	The Bodwad Sarvajanik Co-Op. Education Society Ltd., Bodwad **Arts, Commerce and Science College Bodwad** **<u>Question Bank</u>** **Class:-TYBSc** **Sem:-VI** **Subject: Real Analysis II** **Paper Name:- MTH 602**	
Sr. No.	**Questions**	**Ans**
1)	Every sequence is a function from…… a) R b) Q c) N d) None of these	**C**
2)	The sequence $\left\{\frac{1}{n}\right\}_{n=1}^{\infty}$ converges to…… a) 1 b) 0 c) ∞ d) None of these	**B**
3)	The limit of sequence with $a_n = \frac{1}{n}$ as $n \to \infty$ is …… a) 1 b) 0 c) $\frac{1}{2}$ d) None of these	**B**
4)	The sequence with $x_n = a^n$ is convergent if …… a) $\|a\| = 1$ b) $\|a\| > 1$ c) $\|a\| < 1$ d) None of these	**C**
5)	If the sequence of real numbers $\{x_n\}_{n=1}^{\infty}$ is convergent then it is a) Bounded b) Not bounded c) Infinite d) None of these	**A**
6)	If the sequence of real number is convergent then it is converges to …… a) Unique limit b) Different limit c) 1 d) ∞	**A**
7)	The sequence $\{(-1)^{n+1}\}_{n=1}^{\infty}$ is ……	

	a) Convergent b) Divergent c) Oscillatory d) None of these	**C**
8)	A non decreasing sequence which is bounded …… is convergent. a) Above b) Below c) Both side d) None of these	**C**

9)	The sequence of real numbers $\{x_n\}_{n=1}^{\infty}$ is monotonic iff it is a) Monotonic increasing b) Monotonic decreasing c) Both monotonic increasing and decreasing d) Either monotonic increasing or decreasing	**D**
10)	If the sequence $\{a_n\}_{n=1}^{\infty}$ is convergent then $\lim_{n\to\infty} a_n =$ …… a) 0 b) 1 c) ∞ or $-\infty$ d) None of these	**A**
11)	If the sequence $\{a_n\}_{n=1}^{\infty}$ is divergent then $\lim_{n\to\infty} a_n =$ …… a) 0 b) Finite c) ∞ or $-\infty$ d) None of these	**C**
12)	The sequence $\left\{\left(1+\frac{1}{n}\right)^n\right\}_{n=1}^{\infty}$ converges to …… a) 1 b) e c) π d) ∞	**B**
13)	Let the sequence $\{x_n\}_{n=1}^{\infty}$ converges to L and $\{x_{n_k}\}_{k=1}^{\infty}$ is any subsequence of $\{x_n\}_{n=1}^{\infty}$ then $\{x_{n_k}\}_{k=1}^{\infty}$ …… a) Must be converges to same limit L b) May be converges to different c) May be diverges d) None of these	**A**
14)	If $0 < x < 1$ then sequence $\{x_n\}_{n=1}^{\infty}$ …… a) Converges to 0 b) Converges to 1	**A**

	c) Diverges to ∞ d) Diverges to $-\infty$	

15)	Let $f_n(x) = x^n$ for $0 \le x \le 1, \forall\, n \in I$ then the sequence of functions $\{f_n\}_{n=1}^{\infty}$ …… a) Converges uniformly b) Converges pointwise c) Diverges d) None of these	**B**
16)	Let $f_n(x) = \frac{\sin x}{n}$ for $n \le x \le 1, \forall\, n \in I$ then the sequence of functions $\{f_n(x)\}_{n=1}^{\infty}$. a) Converges uniformly to 0 b) Converges pointwise to 0 c) Diverges to ∞ d) None of these	**A**
17)	If the sequence $\{f_n\}_{n=1}^{\infty}$ converges uniformly to $f(x)$ on $[a, b]$ and $f_n \in R[a, b]\ \forall\, n \in I$ Then $\int_a^b f(x)\, dx =$ …… a) $\sum_{n=1}^{\infty} f_n(x)$ b) $\lim_{n\to\infty} \int_a^b f_n(x)dx$ c) ∞ d) None of these	**B**
18)	Let $f_n(x) = \frac{x^n}{n}$ for $n \le x \le 1, \forall\, n \in I$ then the sequence of functions $\{f_n(x)\}_{n=1}^{\infty}$. a) Converges uniformly to 0 b) Converges pointwise to 0 c) Converges uniformly to 1 d) Diverges to ∞	**A**
19)	The geometric series $1 + x + x^2 + x^3 +$…… is convergent if…… a) $\|x\| < 1$ b) $0 < x < 1$ c) $x < 0$ d) $x > 1$	**A**
20)	The geometric series $1 + x + x^2 + x^3 + \cdots$ is convergent $\frac{1}{1-x}$ iff a) $\|x\| < 1$ b) $0 < x < 1$ c) $x < 0$ d) $x > 1$	**A**

