Chemistry

Chapterwise Practise Problems (CPP) for JEE (Main & Advanced)

Chapter - Structure of Atom

Level-1

SECTION - A

Straight Objective Type

This section contains multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

1. Which of the following statement is incorrect?

   (A) All substances have magnetic properties

   (B) There are substances in which all electron are paired

   (C) There are substances in which one or more electrons are unpaired

   (D) The greater the number of unpaired electrons, the lesser the paramagnetism per mole of substance

2. If λ_0 is the threshold wavelength for photoelectric emission, λ the wavelength of light falling on the surface of a metal and m the mass of electron then the velocity of ejected electrons is given by

   (A) $\left[\frac{2h}{m}(\lambda_0-\lambda)\right]^{1/2}$ (B) $\left[\frac{2hc}{m}(\lambda_0-\lambda)\right]^{1/2}$

   (C) $\left[\frac{2hc}{m}\left(\frac{\lambda_0-\lambda}{\lambda_0\lambda}\right)\right]^{1/2}$ (D) $\left[\frac{2h}{m}\left(\frac{1}{\lambda_0}-\frac{1}{\lambda}\right)\right]^{1/2}$

3. The wavelength of K_α -characteristic X-rays produced is λ, when cathode rays strike on a metal of atomic number Z. What should be the atomic number of metal such that it can produce the K_α -characteristic X-rays of wavelength 4λ ?

   (A) $\frac{Z}{16}$ (B) $\frac{Z}{2}$

   (C) $\frac{Z+1}{2}$ (D) 2Z – 1

4. If the mass of electron is doubled, the radius of first orbit of H-atom become about

   (A) 0.529 Å (B) 0.265 Å

   (C) 1.058 Å (D) 0.32 Å

5. Which of the following transition in He^+ ion emits light of wavelength equal to the longest wavelength emitted in the Paschen series of H-atom ?

   (A) $9 \rightarrow 6$ (B) $8 \rightarrow 6$

   (C) $8 \rightarrow 4$ (D) $6 \rightarrow 3$

6. The angular momentum of electron revolving round nucleus of H-atom is directly proportional to

   (A) n^2 (B) n

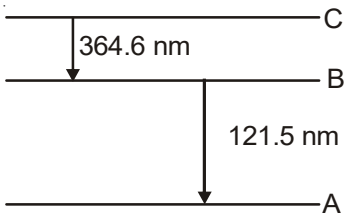
   (C) n^{-2} (D) n^{-1}

7. An excited hydrogen atom emits a photon of wavelength λ in returning to the ground state. If R is the Rydberg's constant, then the quantum number n of the excited state is

   (A) $\sqrt{\lambda R}$ (B) $\sqrt{\lambda R-1}$

   (C) $\sqrt{\frac{\lambda R}{\lambda R-1}}$ (D) $\sqrt{\lambda R(\lambda R-1)}$

8. Three energy states of a hydrogen like atom are shown in the figure. The transition from C to B yields a photon of wavelength 364.6 nm and the transition from B to A yields a photon of wavelength 121.5 nm. Then the transition from C to A will yield a photon of wavelength.



   (A) 91.2 nm (B) 243.1 nm

   (C) 486.1 nm (D) None of these

9. The radial wave function of 1s-orbital for H-atom is given as, $\psi = \frac{1}{\sqrt{\pi}}\left(\frac{1}{a_0}\right)^{3/2} e^{-r/a_0}$, where a_0 = Bohr radius. The probability of finding the electrons at a distance r from the nucleus is given by

(A) $\psi = \psi^2 dr$ (B) $\int \psi^2 4\pi r^2 dr$

(C) $\psi^2 4\pi r^2\, dr$ (D) $\psi \bullet dV$

10. If uncertainty in position of electron and its velocity are equal, then what is the uncertainty in its momentum?

(A) $\sqrt{\frac{hm}{4\pi}}$ (B) $\sqrt{\frac{hm}{2\pi}}$

(C) $\sqrt{\frac{hm}{\pi}}$ (D) $\sqrt{hm}$

11. For a H-atom system, the energy of principal energy level is given by $\frac{Rhc}{16}$, Calculate number of orbitals present at the given level [R $\rightarrow$ Rydberg constant)

