PHYSICS

1. A particle has an initial velocity of 9m/s due east and a constant acceleration of 2 m/s^2 due west. The distance covered by the particle in the fifth second of its motion is
   (1) 0
   (2) 0.5 m
   (3) 2 m
   (4) none of these

2. A bus starts from rest with an acceleration of 1m/s^2. A man who is 48 m behind the bus starts with a uniform velocity of 10 m/s. Then the minimum time after which the man will catch the bus
   (1) 4s (2) 10 s
   (3) 12 s (4) 8 s

3. A car accelerates from rest at a constant rate α for some time, after which it decelerates at a constant rate β and comes to rest. When total elapsed time is t, then the maximum velocity acquired by the car is :
   (1) $\frac{(\alpha^2+\beta^2)t}{\alpha\beta}$ (2) $\frac{(\alpha^2-\beta^2)t}{\alpha\beta}$
   (3) $\frac{(\alpha+\beta)t}{\alpha\beta}$ (4) $\frac{\alpha\beta t}{\alpha+\beta}$

4. A balloon starts rising from the ground with an acceleration of 1.25 m/s^2. After 8s, a stone is released from the balloon. The stone will
   (1) cover a distance of 40 m
   (2) have a displacement of 50 m
   (3) reach the ground in 4 s
   (4) begin to move down after being released

5. From the top of a tower, a stone is thrown up and it reaches the ground in time t_1. A second stone is thrown down with the same speed and reaches the ground in time t_2. A third stone released from rest and it reaches the ground in time t_3.
   (1) $t_3=\frac{1}{2}(t_1+t_2)$ (2) $t_3=\sqrt{t_1t_2}$
   (3) $\frac{1}{t_3}=\frac{1}{t_2}-\frac{1}{t_1}$ (4) $t_3^2=t_1^2-t_2^2$

6. A ball is dropped from a bridge 122.5 m high. After the first ball has fallen for 2s, a second ball is thrown straight down after it, what must the initial velocity of the second ball be, so that both the balls hit the surface on water at the same time?
   (1) 26.1 m/s
   (2) 9.8 m/s
   (3) 55.5 m/s
   (4) 49 m/s

7. A elevator car whose floor to ceiling distance is 2.7 m starts ascending with a constant acceleration of 1.2 m/s^2, 2s after the start a bolt falls from the ceiling of the car. The free fall time of the bolt is: (g = 9.8 m/s^2)
   (1) $\sqrt{\frac{2.7}{9.8}}s$ (2) $\sqrt{\frac{5.4}{9.8}}s$
   (3) $\sqrt{\frac{5.4}{8.6}}s$ (4) $\sqrt{\frac{5.4}{11}}s$

8. A very large number of balls are thrown vertically upwards in quick secessions is such a way that the next ball is thrown when the previous one is at the maximum height. If the maximum height is 5m. The number of balls thrown per minute is: (Take $g=10m/s^2$)
   (1) 80 (2) 120
   (3) 40 (4) 60

9. If the first one -third of a journey is travelled at 20 km/h , next one third at 40 km/h and the last one - third at 60 km/h. The average speed of whole journey will be
   (1) 32.7 km/h
   (2) 35 km/h
   (3) 40 km/h
   (4) 45 km/h

10. If the displacement of the particle varies with time as $\sqrt{x}=t+7$, the :
    (1) velocity of the particle is inversely proportional to t
    (2) velocity of the particle linearly depends on t
    (3) velocity of the particle is proportional to $\sqrt{t}$
    (4) particle moves with a variable acceleration.

11. The relation between time t and distance x is $t = \alpha x^2 + \beta x$ where α and β are constants. The retardation is

(1) $2\alpha V^3$

(2) $2\beta V^3$

(3) $2\alpha\beta V^3$ (4) $2\beta^2 V^3$

12. A person walking at the rate of 3km/hr, the rain appears to fall vertically when he increase his speed 6 km/hr it appears to meet him at angle of 45° with vertical. The speed of the rain is :

(1) $3\sqrt{2}$ km/hr (2) $\frac{3}{\sqrt{2}}$ km/hr

(3) $6\sqrt{2}$ km/hr (4) $2\sqrt{3}$ km/hr

13. The displacement time graph of a particle at time t makes angle 45° with the time axis. After one second, it makes angle 60° with the time axis. What is the average acceleration of the particle

