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B.Sc IVth Sem

Subject : Real Analysis (Paper I)

MCQ Questions

Solve the following multiple choice questions, Each questions having 2 marks

UNIT I

1) A finite set is always

a) Bounded

b) Unbounded

c) Bounded Below

d) Bounded Above

Ans : a

2) The set of natural number is

a) Bounded

b) Unbounded

c) Bounded Below

d) Bounded Above

Ans : c

3) If x>o be a real number, then there exist a positive integer n s.t.

a) x>n

b) x<n

c) x=n

d) None of these

Ans : b

4) Let x,y,z ∈ R then

a) Ixyl ≤ Ixl Iyl

b) Ixyl < Ixl Iyl

c) Ixyl > Ixl Iyl

d) Ixyl = Ixl Iyl

Ans : d

5) If there is no open interval containing x or/and contained in M then M is

a) nbd of x

b) open in x

c) not a nbd of x

d) none of these

Ans : c

6) The empty set is

a) Closed set

b) Open set

c) Closed set as well as open set

d) Neither closed nor open

Ans : c

7) If every neighbourhood of x contains a point of X other than x is

a) open set

b) limit point

c) Interior point

d) None of these

Ans : b

8) Every infinite bounded subset of R has a

a) Interior Point

b) Limit point

c) Both Interior and limit point

d) None of these

Ans : b

9) The set of integers has ---- limit point

a) one

b) no

c) more than one

d) None of these

Ans : b

10) The derived set of a set X is

a) Closed

b) open

c) Neither closed nor open

d) Both (a) and (b)

Ans : a

11) If X = N then $X^d =$

a) R

b) N

c) $\emptyset$

d) All of the above

Ans : c

12) Every real number is a limit point of

a) Complex number

b) Irrational Number

c) Rational Number

d) Both (b) and (c)

Ans : d

13) Finite intersection of open set is

a) open set

b) not open set

c) nbd

d) None of these

Ans : a

14) Let X is subset of R and if X^0 = X then X is

a) open

b) closed

c) Both (a) and (b)

d) Neither (a) nor (b)

Ans : a

15) A limit point of a set may or may not be a member of the set.

a) True

b) False

Ans : a

UNIT II

1) A sequence $<x_n> = (-1)^n$ is

a) convergent

b) divergent

c) oscillatory

d) All of the above

Ans : c

2) A sequence $<2+(-1)^n>$ is

a) Unbounded

b) Bounded

c) Bounded below

d) Bounded above

Ans : b

3) Every convergent sequence is

a) Unbounded

b) Bounded

c) Bounded below

d) Bounded above

Ans : b

4) Every convergent sequence has a ----- limit point.

a) two

b) no

c) Unique

d) More than one

Ans : c

5) $\lim_{n\to\infty} \frac{n}{n+1} =$

a) 0

b) 1

c) ∞

d) None of these

Ans : b

6) Which of the following statement is true?

a) $x_{n+1} > x_n$

b) $x_{n+1} < x_n$

c) $x_{n+1} \geq x_n$

d) All of the above

Ans : d

7) If a Monotonic increasing sequence is bounded then it is

a) convergent

b) divergent

c) oscillatory

d) All of the above

Ans : a

8) A sequence $<x_n> = \frac{2n-7}{3n+2}$ tends to the limit

a) 7/2

b) 3/2

c) 2/3

d) ∞

Ans : c

9) Every bounded sequence is a Cauchy sequence.

a) True

b) False

Ans : b

10) If a sequence $<x_n>$ is Cauchy sequence then it is

a) Convergent

b) Divergent

c) Neither Convergent nor Divergent

d) None of these

Ans : a

11) The sequence $<n>$ is

a) Diverges to -∞

b) Diverges to +∞

c) Converges to 1

d) None of these

Ans : b

12) $\lim_{n\to\infty} \left[\frac{(n!)^{1/n}}{n}\right] =$

a) 1

b) e

c) 1/e

d) 0

Ans : c

13) Is <1/n> Cauchy sequence?

