

**PD18017-POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS**

(Regulation 2018)

Time: Three hours

Maximum : 80 Marks

Answer ALL questions

**PART A - (8 X 2 = 16 marks)**

1. A photocell has a short circuit current of 30mA, an open circuit voltage of 0.6 V and a maximum power output of 12 mW. What is its fill factor?  
a).80%      b)50%      c) 40%      d)66.6%
2. A capacitor bank can be connected across the stator terminals of Induction generator and load in Wind Energy conversion system is to  
a).Supply the Active power to the machine and load  
b). Supply the Reactive power to the machine and load  
c).both a and b  
d) None of the above.
3. Four batteries of 12V, 200Ah are connected in series. What will be the energy stored in the battery?  
a)9.6Kwh      b)8.96Kwh      c)10Kwh      d)4.8Kwh
4. Most suited gate pulses given to the AC regulator with R-L Load can be in the form of  
a)Continuous signal    b)Large isolating pulse transformer    c)A train of pulses  
d)none of these
5. Justify how fuel cell becomes renewable energy sources?
6. Why Induction generator preferred over DC generator in WECS?
7. Identify the problems associated with tapping solar energy?
8. Summarize the need for hybrid energy system.

**PART B - (4 X16 = 64 marks)**

9. (a) Discuss the influence of different renewable energy sources with special reference to (16) the global warming and climate change context.
- (OR)**
- (b) (i) With the neat diagram explain the energy generation using hydrogen energy (8) system
  - (ii) Describe the concept of electric power generation from Biomass (8)
10. (a) Explain the construction, working principle and steady state analysis of a machine (16) which is used in variable speed wind turbine.

**(OR)**

- (b) (i) Discuss the various grid connected issues for wind energy conversion system **(6)**  
(ii) Explain the need of AC-DC-AC converters for wind energy conversion system. **(10)**
11. (a) Describe the any two power conditioning schemes used in Photo-Voltaic system **(16)**
- (OR)**
- (b) Calculate the solar panel size in watt, Battery is kwh and Inverter in KVA for the **(16 )** following appliances: Consider Losses are 7% in controller and inverter, 80% battery DoD, 15% battery losses, 25% solar panel losses, solar radiation is 5.15 kWh/m<sup>2</sup>/day. Appliances: Bulb (5 Nos. of 40 W running for 6 hours), Fan (2 Nos. of 70 W running for 12 hours), TV (1 No. of 35 W running for 6 hours), Water heater (1 No. of 1800 W running for 1 hours), Fridge (1 No. of 200 W running for 24 hours) and Mixer (1 No. of 755W running for 0.25 hours).
12. (a) Discuss with case study how to get maximum power generation in wind energy **(16)** conversion system. .
- (OR)**
- (b) Show the power electronic system used for hybrid solar photovoltaic and wind energy **(16)** system and explain its operation. Discuss the technical challenges associated with it.