

END TERM 3 2026

GRADE 10

PHYSICS

MARKING SCHEME & TEACHER'S GUIDE

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MARKING PRINCIPLES

- Accept equivalent scientifically correct responses consistent with the Grade 10 Physics Curriculum Design.
- Award marks for distinct valid points; do not double-award repeated ideas.
- Numerical answers require appropriate formula, substitution and correct unit where applicable.
- For diagram-based questions, award marks for correct interpretation of the supplied figure and accept equivalent technically correct wording.

DETAILED MARKING SCHEME

Item	Expected Answer / Marking Points	Allocation	Marks
1(a)	Density of liquid; depth below free surface.	1 each	2
1(b)	$P = \rho gh = 800 \times 10 \times 2.5 = 20,000 \text{ Pa}.$	3	3
1(c)	Any two: drinking straw, syringe, siphon, hydraulic machines, bicycle pump, or another valid curriculum application.	1 each	2
1(d)	Greater depth means greater column/weight of liquid above a point; hence greater force per unit area/pressure.	3	3
2(a)	Pascal's principle: pressure applied to an enclosed fluid is transmitted throughout the fluid.	2	2
2(b)	Pressure is transmitted through the fluid; larger piston has larger area; same pressure therefore produces larger force $F = PA.$	1 each	3
2(c)	Any two: braking systems, hydraulic machines, water pumping or other valid curriculum application.	1 each	2
2(d)	Any three valid safety precautions relevant to hydraulic equipment.	1 each	3
3(a)	Ductility: ability to be drawn into wires. Malleability: ability to be hammered/rolled into sheets. Elasticity: ability to regain original shape after removal of deforming force.	1 each	3
3(b)	$\text{Stress} = F/A = 100/(2.0 \times 10^{-6}) = 5.0 \times 10^7 \text{ Pa}.$	2	2
3(c)	Any two: expansion joints;	1 each	2

	bimetallic devices/thermostats; temperature measurement; other curriculum application.		
3(d)	Allows expansion/contraction with temperature change and prevents excessive stress, buckling or damage.	3	3
4(a)	Clockwise moment equals anticlockwise moment about the same pivot for equilibrium.	2	2
4(b)	Moment = force $\times$ perpendicular distance = $40 \times 0.20 = 8 \text{ N m}$.	2	2
4(c)	Any two: position of centre of gravity; base/support; distribution of mass; height of centre of gravity.	1 each	2
4(d)	Gravitational potential energy decreases and is transformed mainly into kinetic energy; mechanical energy is conserved ideally, with possible heat/sound losses.	4	4
5(a)	Amplitude and wavelength.	3	3
5(b)	Any two: reflection, refraction, diffraction, interference, formation/properties of stationary waves.	1 each	2
5(c)	Observed frequency changes because of relative motion; approaching source gives higher apparent frequency and receding source lower apparent frequency.	3	3
5(d)	Any two valid applications of stationary waves/resonance, including musical instruments or vibrating air columns/strings.	1 each	2
6(a)	Time taken for half the original nuclei in a radioactive sample to decay.	2	2
6(b)	Read initial N; identify $N/2$; locate corresponding time interval on graph; use repeated half-life intervals if necessary.	1 each	3

6(c)	Any three: shielding, minimise exposure time, increase distance, safe storage/handling, monitoring, controlled disposal.	1 each	3
6(d)	Fission splits a heavy nucleus; fusion combines light nuclei; both can release energy.	1 each	2
7(a)	$V = IR$ for an ohmic conductor under constant physical conditions.	2	2
7(b)	$R = V/I = 12/3 = 4 \Omega$.	2	2
7(c)	Any two: voltmeter-ammeter method; V-I graph; Wheatstone/metre bridge; resistor colour code where applicable.	1 each	2
7(d)	Any two valid uses: current limiting/protection, voltage/current control, circuit biasing/function, heat-producing applications where appropriate.	1 each	2
7(e)	Any two: avoid exposed conductors; correct fuse/earthing; switch off before work; avoid overloading; appropriate protective equipment.	1 each	2
8(a)	Solar radiation enters and warms Earth; Earth emits heat; greenhouse gases absorb/re-emit part of outgoing radiation, retaining heat.	3	3
8(b)	Any two: increased greenhouse gases; deforestation/land-use change; atmospheric composition changes; other curriculum-supported factor.	1 each	2
8(c)	Any one explained effect: altered rainfall/weather, warming, environmental degradation, ecosystem impacts, etc.	2	2
8(d)	Any two: weather monitoring, communication/navigation, environmental observation, planetary observation, climate/disaster monitoring.	1 each	2
8(e)	Any valid career and	1	1

	relevant role, e.g. astronomer, space scientist, engineer, astronaut, satellite specialist.		
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CURRICULUM TRACEABILITY

Q	Strand	Sub-strand(s)	Coverage
1	1.0 Mechanics and Thermal Physics	1.2 Pressure	Atmospheric pressure; pressure in fluids; $P=\rho gh$; applications
2	1.0 Mechanics and Thermal Physics	1.2 Pressure	Transmission of pressure; hydraulic applications
3	1.0 Mechanics and Thermal Physics	1.3 Mechanical Properties; 1.4 Temperature and Thermal Expansion	Material properties, stress; thermal expansion
4	1.0 Mechanics and Thermal Physics	1.5 Moments and Equilibrium; 1.6 Energy, Work, Power and Machines	Moments, stability, energy transformation
5	2.0 Waves and Optics	2.1 Properties of Waves	Wave properties, stationary waves, resonance, Doppler effect
6	2.0 Waves and Optics	2.2 Radioactivity and Stability of Isotopes	Half-life, radiation safety, fission/fusion
7	3.0 Electricity and Magnetism	3.1 Electrostatics; 3.2 Current Electricity	Current, voltage, resistance and applications
8	4.0 Environmental and Space Physics	4.1 Greenhouse Effect and Climate Change; 4.2 Introduction to Space Physics	Climate change, greenhouse effect, space technology/careers

DIAGRAM / FIGURE GUIDE

- Figure 1 — Hydraulic system: Pascal's principle, force multiplication and applications.
- Figure 2 — Lever: principle of moments and stability.
- Figure 3 — Transverse wave: amplitude, wavelength and wave properties.
- Figure 4 — Radioactive decay curve: half-life interpretation.
- Figure 5 — Series circuit: current, potential difference and resistance.
- Figure 6 — Greenhouse effect: climate and environmental physics.

TOTAL MARK VERIFICATION

Section A = 30 marks; Section B = 30 marks; Section C = 20 marks; TOTAL = 80 marks. The assessment samples all 12 sub-strands listed in the Grade 10 Physics curriculum summary.