a) True

b) False

Ans : a

14) If $<x_n> = \{K\}$ be a constant sequence then $\lim_{n\to\infty} x_n$ =

a) 0

b) K

c) ∞

d) None of these

Ans : b

15) $\lim_{n\to\infty} \frac{1}{\sqrt{n!}}$ =

a) 0

b) 1

c) ∞

d) None of these

Ans : a

UNIT III

1) If $\lim_{n\to\infty} x_n \neq 0$ then $\sum x_n$ is

a) Convergent

b) Bounded

c) Not convergent

d) None of these

Ans : c

2) A series $\sum_n x_n$ is said to be positive term series if

a) $x_n \leq 0$, n ∈ N

b) $x_n < 0$, n ∈ N

c) $x_n \geq 0$, n ∈ N

d) All of the above

Ans : c

3) $If\ series\ \sum x_n = \frac{1}{n^2}$ then

a) Convergent

b) Divergent

c) Neither convergent nor divergent

d) None of these

Ans : a

4)) A series $\sum_n \frac{r^n}{n!}, r > 0$ is

a) Convergent

b) Divergent

c) Neither convergent nor divergent

d) None of these

Ans : a

5) $The\ series\ \sum x_n$ is called absolutely convergent series if the series

a) $\sum x_n$ is convergent

b) $\sum |x_n|$ is divergent

c) $\sum |x_n|$ is convergent

d) None of these

Ans : c

6) A convergent series is always an absolutely convergent series.

a) True

b) False

Ans : b

7) If the series $\sum x_n$ *is convergent but* $\sum |x_n|$ is divergent then the series $\sum x_n$ is called

a) Convergent

b) Divergent

c) Absolutely convergent

d) Conditionally convergent

Ans : d

8) $\sum \frac{1}{3^n+x} x > 0$ is

a) Convergent

b) Divergent

c) Absolutely convergent

d) Conditionally convergent

Ans : a

9) $\sum_{n=1}^{\infty} \frac{n+1}{(n+2)^2}$ is

a) Convergent

b) Divergent

c) Absolutely convergent

d) Conditionally convergent

Ans : b

10) Test the series $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - - -$ is

a) Convergent

b) Divergent

c) Absolutely convergent

d) Conditionally convergent

Ans : a

UNIT IV

Q.1 : If P^* is a refinement of P then

a) $L(P, f, \alpha) \leq L(P^*, f, \alpha)$

b) $L(P, f, \alpha) \geq L(P^*, f, \alpha)$

c) $L(P, f, \alpha) < L(P^*, f, \alpha)$

d) $L(P, f, \alpha) > L(P^*, f, \alpha)$

Ans : a

Q.2 : Let f be a bounded function and α is non-decreasing function on [a,b]. A function f is integrable with respect to α on [a, b] i.e. f ∈ R(α) on [a, b] if and only if for every $\in > 0$ there exist a partition P on [a, b] such that

a) $U(P, f, \alpha) - L(P, f, \alpha) > \in$

b) $U(P, f, \alpha) - L(P, f, \alpha) < \in$

c) $U(P, f, \alpha) - L(P, f, \alpha) \leq \in$

d) $U(P, f, \alpha) - L(P, f, \alpha) \geq \in$

Ans : b

Q.3 : Let f be a bounded function and α is non-decreasing function on [a, b], then

a)$\int_{-a}^{b} f d\alpha \geq \int_{a}^{-b} f d\alpha$

b)$\int_{-a}^{b} f d\alpha > \int_{a}^{-b} f d\alpha$

c)$\int_{-a}^{b} f d\alpha < \int_{a}^{-b} f d\alpha$

d)$\int_{-a}^{b} f d\alpha \leq \int_{a}^{-b} f d\alpha$

Ans : d

Q.4 : If $f \in R(\alpha_1)$ and $f \in R(\alpha_2\,)$ $then$

a) $f \in R(\alpha_1) + R(\alpha_2)$

b) $f \in R(\alpha_1 + \alpha_2)$

c) $f \in R(\alpha_1) - R(\alpha_2)$

d) All of the above

Ans : b

Q.5 : If M and m be the supremum and infimum of a bounded function on [a, b] then

