8. Write the principle and operation of fuel cells. Also explain its-thermodynamics of a fuel cell, Power per Cell and Cell Efficiency. **20**

No. of Printed Pages : 04 **Roll No. .....**

DD283

M. Sc. EXAMINATION, May 2019

(Fourth Semester)

(B. Scheme) (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) Discuss and derive electron, hole concentration in extrinsic semiconductor.

(b) Explain difference between Photoelectric effect and photovoltaic effect. **10,10**

2. (a) Explain interrelationship between absorption coefficient and band gap recombination of carriers.

(b) What are direct and indirect gap materials ? Explain with the help of suitable diagrams and give the examples. **10,10**

Unit II

3. (a) Draw and explain the V-I characteristics of a *p-n* junction and show how temperature change affects the characteristics. Also define the solar cell parameters.

(b) Explain the main features of different type of solar cells based on the active material used and their fabrication. **10,10**

4. (a) Considering solar radiation of 200 J/m^2 and per unit time during daylight, find the area of PV cells needed to generate enough electric power to run a toaster using 500 W. Assume the efficiency of PV to be 25%.

(b) Explain in brief the principle of Photo-electrochemical solar cells. **8,12**

Unit III

5. Discuss the change of electronic behaviour of intermetallic with hydrogenation. Brief the desired properties of Hydrogen storage materials. **20**

6. Describe the formation of metal hydrides using PC-isotherm and explain Van't Hoff plot. **20**

Unit IV

7. (a) Discuss the fuels for fuel cells.

(b) Write down basic principle and working of SOFCs. **8,12**