TML022/EE/20070813

Applied Mathematics

Time : 180 minutes **Marks : 100**

Instructions for the students :

1. All questions are compulsory.
2. "Long Answer type Question (LAQ)" is a supply type question of 20 marks, which require typical answer of about 60-80 lines in about 32-40 minutes.
3. "Short Answer type Question (SAQ)" is a supply type question of 5 marks, which require typical answer of about 15-20 lines in about 08-10 minutes.
4. Use of non-programmable type of scientific calculator is allowed.
5. Draw neat diagrams wherever necessary.
6. Assume suitable data if necessary.

Q. No.	Question (Q)	Question Marks
	Long Answer type Questions (LAQ's)	
1.	(a) Evaluate Lim $\frac{1^2+2^2+..+n^2}{n^3}$ $n\to\infty$	**10**
	(b) Find the equation of tangent to the curve $y = x^3 - 4x^2 + 5$ at a point (2, -3) on it.	**10**
2.	*(a)* Evaluate $\int \frac{dx}{5-4Sinx}$	**10**
	(b) Find the R.M.S. Value of the alternating current *I = 2 Cos 3 t* taken over complete cycle.	**10**
3.	(a) Solve the differential equation $\frac{dy}{dx}+\frac{2xy}{x^2+1}=\frac{1}{(x^2+1)^2}$ given $y=0$ when $x=1$	**10** **10**
	(b) Show that the equation $(x^2-4xy-2y^2)dx+(y^2-4xy-2x^2)dx=0$ is exact and find its solution.	
4	(a) Find $L^{-1}\left[\frac{2S^2-6S+5}{S^3-6S+11S-6}\right]$	**10** **10**
	(b) Solve the differential equation by Laplace transform method. $\frac{dy}{dt}ty = t^2e^{-t}$ given $y=3$, when $t=0$	

	Short Answer type Questions (SAQ's)	
5.	Find the derivative of the function $y = Log\left[x + \sqrt{x^2 + a^2}\right]$	**5**
6.	Evaluate $\int_0^{\pi/2} \frac{Sinx}{(1+Cosx)^2} dx$	**5**
7.	Form the differential equation from $x = aSin(wt + c)$, where a and c are arbitrary constants.	**5**
8.	Find the Laplace transform of $e^{-2t}\left[2Cos5t - 3Sin5t\right]$	**5**