

A-Level Physics

Past-Paper Exercise Sheets — Question Index

76 subtopics • 433 questions • 2067 marks

1.1 Physical quantities

5 questions, 5 marks • multiple choice x5

Source	Q	Type	Marks
9702/11 N25	15	multiple choice	1
9702/12 N25	1	multiple choice	1
9702/14 N25	1	multiple choice	1
9702/12 J25	1	multiple choice	1
9702/14 J25	3	multiple choice	1

1.2 SI units

6 questions, 16 marks • multiple choice x5, calculation

Source	Q	Type	Marks
9702/11 N25	3	multiple choice	1
9702/11 N25	22	multiple choice	1
9702/12 N25	3	multiple choice	1
9702/22 N25	1	calculation	11
9702/12 J25	2	multiple choice	1
9702/12 J25	4	multiple choice	1

1.3 Errors and uncertainties

11 questions, 36 marks • multiple choice x9, calculation, short answer

Source	Q	Type	Marks
9702/11 N25	2	multiple choice	1
9702/12 N25	2	multiple choice	1
9702/12 N25	4	multiple choice	1
9702/14 N25	2	multiple choice	1
9702/14 N25	3	multiple choice	1
9702/35 N25	2	calculation	20
9702/11 J25	2	multiple choice	1
9702/11 J25	3	multiple choice	1
9702/12 J25	3	multiple choice	1
9702/12 M25	12	multiple choice	1
9702/22 M25	1	short answer	7

1.4 Scalars and vectors

7 questions, 26 marks • multiple choice x5, calculation, short answer

Source	Q	Type	Marks
9702/11 N25	1	multiple choice	1
9702/11 N25	4	multiple choice	1
9702/24 N25	1	calculation	11
9702/11 J25	1	multiple choice	1
9702/11 J25	4	multiple choice	1
9702/14 J25	4	multiple choice	1
9702/22 J25	1	short answer	10

2.1 Equations of motion

12 questions, 48 marks • multiple choice x8, calculation x3, short answer

Source	Q	Type	Marks
9702/11 N25	5	multiple choice	1
9702/11 N25	6	multiple choice	1
9702/11 N25	7	multiple choice	1
9702/12 N25	5	multiple choice	1
9702/12 N25	6	multiple choice	1
9702/21 N25	1	calculation	10
9702/24 N25	1	calculation	11
9702/11 J25	7	multiple choice	1
9702/11 J25	8	multiple choice	1
9702/21 J25	1	short answer	9
9702/12 M25	4	multiple choice	1
9702/22 M25	3	calculation	10

3.1 Momentum and Newton's laws of motion

11 questions, 20 marks • multiple choice x10, short answer

Source	Q	Type	Marks
9702/11 N25	11	multiple choice	1
9702/11 N25	12	multiple choice	1
9702/12 N25	8	multiple choice	1
9702/14 N25	8	multiple choice	1
9702/11 J25	10	multiple choice	1
9702/11 J25	11	multiple choice	1
9702/12 J25	9	multiple choice	1
9702/12 J25	11	multiple choice	1
9702/13 J25	9	multiple choice	1
9702/24 J25	2	short answer	10
9702/12 M25	8	multiple choice	1

3.2 Non-uniform motion

8 questions, 26 marks • multiple choice x6, short answer x2

Source	Q	Type	Marks
9702/11 N25	8	multiple choice	1
9702/12 N25	11	multiple choice	1
9702/21 N25	2	short answer	12
9702/11 J25	20	multiple choice	1
9702/12 J25	12	multiple choice	1
9702/13 J25	8	multiple choice	1
9702/14 J25	8	multiple choice	1
9702/23 J25	3	short answer	8

