

Unit 3 - Week 2

Course outline

How to access the portal?

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Week 2

Introduction to Spectroscopy - IV

Introduction to Spectroscopy - V

Introduction to Spectroscopy - VI

Quiz : Assignment 2

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Download Videos (mp4,flv,3gp,mp3)

Lecture Slides

Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-08-21, 23:59 IST.

- 1) The total probability of finding a particle in space is: 1 point
- Unity
 Zero
 Infinite
 None of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Unity
- 2) The wave function must be 1 point
- Square integrable
 Single-valued
 Continuous
 All of these
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
All of these
- 3) Wave function ψ becomes zero when $r \rightarrow$: 1 point
- ∞
 1
 0
 -1
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 ∞
- 4) Probability density is equal to: 1 point
- Square root of wave function
 Wave function
 Square of magnitude of wave function
 None of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Square of magnitude of wave function
- 5) The operator ∇^2 is called: 1 point
- Hamiltonian
 Laplacian
 Poisson
 Vector
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Laplacian
- 6) Hamiltonian (\hat{H}) operator is the operator of: 1 point
- Total energy
 Kinetic energy
 Potential energy
 Momentum
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Total energy
- 7) Correct form of one dimensional Hamiltonian operator is: 1 point
- $\hat{H} = \frac{-h^2}{8\pi^2m} \frac{\partial^2}{\partial x^2} - V(x)$
 $\hat{H} = \frac{-h^2}{8\pi^2m} \frac{\partial^2}{\partial x^2}$
 $\hat{H} = V(x)$
 $\hat{H} = \frac{-h^2}{8\pi^2m} \frac{\partial^2}{\partial x^2} + V(x)$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $\hat{H} = \frac{-h^2}{8\pi^2m} \frac{\partial^2}{\partial x^2} + V(x)$
- 8) Value of normalization constant for a given wave function $\psi(x) = Ax$ ($-1 \leq x \leq 1$) is: 1 point
- 3/2
 2/3
 $\sqrt{\frac{3}{2}}$
 $\sqrt{\frac{2}{3}}$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $\sqrt{\frac{3}{2}}$
- 9) Which of the following operator is not a linear operator: 1 point
- d/dx
 x
 $\sqrt{\quad}$
 $\frac{d^2}{dx^2}$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $\sqrt{\quad}$
- 10) Which of the following is true for Hermitian operators: 1 point
- Hermitian operators can be flipped over to the other side in inner products.
 Hermitian operators have only real eigen values.
 Hermitian operators have a complete set of orthonormal eigen functions (or eigen vectors).
 All of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
All of the above
- 11) The uncertainty in the momentum Δp of a ball traveling at 20m/s is 1×10^{-6} of its momentum. Calculate the uncertainty in position Δx ? Mass of the ball is given as 0.5kg 1 point
- 0.529×10^{-29} m
 0.529×10^{-28} m
 0.529×10^{-19} m
 0.529×10^{-9} m
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 0.529×10^{-29} m
- 12) An electron in a molecule travels at a speed of 40m/s. The uncertainty in the momentum Δp of the electron is 10^{-6} of its momentum. Compute the uncertainty in position Δx if the mass of an electron is 9.1×10^{-31} kg 1 point
- 1.44 m
 0.44 m
 2.0 m
 2.4 m
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 1.44 m
- 13) Physical mechanism/s responsible for spectral line broadening: 1 point
- Heisenberg Uncertainty Principle
 Doppler Effect
 Electric and magnetic field
 All of the above
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
All of the above
- 14) The ratio of population two states at 300 K if the gap between them is 4.1936×10^{-21} j , is 1 point
- 0.350
 0.363
 0.370
 0.340
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 0.363
- 15) Increase in signal-to-noise (S/N) ratio after n scans: 1 point
- \sqrt{n} times
 n times
 n^2 times
 2n times
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 \sqrt{n} times