Benha University Faculty of Eng.- Shoubra Eng. Math. & Phy. Department		1st Year: Elec. Eng.(Power) Mathematics 2-B Date: 3 / 7 / 2011

Time 3 Hours	الامتحان (5) أسئلة فى صفحة واحدة و المطلوب إجابة كل الأسئلة	Marks

[1] Find the following integrals:

(a) $\int_0^{\infty} \frac{1}{\sqrt{xe^x}}\,dx$ (b) $\int_0^{2} \frac{y^2}{\sqrt{2-y}}dy$ (c) $\int_0^{\pi/2} \sqrt{\cot z}\,dz$ (d) $\int_0^{\infty} \frac{2\sin 3t.\sin 4t}{t}\,dt$ — 20

[2](a) Find the series solution of the equation: $y``-xy = 2x$ — 8

(b) Using Laplace transforms, solve the equation: — 8

$y``- 3y` + 2y = e^{2t}$, $y(0) = y`(0) = 0$

[3](a)Find the Laplace transformation of the functions:

(i) $f(t) = (e^{-t}-2t)^2$ (ii) $f(t) = \sqrt{t} + e^{3t}\sin t$ — 10

(b)Find the inverse Laplace transform of :

(i) $F(s) = \frac{1}{s^2(s-1)}$ (ii) $F(s) = \frac{s}{s^2-3s+2}$ — 10

[4] Solve the following partial differential equations:

(a) $u_x - 2u_y + 3u = 0$, $u(0,y)=e^{3y}$ (b) $3u_x + 4u_y = 5(x^2+y^2)$

(c) $u_{xx} - 3u_{xy} = e^{2x+y}$ (d) $u_{xx} - 3u_{xy} + 2u_{yy} = \cos(x+y)$ — 24

[5](a) Prove that: $B(m,n) = \frac{\Gamma(m).\Gamma(n)}{\Gamma(m+n)}$ — 10

(b)Solve the linear system: $\begin{bmatrix} x` \\ y` \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} e^t \\ e^{-t} \end{bmatrix}$ — 10

Good Luck *Dr. Mohamed Eid*