(A) 4 (B) 3

(C) 9 (D) 16

12. An excited atom having atomic number 'Z' emits a photon of wavelength 'λ' while returning to the ground state (I^{st} shell). The value of n of the excited state is given by (R = Rydberg constant)

(A) $\sqrt{R\lambda Z\left(R\lambda Z - 1\right)}$ (B) $\sqrt{\frac{R\lambda Z^2}{R\lambda Z^2 - 1}}$

(C) $\sqrt{\frac{R\lambda Z^2 - 1}{R\lambda Z^2}}$ (D) $\frac{1}{\sqrt{R\lambda Z^2\left(R\lambda Z^2 - 1\right)}}$

13. The first emission line of Balmer series for H spectrum has the wave number equal to

(A) $\frac{9R_H}{400}$ (B) $\frac{7R_H}{144}$

(C) $\frac{3R_H}{4}$ (D) $\frac{5R_H}{36}$

14. Find the incorrect sentence

(A) The angular wave function for p_x orbital becomes zero at all points on the YZ plane

(B) Radial function for 2s orbital rapidly decays as compared to 1s-orbital with distance r

(C) A node is a surface where the wave function passes through zero as it changes sign

(D) Radial probability and radial distribution functions are different things

SECTION - B

Multiple Correct Answer Type

This section contains multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE** is/are correct.

15. If electron in H-atom is replaced by another hypothetical micro-particle say -which is 200 times heavier than electron, the wavelength $\left(\frac{1}{\bar{\nu}}\right)$ of the 2^{nd} line of Lyman series of H-atom will be (assume nucleus to be stationary)

(A) $\frac{9}{1600R_H}$ (B) $\frac{9}{8R_H}$

(C) $\frac{1}{150R_H}$ (D) $\frac{4}{3R_H}$

16. If proton in the nucleus of hydrogen atom is replaced by positron ($_{+1}e^0$) having the charge of proton but mass that of electron, the wave number of the lowest energy transition in the Lyman series of the above designated H-atom considering the nuclear motion will be equal to

(A) $\frac{3}{4}R_H$ (B) $\frac{3}{8}R_H$

(C) $\frac{R_H}{2}$ (D) $\frac{3}{2}R_H$

17. Due to inter electronic repulsion, an electron experiences less nuclear charge. It is, therefore, said that inner shell electrons shield the nucleus. The actual nuclear charge experienced by an electron is called effective nuclear charge. If the electrons in K-shell shields the nucleus to the extent of 0.5 (say) each. What will be the wave number of the spectral line arising out of n = 4 to n = 2 transition in Li atom?

(A) $\frac{3}{4}R_H$ (B) $\frac{3}{8}R_H$

(C) $\frac{R_H}{4}$ (D) $8R_H$

18. The orbital angular momentum of an electron (l = 1) makes an angle of 45° from Z -axis. The L_z of electron will be

(A) $2\left(\frac{h}{2\pi}\right)$ (B) $0\left(\frac{h}{2\pi}\right)$

(C) $\left(\frac{h}{2\pi}\right)$ (D) $3\left(\frac{h}{2\pi}\right)$

19. An electron has an orbital angular momentum equal to $\sqrt{6}\frac{h}{2\pi}$. How many Z-components are possible for this electron ?

(A) One (B) Three

(C) Four (D) Five

20. What is the potential energy of an electron present in Ist shell of hydrogen species?

(A) $\frac{-e^2}{4\pi\varepsilon_0 r}$ (B) $-2R_H hc$

(C) $\frac{-e^2}{8\pi\varepsilon_0 r}$ (D) +13.6 eV

21. Which of the following is / are correct?

(A) The orbital angular momentum for a p–electron is $\frac{h}{\sqrt{2}\pi}$

(B) Number of e^- in a shell with principal quantum no 'n' is $3n^2$

(C) Possible set of quantum no. for last unpaired e^- of F atom is $\left\{2,1,0,+\frac{1}{2}\right\}$

(D) The ratio of energy of e^- in first Bohr orbit of H–atom to that in the first excited state of Be^{3+} is 1 : 4.

