V.P. AND R.P.T.P. SCIENCE COLLEGE , V.V.NAGAR
B.Sc.(MATHEMATICS) SEMESTER - 5
Multiple Choice Question Of US05CMTH21
(Real Analysis)

.....

Unit-1

Que. Fill in the following blanks.

(1) ..... is not order - complete .
(a) $\mathbb{Q}$ (b) $\mathbb{N}$ (c) $\mathbb{R}$ (d) $\mathbb{C}$

(2) ..... is order - complete .
(a) $\mathbb{Q}$ **(b)** $\mathbb{N}$ (c) $\mathbb{Z}$ (d) set of irrational numbers

(3) ..... is not bounded .
(a) $\{1,3,5,7,9\}$ (b) $\{-1,-1/2,-1/3,-1/4,.....\}$ **(c)** $\mathbb{N}$ (d) (a,b)

(4) ..... is ordered field .
(a) $\mathbb{N}$ (b) $\mathbb{Z}$ (c) set of irrational numbers **(d)** $\mathbb{Q}$

(5) ..... is ordered field .
(a) $\mathbb{R}$ (b) $\mathbb{N}$ (c) $\mathbb{Z}$ (d) set of irrational numbers

(6) ..... is not field .
(a) $\mathbb{Q}$ **(b)** $\mathbb{N}$ (c) $\mathbb{R}$ (d) $\mathbb{C}$

(7) ..... is not field .
(a) $\mathbb{Q}$ (c) $\mathbb{R}$ **(c)** I (d) $\mathbb{C}$

(8) ..... is complete ordered field .
(a) $\mathbb{Q}$ (b) $\mathbb{N}$ (c) $\mathbb{Z}$ **(d)** $\mathbb{R}$

(9) Every finite set of numbers is .....
(a) bounded (b) field (c) closed (d) open

(10) $|x|$ ..... $-x$
(a) $\geq$ (b) $\leq$ (c) $<$ (d) $>$

(11) $|x-y|$ ..... $|x|+|y|$
(a) $\geq$ **(b)** $\leq$ (c) $<$ (d) $>$

(12) $|x-y|$ ..... $|y-x|$
(a) $\leq$ (b) $<$ **(c)** $=$ (d) $>$

(13) Supremum of set $\left\{1,-1,1\frac{1}{2},-1\frac{1}{2},1\frac{1}{3},-1\frac{1}{3},.....\right\}$ is .....
(a) 1 (b) 1/2 (c) none of these **(d)** $1\frac{1}{2}$

(14) Infimum of set $\left\{1,-1,1\frac{1}{2},-1\frac{1}{2},1\frac{1}{3},-1\frac{1}{3},.....\right\}$ is .....
(a) $-1\frac{1}{2}$ (b) -1 (c) $-1/2$ (d) none of these

(15) Property of completeness is possess by .....
(a) $\mathbb{R}$ (b) $\mathbb{Q}$ (c) $\mathbb{N}$ (d) $\mathbb{Z}$

(16) Property of completeness is not possess by .....
(a) $\mathbb{R}$ **(b)** $\mathbb{Q}$ (c) $\mathbb{C}$ (d) none of these

(17) If a set is bounded above then it has .....upper bounds .
(a) finitely many **(b)** infinitely many (c) unique (d) two

(18) If a set is bounded below then it has .....lower bounds .
(a) finitely many **(b)** infinitely many (c) unique (d) two

(19) There are ..... irrational number between two rational numbers .
(a) only one **(b)** infinitely many (c) finitely many (d) at most one

(20) There are ..... rational numbers between two rational numbers .
(a) finitely many (b) at most one (c) only one **(d)** infinitely many

(21) There are ..... rational numbers between two irrational numbers .
(a) finitely many (b) at most one (c) only one **(d)** infinitely many

(22) The set $\mathbb{R}$ is called ..... continuum .
(a) geometrical **(b)** arithmetical (c) universal (d) logical

(23) The set of points on a line is called ..... continuum .
(a) geometrical (b) arithmetical (c) universal (d) logical

(24) Supremum of set $\left\{-\frac{n+1}{n} \ / \ n \in \mathbb{N}\right\}$ is .....
(a) 1 (b) 1/2 **(c)** -1 (d) $1\frac{1}{2}$

(25) Infimum of set $\left\{-\frac{n+1}{n} \ / \ n \in \mathbb{N}\right\}$ is .....
(a) -3 **(b)** -2 (c) -1 (d) $-\frac{1}{2}$

(26) Infimum of set $\left\{\frac{(-1)^n}{n} \ / \ n \in \mathbb{N}\right\}$ is .....
(a) -1 (b) -2 (c) 1 (d) $-\frac{1}{2}$

(27) Supremum of set $\left\{\frac{(-1)^n}{n} \ / \ n \in \mathbb{N}\right\}$ is .....
(a) -1 (b) -2 (c) 1 **(d)** $\frac{1}{2}$

(28) Supremum of set $\left\{1+\frac{(-1)^n}{n} \ / \ n \in \mathbb{N}\right\}$ is .....
(a) 1 (b) 2 (c) 3 **(d)** $\frac{3}{2}$

(29) Infimum of set $\left\{1+\frac{(-1)^n}{n} \ / \ n \in \mathbb{N}\right\}$ is .....
(a) -1 **(b)** 0 (c) 1 (d) $-\frac{1}{2}$

(30) Greatest element of set $\left\{1+\frac{(-1)^n}{n} \ / \ n \in \mathbb{N}\right\}$ is .....

