



University of Technology
Department of Applied Sciences
Final Examination 2016/2017



Subject: Mathematics
Branch: Applied physics branch
Examiner: D. Atheer Ibrahim Abdali

Class: 3^{ed} year
Time: 3 hour
Date: 2017

Note answer Four questions only

Q1\ (a) Solve the P.D.E $3x \frac{\partial u}{\partial y} = 2y \frac{\partial u}{\partial x}$? [7.5 marks]

(b) $\int_0^{\frac{\pi}{2}} \sqrt[4]{\sin(x)} dx$? [5 marks]

Q2\

(a) Solve the O.D.E $\frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 0$ by power Series ? [7.5 marks]

(b) Evaluate $\int_0^{\infty} x^3 e^{-2x^2} dx$? [5 marks]

Q3\ (a) Prove that $\Gamma_{\frac{1}{2}} = \sqrt{\pi}$? [7.5 marks]

(b) Evaluate $\int_{-2}^5 \sqrt{x^2 - 4} dx$ by Trapezoidal Methods Take N=7 ?

[5 marks]

Q4\ (a) Is $f(z) = e^z$? Analytic function or not [5 marks]

(b) Evaluate $\int_c (2z - 1) dz$ where c is the line from $z = 1 - 2i$ to $Z = 2 + i$?

[7.5 marks]

Q5\ (a) Evaluate $\int_0^8 \frac{x}{x^2+4} dx$ by Simpsons $\left(\frac{1}{3}\right)$ Rule Take N=8 Compare your answer with the exact Solution ? [7.5 marks]

(b) Prove that $\beta(m, n) = \beta(n, m)$ [5 marks]

Good luck