m

275. The ratio of the orbit of the 1st three radii in an atom of hydrogen is
a) 1 : 4 : 9 b) 9 : 4 : 1 c) 1 : 2 : 3 d) 3 : 2 : 1

276. In Bohr series of lines of hydrogen spectrum, the third line from the red end corresponds to which one of the following inter - orbit jumps of the electron for Bohr orbits in all atom of hydrogen?
a) 3⟶2 b) 5⟶2 c) 4⟶1 d) 2⟶5

277. A cricket ball of mass 0.5 kg is moving with a velocity of 100 $m.s^{-1}$, the wavelength associated with its motion is:
a) 13.25 x 10^{-26}m b) 13.25 x 10^{-34}m c) 13.25 x 10^{-36}m d) 6.6 x 10^{-34}m

278. The wavelength of an electron moving with velocity of 10^7 ms^{-1} is:
a) 7.27 x 10^{-11} m b) 3.55 x 10^{-11} m c) 8.25 x 10^{-4} m d) 1.05 x 10^{-16} m

279. The above statement is known as :
a) de-Broglie's principle b) Pauli's exclusion principle c) Heisenberg's Uncertainity principle
d) Autbau principle

280. The size of a mircorscopic particle is 1 micron and its mass is 6 x 10^{-13}g. If its position may be measured to within 0.1 % of its size, the uncertainiry in velocity (in cm^{-1}) is approximately
a) $\frac{10^{-7}}{4\pi}$ b) $\frac{10^{-5}}{4\pi}$ c) 10^{-5} d) 10^{-8}

281. The electronic configuration of sodium is
a) $[Ne]3s^2$ b) $[Ne]3s^1$ c) $[Ar]4s^1$ d) $[Ar]4s^2$

282. A wave has a frequency of $3x10^{15}$ sec^{-1}. The energy of that photon is
a) 1.6×10^{-12} erg b) 3.2×10^{-11} erg c) 2.0×10^{-11} erg d) 3×10^{15} erg

283. The angular momentum of 3p-orbitals in terms of h* $\left(h* = \frac{h}{2\pi}\right)$ is:
a) $\sqrt{2h}$* b) 2h* c) $\frac{h*}{\sqrt{2h}}$ d) h*

284. What is the K.E. of photo electrons.
a) 6.23×10^{-20} J b) 6.25×10^{-22} J c) 6.625×10^{-18} J d) 6.625×10^{-19} J

285. Consider the following sets of quantum numbers

	n	l	m	s
(i)	3	0	0	+1/2
(ii)	2	2	1	+1/2
(iii)	4	3	-2	-1/2
(iv)	1	0	-1	-1/2
(v)	3	2	3	+1/2

Which of the following sets of quantum number is not possible
a) (i), (ii), (iii) and (iv) b) (ii), (iv) and (v) c) (i) and (iii) d) (ii),(iii) and (iv)

286. Which one is a wrong statement?
a) Total orbital angular momentum of electron in 's' orbital is equal to zero.
b)
An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers.
The electronic configuration of N atom is
c) ↑↓ ↓↑ ↑ ↑ ↓ $1s^2$ $2s^2$ $2p_x^1$ $2p_y^1$ $2p_z^1$ d) The value of m for dz^2 is zero

287. Which of the following designation is impossible?
a) 4f b) 5g c) 2d d) 6p

288. Two values of spin quantum numbers i.e., $\pm$ 1/2 and -1/2 represent:
a) up and down spin of the electrons respectively
b) two quantum mechanical spin states which refer to the orientation of spin of the electron
c) clockwise and anti-clockwise spin of the electrons respectively
d) anti-clockwise and clockwise spin of the electrons respectively

289. The de Broglie wavelength associated with a ball of mass 200 g and moving at a speed of 5 metres/hour, is of the order of ($h = 6.625 \times 10^{-34}$ Js) is:
a) 10^{-15} m b) 10^{-20} m c) 10^{-25} m d) 10^{-30} m

290. For the electrons of oxygen atom, which of the following statements is correct?
a) Z_{eff} for an electron in a 2s orbital is the same as Z_{eff} for an electron in a 2p orbital
b) An electron in the 2s orbital has the same energy as an electron in the 2p orbital
c) Z_{eff} for an electron in Is orbital is the same as Z_{eff} for an electron in a 2s orbital
d) The two electrons present in the 2s orbital have spin quantum numbers, m_s but of opposite sign

291. What is the ratio of time periods(T_1/T_2) in second orbit of H atom to 3rd orbit of He^+
a) 8/27 b) 32/27 c) 27/32 d) 27/8

292. The ratio of number of spectral lines obtained when an e^- jumps from 7th to ground to 6th to 3rd
a) 7 b) 3.5 c) 10 d) 2.5