3.3 Linear momentum and its conservation

12 questions, 23 marks • multiple choice x10, short answer, calculation

Source	Q	Type	Marks
9702/11 N25	9	multiple choice	1
9702/11 N25	10	multiple choice	1
9702/12 N25	9	multiple choice	1
9702/12 N25	10	multiple choice	1
9702/12 N25	12	multiple choice	1
9702/14 N25	10	multiple choice	1
9702/14 N25	11	multiple choice	1
9702/11 J25	9	multiple choice	1
9702/12 J25	10	multiple choice	1
9702/14 J25	9	multiple choice	1
9702/23 J25	4	short answer	6
9702/22 M25	7	calculation	7

4.1 Turning effects of forces

11 questions, 35 marks • multiple choice x8, short answer x3

Source	Q	Type	Marks
9702/11 N25	14	multiple choice	1
9702/12 N25	13	multiple choice	1
9702/14 N25	14	multiple choice	1
9702/24 N25	2	short answer	10
9702/11 J25	13	multiple choice	1
9702/12 J25	15	multiple choice	1
9702/12 J25	17	multiple choice	1
9702/13 J25	12	multiple choice	1
9702/14 J25	10	multiple choice	1
9702/22 J25	2	short answer	8
9702/23 J25	2	short answer	9

4.2 Equilibrium of forces

12 questions, 29 marks • multiple choice x10, calculation, short answer

Source	Q	Type	Marks
9702/11 N25	13	multiple choice	1
9702/12 N25	14	multiple choice	1
9702/14 N25	13	multiple choice	1
9702/14 N25	15	multiple choice	1
9702/22 N25	3	calculation	9
9702/11 J25	15	multiple choice	1
9702/13 J25	10	multiple choice	1
9702/13 J25	14	multiple choice	1
9702/14 J25	11	multiple choice	1
9702/12 M25	9	multiple choice	1
9702/12 M25	11	multiple choice	1
9702/22 M25	2	short answer	10

4.3 Density and pressure

12 questions, 29 marks • multiple choice x10, short answer, calculation

Source	Q	Type	Marks
9702/11 N25	16	multiple choice	1
9702/12 N25	15	multiple choice	1
9702/12 N25	16	multiple choice	1
9702/14 N25	12	multiple choice	1
9702/21 N25	2	short answer	12
9702/11 J25	14	multiple choice	1
9702/11 J25	16	multiple choice	1
9702/12 J25	14	multiple choice	1
9702/13 J25	13	multiple choice	1
9702/14 J25	13	multiple choice	1
9702/12 M25	10	multiple choice	1
9702/21 N24	1	calculation	7

5.1 Energy conservation

12 questions, 22 marks • multiple choice x11, short answer

Source	Q	Type	Marks
9702/11 N25	19	multiple choice	1
9702/12 N25	19	multiple choice	1
9702/12 N25	20	multiple choice	1
9702/14 N25	16	multiple choice	1
9702/14 N25	18	multiple choice	1
9702/11 J25	18	multiple choice	1
9702/12 J25	19	multiple choice	1
9702/12 J25	20	multiple choice	1
9702/13 J25	17	multiple choice	1
9702/14 J25	14	multiple choice	1
9702/14 J25	15	multiple choice	1
9702/21 N24	3	short answer	11

5.2 Gravitational potential energy and kinetic energy

12 questions, 22 marks • multiple choice x11, calculation

Source	Q	Type	Marks
9702/11 N25	17	multiple choice	1
9702/11 N25	18	multiple choice	1
9702/12 N25	17	multiple choice	1
9702/12 N25	18	multiple choice	1
9702/14 N25	17	multiple choice	1
9702/14 N25	19	multiple choice	1
9702/11 J25	17	multiple choice	1
9702/12 J25	18	multiple choice	1
9702/13 J25	18	multiple choice	1
9702/13 J25	19	multiple choice	1
9702/24 J25	3	calculation	11
9702/12 M25	15	multiple choice	1