(a) 1 (b) 2 (c) 3 **(d)** $\frac{3}{2}$

(31) Supremum of set $\left\{\frac{n+1}{n} \ / \ n \in \mathbb{N}\right\}$ is .....

(a) 1 (b) 1/2 **(c)** 2 (d) $1\frac{1}{2}$

(32) Supremum of set $\left\{\frac{(n+1)^n}{2^n} \ / \ n \in \mathbb{N}\right\}$ is .....

(a) 9 (b) 9/2 **(c)** 9/4 (d) 0

(33) Infimum of set $\left\{\frac{(n+1)^n}{2^n} \ / \ n \in \mathbb{N}\right\}$ is .....

(a) 1 (b) 9/2 (c) 9/4 **(d)** 0

(34) Supremum of set $\left\{\frac{m}{n} \ / \ m,n \in \mathbb{N} \ , \ m<2n\right\}$ is .....

(a) 2 (b) 4 (c) 1 (d) 0

(35) Infimum of set $\left\{\frac{m}{n} \ / \ m,n \in \mathbb{N} \ , \ m<2n\right\}$ is .....

(a) 2 **(b)** 0 (c) 1 (d) -1

(36) Supremum of set $\{\sqrt{n}-[\ \sqrt{n}\ ] \ / \ n \in \mathbb{N}\ \}$ is .....

(a) 2 (b) 4 **(c)** 1 (d) 0

(37) Infimum of set $\{\sqrt{n}-[\ \sqrt{n}\ ] \ / \ n \in \mathbb{N}\ \}$ is .....

(a) 2 (b) 4 (c) 1 **(d)** 0

(38) Infimum of set $\{x+x^{-1} \ / \ x \in \mathbb{R} \ , \ x>0\}$ is .....

(a) 2 (b) -2 (c) 1 (d) 0

(39) Infimum of set $\left\{2^x+2^{1/x} \ / \ x \in \mathbb{R} \ , \ x>0\right\}$ is .....

(a) 2 (b) 0 (c) 1 **(d)** 4

(40) Supremum of set $\left\{\frac{m}{m+n} \ / \ m,n \in \mathbb{N}\right\}$ is .....

(a) 2 (b) 1/2 **(c)** 1 (d) 0

(41) Infimum of set $\left\{\frac{m}{m+n} \ / \ m,n \in \mathbb{N}\right\}$ is .....

(a) 2 (b) 1/2 (c) 1 **(d)** 0

(42) Supremum of set $\left\{\frac{m}{|m|+n} \ / \ m \in \mathbb{Z} \ , \ n \in \mathbb{N}\right\}$ is .....

(a) 2 (b) 1/2 **(c)** 1 (d) 0

(43) Infimum of set $\left\{\frac{m}{|m|+n} \ / \ m \in \mathbb{Z} \ , \ n \in \mathbb{N}\right\}$ is .....

(a) 1 **(b)** -1 (c) -2 (d) 0

(44) Supremum of set $\left\{\frac{(n+m)^2}{2^{mn}} \ / \ m \ , \ n \in \mathbb{N}\right\}$ is .....

(a) 2 (b) 4 (c) 1 (d) 0

(45) Infimum of set $\left\{ \dfrac{(n+m)^2}{2^{mn}} \ / \ m \ , \ n \in \mathbb{N} \right\}$ is .....

(a) 2 (b) 4 (c) 1 **(d)** 0

(46) Infimum of set $\left\{ \dfrac{m}{n} + \dfrac{4n}{m} \ / \ m \ , \ n \in \mathbb{N} \right\}$ is .....

(a) 2 **(b)** 4 (c) 1 (d) 0

(47) Infimum of set $\left\{ \dfrac{mn}{4m^2+n^2} \ / \ m \ , \ n \in \mathbb{N} \right\}$ is .....

(a) 1 (b) 1/4 (c) 1/2 **(d)** 0

(48) Infimum of set $\left\{ m + \dfrac{1}{n} \ / \ m \ , \ n \in \mathbb{N} \right\}$ is .....

(a) 2 **(b)** 1 (c) -1 (d) 0

(49) Infimum of set $\left\{ \pi + \dfrac{1}{2^n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) 1 **(b)** π (c) $\pi + 1$ (d) 0

(50) Supremum of set $\left\{ \pi + \dfrac{1}{2^n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) 1 (b) π **(c)** $\pi + \dfrac{1}{2}$ (d) 0

(51) Supremum of set $\left\{ \sin\left(\dfrac{n\pi}{6}\right) \ / \ n \in \mathbb{N} \right\}$ is .....

(a) 1 (b) -1 (c) 2 (d) 0

(52) Infimum of set $\left\{ \sin\left(\dfrac{n\pi}{6}\right) \ / \ n \in \mathbb{N} \right\}$ is .....

(a) 1 **(b)** -1 (c) 1/2 (d) 0

(53) Supremum of set $\{-2\sin x \ / \ x \in \mathbb{R} \}$ is .....

(a) 1 (b) -1 **(c)** 2 (d) 0

(54) Infimum of set $\{-2\sin x \ / \ x \in \mathbb{R} \}$ is .....