a) $m[\alpha(b)-\alpha(a)] \leq L(P,f,\alpha) \leq U(P,f,\alpha) \leq M[\alpha(b)-\alpha(a)]$

b) $m[\alpha(b)-\alpha(a)] \leq L(P,f,\alpha) \leq U(P,f,\alpha) < M[\alpha(b)-\alpha(a)]$

c) $m[\alpha(b)-\alpha(a)] \leq L(P,f,\alpha) = U(P,f,\alpha) \leq M[\alpha(b)-\alpha(a)]$

d) $m[\alpha(b)-\alpha(a)] < L(P,f,\alpha) < U(P,f,\alpha) < M[\alpha(b)-\alpha(a)]$

Ans : a

Q.6 : $\int_a^b f d\alpha$ exists if

a) The function f is integrable over [a, b]

b) The function f is bounded on [a, b]

c) The function f is bounded and integrable over [a, b]

d) All of the above

Q.7 : If $\int_a^{-b} f d\alpha = \int_{-a}^{b} f d\alpha = \int_a^b f d\alpha$ then

a) $f \in R(\alpha)$

b) $f \notin R(\alpha)$

c) both (a) and (b)

d) None of the above

Q.8 : $U(P,f,\alpha) - L(P,f,\alpha) =$

a) $\sum_{i=1}^{n}(M_i - m_i)\,\Delta\alpha_i$

b) $\sum_{i=1}^{n} M_i\Delta\alpha_i - \sum_{i=1}^{n} m_i\Delta\alpha_i$

c) Both (a) and (b)

d) None of the above

Q.9 : Let I be a closed and bounded interval and P be any partition of I. The Partition P^* is called a refinement of P if

a) $P^* \subset P$

b) $P^* \supset P$

c) Only (b)

d) Both (a) and (b)

Ans : c

Q.10 : If f is continuous on [a, b] then

a) $f \in R(\alpha)$ on [a, b]

b) $f \notin R(\alpha)$ on [a, b]

c) both (a) and (b)

d) None of the above

Ans : a

Q.11 : $\Delta x_i =$

a) $x_i - x_{i+1}$

b) $x_i - x_{i-1}$

c) $x_i + x_{i-1}$

d) None of the above

Ans : b

Q.12 : If $f_1(x) \leq f_2(x)$ *on* [a, b], then

a) $\int_a^b f_1 d\alpha \leq \int_a^b f_2\, d\alpha$

b) $\int_a^b f_1 d\alpha \geq \int_a^b f_2\, d\alpha$

c) $\int_a^b f_1 d\alpha < \int_a^b f_2\, d\alpha$

d) $\int_a^b f_1 d\alpha > \int_a^b f_2\, d\alpha$

Ans : a

Q.13 : If $f \in R(\alpha)$ $on\ [a, b] and\ c\ be\ a\ point\ such\ that\ a < c < b$ then

a) $f \in R(\alpha)$ on [a, c] and on [c, b]

b) $f \notin R(\alpha)$ on [a, c] and on [c, b]

c) both (a) and (b)

d) None of the above

Ans : a

Q.14 : Which one of the following is true?

a) A constant function is Riemann integrable

b) Constant function is not Riemann integrable

c) A constant function may or may not be Riemann integrable

d) None of the above

Ans : a

Q.15 : If $f \in R(\alpha)$ on [a, b] then

a) $f^2 \in R(\alpha)$ on [a, b]

b) $f^2 \notin R(\alpha)$ on [a, b]

c) both (a) and (b)

d) None of the above

Ans : a