(1) $\sqrt{3}-1$ (2) $\sqrt{3}+1$

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

14. Two particles of same mass are projected from same place with same velocity u, such that their ranges are same. If h_1 and h_2 are the maximum heights attained by them then the relation between h_1, h_2 and R will be

(1) $R^2 = \frac{h_1^2}{h_2^2}$ (2) $R^2 = \frac{h_1}{h_2}$

(3) $R^2 = h_1 h_2$ (4) $R^2 = 16 h_1 h_2$

15. A bomber plane is moving horizontally with a speed of 500 m/s and a bomb released from it, strikes the ground in 10s. Angle from horizontal at which the bomb strikes the ground is : (g = 10 m/s^2)

(1) $\tan^{-1}(1)$ (2) $\tan^{-1}(5)$

(3) $\tan^{-1}(1/5)$ (4) $\sin^{-1}\left(\frac{1}{5}\right)$

16. A particle is released from a certain height $H = 400$m. Due to the wind the particle gathers the horizontal velocity component $v_x = ay$ where $a = \sqrt{5}s^{-1}$ and y is the vertical displacement of the particle from point of release, then the horizontal drift of the particle when it strikes the ground is

(1) 2.67 km (2) 8.67 km

(3) 1.67 km (4) 5.1 km

17. Two balls are projected from the same point in directions inclined at 60° and 30° to the horizontal. If they attain the same maximum height what is the ratio of their velocities of projection?

(1) $1:\sqrt{3}$

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

(3) 1 : 1

(4) 1 : 2

18. A particle P is at the origin starts with velocity $\vec{u} = \left(2\hat{i} - 4\hat{j}\right)$ m/s with constant acceleration $\left(3\hat{i} + 5\hat{j}\right)$m/s^2. After travelling for 2 second, its distance from the origin is

(1) 10 m (2) 10.2 m

(3) 9.8 m (4) 11.7 m

19. If $x = a(\cos\theta + \theta\sin\theta)$ and $y = a(\sin\theta - \theta\cos\theta)$ and θ increases at uniform rate ω. The velocity of particle is

(1) $a\omega$ (2) $\frac{a^2\theta}{\omega}$

(3) $\frac{a\theta}{\omega}$ (4) $a\theta\omega$

20. A body is projected with velocity u at an angle of projection θ with the horizontal. The body makes 30° with the horizontal at $t = 2$ second and then after 1 second it reaches the maximum height. Then

(1) $\theta = 45°$

(2) $\theta = 60°$

(3) 37° (4) 75°

21. A particle is projected from the ground with an initial speed u at an angle θ with horizontal. The average velocity of the particle between its point of projection and highest point of trajectory is

(1) $u\cos\theta$ (2) $\frac{u}{2}\sqrt{1+\cos^2\theta}$

(3) $\frac{u}{2}\sqrt{1+2\cos^2\theta}$ (4) $\frac{u}{2}\sqrt{1+3\cos^2\theta}$

22. At the highest point of a projectile its velocity and acceleration are at an angle of :

(1) 180° (2) 90°

(3) 60° (4) 45°

23. The height y and the distance x along the horizontal plane of a projectile on a certain planet (with no surrounding atmosphere) are given by $y = \left(8t - 5t^2\right)$ meter and $x = 6t$ meter where t is in seconds. The velocity of projection is

(1) 8 m/s

(2) 6 m/s

(3) 10 m/s

(4) not obtained from the data

24. A cart is moving horizontally along a straight line with constant speed 30 m/s. A projectile is to fired from the moving cart in such a way that it will return to the cart after the cart has moved 80m. At what speed (relative to the cart) must the projectile be fired? (g = 10 m/s^2)

(1) 10 m/s (2) $10\sqrt{8}$ m/s

(3) $\frac{40}{3}$ m/s (4) none of these

25 For a given velocity, a projectile has the same range R for two angles of projection . If t_1 & t_2 are the time of flight in the two cases, then :

(1) $t_1 t_2 \propto R$ (2) $t_1 t_2 \propto R^2$

(3) $t_1 t_2 \propto \frac{1}{R^2}$ (4) $t_1 t_2 \propto \frac{1}{R}$

26. The maximum range of a gun on horizontal terrains is 1.0 km. If g = 10 m/s^2, what must be the muzzle velocity of the shell?