(a) 1 (b) -1 (c) 2 **(d)** -2

(55) Infimum of set $\left\{ \dfrac{n+1}{n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) -1 (b) 1/2 **(c)** 1 (d) 0

(56) Infimum of set $\left\{ \dfrac{n}{n+1} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) 1/3 (b) 1 **(c)** 1/2 (d) 0

(57) Supremum of set $\left\{ \dfrac{n}{n+1} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) 2 **(b)** 1 (c) 1/2 (d) 0

(58) Supremum of set $\{0.2 \ , \ 0.22 \ , \ 0.222 \ , ...\}$ is .....

(a) 2 **(b)** 0.23 (c) 0.3 (d) 0

(59) Infimum of set $\{0.2 \ , \ 0.22 \ , \ 0.222 \ , ...\}$ is .....

(a) 0.2 (b) 0.22 (c) 0.21 (d) 0

(60) Supremum of set $\left\{(-1)^n\left(\frac{1}{4}-\frac{4}{n}\right) \ / \ n\in\mathbb{N}\right\}$ is .....

(a) 4 **(b)** 15/4 (c) 1/4 (d) 1

(61) Infimum of set $\left\{(-1)^n\left(\frac{1}{4}-\frac{4}{n}\right) \ / \ n\in\mathbb{N}\right\}$ is .....

(a) $-7/4$ (b) $-1/4$ (c) $-9/4$ (d) -1

(62) Number of limit point of the set $\left\{\frac{1}{m}+\frac{1}{n} \ / \ m\ ,\ n\in\mathbb{N}\right\}$ is/are .....

(a) 1 (b) 2 (c) finitely many **(d)** infinitely many

(63) The limit point of the set $\left\{\frac{1}{n}\sin\frac{1}{n} \ / \ n\in\mathbb{N}\right\}$ is .....

(a) 1 **(b)** 0 (c) finitely many (d) infinitely many

UNIT-2

(1) Interior point of $\mathbb{N}$ is .....

(a) 1 **(b)** ϕ (c) $\mathbb{N}$ (d) none of these

(2) Interior point of $\mathbb{Q}$ is .....

(a) 1 **(b)** ϕ (c) $\mathbb{Q}$ (d) $\mathbb{R}$

(3) Interior point of $\mathbb{R}$ is .....

(a) 1 (b) ϕ (c) $\mathbb{Q}$ **(d)** $\mathbb{R}$

(4) S^i ..... S

(a) $=$ (b) $\supset$ (c) $\leq$ **(d)** $\subset$

(5) If S is open set then S^i ..... S

(a) $\leq$ (b) $\supset$ **(c)** $=$ (d) $\subset$

(6) If $S_n=(-1/n\ ,\ 1/n)\ \ ,\ \ n\in\mathbb{N}$ then $\cap\, S_n=$ .....

(a) ϕ (b) 1 **(c)** $\{0\}$ (d) 0

(7) $I'=$ .....

(a) ϕ (b) I (c) $\{0\}$ (d) $\mathbb{R}$

(8) $\mathbb{Q}'=$ .....

(a) ϕ **(b)** $\mathbb{R}$ (c) $\{0\}$ (d) $\mathbb{Q}$

(9) $\mathbb{R}'=$ .....

(a) ϕ **(b)** $\mathbb{R}$ (c) $\{0\}$ (d) $\mathbb{Q}$

(10) Every finite set has ..... limit point.

(a) 1 (b) $\{0\}$ **(c)** no (d) finite

(11) $S'\cap T'$ ..... $(S\cap T)'$.

(a) $=$ **(b)** $\supset$ (c) $\leq$ (d) $\subset$

(12) $\tilde{S}=S$ ..... S' .

(a) δ (b) $+$ (c) $\cap$ **(d)** $\cup$

(13) $\tilde{I}$ = ...
(a) ϕ **(b)** I (c) $\mathbb{Q}$ (d) $\mathbb{R}$

(14) $\tilde{\phi}$ = ...
(a) ϕ (b) I (c) $\mathbb{Q}$ (d) $\mathbb{R}$

(15) $\tilde{\mathbb{Q}}$ = ...
(a) ϕ (b) I (c) $\mathbb{Q}$ **(d)** $\mathbb{R}$

(16) $\tilde{\mathbb{R}}$ = ...
(a) ϕ (b) I (c) $\mathbb{Q}$ **(d)** $\mathbb{R}$

(17) $\left\{1, -1, 1\frac{1}{2}, -1\frac{1}{2}, 1\frac{1}{3}, -1\frac{1}{3}, ...\right\}$ is .....
(a) open and closed (b) open but not closed **(c)** closed but not open (d) none

(18) If $S_n = [1 + 1/n\ ,\ 3]\ \ ,\ \ n \in \mathbb{N}$ then $\cup\, S_n$ = ...
(a) $[1\ ,\ 3]$ (b) $[1\ ,\ 3)$ (c) ϕ **(d)** $(1\ ,\ 3]$

(19) Limit point of set $\left\{1, -1, 1\frac{1}{2}, -1\frac{1}{2}, 1\frac{1}{3}, -1\frac{1}{3}, ...\right\}$ are .....
(a) $1, -1$ (b) only 1 (c) only -1 (d) none of these