21)	If the series $\sum_{n=1}^{\infty} a_n = a_1 + a_2 +$.......... is convergent then which of the following series is also convergent a) $a_2 + a_3 + a_4 +$........... b) $\frac{1}{2}(a_1 + a_2) + \frac{1}{2}(a_2 + a_3) + \frac{1}{2}(a_3 + a_4) +$......... c) $a_1 + (a_2 + a_3) + (a_4 + a_5 + a_6) +$......... d) None of these	**D**
22)	If the series $\sum_{n=1}^{\infty}(-1)^{n+1}a_n = a_1 - a_2 + a_3 - a_4 +$.......... is called ...... a) Oscillatory series b) Alternating series c) Power series d) None of the above	**B**
23)	If the series $\sum_{n=1}^{\infty}(-1)^{n+1}a_n$ converges to $L \in R$ then for any $k \in I, \|S_k - L\| \leq$....... a) 0 b) 1 c) a_k d) a_{k+1}	**D**
24)	The infinite series $\sum_{n=1}^{\infty} a_n$ is said to be converges to absolutely iff , a) $\sum_{n=1}^{\infty} a_n$ converges b) $\sum_{n=1}^{\infty} \|a_n\|$ converges c) $\sum_{n=1}^{\infty}(-a_n)$ converges d) $\sum_{n=1}^{\infty} a_n < \infty$	**B**
25)	Which of the following statement is true. a) Every absolutely convergent series is convergent b) Every convergent series is absolutely convergent c) Series converges absolutely iff it is converges d) All of these	**A**
26)	If the series $\sum_{n=1}^{\infty} a_n$ is said to be converges absolutely and $p_n = max\{a_n, 0\}$ and $q_n = min\{a_n, 0\}$ then a) Only $\sum p_n$ converges b) Only $\sum q_n$ converges c) Both $\sum p_n$ and $\sum q_n$ converges converge d) Both $\sum p_n$ and $\sum q_n$ converges diverges	**C**

27)	If the series $\sum_{n=1}^{\infty} b_n$ is rearrangement series of $\sum_{n=1}^{\infty} a_n$ and $\sum_{n=1}^{\infty} a_n$ converges then a) $\sum_{n=1}^{\infty} b_n$ must convergent b) $\sum_{n=1}^{\infty} b_n$ is divergent c) $\sum_{n=1}^{\infty} b_n$ may or may not converges d) None of these	**C**
28)	If $\sum_{n=1}^{\infty} a_n$ is series of non negative terms which converges to A and $\sum_{n=1}^{\infty} b_n$ is rearrangement series of $\sum_{n=1}^{\infty} a_n$ then $\sum_{n=1}^{\infty} b_n$....... a) Also converges to A b) Converges in neighbourhood of A c) Converges to A^2 d) May be divergent	**A**
29)	The auxiliary series $\sum_{n=1}^{\infty} \frac{1}{n^p} = \frac{1}{1^p} + \frac{1}{2^p} + \frac{1}{3^p} +$.......... converges iff a) $p < 1$ b) $p > 1$ c) $p = 1$ d) None of these	**B**
30)	Which of the following series is convergent. a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$ b) $\sum_{n=1}^{\infty} \frac{1}{n}$ c) $\sum_{n=1}^{\infty} \frac{1}{n^2}$ d) All of these	**C**
31)	We say that the series $\sum_{n=1}^{\infty} a_n$ is dominated by $\sum_{n=1}^{\infty} b_n$ iff a) $\lvert a_n \rvert \leq \lvert b_n \rvert \ \forall\, n \in I$ b) $\lvert a_n \rvert = \lvert b_n \rvert \ \forall\, n \in I$ c) $\lvert a_n \rvert \leq \lvert b_n \rvert \ \forall\, n \geq N$ d) None of these	**C**
32)	The series $\sum_{n=1}^{\infty} \frac{1}{n^2+2n+1}$ is a) Convergent b) Divergent c) Neither convergent nor divergent d) Oscillatory	**A**
33)	Which of the following series is divergent. a) $\sum_{n=1}^{\infty} \left(-\frac{1}{2}\right)^n$ b) $\sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^n$ c) $\sum_{n=1}^{\infty} \left(\frac{3}{4}\right)^n$ d) $\sum_{n=1}^{\infty} 1^n$	**D**

34)	If $a_n = \frac{n^n}{n!}$ Then $\frac{a_{n+1}}{a_n} = \ldots\ldots$ a) $\frac{(n+1)^{n+1}}{(n+1)!}$ b) 1 c) $\left(1+\frac{1}{n}\right)^n$ d) None of these	**C**
35)	If $\lim_{n\to\infty}(a_n)^{\frac{1}{n}} = L$ then the series $\sum_{n=1}^{\infty} a_n$ converges if a) $L < 1$ b) $L > 1$ c) $L = 1$ d) $L = 0$	**A**
36)	$\sum_{n=1}^{\infty} 2^n a_{2^n}$ converges implies $\sum_{n=1}^{\infty} a_n$ converges if $\{a_n\}_{n=1}^{\infty}$ is a) Non decreasing sequence of positive numbers b) Non increasing sequence of positive numbers c) Any sequence of positive numbers d) Any sequence of real numbers	**B**
37)	If the series $\sum_{n=1}^{\infty} a_n$ converges to A and c is any non zero constant then the series $\sum_{n=1}^{\infty} c.a_n$ converges to a) A b) $c^{\infty}A$ c) cA d) $\frac{A}{c}$	**C**
38)	If $\sum_{n=1}^{\infty} a_n = a_1 + a_2 + a_3$………. Converges to A then $a_2 + a_3 + a_4 +$ ………. converges to a) $A + a_1$ b) $A - a_1$ c) A d) None of these	**B**
39)	The condition for alternating series $\sum_{n=1}^{\infty}(-1)^n a_n$ to be convergent is a) $\{a_n\}_{n=1}^{\infty}$ is sequence of positive numbers b) $a_1 \geq a_2 \geq a_3 \geq$ ………. c) $\lim_{n\to\infty} a_n = 0$ d) All of above	**D**