(1) 400 m/s (2) 200 m/s

(3) 100 m/s (4) 50 m/s

27. If maximum height and range of a projectile are same. What is the angle of projection?

(1) 30° (2) $\tan^{-1}(4)$

(3) $\tan^{-1}(2)$ (4) 60°

28. The maximum height attained by a projectile is increased by 10% by increasing its speed of projection, without changing the angle of projection. The percentage increase in the horizontal range will be

(1) 20% (2) 15%

(3) 10% (4) 5%

29. A projectile is fired from level ground at an angle θ above the horizontal. The elevation angle ϕ of the highest point as seen from the launch point is related to θ by the relation.

(1) $\tan\phi = \frac{1}{4}\tan\theta$ (2) $\tan\phi = \tan\theta$

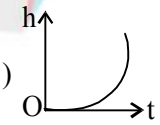
(3) $\tan\phi = \frac{1}{2}\tan\theta$ (4) $\tan\phi = 2\tan\theta$

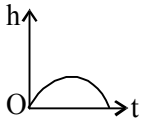
30. The equation of a projectile is $y = \sqrt{3}x - \frac{1}{2}gx^2$. The velocity of projectile is :

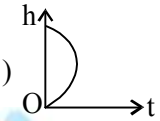
(1) 1 m/s (2) 2 m/s

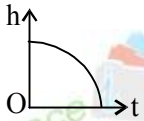
(3) 3 m/s (4) 1.2 m/s

31. Which of the following is the altitude time graph for a projectile thrown horizontally from the top of the tower?

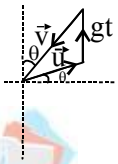
(1) 

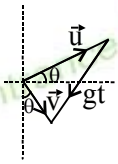
(2) 

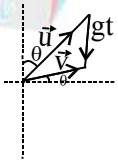
(3) 

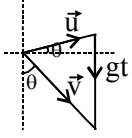
(4) 

32. A particle is moving as a projectile on a parabolic path. At a certain instant of time, its velocity is u making angle θ with the horizontal . After an interval of time t from this instant, its velocity is v making the angle θ with the downward vertical. Which of this following vector triangles correctly depicts the relation between the vectors $\vec{u}$ and $\vec{v}$?

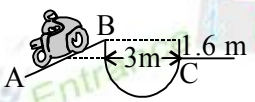
(1) 

(2) 

(3) 

(4) 

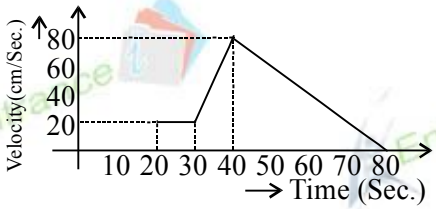
33. Calculate the minimum speed with which a motorcycle stunt driver must leave the 30° ramp at B in order to clear the ditch shown in the figure



(1) 5.63 m/s (2) 6.53 m/s

(3) 4.20 m/s (4) 8.63 m/s

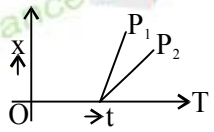
34. The v-t graph of a moving object is given in figure. The maximum acceleration is



(1) 1 cm/sec^2 (2) 2 cm/sec^2

(3) 3 cm/sec^2 (4) 6 cm/sec^2

35. Figure shows two displacement - time graphs of particles P_1 and P_2. Their relative velocity :



(1) is zero

(2) is non zero but constant

(3) continuously decreases

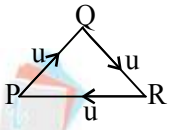
(4) continuously increases

36. A projectile is thrown in the upward direction making an angle of 60° with the horizontal direction with a velocity of 147 ms^{-1}. Then the time after which its inclination with the horizontal is 45°, is :

(1) 15 s (2) 10.90 s

(3) 5.49 s (4) 2.745 s

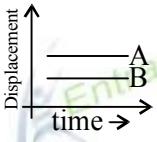
37. Three persons *P, Q* and *R* of same mass travel with same speed *u* along an equilateral triangle of side '*d*' such that each one faces the other always. After how much time will they meet each other :

