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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**University Village, NnamdiAzikiwe Expressway, Plot 91, Cadastral Zone, Jabi, Abuja**

**FACULTY OF SCIENCES**

**Department of Pure and Applied Science**

 **JANUARY/FEBRUARY 2018 EXAMINATION**

**COURSE CODE: PHY311**

**COURSE TITLE: KENETIC THEORY AND STATISTICAL MECHANICS**

**COURSE UNIT: 3 units**

**TIME: 3 HOURS**

**ANSWER QUESTIONS ONE AND ANY FOUR OTHER QUESTIONS**

**Question 1**

1. Explain briefly the three general types of ensemble. [9 marks]
2. Show that the Partition Function for individual particles of an Ideal Monoatomic Gas of volume V is given by:

$$Z=\frac{V}{h^{3}}\left(2mπK\_{B}T\right)^{3/2}$$

 [13 marks]

Q2. a. Calculate Cf for copper, given density=9gcm 3 , atomic weight = 63.5 and valency equal to one. 5 marks

b. state the multiplication rule 5 marks

c. Four coins are flipped in succession. Find the total number of possible outcomes. 5 marks

Q3.

a) Seven physicists assembled for a meeting shake hands with one another. How many handshakes take place? 8 marks

b. list the concepts of statistical mechanics in order of dependence. 7 marks

Q4.

a) Explain the three types of ensemble in detailed form. 9 marks

b) List three (3) factors in which partition function is applicable. 6 marks

Q5.

a) State equipartition theorem. 5 marks

b) What are the three types of degree of freedoms? 5 marks

c) Explain classical statistics. 5 marks

Q6. (a) An unbiased die is rolled; 9 marks

(i) Write down the sample space for the experiment

 (ii) n coins are tossed, what is the sample space

(b) Two coins are tossed. What is the probability that : 6 marks

(i) Two head appears (c) at least one tail appears.