6.1 Stress and strain

10 questions, 18 marks • multiple choice x9, short answer

Source	Q	Type	Marks
9702/11 N25	21	multiple choice	1
9702/12 N25	21	multiple choice	1
9702/12 N25	22	multiple choice	1
9702/14 N25	20	multiple choice	1
9702/14 N25	23	multiple choice	1
9702/21 N25	3	short answer	9
9702/11 J25	21	multiple choice	1
9702/11 J25	22	multiple choice	1
9702/11 J25	23	multiple choice	1
9702/12 J25	21	multiple choice	1

6.2 Elastic and plastic behaviour

9 questions, 9 marks • multiple choice x9

Source	Q	Type	Marks
9702/11 N25	20	multiple choice	1
9702/11 N25	23	multiple choice	1
9702/12 N25	23	multiple choice	1
9702/14 N25	21	multiple choice	1
9702/12 J25	22	multiple choice	1
9702/12 J25	23	multiple choice	1
9702/13 J25	23	multiple choice	1
9702/14 J25	18	multiple choice	1
9702/12 M25	19	multiple choice	1

7.1 Progressive waves

10 questions, 22 marks • multiple choice x8, short answer x2

Source	Q	Type	Marks
9702/12 N25	25	multiple choice	1
9702/12 N25	26	multiple choice	1
9702/14 N25	24	multiple choice	1
9702/11 J25	26	multiple choice	1
9702/13 J25	24	multiple choice	1
9702/13 J25	26	multiple choice	1
9702/14 J25	20	multiple choice	1
9702/21 J25	5	short answer	6
9702/22 J25	3	short answer	8
9702/12 M25	25	multiple choice	1

7.2 Transverse and longitudinal waves

7 questions, 7 marks • multiple choice x7

Source	Q	Type	Marks
9702/11 N25	24	multiple choice	1
9702/11 N25	25	multiple choice	1
9702/12 N25	24	multiple choice	1
9702/11 J25	25	multiple choice	1
9702/12 J25	25	multiple choice	1
9702/12 J25	28	multiple choice	1
9702/14 J25	21	multiple choice	1

7.3 Doppler effect for sound waves

7 questions, 7 marks • multiple choice x7

Source	Q	Type	Marks
9702/11 N25	27	multiple choice	1
9702/12 N25	27	multiple choice	1
9702/14 N25	27	multiple choice	1
9702/11 J25	24	multiple choice	1
9702/12 J25	26	multiple choice	1
9702/14 J25	22	multiple choice	1
9702/12 M25	24	multiple choice	1

7.4 Electromagnetic spectrum

7 questions, 7 marks • multiple choice x7

Source	Q	Type	Marks
9702/14 N25	25	multiple choice	1
9702/11 J25	27	multiple choice	1
9702/12 J25	5	multiple choice	1
9702/13 J25	27	multiple choice	1
9702/14 J25	23	multiple choice	1
9702/12 M25	22	multiple choice	1
9702/12 M25	23	multiple choice	1

7.5 Polarisation

8 questions, 15 marks • multiple choice x7, short answer

Source	Q	Type	Marks
9702/11 N25	26	multiple choice	1
9702/14 N25	28	multiple choice	1
9702/11 J25	28	multiple choice	1
9702/12 J25	27	multiple choice	1
9702/13 J25	25	multiple choice	1
9702/14 J25	24	multiple choice	1
9702/23 J25	5	short answer	8
9702/12 M25	26	multiple choice	1

8.1 Stationary waves

10 questions, 25 marks • multiple choice x8, short answer, long answer

Source	Q	Type	Marks
9702/11 N25	29	multiple choice	1
9702/12 N25	30	multiple choice	1
9702/14 N25	29	multiple choice	1
9702/24 N25	4	short answer	9
9702/11 J25	29	multiple choice	1
9702/11 J25	31	multiple choice	1
9702/12 J25	24	multiple choice	1
9702/12 J25	30	multiple choice	1
9702/14 J25	25	multiple choice	1
9702/22 M25	4	long answer	8