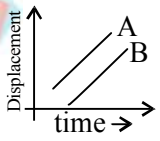


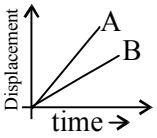
(1) d/u seconds (2) $2d/3u$ seconds

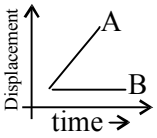
(3) $2d/\sqrt{(3)}u$ seconds (4) $d/\sqrt{(3)}u$ seconds

38. Which one of the following represents the time-displacement graph of two objects *A* and *B* moving with zero relative speed :

(1) 

(2) 

(3) 

(4) 

39. A river is flowing from west to east at a speed of 8m/min. A man on the south bank of the river, capable of swimming at 20 m/min in still water, wants to swim across the river in the shortest time. He should swim in a direction

(1) due north

(2) 30° east of north

(3) 30° west of north

(4) 60° east of north

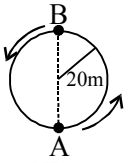
40. A man standing on a road has to hold his umbrella at 30° with the vertical to keep the rain away. He throws the umbrella and starts running at 10 km/h. He find that rain drops are hitting his head vertically. What is the speed of rain with respect to ground?

(1) $10\sqrt{3}$ km/h

(2) 20 km/h

(3) $\frac{20}{\sqrt{3}}$ km/h (4) $\frac{10}{\sqrt{3}}$ km/h

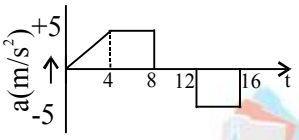
41. A boy is running over a circular track with uniform speed of 10 m/s. Find the average velocity for movement of boy from *A* to *B*. (in m/s)



(1) $\frac{10}{\pi}$ (2) $\frac{40}{\pi}$

(3) 10 (4) none of the above

42. The acceleration of a train between two stations is shown in the figure. The maximum speed of the train is :



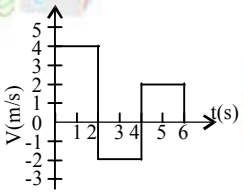
(1) 60 m/s

(2) 30 m/s

(3) 120 m/s

(4) 90 m/s

43. The velocity-time graph of a body moving in a straight line is shown in the figure. The displacement and distance travelled by the body in 6s are respectively :



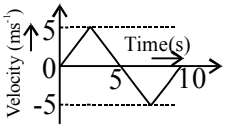
(1) 8m, 16m

(2) 16m, 32m

(3) 16m, 16m

(4) 8m, 18 m

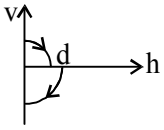
44. The v-t plot of a moving object is shown in the figure. The average velocity of the object during the first 10 s is :

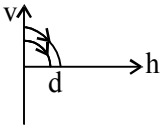


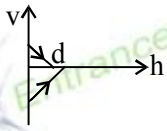
(1) zero (2) 2.5 ms^{-1}

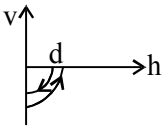
(3) 5 ms^{-1} (4) 2 ms^{-1}

45. A ball is dropped vertically from a height of *d* above the ground. It hits the ground and bounces up vertically to a height $\frac{d}{2}$. Neglecting subsequent motion and air resistance, its velocity *v* varies with the height *h* above the ground is :

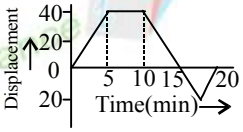
(1) 

(2) 

(3) 

(4) 

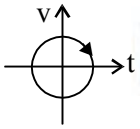
46. A boy begins to walk eastward along a street in front of his house and the graph of his displacement from home is shown in the figure. His average speed for the whole time interval is equal to :

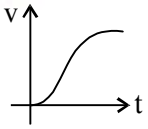


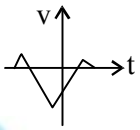
(1) 8 m/min (2) 6 m/min

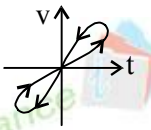
(3) $\frac{8}{3}$ m/min (4) 2 m/min

47. Lock at the graphs (1) to (4) carefully and indicate which of these possibly represents one dimensional motion of a particle?

