

Name: .....

Class: MSc-III

Reg. No.: .....

### Quiz 1: Real Analysis II

**Instructions:**

- Please choose the most correct option by filling or ticking or crossing the box.
- Spoiled or overwritten selection has no credit.

**Question 1** Let  $P_1$  and  $P_2$  be two partitions of  $[a, b]$  and  $P_2$  is refinement of  $P_1$ . Then

- $\|P_1\| \neq \|P_2\|$ .
- $\|P_1\| \leq \|P_2\|$ .
- $\|P_1\| = \|P_2\|$ .
- $\|P_2\| \leq \|P_1\|$ .

**Question 2** Let  $P = \{1, 2, 4, 7, 10\}$  be partition of interval  $[1, 10]$ , then

- $\|P\| = 1$ .
- $\|P\| = 2$ .
- $\|P\| = 9$ .
- $\|P\| = 3$ .

**Question 3** If  $f$  is continuous on  $[a, b]$ , then it is ..... on  $[a, b]$

- bounded
- differentiable
- non-zero
- unbounded

**Question 4** Let  $P$  and  $Q$  be two partitions of  $[a, b]$  and  $P$  is refinement of  $Q$ . Then

- $P \subset Q$ .
- $P = Q$ .
- $P \neq Q$ .
- $Q \subset P$ .

**Question 5** If  $\alpha$  and  $\beta$  be upper and lower bounds of  $f$  on  $[a, b]$  respectively, then

- $\beta \leq f(x) \leq \alpha \forall x \in [a, b]$ .
- $|f(x)| \leq \beta \forall x \in [a, b]$ .
- $|f(x)| \leq \alpha \forall x \in [a, b]$ .
- $\alpha \leq f(x) \leq \beta \forall x \in [a, b]$ .

**Question 6** If  $f \in \mathcal{R}(\alpha)$  on  $[a, b]$ , then  $\frac{d}{dx} \int_a^b f(x)dx =$

- $f(x)$ .
- $f(b) - f(a)$ .
- $f'(x)$ .
- 0.

**Question 7** If  $f \in \mathcal{R}(\alpha)$  on  $[a, b]$ , then  $\int_a^{\bar{b}} f d\alpha =$

- $\sup U(P, f, \alpha)$ .
- $\inf L(P, f, \alpha)$ .
- $\inf U(P, f, \alpha)$ .
- undefine.

**Question 8** If  $f$  is piecewise continuous on  $[a, b]$ , then  $\int_a^b f(x)dx$  ..... exist.

- may
- must
- must not
- may not

**Question 9** If  $\lim_{x \rightarrow \infty} f(x)$  exist, then  $f$  ..... bounded on  $[a, \infty)$

- may
- is
- is not
- must be

**Question 10** Which is/are improper integral(s) of first kind:

(A)  $\int_1^2 \frac{1}{x} dx$  (B)  $\int_1^\infty \frac{1}{x^2} dx$  (C)  $\int_{-\infty}^\infty (2t + 1) dt$

- B only.
- C only.
- A and C only.
- B and C only.

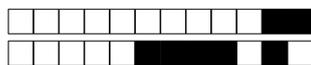
**Question 11** If  $f$  is continous on  $(a, b)$ , then

- $f$  is bounded on  $(a, b)$ .
- $f$  may bounded on  $[a, b]$ .
- $f$  may bounded on  $(a, b)$ .
- $f$  is unbounded on  $[a, b]$ .

**Question 12** Which is/are improper integral(s) of second kind:

(A)  $\int_0^1 \frac{1}{x} dx$  (B)  $\int_1^2 \frac{1}{x^2-1} dx$  (C)  $\int_{-1}^1 \frac{2x+1}{x-2} dx$

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 differentiable               bounded

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- $\|P\| = 9$ .                        $\|P\| = 3$ .  
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**Question 5** If  $f$  is piecewise continuous on  $[a, b]$ , then  $\int_a^b f(x)dx$  ..... exist.

- must not                       must  
 may                               may not

**Question 6** If  $\lim_{x \rightarrow \infty} f(x)$  exist, then  $f$  ..... bounded on  $[a, \infty)$

- may                               is  
 must be                       is not

**Question 7** Which is/are improper integral(s) of second kind:

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**Question 8** If  $\alpha$  and  $\beta$  be upper and lower bounds of  $f$  on  $[a, b]$  respectively, then

- $|f(x)| \leq \alpha \forall x \in [a, b]$ .  
  $|f(x)| \leq \beta \forall x \in [a, b]$ .  
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 unbounded  bounded

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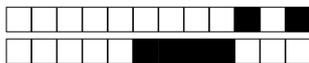
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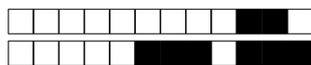
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 B only.  
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