

Exam Report

Module Code/Title: PHYS3002/Nuclei and Particles

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Many of you did well, more than 20% of you achieved a first-class mark. The exam paper was not quite easy so those who did well has demonstrated their good knowledge of Nuclei and Particle physics, that they worked hard and should be proud by themselves.

Section A

A1. Done well by almost all students. Mistakes were mostly not including all possible spin states for the second part.

A2. No problems here with the physics, although some creative use of logarithm rules occasionally led to incorrect solutions.

A3. Most B/A plots were incomplete, often not labelling the Fe point or including the structure for small A. Very few students successfully completed the second part - the error was almost always forgetting to subtract the mass of the electrons. A small number used the SEMF successfully.

A4. A range of explanations for the neutrino evidence, some lacking in detail. Most students could name at least one property of the neutrino although few listed all 4. Last part mostly done well.

A5. Very few correct solutions. A common mistake was to use $T = mv^2/2$. Also often there was calculation of E and pc and then a statement that they are equal, even though they clearly are not from the work done already.

Section B

B1. This was the most popular problem which you have chosen. Many students did a)-c) well -- which was indication that they have been following notes and did the course work. The complete solution problem d) took place less often -- looks like some students have still some problems with the simple event kinematics.

B2. Those who has chosen this question, did it quite well for its part a)-c). Part d) caused more problems --- it was bit disappointing to me, that some of you could not write a simple Fourier-transform formula for $F(q)$.

C1. This question was less popular than C2 one. Most of you who has chosen this question did a good job. However some students were not able to write diagrams for weak interactions. The question d) was the most problematic for some students, indicating that those students did not bother to solve course work problems.

C2. This question was quite popular, but only about half students have managed to draw the complete set of the diagrams for vertices involved in the strong interactions. The last question g) also was a problem for some students, who eventually did not bother to solve course work problems on particle kinematics.