8.2 Diffraction

6 questions, 15 marks • multiple choice x5, short answer

Source	Q	Type	Marks
9702/12 N25	28	multiple choice	1
9702/14 N25	26	multiple choice	1
9702/21 N25	4	short answer	10
9702/13 J25	30	multiple choice	1
9702/14 J25	26	multiple choice	1
9702/12 M25	28	multiple choice	1

8.3 Interference

10 questions, 32 marks • multiple choice x7, long answer, short answer, calculation

Source	Q	Type	Marks
9702/11 N25	28	multiple choice	1
9702/12 N25	31	multiple choice	1
9702/14 N25	31	multiple choice	1
9702/22 N25	4	long answer	8
9702/12 J25	31	multiple choice	1
9702/13 J25	28	multiple choice	1
9702/14 J25	27	multiple choice	1
9702/21 J25	4	short answer	8
9702/12 M25	27	multiple choice	1
9702/21 N24	6	calculation	9

8.4 The diffraction grating

8 questions, 15 marks • multiple choice x7, short answer

Source	Q	Type	Marks
9702/11 N25	30	multiple choice	1
9702/12 N25	29	multiple choice	1
9702/14 N25	30	multiple choice	1
9702/11 J25	30	multiple choice	1
9702/12 J25	29	multiple choice	1
9702/14 J25	28	multiple choice	1
9702/23 J25	6	short answer	8
9702/12 M25	29	multiple choice	1

9.1 Electric current

8 questions, 20 marks • multiple choice x7, calculation

Source	Q	Type	Marks
9702/11 N25	32	multiple choice	1
9702/14 N25	35	multiple choice	1
9702/12 J25	34	multiple choice	1
9702/13 J25	4	multiple choice	1
9702/13 J25	32	multiple choice	1
9702/14 J25	29	multiple choice	1
9702/12 M25	30	multiple choice	1
9702/22 M25	6	calculation	13

9.2 Potential difference and power

5 questions, 14 marks • multiple choice x4, short answer

Source	Q	Type	Marks
9702/11 N25	31	multiple choice	1
9702/12 N25	32	multiple choice	1
9702/11 J25	34	multiple choice	1
9702/14 J25	30	multiple choice	1
9702/22 J25	6	short answer	10

9.3 Resistance and resistivity

12 questions, 35 marks • multiple choice x9, short answer x2, calculation

Source	Q	Type	Marks
9702/11 N25	33	multiple choice	1
9702/12 N25	33	multiple choice	1
9702/14 N25	32	multiple choice	1
9702/14 N25	34	multiple choice	1
9702/24 N25	5	short answer	10
9702/11 J25	32	multiple choice	1
9702/11 J25	33	multiple choice	1
9702/11 J25	35	multiple choice	1
9702/12 J25	33	multiple choice	1
9702/13 J25	34	multiple choice	1
9702/23 J25	7	calculation	8
9702/24 J25	5	short answer	8

10.1 Practical circuits

12 questions, 29 marks • multiple choice x10, short answer, calculation

Source	Q	Type	Marks
9702/11 N25	35	multiple choice	1
9702/12 N25	34	multiple choice	1
9702/14 N25	33	multiple choice	1
9702/14 N25	37	multiple choice	1
9702/22 N25	5	short answer	11
9702/11 J25	37	multiple choice	1
9702/12 J25	35	multiple choice	1
9702/13 J25	36	multiple choice	1
9702/14 J25	33	multiple choice	1
9702/12 M25	34	multiple choice	1
9702/12 M25	36	multiple choice	1
9702/21 N24	7	calculation	8

10.2 Kirchhoff's laws

12 questions, 28 marks • multiple choice x10, short answer, calculation

Source	Q	Type	Marks
9702/11 N25	34	multiple choice	1
9702/11 N25	37	multiple choice	1
9702/12 N25	37	multiple choice	1
9702/14 N25	36	multiple choice	1
9702/21 N25	5	short answer	10
9702/11 J25	36	multiple choice	1
9702/12 J25	37	multiple choice	1
9702/13 J25	35	multiple choice	1
9702/14 J25	34	multiple choice	1
9702/14 J25	35	multiple choice	1
9702/24 J25	6	calculation	8
9702/12 M25	35	multiple choice	1