(20) If $S = \left\{1, -1, 1\frac{1}{2}, -1\frac{1}{2}, 1\frac{1}{3}, -1\frac{1}{3}, ...\right\}$ then inf S' = ...
(a) $1\frac{1}{2}$ **(b)** -1 (c) 1 (d) $-1\frac{1}{2}$

(21) If $S = \left\{1, -1, 1\frac{1}{2}, -1\frac{1}{2}, 1\frac{1}{3}, -1\frac{1}{3}, ...\right\}$ then sup S' = ...
(a) $-1\frac{1}{2}$ (b) -1 **(c)** 1 (d) $1\frac{1}{2}$

(22) If $S = \left\{1, -1, 1\frac{1}{2}, -1\frac{1}{2}, 1\frac{1}{3}, -1\frac{1}{3}, ...\right\}$ then sup $\tilde{S}$ = ...
(a) $-1\frac{1}{2}$ (b) -1 **(c)** $1\frac{1}{2}$ (d) 1

(23) If $S = \left\{1, -1, 1\frac{1}{2}, -1\frac{1}{2}, 1\frac{1}{3}, -1\frac{1}{3}, ...\right\}$ then inf $\tilde{S}$ = ...
(a) $-1\frac{1}{2}$ (b) 1 (c) $1\frac{1}{2}$ (d) -1

(24) Set S is closed iff .....
(a) $S' \subset S$ (b) $S' \supset S$ (c) $S' \neq S$ (d) $S' = S$

(25) If M is supremum of S and $M \notin S$ then M is ..... of S .
(a) closure **(b)** limit point (c) derived set (d) identity

(26) If M is supremum of S and $M \notin S$ then M is greatest member of.....
(a) S (b) $\tilde{S}$ **(c)** S' (d) $\mathbb{R}$

(27) $\bigcup_{n\in\mathbb{N}} \left[a + \frac{1}{n}\ ,\ a + 2\right]\ ,\ a \in \mathbb{R}$ is ..... set .
(a) closed (b) open (c) universal **(d)** not closed

(28) The set of limit points of the set $[0,1] - \left\{ \frac{1}{n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) countable **(b)** uncountable (c) finite (d) empty

(29) Limit point of the set $\left\{ \frac{1}{n} \sin \frac{1}{n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) 1 **(b)** 0 (c) -1 (d) 0,1

(30) The set of limit points of the set $\left\{ \frac{2}{x+1} \ / \ x \in (-1,1) \right\}$ is .....

(a) $[1,\infty)$ (b) $(1,\infty)$ (c) $[-1,1]$ (d) $[-1,\infty)$

(31) The set of limit points of the set $\left\{ \frac{5-x}{x} \ / \ x \in (2,3) \right\}$ is .....

(a) $[2/3, 3/2)$ (b) $(2/3, 3/2)$ **(c)** $[2/3, 3/2]$ (d) $[2/3,\infty)$

(32) The set of limit points of the set $\left\{ \frac{5-x}{3} \ / \ x \in (2,3) \right\}$ is .....

(a) $[2/3, 1)$ (b) $(2/3, 1)$ **(c)** $[2/3, 1]$ (d) $[2/3,\infty)$

(33) Derived set of the set $\{x \ / \ 0 < x < 1, x \in \mathbb{Q}\}$ is .....

(a) $[0,1)$ (b) $(0,1)$ **(c)** $[0,1]$ (d) $(0,1]$

(34) Derived set of the set $\left\{ \frac{1}{m} + \frac{1}{n} \ / \ m,n \in \mathbb{N} \right\}$ is .....

(a) $\left\{ \frac{1}{m} \ / \ m \in \mathbb{N} \right\} \cup \{0\}$ (b) $\left\{ \frac{1}{m} \ / \ m \in \mathbb{N} \right\}$ (c) $\{0\}$ (d) $(0,1]$

(35) Derived set of the set $\left\{ 1 + \frac{1}{2^n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) $\{0\}$ **(b)** $\{1\}$ (c) $[0,1]$ (d) $(0,1]$

(36) Derived set of the set $\{3^{-n} + 5^{-n} \ / \ n \in \mathbb{N}\}$ is .....

(a) $\{0\}$ (b) $\{1\}$ (c) $\{3^{-1}\}$ (d) 0

(37) Derived set of the set $\left\{ \frac{1}{n} \ / \ n \in \mathbb{Z} \ , \ n \neq 0 \right\}$ is .....

(a) $\{0,1\}$ **(b)** $\{-1,1\}$ (c) $\{-1\}$ (d) $\{0\}$

(38) Derived set of the set $\left\{ 1 + \frac{(-1)^n}{n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) $\{0\}$ **(b)** $\{1\}$ (c) $[0,1]$ (d) 1

(39) Derived set of the set $\left\{ \frac{1+(-1)^n}{n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) $\{0\}$ (b) $\{1\}$ (c) $[0,1]$ (d) 0

(40) Derived set of the set $\left\{ (-1)^n + \frac{1}{n} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) $\{-1\}$ (b) $\{1\}$ **(c)** $\{-1,1\}$ (d) $-1, 1$

(41) Derived set of the set $\left\{ \frac{1}{2m} + \frac{1}{3n} \ / \ m,n \in \mathbb{N} \right\}$ is .....

