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Code No. 6760 / CBCS/N

FACULTY OF SCIENCE

M. Sc. II – Semester (CBCS) Examination, May / June 2017

Subject : Maths / Applied Maths

Paper – II : Advanced Analysis

Time : 3 Hours **Max. Marks: 80**

Note : Answer all questions from Part–A and Part–B. Each question carries 4 marks in Part–A and 12 marks in Part – B.

PART – A (8 x 4 = 32 Marks)
(Short Answer Type)

1 Define the terms Algebra, σ Algebra, F_σ-set and G_δ set.

2 Define the term almost everywhere with an example.

3 Define bounded measurable function and show that, if f and g are bounded measureable function defined on a measurable set with m(E) < ∞ then

$$\int_E^{m(E)<\infty} (af+bg) = a\int_E f + b\int_E g$$

4 If f and g are non-negative measurable functions and if f ≤ g a.e. then show that $\int_E f \le \int_E g$.

5 Define function of bounded variation. Show that every monotonic function is a function of bounded variation.

6 If f is a function of bounded variation then show that f is bounded.

7 Define absolute continuity and show that, if f is absolutely continuous on [a, b] then it is of bounded variation on [a, b].

8 State and prove Holder's Inequality.

PART – B (4 x 12 = 48 Marks)
(Essay Answer Type)

9 (a) Show that the outer measure of an interval is its length.

OR

(b) State and prove Egoroff's theorem.

10 (a) (i) State and prove bounded convergence theorem.

(ii) State and prove Fatou's Lemma.

OR

(b) (i) State and prove Monotone convergence theorem.

(ii) State and prove Lebesgue convergence theorem.

11 (a) Show that a real valued function f defined on [a, b] is a function of bounded variable on [a, b] if and only if f can be expressed as a difference of two monotonically increasing functions.

OR

(b) State and prove Vitali conveing lemma.

12 (a) Show that a horn linear space is complete if and only if every absolutely summable series is summable.

OR

(b) State and prove Riesz Fischer Theorem.

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