22. Find correct sentence(s)

(A) High resolving power instruments show that the apparent single line of spectrum consists of many fine lines

(B) –ve energy of electron shows that the electron is actually bound to the nucleus by this amount

(C) The reference potential energy of an electron is arbitrarily chosen

(D) The kinetic energy of electron is by virtue of its motion

SECTION - C

Linked Comprehension Type

This section contains paragraphs. Based upon this paragraph, some multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE THAN ONE** is/are correct.

Paragraph for Question Nos. 23 and 24

It is impossible to determine simultaneously the position and velocity of small microscopic particles like, electron, proton or neutron and accurately. This is called Heisenberg's uncertainty principle. Mathematically it is represented as $\Delta x.\Delta p \geq \frac{h}{4\pi}$ [Δx is uncertainty in position, Δp is uncertainty in momentum.]

23. If uncertainty in the measurement of position and momentum for a particle of mass (m) are equal then the minimum uncertainty in the measurement of its velocity is:

(A) $\frac{\sqrt{h}}{2m\sqrt{\pi}}$ (B) $\frac{h}{4\pi m}$

(C) $\sqrt{\frac{h}{2\pi m}}$ (D) $\sqrt{\frac{h}{4\pi m}}$

24. If a 1.0 g body is travelling along X-axis at 100 cm s^{-1} with an uncertainty in velocity as 2 cms^{-1}. The minimum uncertainty in its position is

(A) 2.64×10^{-30} m (B) 2.64×10^{-28} m

(C) 1.30×10^{-30} m (D) 0.66×10^{-28} m

SECTION-D

Matrix-Match Type

This **Section D** have "match the following" type question. Question contains two columns, **Col-I** and **Col-II**. Match the entries in **Col-I** with the entries in **Col-II**. One or more entries in **Col-I** may match with one or more entries in **Col-II**.

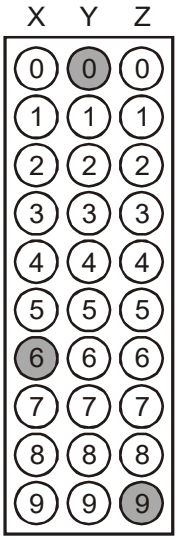
25.

Column - I	**Column - II**
(A) Orbital angular momentum $=\sqrt{2}\frac{h}{2\pi}$	(p) d-orbital.
(B) $mvr=\frac{nh}{2\pi}$, n=1, 2,3.....	(q) Classical analogue of angular momentum.
(C) Orbital with five fold degeneracy	(r) p-orbital.
(D) N-shell	(s) Number of waves made by electron is 4.

SECTION-E

Integer Answer Type

This section contains Integer type questions. The answer to each of the questions is a single digit integer, ranging from 0 to 9. The appropriate bubbles below the respective question numbers in the ORS have to be darkened. For example, if the correct answers to question numbers X, Y and Z(say) are 6, 0 and 9, respectively, then the correct darkening of bubbles will look like the following :



26. Which electronic transition in Balmer series of hydrogen atom has same frequency as that of n = 6 to n = 4 transition in He^+ ?

27. If an electron is revolving round the hydrogen nucleus at a distance of 2.111Å. It's speed is 1.09×10^x m/s. The value of x is

28. The de-Broglie wavelength for an electron in the inner most orbit of the hydrogen atom is 3.34×10^{-x} cm. The value of 'x' is

29. The maximum velocity of photoelectron liberated by electromagnetic radiations of wavelength 18 nm from stationary He^+ in its ground state is 2.3×10^x m/sec. The value of x is

30. A beam of electron accelerated with 4.64V is passed through a tube containing mercury vapours. As a result of adsorption, electronic changes occured with mercury atoms and light was emitted. If the full energy of single electron was converted into light, the wave number of emitted light is 3.75×10^x cm^{-1}. The value of x is

31. In a sample of 4 atoms, each having electron in the fourth energy level on returning to ground state can emit the maximum number of spectral lines _____.

