

Mansoura University  
Faculty of Engineering  
Department: Electrical Eng.  
Year/Level : 2<sup>nd</sup> grade



Course: Statistics Application  
in Electrical Engineering  
Code : EE2221  
Time : 3 hours  
Date : 11/6/2013

Please, answer All the following Questions, Exam is in 2 pages

### Question1

[25]

- Define different kinds of probability.
- Define the conditional probability.
- When 2 events are independent? Explain your with an Example.
- An experiment consists of drawing two balls at random with replacement from an urn containing five balls numbered 1 to 5. Compute the probability  $p$  that the sum of numbers appearing on the two draws equals 9.
- A fair coin is flipped four times. The outcome of each flip is head(H) or Tail (T). What is the probability of obtaining two tails and two heads?
- A random number generator generates integers from 1 to 9 (inclusive). All outcomes are equally likely; each integer is generated independently of any previous integer. Let  $\sum$  denote the sum of two consecutively generated integers; that is;  $\sum = N_1 + N_2$ .
  - Given that  $\sum$  is odd, what is the conditional probability that  $\sum$  is 5
  - Given that  $N_1 > 6$ , what is the conditional probability that  $\sum$  will be odd.

### Question 2

[25]

- Define power system reliability.
- Compare between the loss of load probability, loss of load expectation, and expected unserved energy. Which one of these indices is the best and why?
- A generating system consists of the following units: Two 20 MW units with Forced outage rate (FOR) of 1.5 % each and one 25 MW FOR of 2% and one 30 MW units with FOR of

2.5%. This system supplies a daily load of 85 MW for 8 hours and 60 MW for 16 hours,

- I. Construct the capacity- probability table of the generating system
- II. Calculate the Loss of Load Probability, loss of load expectation, and expected unserved energy for the load 85 MW,
- III. Calculate the Loss of Load Probability, loss of load expectation, and expected unserved energy for the load 60 MW,
- IV. Compare between the results of (II) and (III).
- V. Calculate the System Loss of Load Probability, Loss of Load Expectation, and Expected Unserved Energy.

### Question 3

[20]

- (a) What is the peak demand forecast used for? And what is the usage of the energy forecast? And then compare between the energy forecast and peak demand forecast.
- (b) Compare between different forecasting techniques?
- (c) The accuracy of forecast is very important, what is the disadvantage of too high forecast? And what is the disadvantage of too low forecast?
- (d) Should total forecast be determined by combining forecasts of appropriate components? Or should the total load is forecasted from the total load data? Explain your answer.
- (e) Classify different categories of the load? And what are the features of each category when forecasted?

With my best Wishes  
Dr. Sahar Kaddah