MASTER’S P.U COLLEGE, HASSAN, 573201.

KCET ONLINE TEST-23, MAY-2020  **MATHEMATICS**  **TIME: 45Mins MARKS: 30**

**TOPIC**: **LIMITS, CONTINUIUTY & DIFFERENTIATION. DATE: 15/05/2020**

**KEY**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **C** | **B** | **B** | **B** | **C** | **C** | **A** | **B** | **D** | **C** | **C** | **C** | **D** | **A** | **A** |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **C** | **C** | **C** | **D** | **A** | **B** | **A** | **A** | **C** | **C** | **B** | **C** | **D** | **A** | **B** |

**HINTS AND SOLUTIONS**

1. (c) . Put  as 

Thus .

1. (b)  

**Alter :** Apply L-Hospital’s rule,  .

1. (b) ,

where *n* is any whole number is defined for all positive integers including zero).

1. (b) Given limit   



1. (c) We have   

and  

 ∴ .

1. (c) ⇒ 

⇒ .....(i)

If then L.H.S.  as  while R.H.S. =1, therefore 

Now from (i), 

. Solving  and  we get .

1. (a) Using L-Hospital's rule, we get

 .....(i) Now (i) is satisfied only when 

1. (b) We have 

, 



It can be easily shown by mathematical induction that the sequence  is a monotonically decreasing sequence bounded below by 2. So it is convergent. Let  Then





1. (d) For  to be continuous at  we should have 

 

 Hence 

1. (c) , 

, (using L' Hospital's rule)

as *f* is strictly increasing.

1. (c)  ∴

and 

Hence, the required equation will be(sum of roots) *x*+ (Product of roots) = 0

*i.e*., .

1. (c) 

Since  is always discontinuous at all integral values of points. Hence  is discontinuous for all integral points.

1. (d) .
2. (a) 

⇒ 

.

1. (a) .
2. (c) Let  ⇒ 

Therefore, , 

.

1. (c) We are given that 

When , we get 

Differentiating both sides with respect to *x*, we get



Putting , we get .

1. (c)  

Now, 

.

1. (d) Let then  .
2. (a)  (Dividing  and by )

⇒   ⇒ .

1. (b) ⇒⇒

Therefore, on differentiating .

1. (a) ⇒ 

⇒ 

⇒ .

1. (a) Let 

Putting  we get





Now 



1. (c) Put 

 ⇒ 

or 

or 

If then 

 or  or 

But if we put in the given equation it is not satisfied and hence we must have

or 

or 

Differentiating *w.r.t*. *x*, we get 

.

1. (c) Let 

 ; So,  is defined only at  and 1. So,  is not differentiable.

  does not exist.

1. (b) Let , 

Putting  we get





Putting , we get





Thus .

1. (c) 

⇒ 

⇒ .

1. (d)   ⇒ .
2. (a) Given that , 

, 

∴ 

Again differentiate *w.r.t.* *x*,









1. (b) We have 

Differentiating with respect to *x*, we get

 …..(i)

Differentiating (i) *w*.*r*.*t*. *x*, we get

 …..(ii)

Differentiating (ii) *w*.*r*.*t*. *x*, we get



⇒ 

⇒ 

⇒  , [using (i)]

⇒ .