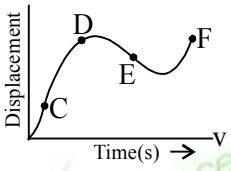
(1) 

(2) 

(3) 

(4) 

48. The displacement - time graph of a moving particle is shown in figure. The instantaneous velocity of the particle is negative at the point :



(1) C (2) D

(3) E (4) F

49. A man goes at the top of a smooth inclined plane. He releases a bag to fall freely and he himself slides on inclined plane to reach the bottom. If v_1 and v_2 are the velocities of the man and bag respectively, then :

(1) $v_1 > v_2$

(2) $v_1 < v_2$

(3) $v_1 = v_2$

(4) v_1 and v_2 cannot be compared

50. A ball is projected upwards from the top of tower with a velocity 50 ms^{-1} making an angle 30° with the horizontal. The height of tower is 70 m. After how many seconds from the instant of throwing will the ball reach the ground?

(1) 2s

(2) 5 s

(3) 7 s

(4) 9 s

CHEMISTRY

51. An electron is present in 4f subshell. The possible values of azimuthal quantum number for this electron are
(1) 0, 1, 2, 3 (2) 1, 2, 3, 4
(3) 3 (4) 4

52. How many of electrons in an atom can have $n=3, l=2$ and $m=+2$?
(1) 10 (2) 8
(3) 6 (4) 2

53. The minimum value of n for which g-subshell is possible is
(1) 6 (2) 5
(3) 4 (4) 3

54. The total number of electrons in a subshell designated by azimuthal quantum number *l*, is given as
(1) $2l+1$ (2) l^2
(3) $4l+2$ (4) $2l+2$

55. The maximum number of electrons that can be accommodated in 5f subshell is
(1) 10 (2) 14
(3) 6 (4) 2

56. For 'f' electron, the orbital angular momentum is
(1) $\sqrt{2}\hbar$ (2) $\sqrt{3}\hbar$
(3) $\sqrt{12}\hbar$ (4) $2\hbar$

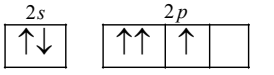
57. An electron has spin quantum number, $s=+\frac{1}{2}$ and magnetic quantum number, $m=+1$. It cannot be present in
(1) *s* - orbital (2) *p* - orbital
(3) *d*-orbital (4) *f*-orbital

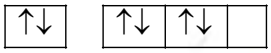
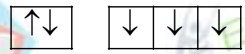
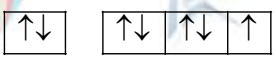
58. Which of the following has non-spherical shell of electron?
(1) He (2) B
(3) Be (4) Li

59. Which of the following orbitals has/have two lobes along x-axis and y-axis?
(1) d_{xy} (2) d_{yz}
(3) $d_{x^2-y^2}$ (4) All of these

60. The Group no. and period number of element having atomic number 78 is
(1) 10, 7th (2) 9, 6th
(3) 12, 7th (4) 10, 5th

61. In chromium atom, in ground state, the number of occupied orbitals is
(1) 14 (2) 15
(3) 7 (4) 12

62. The orbital diagram in which both Pauli's exclusion principle and Hund's rule are violated is
(1) 

(2) 
(3) 
(4) 

63. Which of the following ions has the maximum value of magnetic moment?
(1) Cu^+ (2) Cu^{2+}
(3) Fe^{2+} (4) Fe^{3+}

64. Electronic configurations of four metals are given below. Which of these would be most paramagnetic?
(1) $1s^2, 2s^2, 2p^6, 3s^2 3p^6$ (2) $1s^2, 2s^2, 2p^6, 3s^2$
(3) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^2$
(4) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^2, 4s^2$

65. The maximum kinetic energy of the photoelectrons is found to be 6.63×10^{-19} J when the metal is irradiated with a radiation of frequency $3\times10^{15}\,Hz$. The threshold frequency of the metal is
(1) 1×10^{15} Hz (2) 3×10^{15} Hz
(3) 2×10^{16} Hz (4) 2×10^{15} Hz

66. If kinetic energy of a proton is increased nine times the wavelength of the de-Broglie wave associated with it would become
(1) 3 times (2) 9 times
(3) $\frac{1}{3}$ times (4) $\frac{1}{9}$ times

