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atom of model mechanical quantum chemistry about Worksheet الملف

<u>Almanahj Website</u> \rightarrow <u>American curriculum</u> \rightarrow <u>11th Grade</u> \rightarrow <u>Chemistry</u> \rightarrow <u>Term 1</u> \rightarrow <u>The file</u>

More files for 11th Grade, Subject Chemistry, Term 1						
Worksheet about Chemical calculations	1					
Worksheet about chemistry alkali and alkaline earth metals	2					
Worksheet about chemistry periodic classification	3					
Worksheet abour chemistry hydrogen	4					
Worksheet about Environmental chemistry	5					

Unit

Quantum Mechanical Model of Atom

Choose the best answer

1.	Electronic configuration of species M2+ is 1s2 2s2 2p6 3s2 3p6 3d6 and its atomic weight					
	is 56. The number of neutrons in the nucleus of species M is					

- a) 26
- b) 22
- c) 30
- d) 24

2. The energy of light of wavelength 45 nm is

- a) 6.67×10^{15} J
- b) 6.67×10^{11} J
- c) 4.42×10^{-18} J
- d) 4.42×10^{-15} J

The energies E1 and E2 of two radiations are 25 eV and 50 eV respectively. The relation 3. between their wavelengths ie λ_1 and λ_2 will be

- a) $\frac{\lambda_1}{\lambda_2} = 1$
- b) $\lambda_1 = 2\lambda_2$ c) $\lambda_1 = \sqrt{25 \times 50} \lambda_2$ d) $2\lambda_1 = \lambda_2$

4. Splitting of spectral lines in an electric field is called

a) Zeeman effect

b) Shielding effect

c) Compton effect

d) Stark effect

Based on equation $E = -2.178 \times 10^{-18} \text{ J} \left(\frac{z^2}{n^2}\right)$, certain conclusions are written. Which 5. of them is not correct? (NEET)

a) Equation can be used to calculate the change in energy when the electron changes orbit

b) For n = 1, the electron has a more negative energy than it does for n = 6 which means that the electron is more loosely bound in the smallest allowed orbit

c) The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from the nucleus.

d) Larger the value of n, the larger is the orbit radius.

6.	According to the Bohr Theory, which of the following transitions in the hydrogen atom will give rise to the least energetic photon?								
	a) n = 6 to n = 1		b) $n = 5$ to $n = 4$						
	c) $n = 5$ to $n = 3$			d) $n = 6$ to $n = 5$					
7.	Asse	rtion : The sp	ectrum of He ⁺ is e	um of He ⁺ is expected to be similar to that of hydrogen					
	Reason: He ⁺ is also one electron system.								
	(a) If both assertion and reason are true and reason is the correct exassertion.								
	(b) If both assertion and reason are true but reason is not the correct explanat assertion.								
	(c)	If assertion	n is true but reasor	n is false					
	(d)	If both ass	ertion and reason	are false					
8.	Which of the following pairs of d-orbitals will have electron density along the axes ? (NEET Phase - II)								
	a)	d_{z^2}, d_{xz}	$b) d_{xz}, d_{yz}$	c) d_{z^2} , $d_{x^2-y^2}$	$\mathbf{d}) \; \mathbf{d}_{xy^3} \; \mathbf{d}_{x^2-y^2}$				
9.	Two	electrons occ	cupying the same o	orbital are distinguishe	ed by				
	a) az	imuthal quar	ntum number	b) spin quantur	m number				
	c) magnetic quantum number d) orbital quantum numbe								
10.	The electronic configuration of Eu (Atomic no. 63) Gd (Atomic no. 64) and Tb (Atomic no. 65) are (NEET - Phase II)								
	a) [Xe] 4f ⁶ 5d ¹ 6s ² , [Xe] 4f ⁷ 5d ¹ 6s ² and [Xe] 4f ⁸ 5d ¹ 6s ²								
	b) [Xe] 4f ⁷ , 6s ² , [Xe] 4f ⁷ 5d ¹ 6s ² and [Xe] 4f ⁹ 6s ²								
	c) [Xe] 4f ⁷ , 6s ² , [Xe] 4f ⁸ 6s ² and [Xe] 4f ⁸ 5d ¹ 6s ²								
	d) [Xe] 4f ⁶ 5d ¹ 6s ² , [Xe] 4f ⁷ 5d ¹ 6s ² and [Xe] 4f ⁹ 6s ²								
11.	The n	naximum nu	mber of electrons ir	n a sub shell is given by	the expression				
	a) 2n	2	b) 2 l + 1	c) 4l + 2	d) none of these				

