(b) Comment on relative performances of various types of fuel cells. **15,5**

8. Write notes on the following :

(i) Voltage-Current Characteristics of fuel cell

(ii) Hydride Batteries. **8,12**

DD-283

M. Sc. EXAMINATION, May 2018

(Fourth Semester)

(Main & Re-appear)

PHYSICS

PHY606B

Renewable Energy Sources

Time : 3 *Hours*] [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) What is direct and indirect gap semiconductor materials. Explain with diagram.

(b) Show that $n_0 p_0 = n_i^2$ in semiconductor. **10,10**

2. (a) Discuss interrelationship between absorption coefficients and band gap recombination of carries.

(b) A *p*-type silicon has effective density of states in the valence band as 1×10^{22} per cm^3. An impurity from the third group with concentration of 1×10^{19} per cm^3 is added. If the band gap for silicon is 1.1 eV, find the closeness of the Fermi level with valance band at the temperature of 27K. **10,10**

Unit II

3. (a) Explain how the variation of isolation (incident solar radiation) and temperature affects the current-voltage characteristics of a solar cell. Discuss fill factor and solar efficiency.

(b) Describe the principles of Photo-electrochemical solar cells. **10,10**

4. Write the principal and working of (a) Polymer solar cell and (b) Tandem solar cell. **10,10**

Unit III

5. Write various methods for production of Hydrogen ? Describe production of hydrogen through photo electrolysis.

6. Describe the formation of metal hydrides using PC-isotherm and explain Van't Hoff plot. **10,10**

Unit IV

7. (a) Write down basic principle and working of MCFC and SOFC and derive equation of efficiency of a fuel cell ?