❑ ❑ ❑

SECTION - A

Straight Objective Type

This section contains multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

1. Ionization potential of hydrogen atom is 13.6 eV. If hydrogen atom in its ground state is excited by monochromatic light of energy 12.1 eV then the different spectral lines emitted according to Bohr's theory will be :

   (A) One (B) Two

   (C) Three (D) Four

2. An electron in a hydrogen atom in its ground state absorbs 1.50 times as much energy as the minimum required for its escape from the atom. What is the wavelength of the emitted electron?

   (A) $4.70\,\mathring{A}$ (B) 4.70 nm

   (C) $9.4\,\mathring{A}$ (D) 9.40 nm

3. The binding energy for the third electron in the ground state of Li-atom should be

   (A) 108. eV (B) 122.4 eV

   (C) 30.6 eV (D) 27.2 eV

4. As the orbit number increases, the distance between two consecutive orbits (r_1 = radius of first orbit)

   (A) increases by $2r_1$

   (B) increases by $(2n - 1)r_1$, where n is lower orbit number

   (C) increases by $(2n - 1)r_1$, where n is higher orbit number

   (D) remain constant

5. Suppose that in any Bohr atom or ion, orbits are only in even numbers like 2, 4, 6 ..... The maximum wavelength of radiation emitted in the visible region of H-spectrum should be

   (A) $\frac{4}{R}$ (B) $\frac{R}{4}$

   (C) $\frac{36}{5R}$ (D) $\frac{16}{3R}$

6. Which of the following expressions represents the spectrum of Balmer series (if n is the principle quantum number of higher energy level) ?

   (A) $\bar{v} = \frac{R(n-1)(n+1)}{n^2} cm^{-1}v$

   (B) $\bar{v} = \frac{R(n-2)(n+2)}{n^2} cm^{-1}$

   (C) $\bar{v} = \frac{R(n-2)(n+2)}{4n^2} cm^{-1}$

   (D) $\bar{v} = \frac{R(n-1)(n+1)}{4n^2} cm^{-1}$

7. In the Bohr's model of the hydrogen atom, let r, v and E represent the orbit radius, speed of electron and the total energy of the electron respectively. Which of the following relation is proportional to the orbit number n?

   (A) v • r (B) r/E

   (C) r (D) None of these

8. An electron and a proton are accelerated through a potential V. If p_e and p_p are their momentum, then p_p/p_e ratio is approximately equal to

   (A) 1/21 (B) 21

   (C) 1/43 (D) 43

9. The potential energy of the electron present in the second excited state of Li^{2+} ion is represented by $\left(k = \frac{1}{4\pi \in_0}\right)$

   (A) $+\frac{3e^2}{4\pi\varepsilon_0 r}$ (B) $-\frac{3e}{4\pi\varepsilon_0 r}$

   (C) $-\frac{4\pi^2k^2z^2me^4}{h^2}$ (D) $+\frac{4\pi^2k^2me^4}{h^2}$

10. Find incorrect sentence

    (A) The existence of definite energy levels for the particles contradict the uncertainty principle

    (B) The total probability of finding a particle described by ψ over entire space must be equal to unity

    (C) For electromagnetic wave, the intensity of radiation at any point is proportional to the square of the amplitude of the wave at that point

    (D) Greater the amplitude of light wave, greater is the probability of a photon to be found here

11. Pick the incorrect statement :

(A) Aufbau principle is valid only for the orbitals of different energy

(B) At Cr, 4s and 3d orbitals become nearly identical in energy

(C) A system of particles is stable when its total energy is minimum

(D) Energy of different orbitals drop to same extent with increase in atomic number

SECTION - B

Multiple Correct Answer Type

This section contains multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE** is/are correct.

12. Choose the correct statements among the following

(A) Radial distribution function $\left(\Psi^2.4\pi r^2 dr\right)$ give probability at a particular distance along one chosen direction

(B) $\Psi^2(r)$ gives probability density at a particular distance over a spherical surface

(C) For 's' orbitals ψ (r) ψ (θ) ψ (ϕ) = ψ (x, y, z) is independent of θ and ϕ

(D) '2p' orbital with quantum numbers, n = 2, ℓ =1, m = 0, also shows angular dependence

13. Correct statement(s) regarding $3P_y$ orbital is/are

(A) Angular part of wave function is independent of angles (θ and ϕ)

(B) Number of maxima when a curve is plotted between $4\pi r^2R^2(r)$ vs r are '2'

(C) 'xz' plane acts as nodal plane

(D) Magnetic quantum number must be '–1'

14. Which is/are correct statement ?

(A) The difference in angular momentum associated with the electron present in consecutive orbits of H-atom is $(n-1)\frac{h}{2\pi}$

(B) Energy difference between energy levels will be changed if, P.E. at infinity assigned value other than zero.

