Sections: H-N		USN	
NMAN	INSTITUTE OF TEC	HNOLOGY, N	ITTE

(An Autonomous Institution affiliated to VTU, Belgaum)

II Sem B.E. (Credit System) Mid Semester Examinations – I, January 2015

14MA201 - ENGINEERING MATHEMATICS - II

Duration: 1 Hour

Max. Marks: 20

Note: Answer any One full question from each Unit.

Unit - I

- a) Solve the differential equation  $y e^{xy} dx + (xe^{xy} + 2y) dy = 0$
- b) Solve the differential equation  $y 2px = \tan^{-1}(xp^2)$

 $\sin \frac{\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}}}{d^2y} = c$ 

2. a) Write the order and the degree of the differential equation

The law for the decay of radioactive materials states that disintegration at any instant is directly proportional to the amount of material present. If 30% of the radio active substance disappeared in 10 days, find how long will it take for 90% of it to disappear.

Unit - II

a) If  $L\{f(t)\} = \bar{f}(s)$ , prove that  $L\left\{\int_{0}^{t} f(u)du\right\} = \frac{1}{s}\bar{f}(s)$ 

- b) Find the general and singular solutions of the differential equation  $\sin(y px) = p$
- a) If f(t) is a periodic function with period T, prove that

 $L[f(t)] = \frac{1}{1 - e^{-sT}} \int_{0}^{T} e^{-st} f(t) dt$ 

b) Find the Laplace transform of  $t^2 \sin t$ 

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- Solve the differential equation  $y e^{xy} dx + (xe^{xy} + 2y) dy = 0$
- Solve the differential equation  $y 2px = \tan^{-1}(xp^2)$
- $\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{/2}$ Write the order and the degree of the differential equation
  - The law for the decay of radioactive materials states that disintegration at any instant is directly proportional to the amount of material present. If 30% of the radio active substance 8 disappeared in 10 days, find how long will it take for 90% of it to disappear.
- a) If  $L\{f(t)\} = \bar{f}(s)$ , prove that  $L\{\int_{0}^{t} f(u)du\} = \frac{1}{s}\bar{f}(s)$ 
  - Find the general and singular solutions of the differential equation  $\sin(y px) = p$
  - If f(t) is a periodic function with period T, prove that

$$L[f(t)] = \frac{1}{1 - e^{-sT}} \int_{0}^{T} e^{-st} f(t)dt$$

b) Find the Laplace transform of  $t^2 \sin t$ 

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300.	11	NMAM INSTITUTE OF TECHNOLOGY, NITTE  (An Autonomous Institution affiliated to VTU, Belgaum)  Sem B.E. (Credit System) Mid Semester Examinations – I, January 2015	
	1	14MA201 - ENGINEERING MATHEMATICS - II  1 Hour  Max. Marks: 20	)
Dilino		Note: Answer any One full question from each Unit.	
1.	a)	Unit – I  Define the order and the degree of a differential equation.  A body which is originally at 80°C cools down to 60°C in 20 minutes, the temperature of	2
	b)	air being 40°C. Find the temperature of the body after 40 minutes from the original.	8
2.	a)	Solve the differential equation $\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0$	5
	b)	Solve the differential equation $p(p+y) = x(x+y)$	5
		Unit – II	
3.	a)	If $f(t)$ is a periodic function with period T, prove that	
		$L[f(t)] = \frac{1}{1 - e^{-sT}} \int_{0}^{t} e^{-st} f(t) dt$	6
	h	Find the Laplace transform of $\int_0^t e^{3t} \cos t  dt$	
	b)	O O	

a) If  $L\{f(t)\} = \bar{f}(s)$ , then prove that  $L\{\frac{f(t)}{t}\} = \int_{s}^{\infty} \bar{f}(s) ds$ 