(a) $\left\{ \frac{1}{2m} \ / \ m \in \mathbb{N} \right\} \cup \{0\}$ (b) $\left\{ \frac{1}{3n} \ / \ m \in \mathbb{N} \right\}$ (c) $\{0\}$ **(d)** $\left\{ \frac{1}{2m} \ / \ m \in \mathbb{N} \right\} \cup \left\{ \frac{1}{3n} \ / \ n \in \mathbb{N} \right\}$

(42) Derived set of the set $\left\{ \frac{n}{n+1} \ / \ n \in \mathbb{N} \right\}$ is .....

(a) $\{0,1\}$ **(b)** $\{1\}$ (c) $\{-1\}$ (d) $\{0\}$

(43) Derived set of the set $\left\{ m + \frac{1}{n} \ / \ m,n \in \mathbb{N} \right\}$ is .....

(a) $\{0\}$ **(b)** $\mathbb{N}$ (c) $[0,1]$ (d) $\emptyset$

(44) Derived set of the set $\left\{n+\frac{1}{n} \ / \ n \in \mathbb{N}\right\}$ is .....
(a) $\{0\}$ (b) $\mathbb{N}$ (c) $[0,1]$ **(d)** $\emptyset$

(45) Derived set of the set $(2,3) \cup \left\{4+\frac{1}{n} \ / \ n \in \mathbb{N}\right\} \cup \{5\}$ is .....
(a) $\emptyset$ (b) $(2,4) \cup \{5\}$ (c) $[2,5]$ **(d)** $[2,3] \cup \{4\}$

(46) $(\mathbb{Q}^c)' =$ .....
(a) ϕ **(b)** $\mathbb{R}$ (c) $\{0\}$ (d) $\mathbb{Q}$

(47) If $S = \left\{\frac{1}{n} \ / \ n \in \mathbb{N}\right\}$ then $\bar{S} =$ .....
(a) ϕ **(b)** $S \cup \{0\}$ (c) $\{0\}$ (d) S

(48) If $S = \left\{1-\frac{2}{n} \ / \ n \in \mathbb{N}\right\}$ then $\bar{S} =$ .....
(a) ϕ (b) $S \cup \{0\}$ (c) $\{0\}$ **(d)** $S \cup \{1\}$

(49) If $S = \mathbb{R} - \left\{\frac{1}{n} \ / \ n \in \mathbb{N}\right\}$ then $\bar{S} =$ .....
(a) $\mathbb{R}$ (b) $S \cup \{0\}$ (c) $\{0\}$ (d) $S \cup \{1\}$

(50) If $S = \left\{\frac{1}{m}+\frac{1}{n} \ / \ m,n \in \mathbb{N}\right\}$ then $\bar{S} =$ .....
(a) $\left\{\frac{1}{n}/n \in \mathbb{N}\right\} \cup \left\{\frac{1}{m}+\frac{1}{n}/m,n \in \mathbb{N}\right\} \cup \{0\}$ (b) $\left\{\frac{1}{m}/m, \in \mathbb{N}\right\}$ (c) $\{0\}$ (d) $\left\{\frac{1}{n}/n \in \mathbb{N}\right\} \cup \{0\}$

(51) Closure of $\mathbb{R} - \mathbb{N}$ is .....
(a) $\{0\}$ (b) $\mathbb{N}$ **(c)** $\mathbb{R}$ (d) $\emptyset$

(52) Closure of $\mathbb{R} - \mathbb{Z}$ is .....
(a) $\{0\}$ (b) $\mathbb{Z}$ **(c)** $\mathbb{R}$ (d) $\emptyset$

(53) Closure of $\mathbb{R} - \mathbb{Q}$ is .....
(a) $\{0\}$ (b) $\mathbb{Q}$ **(c)** $\mathbb{R}$ (d) $\emptyset$

(54) Closure of $\mathbb{R} - \mathbb{Q}^c$ is .....
(a) $\{0\}$ (b) $\mathbb{Q}^c$ **(c)** $\mathbb{R}$ (d) $\emptyset$

UNIT-3

(1) If $Sn = 1+(-1)^n$, $n \in \mathbb{N}$ then limit points of sequence $\{S_n\}$ are .....
(a) $0,2$ (b) $1,2$ (c) $-1,1$ (d) none of these

(2) If $Sn = (-1)^n$, $n \in \mathbb{N}$ then limit points of sequence $\{S_n\}$ are .....
(a) $0,2$ (b) $1,2$ **(c)** $-1,1$ (d) none of these

(3) If $Sn = (-1)^n\left(1+\frac{1}{n}\right)$, $n \in \mathbb{N}$ then limit points of sequence $\{S_n\}$ are .....
(a) $0,2$ (b) $1,2$ **(c)** $-1,1$ (d) none of these

(4) If $Sn = 1+(-1)^n$, $n \in \mathbb{N}$ then the range set of sequence $\{S_n\}$ has ..... limit point .
(a) $0,2$ (b) $1,2$ (c) $-1,1$ **(d)** no

(5) If $Sn = (-1)^n$, $n \in \mathbb{N}$ then the range set of sequence $\{S_n\}$ has ..... limit point .
(a) $0,2$ (b) $1,2$ (c) $-1,1$ **(d)** no

(6) Lower limit of sequence $\{(-1)^n\}$ is .....
(a) 0 (b) 1 **(c)** -1 (d) none of these

