Benha University   **Faculty of Engineering-Shoubra**
Mechanical Engineering Department   **Mid Term Exam**   **3rd year (Mechanical Power)**
First term (2016-2017)   MPE312   **Fluid Mechanics (gas dynamic)**

Answer The Following Questions:

1- Define   a- Sound Wave   b- Mach No   (2-Degree)

2- Is the sonic velocity in a specified medium a fixed quantity, or does it change as the properties of the medium change? Explain.   (2-Degree)

3- Explain and draw the distribution of sound wave around moving object through a compressible medium   for the case   a) sonic speed   b) super sonic speed   (2-Degree)

4- Consider subsonic flow in a converging nozzle with fixed inlet conditions. What is the effect of dropping the back pressure to the critical pressure on
 (*a*) the exit velocity,   (*b*) the exit pressure, and   (*c*) the mass flow rate through the nozzle?   (2 Degree)

5- An aircraft cruises at Mach number Ma = 1.4 at 8000 m where the atmospheric temperature is 236.15 K Determine stagnation temperature at leading edge of wing and sonic velocity   (3-Degree)