ES-3706

M. A. / M. Sc. (Fourth Semester) Special Examination, 2020

MATHEMATICS

Paper : First

(Abstract Harmonic Analysis)

Maximum Marks : 35

Note: *Attempt all questions. Each question carries equal marks. Symbols have thier usual meanings.*

1. Prove that :

$(T_a f) \wedge (n) = e^{-ina} \hat{f}(n)$ for $(n \in Z)$ and

$f \in L'$.

2. If $f \in L'$ and $g \in C^k$. Then prove that $D^m(f * g) = f * D^m g$ for any integer $m \geq 0$ not exceeding K.

3. Explain existence and uniqueness of Haar integral.

4. Show that every compact abelian group G contains an infinite compact metric subgroup.

5. The fourier transform, considered as a map of $L'(G)$ into $C \circ (\Gamma)$ is norm decreasing and therefore continuous

$\| \hat{f} \|_\infty \leq \| f \|_1$.