(C) Frequency of spectral line in a H-atom is in the order of $(2\rightarrow1) < (3\rightarrow1) < (4\rightarrow1)$

(D) On moving away from the nucleus, kinetic energy of electron decreases.

15. Which of these are the characteristics of wave function ψ?

(A) ψ must be single valued

(B) $\int_{-\infty}^{+\infty} \Psi^2 dxdydz = 1$

(C) ψ must be finite and continuous

(D) ψ represents a standing wave

16. If there were three possible values for spin quantum number $\left(+\frac{1}{2}, 0, -\frac{1}{2}\right)$ rather than two. Which of the following is/are correct regarding a hypothetical periodic table based on this condition?

(A) First period would have only 2 vertical columns

(B) Second period would have 12 elements

(C) Periodic table would contain 27 groups

(D) Third period would have 12 elements

17. The charge cloud of a single electron in a $2p_x$ atomic orbital has two lobes of electron density. This means

(A) There is a high probability of locating the electron in a 2p, atomic orbital at values of x > 0

(B) There is a high probability of locating it at values of x > 0 but no probability at all of the locating it any where in the yz plane along which x = 0.

(C) There is a great probability of finding a p-electron right at the nucleus

(D) All are correct

18. Which of the following statements is/are correct?

(A) The energy of an electron in a many electron atom generally increases with an increase in value of n, but for a given 'n', the lower the value of ℓ, the lower the energy

(B) An electron close to the nucleus experiences a large electrostatic attraction

(C) For a given value of n, a s – electron has more penetration power than a p-electron, which has penetration power more than a d-electron, and so on

(D) None is correct

19. Choose the correct statements

(A) for an atom in which n = 3 electrons are valence electrons, the inner 1s, 2s and 2p electrons shield a 3d electron from the nuclear charge more than a 3p and 3s

(B) 3d electron experiences a smaller attraction to the nucleus so it is higher in energy

(C) The different degrees of penetration to the nucleus of atomic orbitals with the same value of n but different values of l lead to energies in the orders s<p<d<f<g<h for a many electron atoms

(D) all values of l for the same n are equal in energy for the hydrogen atom as there is only a single electron

20. Which is correct statement in case of Hund's rule?

(A) It states that if more than one atomic orbital of the same energy is available, electrons will occupy different atomic orbitals with parallel spins, as far as possible, in the configuration of lowest energy

(B) Total energy of a many electron atom with more than one electron occupying a set of degenerate orbitals is lowest, if as far as possible, electrons occupy different atomic orbitals and have parallel spins

(C) Hunds rule forbid many configuration that does not violate the Pauli's exclusion principle

(D) Hund's rule simply tells us which of the possible configurations is lowest in energy and other configurations are those of excited states, higher in energy than the ground state

21. The magnitude of spin angular momentum (S) of an electron can be

(A) $S = \sqrt{s(s+1)}\frac{h}{2\pi}$ (B) $S = s\frac{h}{2\pi}$

(C) $S = \frac{\sqrt{3}}{2} \times \frac{h}{2\pi}$ (D) $S = \pm\frac{h}{2\pi}$

22. Identify the correct statement(s) among the following

(A) For H atom energy ratio of 2s and 2p orbitals is equal to one.

(B) The most probable distance of an electron in the 3d orbital of H-atom is $9a_0$

(C) The average distance of the 3s-electron from the nucleus of H-atom is $4a_0$

(D) The degeneracy of the orbitals of the H-atom having energy $-\frac{R_H hc}{16}$ is 16

23. Choose the correct statements(s) regarding the photoelectrical effect

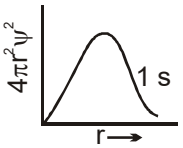
(A) No electrons are ejected, regardless of the intensity of the radiation, unless the frequency exceeds a threshold value characteristic of the metal.