For d-electron, the orbital angular momentum is											
a) $\frac{\sqrt{2}}{2}$	2h eπ		b) $\frac{\sqrt{2}}{2}$	2h π		c) \(\frac{\sqrt{2}}{2}	2×4 h 2π		d)	$\frac{\sqrt{6}\;h}{2\pi}$	
What is the maximum numbers of electrons that can be associated with the follow set of quantum numbers ? $n=3$, $l=1$ and $m=-1$									following		
a) 4			b) 6		c) 2				d) = 10		
Assertion: Number of radial and angular nodes for 3p orbital are 1, 1 respectively.											
Reaso ber.	on : Nu	mber of	radial an	d angular i	nodes d	leper	nds on	ly on j	principa	l quant	um num-
(a)			on and re	eason are t	rue and	d rea	son is	the co	orrect ex	cplanati	ion of as-
 (b) both assertion and reason are true but reason is not the correct explanation assertion. (c) assertion is true but reason is false 								natio <mark>n</mark> of			
(d)	both	assertio	n and re	ason are fa	lse						
5. The total number of orbitals associated with the principal quantum number $n = 3$ is							= 3 is				
a) 9			b) 8		c) 5				d) 7		
If $n = 6$, the correct sequence for filling of electrons will be,											
a) $ns \rightarrow (n-2)$ $f \rightarrow (n-1)$ $d \rightarrow np$ b) $ns \rightarrow (n-1)$ $d \rightarrow (n-2)$ $f \rightarrow$ c) $ns \rightarrow (n-2)$ $f \rightarrow np \rightarrow (n-1)$ d d) none of these are correct							→ np				
							correct				
Cons	sider th	ne follow	ing sets	of quantum	numl	ers :					
	n	1	m	s							
(i)	3	0	0	+ 1/2	(iii)	4	3	-2	+ 1/2		
(ii)	2	2	1	- 1/2	(iv)	1	0	-1	+ 1/2		
				/ 2	(v)	3	4	3	-1/2		
	a) $\frac{\sqrt{2}}{2}$ What set of a) 4 Asser Reasober. (a) (b) (c) (d) The to a) 9 If n = a) ns c) ns Cons	a) $\frac{\sqrt{2h}}{2\pi}$ What is the set of quanta a) 4 Assertion: It Reason: Number. (a) both sertification is a sertification of the sertification is a sertification in the sertification is a sertification in the sertification in the sertification is a sertification in the sertification in the sertification is a sertification in the sertificati	 a) √2h/2π What is the maximus set of quantum numer a) 4 Assertion: Number of ber. (a) both assertionsertion. (b) both assertionsertion. (c) assertion is to do do	 a) √2h/2π b) √2/2 What is the maximum numbers of quantum numbers? not asked of quantum number of radial and ber. (a) both assertion and respection. (b) both assertion and respection. (c) assertion is true but row (d) both assertion and respection. (d) both assertion and respection and respection. (e) assertion is true but row (d) both assertion and respectively. (f) both assertion and respectively. (g) assertion is true but row (h) both assertion and respectively. (h) both assertion and	 a) √2h/2π b) √2h/2π What is the maximum numbers of elections of quantum numbers? n = 3, l = 1 at at a) 4 b) 6 Assertion: Number of radial and angular reservition. (a) both assertion and reason are to sertion. (b) both assertion and reason are to assertion. (c) assertion is true but reason is fall (d) both assertion and reason are fall the total number of orbitals associated a) 9 b) 8 If n = 6, the correct sequence for filling a) ns ⇒ (n - 2) f ⇒ (n - 1) d ⇒ np c) ns ⇒ (n - 2) f ⇒ np ⇒ (n - 1) d Consider the following sets of quantum n l m s 	 a) √2h/2π b) √2h/2π What is the maximum numbers of electrons to set of quantum numbers? n = 3, l = 1 and m = a) 4 b) 6 c) 2 Assertion: Number of radial and angular nodes of ber. (a) both assertion and reason are true and sertion. (b) both assertion and reason are true but assertion. (c) assertion is true but reason is false (d) both assertion and reason are false The total number of orbitals associated with the a) 9 b) 8 c) 5 If n = 6, the correct sequence for filling of election and sequence for filling of	 a) √2h/2π b) √2h/2π c) √2h/2π d) √2h/2π d) √2h/2π d) √2h/2π e) √2h/2π d) 4 e) 6 f) 1 e) 1 e) 3, 1 = 1 and m = -1 a) 4 b) 6 c) 2 d) Assertion: Number of radial and angular nodes for Reason: Number of radial and angular nodes dependent. (a) both assertion and reason are true and reasortion. (b) both assertion and reason are true but reasortion. (c) assertion is true but reason is false (d) both assertion and reason are false The total number of orbitals associated with the properties of the total number of orbitals associated with the properties of the correct sequence for filling of electrons a) ns ⇒ (n - 2) f ⇒ (n - 1) d ⇒ np b) ns ⇒ c) ns ⇒ (n - 2) f ⇒ np ⇒ (n - 1) d d) none Consider the following sets of quantum numbers and the correct sequence for full of the correct sequence full of the correct sequence full of th	a) $\frac{\sqrt{2h}}{2\pi}$ b) $\frac{\sqrt{2h}}{2\pi}$ c) $\frac{\sqrt{2\times4} h}{2\pi}$ What is the maximum numbers of electrons that can be set of quantum numbers ? $n = 3, 1 = 1$ and $m = -1$ a) 4 b) 6 c) 2 Assertion: Number of radial and angular nodes for 3p of Reason: Number of radial and angular nodes depends on ber. (a) both assertion and reason are true and reason is sertion. (b) both assertion and reason are true but reason is assertion. (c) assertion is true but reason is false (d) both assertion and reason are false The total number of orbitals associated with the principal a) 9 b) 8 c) 5 If $n = 6$, the correct sequence for filling of electrons will a) $ns \Rightarrow (n-2) f \Rightarrow (n-1) d \Rightarrow np$ b) $ns \Rightarrow (n-1) c$ on $ns \Rightarrow (n-2) f \Rightarrow np \Rightarrow (n-1) d$ d) none of the Consider the following sets of quantum numbers:	 a) √2h/2π b) √2h/2π c) √2×4 h/2π What is the maximum numbers of electrons that can be associated of quantum numbers? n = 3, l = 1 and m = −1 a) 4 b) 6 c) 2 Assertion: Number of radial and angular nodes for 3p orbital electrons. (a) both assertion and reason are true and reason is the consertion. (b) both assertion and reason are true but reason is not the assertion. (c) assertion is true but reason is false (d) both assertion and reason are false The total number of orbitals associated with the principal quantal points of the conservation of the principal quantal points of the pri	a) $\frac{\sqrt{2}h}{2\pi}$ b) $\frac{\sqrt{2h}}{2\pi}$ c) $\frac{\sqrt{2\times4}h}{2\pi}$ d) What is the maximum numbers of electrons that can be associated wiset of quantum numbers ? $n = 3$, $l = 1$ and $m = -1$ a) 4 b) 6 c) 2 d) = 10 Assertion: Number of radial and angular nodes for 3p orbital are 1, 1 for the second seco	a) $\frac{\sqrt{2}h}{2\pi}$ b) $\frac{\sqrt{2}h}{2\pi}$ c) $\frac{\sqrt{2}\times 4}{2\pi}$ d) $\frac{\sqrt{6}h}{2\pi}$ What is the maximum numbers of electrons that can be associated with the set of quantum numbers ? $n = 3$, $l = 1$ and $m = -1$ a) 4 b) 6 c) 2 d) = 10 Assertion: Number of radial and angular nodes for 3p orbital are 1, 1 respectively. Reason: Number of radial and angular nodes depends only on principal quantibles. (a) both assertion and reason are true and reason is the correct explanation sertion. (b) both assertion and reason are true but reason is not the correct explanation assertion. (c) assertion is true but reason is false (d) both assertion and reason are false The total number of orbitals associated with the principal quantum number in a) 9 b) 8 c) 5 d) 7 If $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be, a) $n = 6$, the correct sequence for filling of electrons will be.

