

Registration No:

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Total Number of Pages: 01

M.Sc.
15MMCC301

3RD Semester Regular / Back Examination 2017-18

Functional Analysis

BRANCH(S): M .Sc. (MC)

Time: 3 Hours

Max marks: 70

Q.CODE: B568

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1. Answer the following questions: (2 x 10)**
- a) What do you mean by Linear spaces?
 - b) What is orthonormal sets?
 - c) What is the inner product spaces?
 - d) What is difference between Dual and Transpose?
 - e) Write conditions of normed spaces.
 - f) What is open sets ?
 - g) State Jensen's Lemma .
 - h) What is $\{L^p\}$ spaces?
 - i) Write spectral Radius formula.
 - j) Write Hahn Banach separation Theorem .
- Q2**
- a) Let Y be a subspace of X then Y^\perp is also subspace. (5)
 - b) State and Prove Ascoli's Lemma. (5)
- Q3**
- a) Every closed and bounded subset of X is compact . (5)
 - b) State and prove Hahn – Banach Theorem. (5)
- Q4**
- a) Prove that If X is finite dimensional then X is complete. (5)
 - b) State and Prove Bounded Inverse Theorem. (5)
- Q5**
- a) State and Prove Uniform Boundedness Principle. (5)
 - b) Derive Riesz Representation Theorem. (5)
- Q6**
- a) If $F: X \rightarrow Y$ be a linear space then F is bounded. (5)
 - b) If E_1 and E_2 is open in normed space X then $E_1 + E_2$ is open in X . (5)
- Q7**
- a) State and Prove Taylor – Foguel theorem. (5)
 - b) State and prove F. Riesz lemma. (5)
- Q8 Write short notes on :**
- a) Banach spaces. (5)
 - b) Orthonormal sets. (5)