67. The number of electrons having $l=0$ in chlorine atom (Z = 17) is
(1) 2 (2) 4
(3) 6 (4) 5

68. Which of the following sets of quantum numbers represents an impossible arrangement?

	n	*l*	*m*	*s*
(1)	4	0	0	$+\frac{1}{2}$
(2)	3	2	- 2	$+\frac{1}{2}$
(3)	3	2	- 3	$+\frac{1}{2}$
(4)	5	3	0	$+\frac{1}{2}$

69. The number of d-electrons in Fe^{+2} (At. no. of Fe = 26) is not equal to that of the
(1) p - electrons in Ne (At. no. = 10)
(2) s-electrons in Mg (At. no. = 12)
(3) d-electrons in Fe
(4) p-electrons in Cl^- (At. no. of Cl = 17)

70. The probability of finding an electron residing in a p_x orbital is zero in the
(1) XY plane (2) YZ plane
(3) Y direction (4) Z direction

71. For which one of the following sets of four quantum numbers, an electron will have the highest energy?
(1) $n=3, l=2, m=1, s=1/2$
(2) $n=4, l=2, m=-1, s=1/2$
(3) $n=4, l=1, m=0, s=-1/2$
(4) $n=5, l=0, m=0, s=-1/2$

72. The configuration of X is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^3$. Its properties are similar to
(1) Boron (2) Oxygen
(3) Nitrogen (4) Chlorine

73. The values of quantum numbers *n, l* and *m* for the fifth electron of boron is
(1) $n=2, l=1, m=-1$ (2) $n=2, l=0, m=-1$
(3) $n=2, l=2, m=-1$ (4) $n=1, l=2, m=-1$

74. The 19th electron of chromium has which of the following sets of quantum numbers?

	n	*l*	*m*	*s*
(1)	3	0	0	$+\frac{1}{2}$
(2)	3	2	-2	$+\frac{1}{2}$
(3)	4	0	0	$+\frac{1}{2}$
(4)	4	1	-1	$+\frac{1}{2}$

75. Which of the following orbital can absorb energy only but not emit ?
(1) $1s$ (2) $2p$
(3) $3d$ (4) $4f$

76. Which one of the following pairs of ions have the same electronic configuration?
(1) Cr^{3+}, Fe^{3+} (2) Fe^{3+}, Mn^{2+}
(3) Fe^{3+}, Co^{3+} (4) Sc^{3+}, Cr^{3+}

77. The correct order of increasing energy of atomic orbitals is
(1) $5p < 4f < 6s < 5d$ (2) $5p < 6s < 4f < 5d$
(3) $4f < 5p < 5d < 6s$ (4) $5p < 5d < 4f < 6s$

78. Consider the ground state of Cr atom (Z = 24). The numbers of electrons with the azimuthal quantum numbers, $l = 1$ and 2 are, respectively:
(1) 12 and 4 (2) 12 and 5
(3) 16 and 4 (4) 16 and 5

79. Which of the following statements in relation to the hydrogen atom is correct?
(1) 3s, 3p and 3d orbital all have the same energy
(2) 3s and 3p orbitals are of lower energy than 3d orbitals
(3) 3p orbital is lower in energy than 3d orbital
(4) 3s orbital is lower in energy than 3p orbital

80. The correct representation of Heisenberg uncertainity principle is
(1) $\Delta E.\Delta t. \geq \frac{h}{4\pi m}$ (2) $\Delta P.\Delta x. \geq \frac{h}{4\pi m}$
(3) $\Delta E.\Delta t. \geq \frac{h}{4\pi}$ (4) $\Delta x.\Delta v. \geq \frac{h}{4\pi}$

81. Electrons will first enter into the orbital with the set of quantum numbers
(1) $n=5, l=0$ (2) $n=4, l=1$
(3) $n=3, l=2$ (4) any of these

82. An electron is moving in Bohr's fourth orbit. Its de Broglie wavelength is λ. What is the circumference of the fourth orbit?
(1) $\frac{2}{\lambda}$ (2) 2λ
(3) 4λ (4) $\frac{4}{\lambda}$

