GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI
CLASS TEST – 2 Winter-2012
B. Tech. CIVIL and MECH(D A./Branch change students)
Course: SHU301 Engineering Mathematics-III **Max. Marks: 15**

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*Instructions: Attempt **any five** questions.*

Que 1) Find Laplace transform of i) $f(t)=\begin{cases}1\,, & 0\le t<1\\ t\,, & 1\le t<2\\ t^2\,, & 2\le t<\infty\end{cases}$ ii) $F(t)=\begin{cases}(t-1)^3, & t>1\\ 0, & 0<t<1\end{cases}$

Que2) State first and second shifting theorem. Given $L\left(2\sqrt{\frac{t}{\pi}}\right)=\frac{1}{s^{3/2}}$, Show that $L\left(\frac{1}{\sqrt{\pi t}}\right)=\frac{1}{\sqrt{s}}$.

Que3) State convolution theorem and verify it for the functions $f(t)=t^2,\ g(t)=\sin at$

Que 4) Find Laplace transform of y(t) and hence y(t) if $\frac{d^2y}{dt^2}+2\frac{dy}{dt}+5y=e^{-t}\sin t$

with $y(0)=0,\ y'(0)=1$.

Que5) Evaluate: i) $\int_0^\infty\left(\frac{e^{-t}-e^{-3t}}{t}\right)dt$ ii) $\int_0^\infty\frac{e^{-2t}\sinh t}{t}dt$

Que 6) Using partial fraction find $L^{-1}\left\{\frac{3s^3+s^2+12s+2}{(s-3)(s+1)^3}\right\}$

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CT-II W-2014 MARKS-15 TIME-1 HOUR

SHU301, SHU303, SU304 ENGG.MATHS-III [Civil/Mech/ELPO/EXTC/CS/IN/IT]

Q.1 Solve by using the Separation of variables method

$$u_{xx} = u_y + 2u, \quad u(0,y) = 0, \quad \frac{\partial}{\partial x}u(0,y) = 1 + e^{-3y}$$

Q.2 Solve $(z - xp - yq)^{1/2} = a(x^2 + y^2 + z^2)$

Q. 3 ATTEMPT ANY THREE

(A) Solve $pq = x^m y^n z^{2l}$ (3)

(B) Solve $2x^{1/2}y^{1/2}z^{1/2} = (pq + 2px^2y + 2qxy^2)^{1/2}$

(C) Solve $(x+y)(p+q)^2 + (x-y)(p-q)^2 = 1$ (3)

(D) Solve $yp = 2yx + \log q$ (3)

Que5) Evaluate: i) $\int_0^\infty \left(\frac{e^{-t} - e^{-3t}}{t}\right) dt$ ii) $\int_0^\infty \frac{e^{-2t}\sinh t}{t}\, dt$

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CT-II **W-2015** **MARKS-15** **TIME-1 HOUR**

SHU303 ENGG. MATHS-III [ELPO/EXTC /IN]

Q.1 Solve by using the Separation of variables method

$$u_{xx} - 2u = u_y \;,\quad u(0,y) = 0 \quad \frac{\partial}{\partial x}u(0,y) = 1 + e^{-3y}$$ **3**

Q.2 Solve $$p = \sqrt{\frac{1 - y^2\left(p^2 + q^2\right)}{x^2} - q^2}$$ **3**

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Q. 3 ATTEMPT ANY THREE

(A) Solve $p\left(1+q^2\right) = q\left(z-a\right)$

(B) Solve $x = \dfrac{4xyz - pq}{2y\left(px + qy\right)}$

(C) Solve $\left(x^2 - y^2 - z^2\right)p = 2x\left(z - yq\right)$

(D) Solve $yp = 2yx + \log q$