جـــامعـــة المنوفية
كلـــــيـة الهندســـة
قســـم هندسة الإنتاج
والتصميم الميكانيكي

NTM processes
Level **600**
Total Marks **100**

2nd term **(2017-2018)**

Master degree Final Exam **Jun. 2018**
Time allowed 3 hours

Answer all the following Questions

QUESTION 1 *(70 marks)*

Today, hybrid manufacturing technology has drawn significant interests from both academia and industry due to the capability to make products in a more efficient and productive way. Although there is no specific consensus on the definition of the term 'hybrid processes', researchers have explored a number of approaches to combine different manufacturing processes with the similar objectives of improving surface integrity, increasing material removal rate, reducing tool wear, reducing production time and extending application areas. Thus, hybrid processes open up new opportunities and applications for manufacturing various components which are not able to be produced economically by processes on their own.

1-Explain the beneficial effect of hybrid nontraditional machining processes. (5)
2-Defined and Classify the hybrid nontraditional machining processes. (5)
3-Explain USMEDM hybrid process. (50)
4-Design an exponential USM magnification horn. (10)

QUESTION 2 *(30 marks)*

1-Explain ECM dynamics and heat generating in ECM gap and how to avoid temperature rise. (10 marks)
2-Sketch the major EDM power supply circuit and make a complete RC circuit analysis (10 marks)
3-Differentiate the conventional and unconventional machining processes in terms of principles. (5 marks)
4. Identify the mechanism of material removal, transfer media and energy source for all NTM processes. (5 marks)

GOOD LUCK