10.3 Potential dividers

3 questions, 3 marks • multiple choice x3

Source	Q	Type	Marks
9702/12 N25	35	multiple choice	1
9702/12 N25	36	multiple choice	1
9702/14 J25	36	multiple choice	1

11.1 Atoms, nuclei and radiation

12 questions, 42 marks • multiple choice x8, short answer x4

Source	Q	Type	Marks
9702/11 N25	38	multiple choice	1
9702/11 N25	39	multiple choice	1
9702/12 N25	39	multiple choice	1
9702/12 N25	40	multiple choice	1
9702/14 N25	38	multiple choice	1
9702/14 N25	39	multiple choice	1
9702/21 N25	6	short answer	9
9702/24 N25	6	short answer	10
9702/11 J25	39	multiple choice	1
9702/12 J25	38	multiple choice	1
9702/21 J25	7	short answer	8
9702/21 N24	5	short answer	7

11.2 Fundamental particles

11 questions, 19 marks • multiple choice x10, short answer

Source	Q	Type	Marks
9702/11 N25	40	multiple choice	1
9702/12 N25	38	multiple choice	1
9702/14 N25	40	multiple choice	1
9702/22 N25	6	short answer	9
9702/11 J25	38	multiple choice	1
9702/11 J25	40	multiple choice	1
9702/12 J25	39	multiple choice	1
9702/12 J25	40	multiple choice	1
9702/13 J25	33	multiple choice	1
9702/13 J25	38	multiple choice	1
9702/13 J25	39	multiple choice	1

12.1 Kinematics of uniform circular motion

4 questions, 43 marks • short answer x2, calculation x2

Source	Q	Type	Marks
9702/41 N25	1	short answer	15
9702/42 N25	1	calculation	9
9702/42 J25	1	short answer	10
9702/42 M25	1	calculation	9

12.2 Centripetal acceleration

3 questions, 33 marks • calculation x2, short answer

Source	Q	Type	Marks
9702/41 N25	1	short answer	15
9702/42 N25	1	calculation	9
9702/42 M25	1	calculation	9

13.1 Gravitational field

3 questions, 30 marks • short answer x3

Source	Q	Type	Marks
9702/41 N25	3	short answer	9
9702/44 J25	1	short answer	11
9702/43 N23	1	short answer	10

13.2 Gravitational force between point masses

4 questions, 41 marks • short answer x3, calculation

Source	Q	Type	Marks
9702/41 J25	1	short answer	9
9702/43 J25	1	short answer	9
9702/43 N24	1	short answer	12
9702/42 J23	1	calculation	11

13.3 Gravitational field of a point mass

3 questions, 29 marks • short answer x3

Source	Q	Type	Marks
9702/41 N25	3	short answer	9
9702/43 J25	1	short answer	9
9702/44 J25	1	short answer	11

13.4 Gravitational potential

3 questions, 25 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/41 J25	1	short answer	9
9702/43 J25	1	short answer	9
9702/42 M25	2	calculation	7

14.1 Thermal equilibrium

3 questions, 30 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/44 J25	2	calculation	7
9702/42 M25	3	short answer	12
9702/43 J23	3	short answer	11

14.2 Temperature scales

3 questions, 29 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/41 N25	4	calculation	10
9702/43 J24	2	short answer	7
9702/42 J23	2	short answer	12

14.3 Specific heat capacity and specific latent heat

4 questions, 38 marks • short answer x3, calculation

Source	Q	Type	Marks
9702/41 J25	3	short answer	9
9702/42 J25	3	short answer	13
9702/43 J25	3	short answer	9
9702/44 J25	2	calculation	7

15.1 The mole

3 questions, 31 marks • short answer x3

Source	Q	Type	Marks
9702/43 N24	3	short answer	8
9702/42 M25	3	short answer	12
9702/42 M23	8	short answer	11