(7) Upper limit of sequence $\{1+(-1)^n\}$ is .....
(a) 0 (b) 1 **(c)** 2 (d) none of these

(8) Sequence $\{1+(-1)^n\}$ is .....
(a) oscillates finitely (b) diverges to $+\infty$ (c) oscillates infinitely (d) diverges to $-\infty$

(9) Sequence $\left\{(-1)^n\left(1+\frac{1}{n}\right)\right\}$ is .....
(a) oscillates finitely (b) diverges to $+\infty$ (c) oscillates infinitely (d)diverges to $-\infty$

(10) Sequence $\{n(-1)^n\}$ is .....
(a) oscillates finitely (b) diverges to $+\infty$ **(c)** oscillates infinitely (d) diverges to $-\infty$

(11) Sequence $\{n^2\}$ is .....
(a) oscillates finitely **(b)** diverges to $+\infty$ (c) oscillates infinitely (d) diverges to $-\infty$

(12) Sequence $\{-2^n\}$ is .....
(a) oscillates finitely (b) diverges to $+\infty$ (c) oscillates infinitely **(d)** diverges to $-\infty$

(13) Sequence $\{1, 2, 1/2, 3, 1/3, ...\}$ is .....
(a) oscillates finitely (b) diverges to $+\infty$ **(c)** oscillates infinitely (d) diverges to $-\infty$

(14) Sequence $\{1, 2, 3, 2, 5, 2, 7, 2, 3, 2, 11, 2, 13, ...\}$ is .....
(a) oscillates finitely (b) diverges to $+\infty$ **(c)** oscillates infinitely (d) diverges to $-\infty$

(15) $\lim_{n\to\infty} n^{1/n} =$ .....
(a) n (b) ∞ (c) 0 **(d)** 1

(16) the sequence $\{r^n\}$ converges iff .....
(a) $-1 < r \leq 1$ (b) $-1 < r < 1$ (c) $-1 \leq r \leq 1$ (d) $-1 \leq r < 1$

(17) The sequence $\{r^n\}$ converges to zero iff .....
(a) $|r| \geq 1$ **(b)** $|r| < 1$ (c) $|r| \leq 1$ (d) $|r| > 1$

(18) $\lim \frac{1+2+3+.....+n}{n^2} =$ .....
(a) $1/n$ (b) 1 (c) 0 **(d)** 1/2

(19) $\lim \frac{1+3+5+.....+(2n-1)}{n^2} =$ .....
(a) $1/n$ **(b)** 1 (c) 0 (d) 1/2

(20) $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n =$ .....
(a) 1 (b) ∞ (c) 0 **(d)** e

(21) A limit point of the sequence ..... a limit point of the range set of a sequence .
(a) is also (b) is same as **(c)** need not be (d) none of these

(22) Every bounded sequence has ..... limit point .
(a) unique **(b)** at least one (c) finite (d) infinite

(23) A bounded sequence with ..... limit point is convergent .
(a) unique (b) at least one (c) finite (d) infinite

(24) $\lim_{n\to\infty} \frac{x^n}{n!}$ = ...
(a) e (b) ∞ **(c)** 0 (d) 1

(25) The limit point of sequence $\left\{m + \frac{1}{n}\right\}$ are .....
(a) $e, 1$ (b) $0, 1$ **(c)** $1, 2, 3, 4, ...$ (d) $1, 1/2, 1/3, 1/4, ...$

(26) The limit point of sequence $\left\{\frac{1}{m} + \frac{1}{n}\right\}$ are .....
(a) $e, 1$ (b) $0, 1$ (c) $1, 2, 3, 4, ...$ **(d)** $1, 1/2, 1/3, 1/4, ...$

(27) The sequence $\{(-1)^n\}$ is .....
(a) bounded and convergent **(b)** bounded and divergent (c) unbounded and convergent (d) unbounded and divergent

(28) The sequence ..... is convergent .
(a) $\{2^n\}$ **(b)** $\{(1/3)^n\}$ (c) $\{3^n\}$ (d) none of these
none of these

(29) The sequence ..... is divergent .
(a) $\left\{1 + \frac{1}{n}\right\}$ (b) $\left\{\frac{(-1)^{n-1}}{n!}\right\}$ (c) $\left\{\frac{(-1)^n}{n^2}\right\}$ (d) $\{(1/3)^n\}$

(30) The sequence ..... is divergent .
(a) $\left\{(-1)^n\left(1 + \frac{1}{n}\right)\right\}$ (b) $\left\{\frac{(-1)^{n-1}}{n!}\right\}$ (c) $\left\{\frac{(-1)^n}{n^2}\right\}$ (d) $\{(1/3)^n\}$

(31) If $L = \lim_{n\to\infty} \frac{1}{\sqrt[n]{n!}}$ then .....
(a) $L = 0$ (b) $L = 1$ (c) $0 < L < 1$ (d) $L = \infty$

(32) $\lim \frac{1}{n}\left(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + ...\right)$ is .....
(a) 2 (b) 1 **(c)** 0 (d) 1/2

(33) $\lim_{n\to\infty} \left(1 + \frac{x}{n}\right)^n$ = ...
(a) e^x (b) 1 (c) 0 (d) e

(34) $\lim_{n\to\infty} \frac{\log n}{n}$ = ...
(a) ∞ (b) 1 **(c)** 0 (d) e

(35) $\lim_{n\to\infty} (n)^{\frac{1}{n}}$ = ...
(a) e (b) ∞ (c) 0 **(d)** 1

(36) $\lim_{n\to\infty} \left(\frac{1}{n}\right)^{\frac{1}{n}}$ = ...
(a) e (b) ∞ (c) 0 **(d)** 1

(37) $\lim_{n\to\infty} \left(\frac{1}{n^2}\right)^{\frac{1}{n}}$ = ...