293. The Bohr's orbit radius for the hydrogen atom (n=1) is approximately 0.53 A. The radius for the first excited state (n = 2) orbit is:
a) 0.27 A b) 1.27 A c) 2.12 A d) 3.12 A

294. If the energy of H-atom in the ground state is -E, the velocity of photo-electron emitted when a photon having energy E_p strikes a stationary Li^{2+} ion in ground state, is given by:

a) $v = \sqrt{\frac{2(E_p - E)}{m}}$ b) $v = \sqrt{\frac{2(E_p + 9E)}{m}}$ c) $v = \sqrt{\frac{2(E_p - 9E)}{m}}$ d) $v = \sqrt{\frac{2(E_p - 3E)}{m}}$

295. The pair of ions having same electronic configuration is _____

a) Cr^{3+}, Fe^{3+} b) Fe^{3+}, Mn^{2+} c) Fe^{3+}, Co^{3+} d) Sc^{3+}, Cr^{3+}

296. Which quantum number defines the orientation of orbital in the space around the nucleus ?

a) Principal quantum number (n) b) Angular momentum quantum number

c) Magnetic quantum number (m_1) d) Spin quantum number (m_s)

297. If the Planck's constant h = 6.6 x 10^{-34} Js, the dc-Broglies wave length ofa particle having momentum of 3.3 x 10^{-24} kg.ms^{-1} will be:

a) 2 x 10^{-10} m b) 1 x 10^{-15} m c) 10^{-5} m d) 4 x 10^{-10} m

298. What would be the wavelength and name of series respectively for the emission transition for H-atom if it starts from the orbit having radius 1.3225 nm and ends at 211.6 pm?

a) 434 nm, Balmer b) 434 pm, Paschen c) 545 pm, Pfund d) 600 nm, Lyman

299. The hydrogen-like species Li^{2+} is in a spherically symmetric state S_1 with one radial node. Upon absorbing light the ion undergoes transition to a state S_2 The state S_2 has one radial node and its energy is equal to the ground state energy of the hydrogen atom.

The orbital angular momentum quantum number of the state S_2 is

a) 0 b) 1 c) 2 d) 3

300. A certain metal when irradiated by light (v = 3.2 x 10^{16} Hz) emits photoelectrons with twice of K.E. as did photoelectrons when the same metal is irradiated by light (v = 2.0 x 10^{16} Hz). The Vo of the metal is

a) 1.2 x 10^{14} Hz b) 8 x 10^{15} Hz c) 1.2 X 10^{16} Hz d) 4 x 10^{12} Hz

301. The angular shape of ozone molecule (O_3) consists of:

a) 1 sigma and 2 pi bonds b) 2 sigma and 2 pi bonds c) 1 sigma and 1 pi bonds

d) 2 sigma and 1 pi bonds

302. Which of the following diatomic molecular species has only π bonds according to Molecular Orbital Theory?

a) N_2 b) C_2 c) Be_2 d) O_2

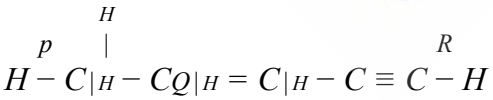
303. Identify the incorrect statement related to PCl_5 from the following:

a) Three equitorial P - Cl bonds makes an angle of 120° with each other

b) Two axial P - Cl bonds make an angle of 180° with each other

c) Axial P - Cl bonds are longer than equatorial P - Cl bonds d) PCl_5 molecules is non reactive

304. Which is the correct order of bond lengths P, Q and R in



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

305. Which of the following statements is correct regarding the structure of PCl_5?

a) Three P-Cl bonds lie in one plane and two P- Cl bonds lie above and below the equatorial plane.

b) Five P-Cl bonds lie in the same plane. c) The bond angle in all P-Cl bonds is 90°.

d) The bond length of all P-Cl bonds is same.

306. The number of sigma (σ) and pi (π) bonds in pent-2-en-4- yne is:

a) 8σ bonds and 5 π bonds b) 11σ bonds and 2π bonds c) 13σ bonds and no π bonds

d) 10σ bonds and 3π bonds

307. The correct order of increasing bond angles is :

a) $PF_3 < PCl_3 < PBr_3 < PI_3$ b) $PF_3 < PBr_3 < pcl_3 < PI_3$ c) $PI_3 < PBr_3 < PCl_3 < PF_3$

d) $PF_3 > PCl_3 < PBr_3 < PI_3$

308. Which of the following will be the strongest bond?

a) F - O b) O - Cl c) N - H d) O - H

309. Given below is the bond angle in various types of hybridisation. Mark the bond angle which is not correctly matched.
a) dsp^2-90° b) sp^3d^2-90° c) sp^3d-90° d) sp^3-109.5°

310. As sp^3 hybrid orbital contains :
a) $\frac{1}{4}$ s-character b) $\frac{1}{2}$ s-character c) $\frac{1}{3}$ s-character d) $\frac{2}{3}$ s-character

311. Some of the properties of the two species, NO_3^- and H_2O^+ are described below. Which one of them is correct?
a) Similar in hybridisation for the central atom with different structures
b) Dissimilar in hybridisation for the central atom with different structures
c) Isostructural with same hybridisation for the central atom.
d) Isostructural with different hybridisation for the central atom.

