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| Faculty of Engineering<br>Basic Science Department<br>Final Exam: Mathematics IV<br>Code: Math 204<br>Answer All Questions | Modern University for Technology & Information<br>مستقبل الصفوة | Academic year: 2014 / 2015<br>Semester: Summer<br>Date: August 3, 2015<br>Examiners: Dr. Mohamed Eid<br>Time Allowed: **2** Hours |
| The exam consists of one page | No. of Questions: 4 | Total Mark: 40 |

**Question 1** (10 Marks)

(a)Find $\Gamma(1.5)$, $B(3,-\frac{1}{2})$. 4

(b)Find the integrals: (i) $\int_0^\infty \sqrt{x}\ .e^{-2x}dx$ (ii) $\int_0^\infty \frac{1}{1+y^3}\ dy$ (iii) $\int_0^1 \sqrt{x^2-x^3}\ dx$ 6

**Question 2** (10 Marks)

(a)Find the L.T of the following: 4

(i) $f(t)=2+t+e^{2t}$ (ii) $f(t)=\cosh 3t+3\sin t$

(iii) $f(t)=e^{4t}.\cos 3t$ (iv) $f(t)=t^2.\delta_2(t)+(t-1)^2$

(b)Find the inverse L.T of the following: 6

(i) $F(s)=\frac{3}{s}+\frac{3}{s^2}$ (ii) $F(s)=\frac{1}{s-2}+\frac{2}{s^2+1}$ (iii) $F(s)=\frac{s}{s^2-4}+\frac{s}{s^2+1}$

**Question 3** (10 Marks)

(a) Solve the equation: $y`` - 2y` - 3y = e^t$, $y(0)=0$, $y`(0)=1$ 5

(b) Find the Fourier cosine series of the function: 5

$f(x)=x,\ 0\le x\le\pi,\ f(x+2\pi)=f(x)$

**Question 4** (10 Marks)

(a)State the definition of the **order** and **degree** of P.D.E. 2

(b)Solve the P.D.E : $u_{xx}-3u_{xy}+2u_{yy}=e^{x+2y}$ 4

(c)Solve the wave equation 4

$u_{tt}=4u_{xx}$, $0<x<1$

B.C: $u(0,t)=u(1,t)=0$, I.C: $u(x,0)=2$, $u_t(x,0)=x$

*Good Luck* *Dr. Mohamed Eid*