(a) e (b) ∞ (c) 0 **(d)** 1

(38) The sequence $\left\{\frac{n}{n+1}\right\}$ is .....

(a) decreasing **(b)** increasing (c) unbounded (d) none of these

(39) The sequence $\left\{a + \frac{(-1)^n b}{n}\right\}$ is .....

(a) bounded (b) unbounded (c) convergent (d) none of these

(40) If $S = \left\{\frac{1}{n} \;/\; n \in \mathbb{N}\ ,\ n \text{ is prime}\right\}$, $T = \{x^2 \;/\; x \in \mathbb{R}\}$ then .....

(a) $\sup(S \cap T) = 1$ (b) $\sup\ S = 1$, $\inf\ T = 0$ **(c)** $\sup\ S = 1/2$, $\inf\ T = 0$
(d) $\inf(S \cup T) = 1/2$

(41) For sequence $a_n = \left(1 + (-1)^n \frac{1}{n}\right)^n$, $\limsup\ a_n$ = ...

(a) 0 (b) 1 **(c)** e (d) $1/e$

(42) For sequence $a_n = \left(1 + (-1)^n \frac{1}{n}\right)^n$, $\liminf\ a_n$ = ...

(a) 0 (b) 1 (c) e **(d)** $1/e$

(43) Limit points of the sequence $a_n = \left(1 + (-1)^n \frac{1}{n}\right)^n$ is/are .....

(a) 1 (b) only $1/e$ (c) only e **(d)** e and $1/e$

UNIT-4

(1) The series $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \ldots$ is .....

(a) not convergent (b) oscillating (c) convergent (d) none of these

(2) The series $1 + \frac{1}{2!} + \frac{1}{3!} + \ldots$ is .....

(a) not convergent (b) oscillating **(c)** convergent (d) none of these

(3) The series $\frac{1}{(\log 2)^p} + \frac{1}{(\log 3)^p} + \cdots + \frac{1}{(\log n)^p} + \ldots$ is ..... for $p > 0$.

(a) oscillating **(b)** divergent (c) convergent (d) none of these

(4) The series $\frac{1\cdot 2}{3^2\cdot 4^2} + \frac{3\cdot 4}{5^2\cdot 6^2} + \frac{5\cdot 6}{7^2\cdot 8^2} + \ldots$ is .....

(a) convergent (b) divergence (c) oscillating (d) none of these

(5) The series $\frac{1}{1.2.3} + \frac{3}{2.3.4} + \frac{5}{3.4.5} + \ldots$ is .....

(a) oscillating **(b)** convergent (c) not convergent (d) none of these

(6) The series $\frac{1}{\sqrt{1.2}} + \frac{1}{\sqrt{2.3}} + \frac{1}{\sqrt{3.4}} + \ldots$ is .....

(a) oscillating **(b)** divergent (c) convergent (d) none of these

(7) The series $\frac{1}{4.6} + \frac{\sqrt{3}}{6.8} + \frac{\sqrt{5}}{8.10} + \frac{\sqrt{7}}{10.12} + \ldots$ is .....

(a) oscillating (b) not convergent **(c)** convergent (d) none of these

(8) $\sum \frac{n+1}{n^p}$ is convergent for .....

(a) $p > 2$ (b) $p < 2$ (c) $p = 1$ (d) $p < 1$

(9) $\sum \frac{1}{\sqrt{n}+\sqrt{n+1}}$ is .....
(a) divergence (b) convergent (c) oscillating (d) none of these

(10) $\sum \sin \frac{1}{n^2}$ is .....
(a) divergence **(b)** convergent (c) oscillating (d) none of these

(11) $\sum \cos \frac{1}{n}$ is .....
(a) divergence (b) convergent (c) oscillating (d) none of these

(12) $\sum \frac{1}{\sqrt{n}} \tan \frac{1}{n}$ is .....
(a) divergence **(b)** convergent (c) oscillating (d) none of these

(13) $\sum \frac{\sqrt{n+1}+\sqrt{n-1}}{n}$ is .....
(a) divergence **(b)** convergent (c) oscillating (d) none of these

(14) $\frac{x}{1}+\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}+\ldots$ is convergent for .....
(a) $|x|>1$ **(b)** $|x|<1$ (c) $|x|\leq 1$ (d) $|x|\geq 1$

(15) $\frac{x}{1}+\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}+\ldots$ is divergent for .....
(a) $|x|>1$ (b) $|x|<1$ **(c)** $|x|\geq 1$ (d) $|x|=1$

(16) $\frac{x^2}{2\sqrt{1}}+\frac{x^3}{3\sqrt{2}}+\frac{x^4}{4\sqrt{3}}+\frac{x^5}{5\sqrt{4}}+\ldots$ is convergent for .....
(a) $|x|>1$ (b) $|x|<1$ **(c)** $|x|\leq 1$ (d) $|x|\geq 1$

