

## MATH-2205-A-ICA-3

Solve all the following problems.

1. If the *mgf* of random variable  $X$  is  $M(t) = \frac{e^{2t}-1}{2t}; t \neq 0$  &  $M(0) = 1$ , find the *pmf*, of  $X$ . Also, find  $P(0.5 < X < 1.2)$ .
2. For which value of  $k$  the function  $f(x) = \frac{x^2}{k}; -1 < x < 1$  is a *pmf*. If possible, find the corresponding *mgf*.
3. Patients come at an emergency medical store at a mean rate of **120 per day**. Assuming that the number of patients **per hour** has a Poisson process, find the probability that **4** patients will arrive within **2pm to 3pm** of a particular day. What is the **standard deviation** of the arrivals of the patients?
4. Let  $Y_1 < Y_2 < Y_3 < Y_4 < Y_5 < Y_6$  be the order statistics of **six** independent observations  $X_1, X_2, X_3, X_4, X_5, X_6$  each from the distribution with *pdf*  $f(x) = \frac{1}{9}x^2$  defined in the interval  $0 < x < 3$ . Find  $P(Y_5 \leq 2.25)$  and the *pdf* of the order statistics. Also, find the  $\mu_5$ .