15.2 Equation of state

3 questions, 30 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/42 J25	4	short answer	8
9702/44 J25	3	calculation	10
9702/43 J23	4	short answer	12

15.3 Kinetic theory of gases

4 questions, 41 marks • short answer x3, calculation

Source	Q	Type	Marks
9702/41 J25	4	short answer	8
9702/43 J25	4	short answer	8
9702/41 N23	3	calculation	13
9702/41 J23	4	short answer	12

16.1 Internal energy

3 questions, 28 marks • short answer x3

Source	Q	Type	Marks
9702/41 J25	4	short answer	8
9702/43 J25	4	short answer	8
9702/43 J24	3	short answer	12

16.2 The first law of thermodynamics

3 questions, 32 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/43 N25	2	short answer	8
9702/41 N23	2	short answer	12
9702/42 M23	2	calculation	12

17.1 Simple harmonic oscillations

6 questions, 57 marks • short answer x4, calculation x2

Source	Q	Type	Marks
9702/42 N25	5	short answer	10
9702/44 N25	4	short answer	10
9702/42 J25	5	short answer	9
9702/43 J25	5	calculation	8
9702/44 J25	4	short answer	8
9702/42 M25	4	calculation	12

17.2 Energy in simple harmonic motion

3 questions, 31 marks • calculation x3

Source	Q	Type	Marks
9702/43 J25	5	calculation	8
9702/42 M25	4	calculation	12
9702/42 J23	4	calculation	11

17.3 Damped and forced oscillations, resonance

3 questions, 27 marks • short answer x3

Source	Q	Type	Marks
9702/42 N25	5	short answer	10
9702/44 J25	7	short answer	8
9702/43 N23	4	short answer	9

18.1 Electric fields and field lines

3 questions, 39 marks • short answer x3

Source	Q	Type	Marks
9702/41 J24	5	short answer	13
9702/41 J24	5	short answer	13
9702/43 J24	5	short answer	13

18.2 Uniform electric fields

2 questions, 22 marks • calculation, short answer

Source	Q	Type	Marks
9702/42 J25	6	calculation	11
9702/42 M25	6	short answer	11

18.3 Electric force between point charges

3 questions, 34 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/41 J25	2	short answer	11
9702/43 J25	2	calculation	11
9702/42 M23	4	short answer	12

18.4 Electric field of a point charge

2 questions, 19 marks • long answer, short answer

Source	Q	Type	Marks
9702/44 N25	5	long answer	9
9702/44 J25	5	short answer	10

18.5 Electric potential

3 questions, 29 marks • short answer x2, long answer

Source	Q	Type	Marks
9702/41 N25	5	short answer	10
9702/44 N25	5	long answer	9
9702/44 J25	5	short answer	10

19.1 Capacitors and capacitance

4 questions, 40 marks • short answer x2, calculation, long answer

Source	Q	Type	Marks
9702/41 N25	6	short answer	11
9702/42 M25	5	calculation	9
9702/42 N24	7	short answer	10
9702/42 J24	6	long answer	10

19.2 Energy stored in a capacitor

3 questions, 31 marks • calculation x2, short answer

Source	Q	Type	Marks
9702/41 N25	6	short answer	11
9702/42 M24	4	calculation	10
9702/42 M23	5	calculation	10

19.3 Discharging a capacitor

4 questions, 40 marks • short answer x3, calculation

Source	Q	Type	Marks
9702/42 J25	7	short answer	10
9702/41 N24	6	short answer	11
9702/43 J24	6	calculation	10
9702/43 J23	5	short answer	9

20.1 Concept of a magnetic field

2 questions, 20 marks • short answer, calculation

Source	Q	Type	Marks
9702/43 J23	6	short answer	10
9702/44 J25	6	calculation	10

20.2 Force on a current-carrying conductor

3 questions, 32 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/43 J25	7	short answer	10
9702/44 J25	6	calculation	10
9702/43 N23	6	short answer	12