(17) $\frac{x^2}{2\sqrt{1}}+\frac{x^3}{3\sqrt{2}}+\frac{x^4}{4\sqrt{3}}+\frac{x^5}{5\sqrt{4}}+\ldots$ is divergent for .....
(a) $|x|>1$ (b) $|x|<1$ (c) $|x|\leq 1$ (d) $|x|\geq 1$

(18) $1+\frac{x^2}{2^p}+\frac{x^4}{4^p}+\frac{x^6}{6^p}+\ldots$ is divergent for .....
(a) $|x|>1$ (b) $|x|<1$ (c) $|x|\geq 1$ (d) $|x|\leq 1$

(19) $1+\frac{x^2}{2^p}+\frac{x^4}{4^p}+\frac{x^6}{6^p}+\ldots$ is convergent for .....
(a) $|x|>1$ **(b)** $|x|<1$ (c) $|x|\geq 1$ (d) $|x|\leq 1$

(20) $1+\frac{1}{2^p}+\frac{1}{4^p}+\frac{1}{6^p}+\ldots$ is divergent for .....
(a) $p>1$ (b) $p<1$ (c) $p\geq 1$ **(d)** $p\leq 1$

(21) $1+\frac{1}{2^p}+\frac{1}{4^p}+\frac{1}{6^p}+\ldots$ is convergent for .....
(a) $p>1$ (b) $p<1$ (c) $p\geq 1$ (d) $p\leq 1$

(22) $\frac{1}{2}+\frac{1}{3^2}+\frac{1}{2^3}+\frac{1}{3^4}+\ldots$ is .....
(a) 0 (b) 1 **(c)** convergent (d) not convergent

(23) A positive term series can not .....
(a) oscillate (b) divergent to $+\infty$ (c) convergent (d) None of these

(24) The series $\sum \frac{1}{\left(1+\frac{1}{n}\right)^{n^2}}$ is .....
(a) oscillate (b) divergent **(c)** convergent (d) None of these

(25) The series $\sum \frac{\sqrt{n}}{n^2+1}$ is .....
(a) oscillate (b) divergent **(c)** convergent (d) None of these

(26) The series $\sum \frac{x^n}{x+n}$ is convergent if .....
(a) $x<1$ (b) $x>1$ (c) $x=1$ (d) $0<x<1$

(27) The series $1+\frac{1}{2^2}+\frac{2^2}{3^3}+\frac{3^3}{4^4}+$..... is .....
(a) oscillate **(b)** divergent (c) convergent (d) None of these

(28) The series $\sum \frac{n^2}{3^n}$ is .....
(a) unbounded (b) divergent **(c)** convergent (d) None of these

(29) The series $\sum \frac{2n+1}{(n^2+n)^2}$ is convergent to .....
(a) 1 **(b)** number >1 (c) 0 (d) None of these

(30) $\sqrt[7]{\frac{1}{2}}+\sqrt[7]{\frac{2}{3}}+\sqrt[7]{\frac{3}{4}}+$..... is .....
(a) oscillate **(b)** divergent (c) convergent (d) None of these

(31) The series $\sum n\log\left(\frac{3n+2}{3n-2}-1\right)$ is .....
(a) oscillate **(b)** divergent (c) convergent (d) None of these

(32) The series $\sum \frac{3^n}{3^n+4^n}$ is .....
(a) oscillate (b) divergent **(c)** convergent (d) None of these

(33) The series $\sum \frac{5^n}{4^n+5^n}$ is .....
(a) oscillate **(b)** divergent (c) convergent (d) None of these
NOTE : (i)The series $\sum \frac{a^n}{a^n+b^n}$ is convergent if $0<\frac{a}{b}<1$ and is divergent if $\frac{a}{b}>1$.
(ii) The series $\sum \frac{a}{bn^p \pm c}$, $(b\neq 0)$ is convergent if $p>1$ and is divergent if $p\leq 1$.

(34) The series $\sum \frac{1}{n^{50}-500}$ is .....
(a) oscillate (b) divergent **(c)** convergent (d) None of these

(35) The series $\sum \frac{2}{3n^2-2^2}$ is .....
(a) oscillate (b) divergent **(c)** convergent (d) None of these

(36) The series $\sum \frac{6}{4n^{48}-62}$ is .....
(a) oscillate (b) divergent **(c)** convergent (d) None of these

(37) The series $\sum \frac{2}{7\sqrt{n}-2^3}$ is .....
(a) oscillate **(b)** divergent (c) convergent (d) None of these

(38) The series $\sum \frac{5}{7n+2^3}$ is .....
(a) oscillate **(b)** divergent (c) convergent (d) None of these

(39) The series $\sum \frac{100}{2\sqrt[3]{n}+50}$ is .....

(a) oscillate **(b)** divergent (c) convergent (d) None of these

(40) The series $\sum \frac{4 \cdot 7 \cdot 10.....(3n+1)}{1 \cdot 2 \cdot 3.....n} x^n$ is convergent if .....

(a) $|x| < \frac{1}{3}$ (b) $|x| < 1$ (c) $|x| < \frac{1}{2}$ (d) $|x| < \frac{1}{4}$