Sanjay Ghodawat University, Kolhapur Established as State Private University under Govt. of Maharashtra. Act No XL, 2017		**2020-21** EXM/P/09/00
M.Sc. I	**School of Science**	**Department: Physics**
PHS 507	**Mathematical Methods in Physics**	**Semester : I**
	End Semester Examination	**Time:2 Hrs.** **Max Marks:50**

Instructions: 1) All Questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Answer / Solve the following**			
a)	Derive the De-Movier's Theorem for positive and negative integer.	8	L2	CO1
b)	Findthe nthorder derivative using Cauchy'sintegral formula.	8	L1	CO2
	OR			
b)	Find the Residue of $f(z) = \frac{1}{z^2+a^2}$.	8	L1	CO2
Q.2	**Answer / Solve the following**			
a)	Derive the sine and cosine series of Fourier function.	8	L3	CO3
b)	Find the Fourier series of $f(x) = x \quad -\pi < x < \pi$.	8	L3	CO3
	OR			
b)	Obtain the Fourier integral for odd function.	8	L3	CO3
Q.3	**Answer / Solve the following**			
a)	Give the solution for One-Dimensional Linear Harmonic Oscillator.	9	L4	CO4
b)	Using Generating function for Hermite Polynomial $H_n\ (x)$, Show that: i) $\frac{1}{e}\sinh 2x = \sum_{n=0}^{\infty} \frac{1}{(2n+1)!} H_{2n+1}(x)$ ii) $e\cos 2x = \sum_n (-1)^n \frac{H_{2n}(x)}{(2n)!}$.	9	L2	CO4
	OR			
b)	Derive the Bessel's Differential Equation.	9	L2	CO4

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