		c) (i) and (iii)		d) (ii), (iii) and (iv)					
18	8.	How many electron	ns in an atom with ato	tomic number 105 can have $(n + l) = 8$?					
		a) 30	b) 17	c) 15	d) unpredictable				
19	9.	Electron density in	the yz plane of 3d _{xy}	_{xy} orbital is					
		a) zero	b) 0.50	c) 0.75	d) 0.90				
20	0.	If uncertainty in p velocity is	osition and moment	entum are equal, then minimum uncertainty in					
			1 14	c) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$					
2	1.	A macroscopic particle of mass 100 g and moving at a velocity of 100 cm s ⁻¹ will have a de Broglie wavelength of							
		a) 6.6×10^{-29} cm	b) 6.6×10^{-30} cm	c) 6.6×10^{-31} cm	d) 6.6×10^{-32} cm				
22	2.	The ratio of de Broglie wavelengths of a deuterium atom to that of an α - particle, when the velocity of the former is five times greater than that of later, is							
		a) 4	b) 0.2	c) 2.5	d) 0.4				
23	3.	The energy of an el electron in the first		bit of hydrogen atom	is -E. The energy of an				
		a) -3E	b) -E/3	c) -E/9	d) -9E				
24	4.	. Time independent Schnodinger wave equation is							
		a) Ĥψ – Εψ		b) $\nabla^2 \psi + \frac{8\pi^2 m}{h^2} (E + V) \psi = 0$					
		c) $\frac{\partial^2 \psi}{\partial x^2} + \frac{\partial^2 \psi}{\partial y^2} + \frac{\partial^2 \psi}{\partial z^2} + \frac{\partial^2 \psi}{\partial z^2}$	$\frac{2m}{h^2}(E-V)\psi=0$	d) all of these					
25	5.	Which of the following does not represent the mathematical expression for the Heisenberg uncertainty principle?							
		a) $\Delta x \cdot \Delta p \ge \frac{h}{4\pi}$		b) $\Delta x \cdot \Delta v \ge \frac{h}{4\pi m}$					
		c) $\Delta E \cdot \Delta t \ge \frac{h}{4\pi}$		d) $\Delta E \cdot \Delta x \ge \frac{h}{4\pi}$					

Which of the following sets of quantum number is not possible?

b) (ii), (iv) and (v)

a) (i), (ii), (iii) and (iv)