b) Find the general and singular solutions of  $y = xp - \log p$ 

NMAM INSTITUTE OF TECHNOLOGY, NITTE (An Autonomous Institution affiliated to VTU, Belgaum). If Sem B.E. (Credit System) Mid Semester Examinations – I, January 2015  14MA201 · ENGINEERING MATHEMATICS · II  Note: Answer any One full question from each Unit.  Unit – I  a) Solve the differential equation $y e^{xy} dx + \left(xe^{xy} + 2y\right) dy = 0$ b) Solve the differential equation $y = x^2 + 2y + 2y = x^2 + 2y + $	CHM	N. CH		
An Autonomous Institution affiliated to VTU, Belgaum)  If Sem B.E. (Credit System) Mid Semester Examinations – I., January 2015  14MA201 - ENGINEERING MATHEMATICS - II  Note: Answer any One full question from each Unit.  Unit – I  a) Solve the differential equation $y e^{xy} dx + (xe^{xy} + 2y) dy = 0$ b) Solve the differential equation $y - 2px = \tan^{-1}(xp^2)$ $\int_{-1}^{1} \frac{d^2y}{dx^2} dx^2$ b) The law for the decay of radioactive materials states that disintegration at any instant is directly proportional to the amount of material present. If 30% of the radio active substance disappeared in 10 days, find how long will it take for 90% of it to disappear.  Unit – II  3. a) If $L\{f(t)\} = \bar{f}(s)$ , prove that $L\{\int_0^t f(u)du\} = \frac{1}{s}\bar{f}(s)$ b) Find the general and singular solutions of the differential equation $\sin(y - px) = p$ 5.  4. a) If $f(t)$ is a periodic function with period T, prove that $L[f(t)] = \frac{1}{1 - e^{-st}} \int_0^t e^{-st} f(t) dt$ .	Seci	ion	SI HAN Y	
Ouralien 1 Hour Note: Answer any One full question from each Unit.  Unit - 1  a) Solve the differential equation $y e^{xy} dx + (xe^{xy} + 2y) dy = 0$ b) Solve the differential equation $y - 2px = \tan^{-1}(xp^2)$ 5  1 The law for the decay of radioactive materials states that disintegration at any instant is directly proportional to the amount of material present. If 30% of the radio active substance disappeared in 10 days, find how long will it take for 90% of it to disappear.  1 Unit - II  1 L{f(t)} = $\bar{f}(s)$ , prove that $L = \frac{1}{s} \bar{f}(s)$ 2 proportional to the differential equation $f(s) = \frac{1}{s} \bar{f}(s)$ 3 a) If $f(t)$ is a periodic function with period T, prove that $f(t) = \frac{1}{1 - e^{-sT}} \int_{0}^{t} e^{-st} f(t) dt$ .		11	(An Autonomous Institution affiliated to VTU. Belgaum)	
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3. a) If $L\{f(t)\} = \bar{f}(s)$ , prove that $L\left\{\int_0^t f(u)du\right\} = \frac{1}{s}\bar{f}(s)$ b) Find the general and singular solutions of the differential equation $\sin(y-px) = p$ 5  4 a) If $f(t)$ is a periodic function with period T, prove that $L[f(t)] = \frac{1}{1-e^{-sT}} \int_0^T e^{-st} f(t)dt$ 6		b)	the amount of material present. If 30 % of the radio some	8
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$L[f(t)] = \frac{1}{1 - e^{-sT}} \int_{0}^{T} e^{-st} f(t) dt.$		b)	Find the general and singular solutions of the differential equation of	
	4	a)		
b) Find the Laplace transform of $t^2 \sin t$			$L[f(t)] = \frac{1}{1 - e^{-sT}} \int_{0}^{t} e^{-st} f(t) dt.$	6
********		b)	Find the Laplace transform of $t^2 \sin t$	4
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Sec	tion	s: A+G	
	1	NMAM INSTITUTE OF TECHNOLOGY, NITTE  (An Autonomous Institution affiliated to VTU, Belgaum)  [Sem B.E. (Credit System) Mid Semester Examinations - II, March 2015	
E.		14MA201 - ENGINEERING MATHEMATICS - II	
Dura	tion:	1 Hour Max. Marks: 20	
		Note: Answer any One full question from each Unit.	
1.	a)	Unit – I  Rewrite the following function using unit step function and hence find its Laplace transform	
		$f(t) = \begin{cases} t^2, & 0 < t < 2 \\ 4, & 2 < t < 4 \\ 0, & t > 4 \end{cases}$	
		$f(t) = \begin{cases} 4, 2 < t < 4 \end{cases}$	
		0, t > 4	5
		$\left( -s/\right)$	
		$L^{-1} \left\{ \frac{s e^{-s/2} + \pi e^{-s}}{s^2 + \pi^2} \right\}$	
		$L = \left\{ \begin{array}{c c} & & & \\ \hline & & & \\ \end{array} \right\}$	
	b)	Find $S + \pi$	5
		Find $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$ using convolution theorem.	
2.	a)	Find $\frac{L}{(s^2+a^2)^2}$ using convolution theorem.	5
	b)	Solve the differential equation $x''(t) + x(t) = 6\cos 2t$ ; $x(0) = 3$ , $x'(0) = 1$ using	5
		Laplace transform method.	3
		Unit – II	
3.	a)	A spring is such that 1.96kg weight stretches it 19.6cms ,an impressed force $\frac{1}{2}\cos 8t$	
		is acting as the apping. If the weight is started from the equilibrium point with an imparted	
		upward velocity of 14.7 cms. per sec. ,determine the position of the weight as a function of time	5
	b)	Solve the differential equation $(D^2 + D - 2)y = x + \sin x$ using the method of	
		undetermined coefficients.	5
		$J^{2}$ , 2, 1	
4	a)	Solve the differential equation $x \frac{d^2y}{dx^2} - \frac{2y}{x} = x + \frac{1}{x^2}$ .	NO P
			5
	b)	Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$	5
		*******	