**DPCN (Quiz 2)**

**Set1**

**1a.** Assume the degree distribution of a network (symmetric and binary) follows a power law $p_k = Ck^{-\gamma}$, Calculate the normalization constant $C$. Find out the condition such that you can obtain the finite $C$. **(Marks 3)**

**1b.** Assume the degree distribution of network (symmetric and binary) follows a power law $p_k = Ck^{-\gamma}$. Find out the first moment ($\langle k \rangle$), and the second moment ($\langle k^2 \rangle$). Explain in which cases these moments will diverge. **(Marks 4)**

**2.** Prove that, in Erdos-Renyi Graph, GCC will pop-up if mean degree ($\langle k \rangle$) is greater than 1.

**(Marks 5)**

**3.** If $x_{n+1} = f(x_n)$; Find the condition (show the derivation) where the system will show a stable fixed point

$$(x_{n+1} = f(x_n) = x^*).$$

$(i) f(x_n) = x_n^2$; $(ii) f(x_n) = \cos x_n$; Find the fixed points and find the stability conditions.

**(Marks 2+3=5)**