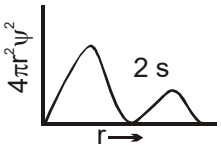
(B) The kinetic energy of the ejected electrons varies linearly with the frequency of the incident radiation and its intensity

(C) Even at low intensities electrons are ejected immediately if the frequency of irradiation is above the threshold values

(D) An intense and a weak beam of monochromatic radiations differs in having number of photons

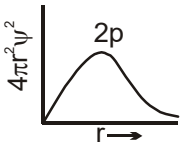
24. Which of the following graph correctly represent the variation: for $4\pi r^2\psi^2$ vs r?

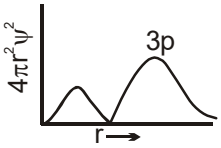
(A) 

(B) 

$4\pi r^2\psi^2$ is radial Probability distribution function

r is distance from nucleus

(C) 

(D) 

SECTION - C

Linked Comprehension Type

This section contains paragraphs. Based upon this paragraph, some multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE THAN ONE** is/are correct.

Paragraph for Question Nos. 25 to 27

In a mixture of H – He^+ gas (He^+ is singly ionized He atom), H atoms and He^+ ions are excited to their respective first excited states. Subsequently, H atoms transfer their total excitation energy to He^+ ions (by collisions). Assuming that the Bohr model of atom is applicable, answer the following questions.

25. The quantum number n of the state finally populated in He^+ ions is:

(A) 2 (B) 3
(C) 4 (D) 5

26. The wavelength of light emitted in the visible region by He+ ions after collisions with H atoms is

(A) 6.5×10^{-7} m

(B) 5.6×10^{-7} m

(C) 4.8×10^{-7} m

(D) 1.22×10^{-7} m

27. The ratio of the potential energy of the n = 2 electron for the H atom to that of He^+ ion is:

(A) 1/4 (B) 1/2
(C) 1 (D) 2

Paragraph for Question Nos. 28 and 29

Hydrogen atoms in higher excited states have been created in the laboratory and observed in space. They are called Rydberg atoms. In a Rydberg atom, electron is at a distance of 10.01 μm from the nucleus.

28. Find the orbit number for a hydrogen atom, whose radius is 10.01 μm.

(A) 435 (B) 189225
(C) 21 (D) 870

29. What is the energy of electron in this state ?

(A) 7.187×10^{-5} eV (B) 3.798×10^{-10} eV
(C) 0.031 eV (D) 1.797×10^{-5} eV

SECTION-D

Matrix-Match Type

This **Section D** have "match the following" type question. Question contains two columns, **Col-I** and **Col-II**. Match the entries in **Col-I** with the entries in **Col-II**. One or more entries in **Col-I** may match with one or more entries in **Col-II**.

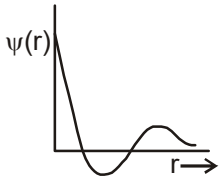
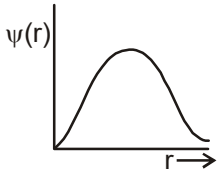
30. Match the entries in Column I with the correctly related quantities in Column II.

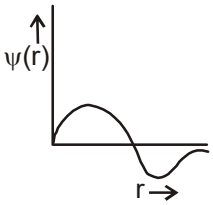
Column - I (Electronic transition)	**Column - II (Characteristics of radiation concerned)**
(A) $n_1 \rightarrow n_\infty$ in H-atoms	(p) Visible radiations
(B) $n_4 \rightarrow n_2$ in He^+ ion	(q) Energy numerically equal to Rydberg energy
(C) $n_\infty \rightarrow n_1$ in He^+ ion	(r) Energy numerically equal to Ionization Energy
(D) $n_4 \rightarrow n_2$ in H-atom	(s) Ultraviolet radiations

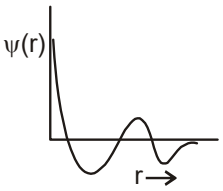
31. Match the entries in Column I with the correctly related quantities in Column II.