312. Which of the following two are isostructural?
a) XeF_2 and IF_2^- b) NH_3 and BF_3 c) CO_3^{2-} and SO_3^{2-} d) PCl_5 and ICl_5

313. Which of the following would have a permanent dipole moment?
a) SiF_4 b) SF_4 c) XeF_4 d) BF_3

314. The correct order of decreasing bond lengths of CO, CO_2 and CO_3^{2-} is
a) $CO > CO_2 > CO_3^{2-}$ b) $CO_3^{2-} > CO_2 > CO$ c) $CO_2 > CO > CO_3^{2-}$ d) $CO_2 > CO_3^{2-} > CO$

315. How many orbitals are singly occupied in O_2 molecule?
a) 2 b) 1 c) 3 d) 4

316. In which of the following molecules/ions BF_3, NO_2^-, NH_2^- and H_2O, the central atom is Sp_2 hybridized?
a) NO_2^- and NH_2^- b) NH_2^- and H_2O c) NO_2^- and H_2O d) BF_3 and NO_2^-

317. For which element would XH3 be a stable species?
a) C b) Cl c) P d) S

318. The manganate and permanganate ions are tetrahedral, due to
a) There is no π-bonding
b) The π-bonding involves overlap of p-orbitals of oxygen with p-orbitals of manganese
c) The π-bonding involves overlap of d-orbitals of oxygen with d-orbitals of manganese
d) The π-bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese

319. In which of the following pairs, the two species are isostructural?
a) SF_4 and XeF_4 b) SO_3^{2-} and NO_3^- c) BF_3 and NF_3 d) BrO_3- and XeO_3

320. In which one of the following species the central atom has the type of hybridization which is not the same as they present in the other three?
a) SF_4 b) I_3^- c) $SbCl_5^{2-}$ d) PCl_5

321. **Assertion:** Boiling point of p-nitrophenol is greater than that of o-nitrophenol.
Reason: There is intramolecular hydrogen bonding in p-nitrophenol and intermolecular hydrogen bonding in o-nitrophenol.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true and reason is the correct explanation of assertion.
c) If assertion is true but reason is false d) If both assertion and reason are false.

322. The hybridizations of atomic orbitals of nitrogen in NO_2^+. NO_3^- and NH_4^+ respectively are :
a) sp, sp^3 and sp^2 b) sp^2, Sp^3 and sp c) sp, sp^2 and sp^3 d) sp^2, sp and sp^3

323. Which of the following molecules is formed by Sp^2 hybrid orbitals?
a) CH_4 b) CO_2 c) BF_3 d) BeF_2

324. Metallic lustre is explained by
a) diffusion of metal ions b) oscillation of loose electrons c) excitation of free protons
d) existence of bee lattice

325. In which of the following molecule/ ion all the bonds are not equal?
a) XeF_4 b) BF_4^- c) C_2H_4 d) SiF_4

326. A square planar complex is formed by hybridisation of which of the following atomic orbitals?
a) s, P_x, P_y, d_{yz} b) S, P_x, p_y, $d_{X^2-y^2}$ c) S, P_x, p_y, d_{z2} d) s, p_y, p_z, d_{xy}

327. H_2O has a net dipole moment while BeF_2 has zero dipole moment because :
a) H_2O molecule is linear while BeF_2 is bent b) BeF_2 molecule is linear while H_2O is bent
c) Fluorine has more electronegativity than oxygen d) Beryllium has more electronegativity than oxygen.

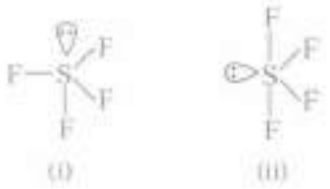
328. Which one of the following molecules will form a linear polymeric structure due to hydrogen bonding?
a) NH_3 b) H_2O c) HCl d) HF

329. Atomic orbitals of carbon in carbon dioxide are:
a) sp^2-hybridised b) Sp^3d-hybridised c) sp-hybridised d) Sp^3-hybridised

330. Which one of the following molecules contain both ionic and covalent bonds?
a) CH_2Cl_2 b) K_2SO_4 c) $BeCl_2$ d) SO_2

331. **Assertion:** O_2 molecule is diamagnetic while C_2 molecule is paramagnetic in nature.
Reason: Bond order of O_2 molecule is 1.5 and that of C_2 molecule is 2.5.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true and reason is the correct explanation of assertion.
c) If assertion is true but reason is false d) If both assertion and reason are false.

