LIMITS,CONTINUITY

EE24BTECH11046 - NENAVATH VASU *

C: MCQs with One Correct Answer

2) For a real number y, let [y] denote the greatest integer less thsn or equal to y.Then the function$f(x)$ = $\frac{\tan \pi[x-\pi]}{1+[x]^2}$ is (1981 - 2 Marks)
   (a) discontinuous at some x
   (b) continuous at all x, but the derivative$f'(x)$ does not exist for some x
   (c) $f'(x)$ exists for all x, but the second derivative f''(x) does not exist for some x
   (d) $f'(x)$ exists for all x
3) There exists a function $f(x)$,satisfying f(0)=1,f'(0)=-1,f(x)¿0 for all x, and (1982 - 2 Marks)
   (a) f'(x) > 0 for all x
   (b) -1 < f''(x) < 0 for all x
   (c) -2 ≤ f''(x) ≤ -1 for all
   (d) f''(x) < -2 for all x
4) If G(x)=- $\sqrt{25-x^2}$ then $\lim_{x\to 1} \frac{G(x)-G(1)}{x-1}$ has the value (1983 - 1 Mark)
   a) $\frac{1}{24}$
   b) $\frac{1}{5}$
   c) - $\sqrt{24}$
   d) none of these
5) If f(a)=2,f'(a)=1,g(a)=-1,g'(a)2, then the value of $\lim_{x\to a} \frac{g(x)f(a)-g(a)f(x)}{x-a}$ is (1983 - 1 Mark)
   a) -5
   b) $\frac{1}{5}$
   c) 5
   d) none of these
6) The function f(x)=$\frac{\ln(1+ax)-\ln(1-bx)}{x}$ is not defined at x=0.The value which should be assigned to f at x=0 so that it is continuous at x=0, is (1983 - 1 Mark)
   a) a-b
   b) a+b
   c) $\ln a - \ln b$
   d) none of these
7) $\lim_{n\to\infty} \left(\frac{1}{1-n^2} + \frac{2}{1-n^2} + ... + \frac{n}{1-n^2}\right)$ is equal to (1984 - 2 Marks)
   a) 0
   b) -$\frac{1}{2}$
   c) $\frac{1}{2}$
   d) none of these
8) If f(x)=$\begin{cases} \frac{\sin[x]}{[x]}, [x] \neq 0 \\ = 0, [x] = 0 \end{cases}$ where [x] denotes the greatest integer less than or equal to x, then $\lim_{x\to 0}$ equals (1985 - 2 Marks)
   a) 1
   b) 0
   c) -1
   d) none of these
9) Let f:R → R be a differentiable function and f(1)=4.Then the value of $\lim_{x\to 1}$
$$\int_4^{f(x)} \frac{2t}{x-1}\, dt$$
   is (1990 - 2 Marks)
   a) 8f'(1)
   b) 4f'(1)
   c) 2f'(1)
   d) f'(1)
10) Let [.] denote the greatest integer function and f(x)=[$\tan^2 x$], then (1993 - 1 Mark)
   a) $\lim_{x\to 0}$ does not exist
   b) f(x) is continuous at x=0
   c) f(x) is not differentiable at x=0
   d) f'(0)=1
11) function f(x)=[x]cos $(\frac{2x-1}{2})\pi$,denotes[.] denotes the greatest integer function, is discontinuous at (1995S)
   a) All x
   b) All integer points
   c) No x
   d) x which is not an integer
12) $\lim_{n\to\infty} \frac{1}{n} \sum_{r=1}^{2n} \frac{r}{\sqrt{n^2+r^2}}$ equals (1997 - 2 Marks)
   a) 1+ $\sqrt{5}$
   b) -1+ $\sqrt{5}$
   c) -1+ $\sqrt{2}$

d) $1+\sqrt{2}$

13) The function f(x)=$[x]^2$-$[x^2]$ (where [y] is the greatest integer less than or equal to y), is discontinuous at (1992 - 2 Marks)

a) all integers
b) all integers except 0 and 1
c) all integers except 0
d) all integers except 1

14) The function f(x)=(x^2-1) mod $x^2 - 3x + 2$ + cos mod x is NOT differentiable at (1999 - 2 Marks)

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

15) $\lim_{x\to 0} \frac{x\tan(2x) - 2x\tan(x)}{(1-\cos(2x))^2}$ is (1999 - 2 Marks)

a) 2
b) -2
c) $\frac{1}{2}$
d) $\frac{-1}{2}$

16) For x∈R, $\lim_{x\to\infty} (\frac{x-3}{x+2})^x$ = (2000S)

a) e
b) e^{-1}
c) e^{-5}
d) e^5