20.3 Force on a moving charge

2 questions, 21 marks • short answer x2

Source	Q	Type	Marks
9702/43 J25	7	short answer	10
9702/42 M25	6	short answer	11

20.4 Magnetic fields due to currents

1 question, 10 marks • short answer

Source	Q	Type	Marks
9702/43 J23	6	short answer	10

20.5 Electromagnetic induction

3 questions, 28 marks • short answer x3

Source	Q	Type	Marks
9702/41 N25	7	short answer	11
9702/44 J25	7	short answer	8
9702/42 M25	7	short answer	9

21.1 Characteristics of alternating currents

4 questions, 37 marks • short answer x2, calculation x2

Source	Q	Type	Marks
9702/42 N25	7	short answer	8
9702/41 J24	7	short answer	10
9702/42 N23	4	calculation	11
9702/43 N23	7	calculation	8

21.2 Rectification and smoothing

5 questions, 59 marks • calculation x4, short answer

Source	Q	Type	Marks
9702/44 N25	6	calculation	15
9702/41 J25	6	calculation	12
9702/42 J25	8	calculation	10
9702/43 J25	6	calculation	12
9702/44 J25	8	short answer	10

22.1 Energy and momentum of a photon

3 questions, 31 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/41 N25	8	short answer	11
9702/42 M25	8	short answer	10
9702/41 N23	8	calculation	10

22.2 Photoelectric effect

3 questions, 25 marks • short answer x3

Source	Q	Type	Marks
9702/44 N25	9	short answer	8
9702/42 J25	9	short answer	8
9702/41 N24	8	short answer	9

22.3 Wave-particle duality

3 questions, 30 marks • short answer x2, long answer

Source	Q	Type	Marks
9702/41 J25	8	short answer	13
9702/44 J25	9	short answer	8
9702/42 N24	9	long answer	9

22.4 Energy levels in atoms and line spectra

2 questions, 22 marks • long answer, calculation

Source	Q	Type	Marks
9702/42 N25	8	long answer	10
9702/42 J24	8	calculation	12

23.1 Mass defect and nuclear binding energy

3 questions, 32 marks • short answer x2, calculation

Source	Q	Type	Marks
9702/42 N25	9	calculation	13
9702/44 J25	11	short answer	9
9702/42 M25	9	short answer	10

23.2 Radioactive decay

4 questions, 44 marks • short answer x4

Source	Q	Type	Marks
9702/44 N25	8	short answer	15
9702/41 J25	9	short answer	10
9702/42 J25	10	short answer	9
9702/43 J25	9	short answer	10

24.1 Production and use of ultrasound

4 questions, 34 marks • short answer x2, calculation, long answer

Source	Q	Type	Marks
9702/41 N25	10	short answer	8
9702/44 J25	10	short answer	9
9702/43 J23	8	calculation	8
9702/42 M23	9	long answer	9

24.2 Production and use of X-rays

3 questions, 30 marks • short answer x3

Source	Q	Type	Marks
9702/43 J24	8	short answer	13
9702/43 N23	10	short answer	8
9702/42 J23	10	short answer	9

24.3 PET scanning

1 question, 15 marks • short answer

Source	Q	Type	Marks
9702/44 N25	8	short answer	15

25.1 Standard candles

3 questions, 29 marks • short answer x3

Source	Q	Type	Marks
9702/42 M25	10	short answer	11
9702/43 J24	10	short answer	9
9702/42 M23	10	short answer	9

25.2 Stellar radii

2 questions, 20 marks • short answer x2

Source	Q	Type	Marks
9702/41 J25	10	short answer	10
9702/43 J25	10	short answer	10

25.3 Hubble's law and the Big Bang theory

2 questions, 20 marks • short answer x2

Source	Q	Type	Marks
9702/41 J25	10	short answer	10
9702/43 N24	10	short answer	10