

Principal Assessor Report – Summer 2001

Principal Assessor:

Dr J L Page

Assessment Panel:

Physics

Lead Officer:

Hugh McGill

Qualification area

**Subject - Levels
included in this report**

Physics - Higher, SCE Higher

Comments on candidate performance

Areas of external assessment in which candidates performed well

Higher

- 21 (b) prediction and explanation of the effect on the distance travelled by a box in a given time when the angle of an applied force was altered.
- 22 (b) explanations, in terms of the kinetic model, of the effect of changing volume on the pressure of a trapped mass of gas were logically set out; many candidates were aware of the importance of the time element in the collisions between the molecules and the walls of the container
- 23 (b) understanding of the transfer of energy between electrostatic (QV) and kinetic
- 25 (b) calculation of the number of photons in a given energy of light of a stated frequency; few candidates tried to apply the relationship $I = Nh\nu$.
- 26 better understanding of "saturation of an amplifier" rather than stating that "voltage saturated".
- 27 analysis showing that the ray of light was totally internally reflected.

Areas of external assessment in which candidates had difficulty

Higher

- 22 common error: stating that increasing the volume of the gas decreases the absolute error in volume.
- 23 (a) units of impulse
(b) some candidates tried to apply the relationship for the energy stored in a capacitor.
- 28 (a) explanations of the term "stimulated emission" of radiation often lacked clarity; some candidates confused this with the photoelectric effect.
(b) (ii) by far the most difficult question even for better candidates; many applied the inverse square law to the intensity of the laser beam

Areas of common misunderstanding

Higher

- 28 Many candidates applied the inverse square law relationship to the intensity of the laser beam.

Feedback to centres

- Candidates should be aware that increasing the size of a quantity has no effect on the absolute uncertainty but lowers the percentage uncertainty.
- In general candidates should be encouraged to use complete relationships such as in the gas laws; many who attempted a simple proportionality calculation made mistakes.
- The unit of impulse was often given incorrectly as N s^{-1} rather than N s .
- While not as common a problem as in previous years many candidates continue to confuse use of the energy relationships $E = QV$ and $E = \frac{1}{2}QV$.
- Candidates should be advised to take great care when reading the units in graphs. The use of **ms** instead of **s** is often overlooked.
- When asked to use information to verify a given value, as in Q 23 (a) (ii), candidates should be aware that all logical steps must be clearly shown in their responses.
- In responses to questions on operational amplifiers such as Q 26 (a) (iii) the correct terminology is "saturation of the amplifier" not "saturation of the voltage".
- Where a question requires a calculation in order to predict an effect, as in 27 (b) (ii), the response must clearly state the prediction.
- Many candidates were not aware that the inverse square law for the intensity of light applies to point sources not to laser beams.
- Many candidates had difficulty explaining the term "stimulated emission" of radiation.

