



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



Subject: Electromagnetic
Branch: laser
Examiner: Dr. khawla Salah khashan

Class: 3rd Laser
Time: 3 h
Date: 25 / 5 / 2015

Note: Answer Four questions only

Q₁: a) Determine electric field intensity for a line charge with uniform charge density ρ_L extending from A to B along the z -axis. (8.75 mark)

b) Determine electric flux density due to the dipole with center at the origin. (8.75 mark)

Q₂: a) Write briefly about polarization in dielectric materials. (8.75 mark)

b) Find energy stored in an isolated sphere capacitor, the inner sphere of radius a and outer sphere of radius b separated by a dielectric medium with permittivity ϵ . (8.75 mark)

Q₃: a) Determine magnetic flux density for any straight filamentary conductor of finite length. (8.75 mark)

b) Define magnetic boundary conditions at the boundary between two different media. (8.75 mark)

Q₄: a) Find the magnetic flux between the conductors of the coaxial transmission line. (8.75 mark)

b) Derive Poisson's equation for a time-varying field. (8.75 mark)

Q₅: a) Determine the magnetic field intensity at point $P(r, \theta, \phi)$ due to a circular loop carrying current I (8.75 mark)

b) Determine H and E for EM wave propagation in material medium which $\sigma \gg \omega\epsilon$. (8.75 mark)

GOOD LUCK



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



Subject: mathematics
Branch : applied Laser
Examiner :Bushra Essa

Class : 3 year
Time : 3 hours
Date :

Answer four questions only (15 D for question)

Q1) Use Modified Euler Method at three decimal places to find $y(-1)$ where

$$\dot{y} = y + e^{-x}, \quad y(0) = 0, \quad x = 0 \text{ to } (-0.5) - 1$$

And compare your numerical results with exact solution $y = \sinh x$

Q2) Solve the P.D.E $\frac{\partial u}{\partial t} = 4 \frac{\partial^2 u}{\partial x^2}$ with initial condition $u(x, 0) = x^2 - x$ and boundary condition $u(0, t) = u(\pi, t) = 0$

Q3) Solve the following diff. eq. using Power Series

$$\ddot{y} - \frac{y}{1+x^2} + 1 = 0$$

Q4) Evaluate the following integral (use Gamma or Beta function)

1) $\int_0^{\infty} x^3 e^{-2x} dx$

2) $\int_0^3 \frac{x^2 dx}{\sqrt{6-x}}$

Q5) Find $\int_1^{1.3} e^{2x^2+3} dx$ to four decimal places where $N=6$ using

- 1) Trapezoidal rule
- 2) Simpson 1/3 rule

