Concordia University

Department of Mathematics and Statistics

Course	**Number**	**Section**	
STAT	249/2	AA	
Examination	**Date**	**Time**	Pages
Mid-term	October, 2017	70 Minutes	2
Instructor	**Course Examiner**	**Marks**	
M. Singh	E. Duma	40	

Special Instructions: **Closed Book Exam.**

1. Answer ALL questions.

2. Calculators are allowed.

3. Full credit will be given only for answering questions clearly & systematically.

[2+2+2+4]Q1.(a) A business office orders paper supplies from one of the three vendors, V_1, V_2, or, V_3. Orders are to be placed on two successive days, one order per day. Thus, (V_2, V_3) might denote that vendor V_2 gets the order on the first day and vendor V_3 gets the order on the second day.

i List the sample points in this experiment of ordering paper on two successive days.

ii Assume the vendors are selected randomly each day and assign a probability to each sample point.

iii Let A denote the event that the same vendor gets both orders and B the event that V_2 gets at least one order. Find $P(A), P(B)$ and $P(A \cap B)$.

(b) Two applicants are randomly selected from among five who have applied for a job. Find the probability that exactly one of the two best applicants is selected.

[3+2+3+2] Q 2. Of the travelers arriving at a small airport, 50% fly on major airlines, 30% fly on privately owned planes, and the remainder fly on commercially owned planes not belonging to a major airline. Of those traveling on major airlines, 60% are traveling for business reasons, whereas 50% of those arriving on private planes and 90% of those arriving on other commercially owned planes are traveling for business reasons. Suppose that we randomly select one person arriving at this airport. What is the probability that the person

(a) is traveling on business?

(b) is traveling on business on a privately owned plane?

(c) arrived on a privately owned plane, given that the person is traveling for business reasons?

(d) is traveling for non-business reasons, given that the person is flying on a commercially owned plane?

[2+3+5] Q3 A particular sale involves four items randomly selected from a large lot that is known to contain 20% defectives.

(a) Find the probability of observing at least one defective.

(b) Find the probability of observing up to two defectives.

(c) Let Y denotes the number of defectives among the four sold. The purchaser of the items will return the defectives for repair, and the repair cost is given by

$$C = 3Y^2 + 2Y + 1$$

Find the expected repair cost.

[2x3+4] Q 4. (a) An oil prospector will drill a succession of holes in a given area to find a productive well. The probability of success on a given trial is 0.1. What is the probability that the fourth hole drilled is the first to yield a productive well?

(b) If the prospector can afford to drill at most ten wells, what is the probability that he will fail to find a productive well.

(c) What is te average number of drills on which the first productive well is found?

(d) For a geometric random variable Y with probability of success p, show that

$$P(Y > a) = (1 - p)^a$$

GOOD LUCK!