40)	Let $\lim_{n\to\infty}\frac{\lvert a_n\rvert}{\lvert b_n\rvert}$ exists and finite then .... a) If $\sum_{n=1}^{\infty}\lvert b_n\rvert$ converges then $\sum_{n=1}^{\infty}\lvert a_n\rvert$ converges b) If $\sum_{n=1}^{\infty}\lvert a_n\rvert$ converges then $\sum_{n=1}^{\infty}\lvert b_n\rvert$ converges c) $\sum_{n=1}^{\infty}\lvert a_n\rvert$ converges iff $\sum_{n=1}^{\infty}\lvert b_n\rvert$ converges d) All of above	**A**
41)	The series $1+2x+3x^2+4x^3+\ldots\ldots$ converges iff a) $\lvert x\rvert>1$ b) $\lvert x\rvert=1$ c) $\lvert x\rvert<1$ d) $\lvert x\rvert=\infty$	**C**
42)	If $\lim_{n\to\infty}(a_n)^{\frac{1}{n}}=l$ then the series of positive terms $\sum_{n=1}^{\infty}a_n$ converges if $l<1$ diverges if $l>1$ and test fail if $l=1$. This test for convergence is called ...... a) Comparison test b) Limit test c) Ratio test d) Root test	**D**
43)	Let $\sum_{n=1}^{\infty}a_n$ is a series of positive terms and $\lim_{n\to\infty}(a_n)^{\frac{1}{n}}=l$ then root test for convergence fails if a) $l=0$ b) $l=1$ c) $l=\infty$ d) None of these	**B**
44)	Let $\{a_n\}_{n=1}^{\infty}$ be a sequence of real numbers if $\lim_{n\to\infty}\sup\lvert a_n\rvert^{\frac{1}{n}}=0$ then the series $\sum_{n=1}^{\infty}a_nx^n$ converges absolutely for a) $\lvert x\rvert<1$ b) $\lvert x\rvert>1$ c) $\lvert x\rvert=1$ d) $\forall\ x\in R$	**D**
45)	The sequence 1, -1, 1, -1, 1, -1, ... Is a) Convergent b) Divergent c) Neither convergent nor divergent d) Unbounded	**C**

46)	Let $\{f_n\}_{n=1}^{\infty}$ be a sequence of function defined on R then which of the following statement is true. a) If $\{f_n\}_{n=1}^{\infty}$ converges uniformly to f then $\{f_n\}_{n=1}^{\infty}$ converges point wise to f b) If $\{f_n\}_{n=1}^{\infty}$ converges point wise to f then $\{f_n\}_{n=1}^{\infty}$ converges uniformly to f c) If $\{f_n\}_{n=1}^{\infty}$ converges point wise to f iff $\{f_n\}_{n=1}^{\infty}$ converges uniformly to f d) All of above	**A**
47)	If $\{x_n\}_{n=1}^{\infty}$ is sequence of real numbers then which of the following statement is true. a) If $\{x_n\}_{n=1}^{\infty}$ is bounded then it is convergent b) If $\{x_n\}_{n=1}^{\infty}$ is convergent then it is bounded c) $\{x_n\}_{n=1}^{\infty}$ is convergent iff it is bounded d) None of these	**B**
48)	Which of the following sequence is monotonic . a) $\left\{\frac{1}{2^n}\right\}_{n=1}^{\infty}$ b) $\left\{\frac{1}{\log(n+1)}\right\}_{n=1}^{\infty}$ c) $\{n^2\}_{n=1}^{\infty}$ d) All of these	**D**
49)	The sequence of real valued function $\{f_n\}_{n=1}^{\infty}$ converges uniformly on E iff for $\epsilon > 0$ there exists $N \in I$ such that $\|f_n(x) - f_m(x)\| < \epsilon$ $\forall\, m, n \geq N, \forall\, x \in E$ this criteria is known as a) Euler's criteria b) Cauchy's criteria c) Monge's criteria d) None of these	**B**
50)	If $\{a_n\}_{n=1}^{\infty}$ is a sequence of real numbers then $\sum_{n=1}^{\infty} a_n$ is known as a) Partial sum b) Infinite sum c) Infinite series d) None of these	**C**