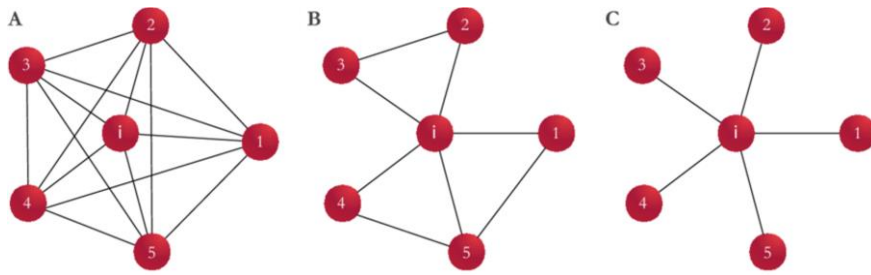**Time: One Hour**   **Date: 08/11/20203**   **Total Marks: 5x4=20**
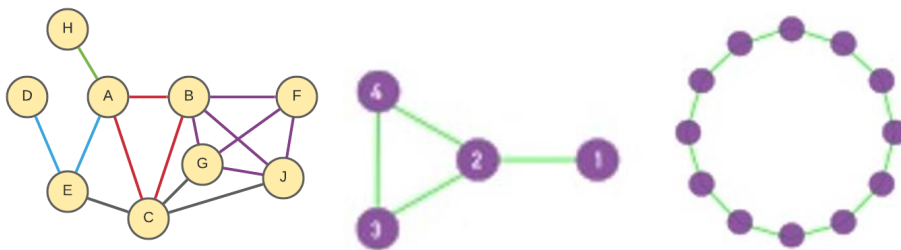
Answer any four questions.

1. What is clustering coefficient? Explain its uses in network science. Find the clustering coefficients of following graphs about nodes **i**.

2. Define degree distribution of a graph. Sketch the degree distribution of the following graphs.

3. Deduce the limiting case of the following distribution, when **N** is very large and average degree **<k>** is very small in the complex networks: $p(k) = \binom{N-1}{k} p^k (1-p)^{N-1-k}$

4. Define graph and network, and their representations. Is "Network" equal to" Graph"? Justify your answer with suitable explanations and illustrations.

5. Derive the formulation $\langle d \rangle = \dfrac{\log N}{\log \langle k \rangle}$ for average distance between two nodes in the networks. Calculate **<d>** for the following figure: