University of Technology
Department of Applied Sciences
Final Examination 2014/2015

Subject: mathematics | **Class: 3**
Branch: physics | **Time:3 hours**
Examiner: Isra'a Hadi | **Date:**

Note: Answer 5 questions, 12 marks for each question.

Q1/ *Use power series (up to five terms) to find the solution of the following differential equation:*

$$(x^2-1)y''+3xy'+xy=0$$

Q2/ *Is* $f(z)=2xy+i(x^2+y^2)$ *analytic function or not? Where z is complex number and f(z)is complex function.*

Q3/ *Find* $\int_1^{1.3} e^x + x \;\; dx$ *, to three decimal places by Simpson (3/8) rule where N=3.*

Q4/ *Solve the following Partial differential equation:*

$$\frac{\partial u}{\partial x}=3\frac{\partial u}{\partial y}+\frac{1}{2}u \qquad\qquad u(x,0)=3e^{-5x}+2e^{-3x}$$

Q5/ *Use Taylor method (up to 4 terms) at three decimal places to find y(0.2) where:*

$$y'=x^2+y \qquad y(0)=1 \qquad , \quad h=0.1$$

Q6/ *Evaluate the following integrals in terms of gamma and beta functions:*

1) $\int_0^{\infty} \frac{dy}{1+y^4}$ 2) $\int_0^2 y^{3/2}(1-\frac{y}{2})^4 \; dy$

GOOD LUCK