



## **BSc/MSci EXAMINATION**

PHY-312 Explaining the Universe

Time Allowed: 2 hours 15 minutes

Date: 22 May 2006

Time: 10:00 – 12:15

**Answer ONE question from Section A and TWO questions from Section B. The indicative marks are for each question in Section A, 25 marks; and for each question in Section B, 12.5 marks. The coursework carries 50 marks.**

**DO NOT TURN TO THE FIRST PAGE OF THE QUESTION PAPER UNTIL INSTRUCTED TO DO SO BY THE INVIGILATOR**



## SECTION A

Answer ONE question from this Section

### QUESTION 1

In an essay of 1200 to 1500 words explain to a history undergraduate the significance of any one major discovery in physics made in the twentieth century.

### QUESTION 2

The ATLAS Experiment for the Large Hadron Collider (LHC) involves the participation of some 2000 physicists. Write an essay (1200 to 1500 words) on the implications for the future direction of research in physics of the need for such enormous undertakings. You may wish to comment on any or all of the following:

- possible distortions (personnel, financial) in the balance of research
- the difficulties inherent in setting long term plans for research
- fitting three year PhD students into giant ten year programmes.

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## **SECTION B**

**Answer TWO questions from this Section**

### **QUESTION 3**

A friend who is not a scientist asks you to explain what physicists mean when they talk about “Heisenberg’s uncertainty principle”. Give an answer in 500 to 600 words.

### **QUESTION 4**

You have been invited to give a talk to a school science club in which you explain what is meant by “nanotechnology”. Write 500 to 600 words in preparation for your talk.

### **QUESTION 5**

Write an essay (500 to 600 words) on dark matter.

**End of Examination Paper**

**Professor John M Charap**