Program:	S.Y.B.Sc IT	**Semester:** III	**Program Code:**	UGIT01	
Course:	Applied Mathematics		**Course Code:**	NUIT308	
Duration:	1 Hour	**Examination Pattern:**	NEP-Autonomous-External	**Max. Marks:**	30

Instructions:

1. All questions are compulsory with internal choice.
2. Do not mix questions from Q.1 and Q.2
3. Write clearly question and sub-question number.
4. Symbols have their usual meanings.
5. Scientific calculator fx 82 series or lower version is only permitted.
6. CO (Course Outcome), KL (Knowledge Level).

Examination:

REGULAR

Q. 1		**Attempt any THREE of the following.**	[15]	CO's	KL's
	(a)	Find $L[cos^3 t]$		CO2	L2
	(b)	Find Laplace transform of $t^4H(t-2) + t^2\delta(t-2)$, where H is a Heaviside unit step function and δ is Dirac -delta function.		CO3	L3
	(c)	Apply Laplace transform to solve $\frac{dy}{dt} + 2y + \int_0^t y\ dt = sint$, given that $y(0) = 1$.		OC2	L3
	(d)	Find the modulus and argument of $e^{i\frac{\pi}{2}} + \sqrt{2}e^{i\frac{\pi}{4}}$		CO1	L3
	(e)	If $cos^6\theta + sin^6\theta = \alpha cos4\theta + \beta$, then prove and justify that $\alpha + \beta = 1$		CO1	L5
Q. 2		**Attempt any THREE of the following.**	[15]	CO's	KL's
	(a)	State Cauchy Euler equation and Solve $(x^2D^2 - 3xD + 5)y = x^2 sin(logx)$		CO5	L1, L3
	(b)	Solve $(y - 2x^3)dx - x(1 - xy)dy = 0$		CO4	L3
	(c)	Solve $x\frac{dy}{dx} + y = x^6y^6$		CO4	L3
	(d)	Solve and verify the solution of $\frac{d^3y}{dx^3} + y = 0$		CO5	L3, L5
	(e)	Apply the method of variation of parameters to solve $\frac{d^2y}{dx^2} + a^2y = secax$		CO5	L3

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