332. Which of the following shapes of SF_4 is more stable and why?



a) Both are equally stable due to 2 lp-bp repulsions b) Both are unstable since SF_4 has tetrahedral shape
c) (i), due to 3 lp-bp repulsions at 90°. d) (ii), due to 2 lp-bp repulsions.

333. Which one of the following has the highest dipole moment?
a) AsH_3 b) SbH_3 c) PH_3 d) NH_3

334. The high density of water compared to ice is due to
a) hydrogen bonding interactions b) dipole-dipole interactions c) dipole-induced dipole interactions
d) induced dipole-induced dipole interactions

335. Which has a giant covalent structure?
a) PbO_2 b) SiO_2 c) NaCl d) AlC_3

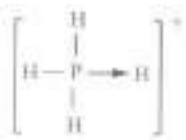
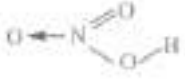
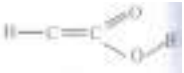
336. Which of the following when dissolved in water forms a solution which is non-conducting?
a) Chile salt petre b) Green vitrol c) Potash alum d) Alcohol

337. The high density of water compared to ice is due to
a) Hydrogen bonding interactions b) dipole-dipole interactions c) dipole-induced dipole interactions
d) Induced dipole-induced dipole interactions

338. Lattice energy of ionic compound depends upon:
a) packing of ions only b) charge and size of ions c) charge on ion only d) size of ions only

339. **Assertion:** The dipole moment in case of BeF2 is zero.
Reason: The two equal bond dipoles point in opposite directions and cancel the effect of each other.
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.

340. Which formulae does not correctly represents the bonding capacity of the atom involved?

a)  b)  c)  d) 

341. Which of the following molecule does not have a linear arrangement of atoms?
a) H_2S b) C_2H_2 c) BeH_2 d) CO_2

342. Which of the following is not isostructural with $SiCl_4$?
a) SCl_4 b) SO_4^{2-} c) PO_4^{3-} d) NH_4^+

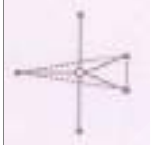
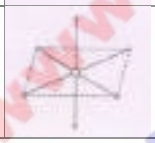
343. In which of the following pair both the species have sp^3 hybridisation?
a) H_2S, BF_3 b) SiF_4, BeH_2 c) NF_3, H_2O d) NF_3, BF_3

344. Which of the following statement is not correct for sigma and pi-bonds formed between two carbon atoms?
a) A sigma bond is stronger than a pi-bond. b) Bond energies of sigma and pi-bonds are of the same order.
c) Free rotation of atoms about a sigma bond is allowed but not in case of a pi-bond.
d)
Asigma bond determines the direction between carbon atoms, but a pi-bond has no primary effect in this regard.

345. **Assertion:** Ionic bonds are directional in nature whereas covalent bonds are non-directional.
Reason: According to orbital overlap concept, the formation of a covalent bond between two atoms results by pairing of electrons present in the valence shell having same spins.
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.

346. Considering the state of hybridisation of carbon atoms, find out the molecule among the following which is linear?
a) $CH_3 - CH = CH - CH_3$ b) $CH_3 - C \equiv C - CH_3$ c) $CH_2 = CH - CH_2 - C \equiv CH$
d) $CH_3 - CH_2 - CH_2 - CH_3$

347. Match the molecules given in column I with their shapes given in column II and mark the appropriate choice.

Column I (Molecule)		Column II(Shape)	
(A)	SF_6	(i)	
(B)	$SiCl_4$	(ii)	
(C)	AsF_5	(iii)	
(D)	BCl_3	(iv)	

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

348. In the formation of SF_6 molecule, the sulphur atom is in
a) first excited state b) second excited state c) third excited state d) fourth excited state

349. Hypervalent compound is
a) IF_7 b) NH_3 c) BeF_2 d) CH_4

350. The ground state electronic configuration of valence shell electrons in nitrogen molecule (N_2) is written as KK, $\sigma 2s^2$, $\sigma^* 2s^2$, $\pi 2p^2_x$ = $\pi 2p^2_y$ $\sigma 2p^2_z$ Bond order in nitrogen molecule is :
a) 0 b) 1 c) 2 d) 3