# TUT DMA - B05.

## Problem Set 9.

**Problem 1.**

* Graph G :
  - +, 6 vertices
  - +, 6 edges
  - +, deg (a) = 2
  - +, deg (b) = 4
  - +, deg (c) = 1
  - +, deg (d) = 0
  - +, deg (e) = 2
  - +, deg (f) = 3.

$\Rightarrow$ deg (G) = 12 = 2e

* Graph H :
  - +, 8 vertices
  - +, 12 edges
  - +, deg (a) = 3
  - +, deg (b) = 2
  - +, deg (c) = 4
  - +, deg (d) = 0
  - +, deg (e) = 6
  - +, deg (f) = 0
  - +, deg (g) = 4
  - +, deg (h) = 2
  - +, deg (i) = 3.

$\Rightarrow$ deg (H) = 24 = 2e.

Problem 2:

In Hanshaking Theorem state in any given graph, sum of degree of all the vertices is twice, the number of edges continue in it. The sum of the degrees of the vertices $5.15 = 75$ odd.

Therefore, a simple graph with 15 vertices each of degree five cannot exist.

Problem 4:

* Graph G:
  + 4 vertices.
  + 7 edges.
  + $deg^+(a) = 0$, $deg^-(a) = 3$.
  + $deg^+(b) = 2$, $deg^-(b) = 1$
  + $deg^+(c) = 1$, $deg^-(c) = 2$
  + $deg^+(d) = 3$, $deg^-(d) = 1$.

* Graph H:
  + 5 vertices.
  + 13 edges.
  + $deg^-(a) = 6$, $deg^+(a) = 1$.
  + $deg^-(b) = 1$, $deg^+(b) = 5$.
  + $deg^-(c) = 2$, $deg^+(c) = 5$.
  + $deg^-(d) = 4$, $deg^+(d) = 2$.
  + $deg^-(e) = 0$, $deg^+(e) = 0$.

Problem 5:

* Graph G:

| Vertex | Adjacent Vertices |
|---|---|
| a | b, d, c |
| b | a, d |
| c | a, d |
| d | a, b, c |

* Graph H:

| Vertex | Adjacent Vertices |
|---|---|
| a | b, c, d |
| b | a, c, d |
| c | a, b, d |
| d | a, b, c |