The 50

Physics — Fundamentals

1. (2 marks) Describe Dalton's model of the atom.
2. (3 marks) Describe Thomson's model of the atom.
3. (4 marks) Describe what was expected to happen in the gold foil experiment and what actually happened. How did this change the model of the atom?
4. (2 marks) What is the Bohr model of the atom?
5. (3 marks) Draw state diagrams for a solid, liquid and gas.
6. (2 marks) What is specific heat capacity?
7. (5 marks) Draw a temperature against time graph for a piece of ice that is heated until it boils.
8. (4 marks) Explain how a gas exerts pressure.
9. (4 marks) What happens to pressure as you ascend into the atmosphere and why? What happens to pressure when you dive deeper into the ocean and why?
10. (3 marks) Explain how objects float.
11. (3 marks) What is the difference between a vector and a scalar?
12. (3 marks) List three vectors and three scalars.
13. (3 marks) What is acceleration? How do you calculate acceleration?
14. (2 marks) What do the area and gradient of a velocity-time graph represent?
15. (6 marks) Draw a free body diagram of a skydiver at various points of their decent (minimum three diagrams).
16. (2 marks) What is the law of conservation of momentum?
17. (2 marks) What is the difference between an elastic and inelastic collision?
18. (1 mark) Calculate the work done when an object is pushed 5m with a force of 10N.
19. (2 marks) What is Hooke's law?
20. (3 marks) Draw the electric field of (a) two positive charges (b) two negative charges and (c) one negative and one positive charge.

21. (2 marks) What is the difference between conventional current and electron flow?

22. (5 marks) Draw the circuit used to determine the resistance of a lamp.

23. (3 marks) Draw a series circuit with a cell, resistor, ammeter and two lamps. Draw a parallel circuit with the same components.

24. (4 marks) Why does the resistance of a filament lamp increase as it is used?

25. (3 marks) Draw the I-V characteristic of a diode, filament lamp and fixed resistor.

26. (2 marks) Describe how the magnetic field of a magnet shows the strength and direction of magnetic forces.

27. (2 marks) What does the strength of the magnetic field around a wire depend on?

28. (2 marks) State the law of reflection.

29. (2 marks) State the equation for wave speed.

30. (1 mark) What is the speed of an electromagnetic wave?

31. (7 marks) List the different types of electromagnetic wave.

32. (3 marks) Which type of electromagnetic wave has the most energy? Explain why.

33. (2 marks) Describe what is inside the nucleus of an atom, and state the charge of the nucleus.

34. (2 marks) What is an isotope?

35. (4 marks) Describe the types of radiation that unstable nuclei emit.

36. (4 marks) Order the three types of ionising radiation in terms of (i) ionising power and then (ii) range.

37. (3 marks) Describe in terms of particles what happens in alpha, beta and gamma decay.

38. (2 marks) Explain what is meant by half-life.

39. (2 marks) Describe the difference between contamination and irradiation.

40. (3 marks) What is nuclear fission?

41. (3 marks) What is nuclear fusion?

42. (8 marks) List the 8 types of energy store. (*Bonus: give an example of each and the formula where applicable.*)

43. (4 marks) How is energy transferred?

44. (3 marks) Describe, in terms of energy stores, what happens when a car competes in a drag race. (*Start of race: stationary. End of race: maximum speed.*)

45. (3 marks) Describe, in terms of energy stores, what happens when you throw a ball into the air until it stops momentarily at the top of its flight.

46. (3 marks) Why is electricity transported across the national grid at high voltages?

47. (4 marks) What is thermal conductivity? How does thermal conductivity of the walls of a house affect the rate of cooling?

48. (3 marks) What factors affect thinking distance? What factors affect breaking distance? What factors affect stopping distance?

49. (3 marks) How do seatbelts and airbags protect you in a car collision?

50. (3 marks) Explain the evidence for the Big Bang model.