1. Let $f(x)=\begin{cases} ax+1 & \text{if} \quad x<1 \\ 3 & \text{if} \quad x=1 \\ bx^2+1 & \text{if} \quad x>1 \end{cases}$. If $f(x)$ is continuous at x = 1 then (a – b) is equal to-

(A) 0 (B) 1 (C) 2 (D) 4

2. For the function $f(x)=\dfrac{1}{x+2^{\left(\frac{1}{x-2}\right)}}, x \neq 2$ which of the following holds ?

(A) $f(2)$ = 1/2 and f is continuous at x = 2 (B) $f(2) \neq 0$, 1/2 and f is continuous at x = 2
(C) f can not be continuous at x = 2 (D) $f(2)$ = 0 and f is continuous at x = 2.

3. The function $f(x)=\dfrac{4-x^2}{4x-x^3}$, is-

(A) discontinuous at only one point in its domain.
(B) discontinuous at two points in its domain.
(C) discontinuous at three points in its domain.
(D) continuous everywhere in its domain.

4. If $f(x)=\begin{cases} -4\sin x+\cos x & \text{for} \quad x \le -\frac{\pi}{2} \\ a\sin x+b & \text{for} \quad -\frac{\pi}{2}<x<\frac{\pi}{2} \\ \cos x+2 & \text{for} \quad x \ge \frac{\pi}{2} \end{cases}$ is continuous then :

(A) a = –1, b = 3 (B) a = 1, b = –3
(C) a = 1, b = 3 (D) a = –1, b = –3

5. The function $f(x)=\begin{cases} \frac{1}{4}(3x^2+1) & -\infty<x\le 1 \\ 5-4x & 1<x<4 \\ 4-x & 4\le x<\infty \end{cases}$ is -

(A) continuous at x = 1 & x = 4
(B) continuous at x = 1, discontinuous at x= 4
(C) continuous at x = 4, discontinuous at x = 1
(D) discontinuous at x = 1 & x = 4

6. If $f(x)=\dfrac{x^2-bx+25}{x^2-7x+10}$ for $x \neq 5$ and f is continuous at x = 5, then $f(5)$ has the value equal to-

(A) 0 (B) 5 (C) 10 (D) 25

7. If $f(x)=\dfrac{x-e^x+\cos 2x}{x^2}, x\neq 0$ is continuous at x = 0, then -

(A) $f(0)=\dfrac{5}{2}$ (B) $[f(0)]=-2$ (C) $\{f(0)\}=-0.5$ (D) $[f(0)].\{f(0)\}=-1.5$

where [.] and {.} denotes greatest integer and fractional part function

8. $y=f(x)$ is a continuous function such that its graph passes through (a,0). Then $\lim\limits_{x\to a}\dfrac{\log_e(1+3f(x))}{2f(x)}$ is-

(A) 1 (B) 0 (C) $\dfrac{3}{2}$ (D) $\dfrac{2}{3}$

9. In [1,3], the function $[x^2+1]$,[.] denoting the greatest integer function, is continuous -

(A) for all x

(B) for all x except at nine points

(C) for all x except at seven points

(D) for all x except at eight points

10. Number of points of discontinuity of $f(x)=[2x^3-5]$ in [1,2), is equal to-
(where [x] denotes greatest integer less than or equal to x)

(A) 14 (B) 13 (C) 10 (D) 8

11. Given $f(x)=\begin{cases}|x+1| & \text{if } x<-2\\ 2x+3 & \text{if } -2\le x<0\\ x^2+3 & \text{if } 0\le x<3\\ x^3-15 & \text{if } x\ge 3\end{cases}$. Then number of point(s) of discontinuity of $f(x)$ is-

(A) 0 (B) 1 (C) 2 (D) 3

12. If $f(x)$ is continuous and $f\left(\dfrac{9}{2}\right)=\dfrac{2}{9}$, then the value of $\lim\limits_{x\to 0} f\left(\dfrac{1-\cos 3x}{x^2}\right)$ is-

(A) $\dfrac{2}{9}$ (B) $\dfrac{9}{2}$ (C) 0 (D) data insufficient

13. f is a continuous function on the real line. Given that $x^2+(f(x)-2)x-\sqrt{3}\cdot f(x)+2\sqrt{3}-3=0$.
Then the value of $f(\sqrt{3})$

(A) can not be determined (B) is $2(1-\sqrt{3})$

(C) is zero (D) is $\dfrac{2(\sqrt{3}-2)}{\sqrt{3}}$

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

(A) all integers (B) all integers except 0 & 1

(C) all integers except 0 (D) all integers except 1