Department of Electrical Engineering
Final Assignment
Date: 23/06/2020

Course Details

Course Title: Smart Grid Design and Operation   **Module:** 3

Instructor: **Total Marks:** 50

Student Details

Name: **Student ID:**

INSTRUCTIONS:

1. The solution must be uploaded before the end of deadline mentioned on the *Online Portal* of subject.

Question 1   (10)

The grid that is initially designed for one-way power flow is now experiencing two-way flow of power. As the grid is transforming to microgrid and smart grid it gives rise to new debate for the power system intellectualist whether to invest in conventional grid model (generation + transmission + distribution) or to invest in storage model (distributed generation + distribution + storage).

Discuss in detail the major factors/ issues preventing Pakistan to shift to smart grids. Also give a detailed overview of how Pakistan can take benifit of smart grid in her quest for power sufficiency?

Question 2   (10)

There are many causes of power failures in an electricity network. Examples of these causes include faults at power stations, damage to electric transmission lines, substations or other parts of the distribution system, a short circuit, cascading failure, fuse or circuit breaker operation.

i. Discuss the typical sequence of steps seen in large power system blackouts. Explain with the help of example that how a self-healing grid can arrest the sequence and prevent such blackouts.
ii. Consider the example of a disasterous blackouts in Pakistan and Explain how this typical sequence

Question 3   (10)

The communication network is backbone of a smartgridand is characterized by the coverage in smaller areas like homes and buildings, coverage over medium areas ranging from few hundred meters to about a kilometer and coverage over longer distances. Explain in details the type of networks used to create

smartgrid communication network. Also discuss what type of communications can be that are necessary in smar grid environent.

Question 4 (20)

a. How does the smart meters' architecture differ from the conventional energy meters in smartgrid environment?
b. Comprehensively discuss the network in smart meter system by elaborating communication and electrical interfaces.
c. Discuss the major design issues of a smart meter system.
d. What are the advantages of load scheduling in smartgrid considering both the PPs, consumers and grid operations? Discuss in detail