83. Electronic configuration of deuterium atom is
(1) $1s^1$ (2) $2s^2$
(3) $2s^1$ (4) $1s^2$

84. Which of the following correctly representes schrodinger wave equation ?

(1) $\frac{\partial^2\Psi}{\partial x^2}+\frac{\partial^2\Psi}{\partial y^2}+\frac{\partial^2\Psi}{\partial z^2}+\frac{8\pi^2 m}{h^2}(E-V)\Psi=0$

(2) $\frac{\partial^2\Psi^2}{\partial x^2}+\frac{\partial^2\Psi^2}{\partial y^2}+\frac{\partial^2\Psi^2}{\partial z^2}+\frac{8\pi^2 m}{h^2}(E+V)\Psi=0$

(3) $\frac{\partial^2\Psi}{\partial x^2}+\frac{\partial^2\Psi}{\partial y^2}+\frac{\partial^2\Psi}{\partial z^2}=\frac{8\pi^2 m}{h^2}(E-V)\Psi$

(4) $mvr=\frac{nh}{2\pi}$

85. Uncertainty in the position of an electron (mass $=9.1\times10^{31}$ kg) moving with a velocity $300\,ms^{-1}$, accurate upto 0.001%, will be ($h=6.63\times10^{-34}$ Js)

(1) 19.2×10^{-2} m (2) 5.76×10^{-2} m

(3) 1.92×10^{-2} m (4) 3.84×10^{-2} m

86. Significance of $1\Psi^2 1$ is

(1) Probability density of finding of e^-
(2) Probability of finding neutrons in nucleus
(3) Angular wave function
(4) Radial wave function

87. The electrons identified by quantum numbers n and 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, as

(1) (iv) < (ii) < (iii) < (i)
(2) (ii) < (iv) < (i) < (iii)
(3) (i) < (iii) < (ii) < (iv)
(4) (iii) < (i) < (iv) < (ii)

88. If the nitrogen atom had electronic configuration $1s^7$ it would have energy lower than that of the normal ground state configuration $1s^2 2s^2 2p^3$, because the electrons would be closer to the nucleus. Yet $1s^7$ is not observed. It violates

(1) Heisenberg's uncertainty principle
(2) Hund's rule
(3) Pauli's exclusion principle
(4) Bohr postulate of stationary orbits

89. The number of radial nodes in 3s and 2p respectively are:

(1) 2 and 0 (2) 1 and 2
(3) 0 and 2 (4) 2 and 1

90. The subshell with $n=6$ and $l=4$ can accommodate a maximum of

(1) 18 electrons (2) 16 electrons
(3) 14 electrons (4) 10 electrons

91. The angular part of wave function depends on quantum number(s)

(1) n and l (2) l and m
(3) n only (4) n, l and m

92. Which of the following is expected to be paramagnetic?

(1) Sc^{3+} (2) Zn^{2+}
(3) Ti^{4+} (4) Cu^{2+}

93. The quantum number not obtained from the Schrodinger wave equation is

(1) n (2) l
(3) m (4) s

94. The radial part of wave function depends on quantum number(s)

(1) n only (2) l only
(3) n and l (4) l and m

95. The magnetic moment of M^{x+} (Atomic number of M = 25) is $\sqrt{15}BM$. The number of unpaired electrons and the value of x respectively are

(1) 4, 3 (2) 3, 4
(3) 3, 2 (4) 5, 2

96. Which of the following has five unpaired electrons?

(1) Cr^{3+} (2) Fe^{2+}
(3) Co^{2+} (4) Fe^{3+}

97. An atom has 2K, 8L and 5M electrons. The number of occupied subshells in the atom in ground state is

(1) 3 (2) 5
(3) 7 (4) 9

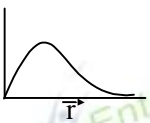
98. The ratio of magnetic moments of Fe^{3+} and Co^{2+} is

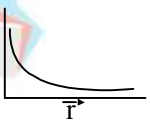
(1) $\sqrt{7}:\sqrt{3}$ (2) 2 : 3
(3) 3 : 2 (4) $\sqrt{3}:\sqrt{7}$

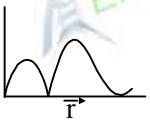
99. The orbital of next higher energy than that of np orbital is

(1) $(n+1)p$ (2) $(n+1)s$
(3) $(n+1)d$ (4) nd

100. Which of the following graphs represents the radial charge density of 3d-electron?

(1) 

(2) 

(3) 

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