KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 301: Introduction to Probability Theory
Semester 152
Final Exam (subjective)
Wednesday May 18, 2016
8:00 – 9:00 pm

Name: ID #:

Question No	Full Marks	Marks Obtained
1	**27**	
2	**07**	
3	**08**	
4	**06**	
5	**06**	
Total	**54**	

Q.No.2:- (3+4 = 7 points)

(a) If $E(X) = 75$, $E(Y) = 75$, $\mathrm{Var}(X) = 10$, $\mathrm{Var}(Y) = 12$ and $\mathrm{Cov}(X, Y) = -3$, then give an upper bound for $P\{|X - Y| > 15\}$.

(b) The number of automobiles sold weekly at a certain dealership is a random variable with expected value 16. Suppose that the variance of the number of automobiles sold weekly is 9. Give a lower bound to the probability that next week's sales are between 10 and 22, inclusively.

Q.No.3:- (2+3+3 = 8 points) The joint density function of U and V is

$$f(u,v) = \begin{cases} u+v & 0 < u < 1, \quad 0 < v < 1 \\ 0 & \text{otherwise} \end{cases}$$

(a) Find the density function of U.

(b) Are U and V independent? Justify your answer.

(c) Find $P\{U + V < 1\}$.

Q.No.4:- (6 points) Let U be a random variable that follows Gamma distribution with mean 1.5 and variance 0.75. Find $P\{U < 2\}$.

(Integration by parts: $\int_a^b f(x)g(x)dx = [f(x)\{\int g(x)dx\}]_a^b - \int_a^b [f'(x)\{\int g(x)dx\}]dx$)

Q.No.5:- (6 points) Consider 3 urns. Urn A contains 2 white and 4 red balls, urn B contains 8 white and 4 red balls, and urn C contains 1 white and 3 red balls. If 1 ball is selected from each urn, what is the probability that the ball chosen from urn A was white given that exactly 2 white balls were selected?