Math5-Comm: Mid Term Exam 1 – 30 Marks Autumn2019 Time: 1 Hour

(1)By Gamma function, find the integral : $\int_0^\infty y^2\, e^{-\sqrt{y}}\, dy$

(2)By Beta function, find the integral : $\int_{-\infty}^{\infty} \frac{e^{2x}}{1+e^{3x}}\, dx$

(3)Find the integral: $\iint_D (2x + y)\, dx\, dy$, D is bounded by $y = x^2$, $y = x$, x in $[0, 1]$

(4)From the data: (1, 4), (2, 5), (3, 10), (4, 12), (5, 18)

(a)Find the curve: $y = a\, e^{bx}$ that fit the data.

(b)Find the correlation coefficient r. (c)Find $\bar{x}$, $\bar{y}$, σ_x, σ_y.

(5)If x is random variable defined by the data: 3, 3, 4, 5, 5, 6, 6, 6, 7, 7, 7, 7, 8, 8, 8.

(a)Write the table of frequency and the Pdf f(x).

(b)Find $\bar{x}$, σ (c)Find $P(x < 6)$, $P(x \leq 6)$, $P(x > 6)$

(6) A box contains, 2 red, 3 white and 3 blue balls. At random, three balls are selected simultaneously. If x is the number of red balls, write the table of x and its Pdf f(x).

(7)If x, y are random variables with Pdf $f(x, y) = e^{-x-y}$, $x, y \geq 0$.

Find the $cov(x, y)$ and the correlation coefficient r.

Good Luck *Dr. Mohamed Eid*

Math5-Comm Autumn2019 Mid Term Exam2– 20 Marks Semester201

(1)If x and y are random variables with join Pdf: $f(x, y) = \frac{2}{55}(x + y^2)$, where $x = 0, 1, 2$ *and* $y = 1, 2$. Write the table of the Pdf and find $P(x = 1,\ y = 1)$, $P(x \leq 1,\ y < 2)$, $P(x > 1,\ y \leq 2)$, $cov(x, y)$.

(2) If x is random variable and $f(x) = 3e^{-3x}$, $x \geq 0$. Write the moment generating function $M_x(t)$ and from it, find m_1, m_2 *and* σ.

(3)In rolling a fair dice 4 times. Find the probability that:

(a)the number 1 appears three times. (b)the number 1 appears at least three times.

Good Luck *Dr. Mohamed Eid*