Phys2023 Wave Physics February 2006

Overall, most marks were lost for

- not attempting all parts of a question
- accounts which were scant, inaccurate or lacking in rigour
- failure to read the question
- poor diagrams

Section A **mean 16.1/20**

A1 Transverse & longitudinal waves **mean 3.5**

Well answered, though the final part generally showed little depth of thought. Note that it was possible to condense a good answer into 5-6 lines.

A2 Sinusoidal wave parameters **mean 3.2**

Rarely gave fundamental difficulties, except that a fair number lost track of πs. A depressing minority through the speed to be given by dy/dx. Few gave any units for the wavenumber k.

A3 Huygens model of refraction **mean 3.2**

Mostly well answered, though the diagrams were rather varied.

A4 Interference **mean 3.1**

Various degrees of clarity in the initial definition. Several referred to waves *interacting* which, in linear media, isn't true: their displacements *add*. Clearer diagrams would in several cases have helped avoid later mistakes. A few used the formula for the centre of the first interference *maximum*.

A5 Boundary conditions **mean 2.8**

Most students could probably understand all this, so marks reflected the clarity of the answer. A handful confused boundary conditions with continuity conditions; as not all books make this distinction (which should however have been clear from context), marking was lenient.

(averages include those papers from which the question was omitted entirely)

Section B **mean 23.5/40**

B1 Waves on strings **42 attempts mean 13.8**

Attempted by all students. Marks were generally lost by sloppiness and omissions. A few incorrectly interpreted the musical notation to imply the fourth harmonic of the string.

B2 Fraunhofer diffraction **3 attempts mean 9.7**

Sloppy definitions of Fraunhofer diffraction, but otherwise well answered as far as attempted.

B3 Fourier transforms **2 attempts mean 18.2**

Unpopular, but done very well.

B4 Dispersion **36 attempts score 9.5**

Popular but, as usually attempted last, often incomplete. A minority demonstrated surprising confusion over the meanings of dispersion, phase velocity and group velocity.