Column - I	**Column - II**
(A) Angular momentum	(p) Increases by increasing n
(B) Kinetic energy	(q) Decreases by decreasing Z
(C) Potential energy	(r) Increases by decreasing Z
(D) Velocity	(s) Decreases by decreasing n

32. Match the following columns:

Column - I	**Column - II**
(A) 3s	(p) 
(B) 4s	(q) 

(C) 2p (r) 

(D) 3p (s) 

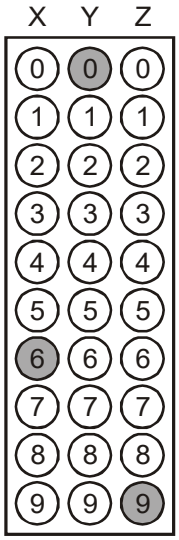
33. Match the following columns:

Column - I (Parameters for H-like atoms)		**Column - II (Dependence on 'n' and 'Z')**
(A)	Radius of orbit	(p) n^2
(B)	Speed of electron	(q) $1/n$
(C)	Centripetal force between electron and nucleus	(r) $1/n^3$
(D)	Frequency of revolution of electron	(s) $1/n^4$
		(t) Z
		(u) 1/Z
		(v) Z^2
		(w) Z^3

SECTION-E

Integer Answer Type

This section contains Integer type questions. The answer to each of the questions is a single digit integer, ranging from 0 to 9. The appropriate bubbles below the respective question numbers in the ORS have to be darkened. For example, if the correct answers to question numbers X, Y and Z(say) are 6, 0 and 9, respectively, then the correct darkening of bubbles will look like the following :



34. The wavelength of the K_α line for an element of atomic number 58 is λ. The wavelength of the K_α line for the element with atomic number is 29 is how many times that of λ ?

35. The velocity with which should an alpha particle travel towards the nucleus of a copper atom so as to arrive at a distance 10^{-13}m from the nucleus of the copper atom is 6.35×10^x m/sec. Atomic number of copper is 29. Mass of α-particle is 4 amu. The value of 'x' is

36. Kinetic energy of an e^- in nth Bohr orbit is $\frac{Z^2e^2}{y\pi \in_0 r_1 \times n^2}$ where y is a whole no. y = ?

(r_1 is the first Bohr's radius of hydrgen atom)

37. If λ is the wavelength of moving electrons in Bohr's 4th orbit. The area enclosed by 4th orbit is $\frac{x\lambda^2}{\pi}$. The value of x is _____.

38. A particle having charge equal to that of electron and mass 208 times the mass of electron is moving around a nucleus with charge +3e and mass infinite. The value of $\sqrt{n}$ for which the radius of the orbit is approximately same as that of the first Bohr orbit of the hydrogen atom is (n = orbit no.) _____.

❑ ❑ ❑

ANSWERS

LEVEL-1

1. (D)	2. (C)	3. (C)	4. (B)	5. (B)	6. (B)
7. (C)	8. (A)	9. (C)	10. (A)	11. (D)	12. (B)
13. (D)	14. (B)	15. (A)	16. (B)	17. (A)	18. (C)
19. (D)	20. (A,B)	21. (A,C,D)	22. (A,B,C,D)	23. (A)	24. (A)
25. (A-r,B-q,C-p,D-s)		26. (3)	27. (6)	28. (8)	29. (6)
30. (4)	31. (6)				

LEVEL-2

1. (C)	2. (A)	3. (B)	4. (C)	5. (D)	6. (C)
7. (A)	8. (D)	9. (C)	10. (A)	11. (D)	12. (C,D)
13. (B,C)	14. (C,D)	15. (A,B,C,D)	16. (B,C,D)	17. (A,B)	18. (A,B,C)
19. (A,B,C,D)	20. (A,B,D)	21. (A,C)	22. (A,B,C,D)	23. (A,C,D)	24. (A,C,D)
25. (C)	26. (D)	27. (A)	28. (A)	29. (A)	
30. (A-q,r,s,B-s,C-r,s,D-p)		31. (A-p,s,B-q,C-p,r,s,D-q)		32. (A-p,B-s,C-q,D-r)	
33. (A-p,u,B-q,t,C-s,w,D-r,v)		34. (4)	35. (6)	36. (8)	37. (4)
38. (5)					

❑ ❑ ❑