



Course Title: Prob. and statistics analysis	Eng. Math (4a)	(3 rd electrical eng. year)
Date: (First term) 5/1/ 2017		Time: 3 hour

Q (1) (25M)

- (a) For any events A, B and C, prove that :
 $P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$
- (b) Find $P(B|A)$ if (i) A subset of B (ii) A and B are disjoint
- (c) Prove that, if A and B are independent events, then A^c and B^c are independent events

Q(2) (25M)

- (a) Consider the random variable X which assigns the sum of the numbers showing on a pair of dice .
- (i) Find the distribution of X
- (ii) compute the mean (μ_x), the variance ($V(X)$) and the standard deviation of X (σ_x).

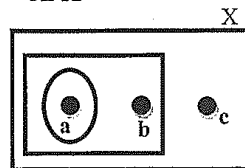
- (b) If X is a continuous random variable with the following distribution

$$f(x) = \begin{cases} kx & 0 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}$$

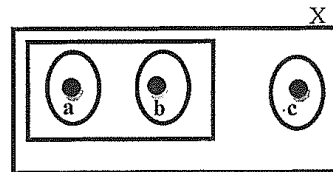
- (i) Find the value of k to make f(x) probability density function .
- (ii) Find $P(1 \leq x \leq 3 | 2 \leq x \leq 6)$.
- (c) The probability that a man will live 10 more years is $\frac{1}{4}$ and the probability that his wife live 10 more years is $\frac{1}{3}$ find the probability that :
- (i) Both will be a live in 10 years.
- (ii) At least one will be alive in 10 years.
- (iii) Neither will be alive in 10 year .

Q(3)(20M)

- (a) Define a topological space.
- (b) Let $X = \{a, b, c\}$, which any collection of the following represent a topology on X



(1)



(2)

- (c) Calculate the Linear correlation coefficient of Pearson for the following data

The weight(x)	61	70	72	65	83	56	62
The length(Y)	165	170	170	165	170	154	164

Ⓐ

b) The perpendicular offsets taken at 10 m intervals from a survey line to an irregular boundary are 2.25, 3.85, 4.50, 6.80, 5.20, 7.35, 8.90 and 5.45 meters. Determine the area enclosed between the survey line, the irregular boundary, the first and last offsets by: Average-ordinates rule, Trapezoidal rule and Simpson's rule.

Question (3) (30%)

a) The following coordinates were calculated in closed traverse

Stations	X-coordinates	Y-coordinates
A	7200.054	7640.842
B	7204.601	8103.036
C	7369.177	8001.383
D	7356.207	7759.292

Compute the area of traverse by two methods.

b) The accompanying longitudinal and cross sections show that the ground level at 2 m interval, is as follows:

distance	0	2	4	6	8	10	12	14
elevation	15	14.59	14.33	13.25	11.96	13.10	13.10	13.10

If the formation level for first point = 14.00 m and gradient of formation line is 1:16 failing, and that the section side slope at 1 unit vertically to 2 units horizontally and 8.0 m wide:

- 1) Calculate the depth of cut and height of fill for every point?
- 2) Calculate the volume of cut and fill?

Good Luck

D. Magda Farhan