

20 Final Exam Questions will be selected from those below (there will be 4 multiple choice responses to each and you will have up to 20 minutes to answer).

1. The probability of observing a particular event in quantum mechanics is given by
3. Which of the following was *not* a characteristic of the hypothetical luminiferous ether?
4. Which of the following best explains what is meant by an *operational* definition in science?
5. Bose-Einstein condensation of liquid Helium leads to its
6. Which of the following is *impossible* in Special Relativity?
7. The Hubble Relation states that
8. Which of the following is necessary laser operation?
10. What is the probability of rolling two dice and getting a total of?
11. Which of the following is *not* evidence for the correctness of General Relativity?
12. A ball is released inside and from rest relative to a freely falling elevator. What happens?
13. Freely moving objects are represented in space-time by world-lines of longest
14. Which of the following is not typically found in a galaxy?
15. In which case would two observers *necessarily* agree about the simultaneity of two events?
16. According to current measurements the expansion of the universe is
17. According to General Relativity, which of the following did *not* begin with the Big Bang?
18. Which kind of photon has the least energy?
19. The patterns observed when two light waves combine are called
20. Which of the following is not a direct application of Quantum Mechanics to technology?
22. Why does the interference pattern no longer appear if you observe which slit each photon goes through in the double-slit experiment?
23. Where are the electrons in the atom that govern the chemistry of an element?
24. Which of the following two quantities can Heisenberg's uncertainty principle refer to?
25. Electron microscopes can be used to see more detail than with visible light because
26. The name given to the central part of an atom is
27. Which of these is *not* an application of radioactivity?
28. Atoms are stable because
29. What do spectral lines signify?
30. Which atom is the simplest?
31. Whose equation describes the general movement of quantum probability waves?
32. What are the smallest features that a Scanning Tunneling Microscope can see?
33. Energy released in a typical nuclear weapon is converted from roughly how much mass?
34. What does the acronym LASER stand for?
36. In Feynman diagrams, particles (as opposed to anti-particles) are understood as
37. Which scientists first performed an artificial nuclear reaction?
38. Which particles are found in an atomic nucleus?
39. Which type of nuclear reaction involves smaller nuclei combining to make bigger nuclei?
42. Fermion particles of the same type are such that
43. The basic vertex in any QED space-time Feynman diagram involves
44. Speed is defined as
45. The half-life of a radioactive sample is 2 years. The fraction decayed after 8 years on average is
46. Which of the following is *not* a force-carrier particle?
47. The amount of antimatter in the universe appears to be
48. Quark confinement is a property of which force of nature?
49. Which of the following is *not* a consequence of combining relativity and quantum mechanics?
50. Which of these is evidence for Dark Matter?