

B.Tech. 8th Semester Exam., 2017

Direct Energy Conversion

Time : 3 hours

Full Marks : 70

Instructions :

- (i) *The marks are indicated in the right-hand margin.*
- (ii) *There are Nine questions in this paper.*
- (iii) *Attempt Five questions in all.*
- (iv) *Questions No. 1 is compulsory.*

1. 14
- (a) Write the mathematical form of I-V characteristic of solar cell.
 - (b) Write the classification of solar cell on the basis of thickness of active material.
 - (c) What is the condition for generation of electron hole pair in terms of band gap and energy in photon.
 - (d) What is the range of efficiency of solar cell (single crystal) ?
 - (e) Write the classification of fuel cell based on chemical nature.

(f) Power generation through μ HD generation based on faraday effect.

state true or false

(g) Induction generator can be used for converting wind power of electric power.

state true or false

(h) In full cell chemical energy is directly converted to electric energy.

write true or false

(i) Thermo-electric generation produces direct current.

write true or false

2. (a) Write the advantages and disadvantages of solar cell compared to conventional system. 7

(b) Draw and explain equivalent circuit of a solar cell. 7

3. (a) What is maximum power point tracking in solar PV system? What are the different strategies for maximum power point tracking? 14

4. (a) Give the classification of fuel cell. 7

(b) Draw and explain the VI characteristic of fuel cell. 7

5. (a) Discuss different types of μ HD generating system.

(b) What are the advantages and disadvantages of μ HD generation? 7+7

6. (a) Explain thermo-electric power conversion. 7

(b) Show maximum power output of thermo-electric

$$\text{generation } P_{\max} = \frac{4\alpha^2 4T^2}{4K_g}$$

7. (a) Explain the principle of fusion power generation. 7

(b) What are the advantages and disadvantages of fusion power? 7

8. (a) Discuss the basic principle of μ HD generation. 7

(b) Derive the expression for maximum power output of μ HD generation. 7

9. Write short notes : 7x2

(a) Wind energy conversion system

(b) Solid oxide fuel cell
