GALGOTIAS UNIVERSITY

School of Basic Sciences
Master of Science in Mathematics
Mid Term Examination - Mar 2024

Duration : 90 Minutes
Max Marks : 50

Sem IV - MSCM327 - Measure Theory

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) Explain that empty set and whole set are measurable.   K2 (2)

2) How would you identify outer measure of a set.   K1 (3)

3) Give a counter example of measurable function that is not continuous also discuss the measurbility of the provided function.   K2 (4)

4) Every set of positive measure contains a nonmeasurable set.   K2 (6)

5) Prove that the measure of Cantor set is zero.   K3 (6)

6) Show that a real valued function with measurable domain is measurable if and only if inverse image of open set is measurable   K3 (9)

7) Prove that the if A is subest B and $\mu(A) < \infty$ then $\mu(B - A) = \mu(B) - \mu(A)$.   K4 (8)

8) If f is integrable on [a, b] and $\int_a^x f(t)dt = 0, \forall\, x \in [a, b]$, then $f(t) = 0$ for almost every $t \in [a, b]$.   K4 (12)

OR

What criteria would you use to assess that when any property holds almost everywhere.   K4 (12)