AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
ENG. PHYSICS & MATH. DEPARTMENT
Electronics and Communications Engineering Program
Junior Students.

Mid Term Examination

Spring 2021 ***Exam Time: 60 minutes.***

PHM212s: Complex, Special Functions and Numerical Analysis

The Exam Consists of TWO Questions in THREE Pages. Answer All Questions ***Total Marks: 20 Marks***

Student's Name:	ID:	Sec:

General Instructions:

- ***Please read the examination paper carefully.***
- ***Be sure to solve each question in its paper (you can use the back).***
- ***Programmable & Graphical Calculators are NOT Allowed.***

Question no. 1 (12 marks)

a) By two different methods obtain a closed form for $\Gamma(n+3/2)$ where n is any positive integer. **[4 Marks]**

b) Evaluate in terms of the Gamma function the integral $\int_0^\infty \frac{x^k}{k^x}\,dx$ and state the condition on k such that the integral converges. **[4 Marks]**

C) Find the area enclosed by the curve

$$x^{2/5} + y^{2/5} = 1$$

[4 Marks]

Question no. 3 (8 marks)

Find two linearly independent solutions in powers of " x " for the following differential equations: $$(1-x^2)\,y'' - 2\,x\,y' + 12\,y = 0$$	

Best Wishes,
Dr. Makram Roshdy Eskaros.