1) Which of the following function is uniformly continuous?
   a) \( f(x) = \frac{1}{x} \) on \([0, 1]\)
   b) \( f(x) = \sin(x^2) \) on \([0, \infty[\)
   c) \( f(x) = \sin(x) \) on \([0, \infty[\)
   d) None of the above
   Answer: c)

2) Which of the following function is not uniformly continuous?
   a) \( f(x) = x^2 \) on \([0, 1]\)
   b) \( f(x) = x^3 \) on \([0, 2]\)
   c) \( f(x) = \sqrt{x} \) on \([0, 3]\)
   d) \( f(x) = x^2 \) on \([0, \infty[\)
   Answer: d)

3) If \( f \) and \( g \) are uniformly continuous on the same interval, then
   a) \( f + g \) is also a uniformly continuous function on the interval
   b) \( f + g \) is not a uniformly continuous function on the interval
   c) \( f + g \) is not a continuous function on the interval
   d) None of the above
   Answer: a)

4) If a continuous function \( f(x) \) has a maximum or minimum value at \( x_0 \), and is also differentiable at this point, then
   a) \( f'(x_0) \neq 0 \)
   b) \( f'(x_0) > 0 \)
   c) \( f'(x_0) = 0 \)
   d) \( f'(x_0) < 0 \)
   Answer: c)

5) Let \( f \) be a continuous real-valued function on \([0,1]\) such that \( f(0) = -1 \) and \( f(1) = 1 \), then there always exist a \( t \in [0, 1] \) such that
   a) \( f(t) = -2 \)
   b) \( f(t) = 2 \)
   c) \( f(t) = 3/2 \)
   d) \( f(t) = -1/2 \)
   Answer: d)
6) The function \( f(x) = \begin{cases} x \sin \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases} \) is
a) absolutely continuous but not continuous
b) neither continuous nor absolutely continuous
c) continuous and absolutely continuous both
d) continuous but not absolutely continuous
Answer: d)

7) Let \( f(x) = \begin{cases} \frac{x-|x|}{x} & \text{when } x \neq 0 \\ 2 & \text{when } x = 0 \end{cases} \). Then
a) \( f \) has removal discontinuity at \( x = 0 \)
b) \( f \) has discontinuity of first kind at \( x = 0 \)
c) \( f \) has discontinuity of second kind at \( x = 0 \)
d) None of the above
Answer: b)

8) Let \( f(x) = \begin{cases} 1, & \text{when } x \text{ is irrational} \\ -1, & \text{when } x \text{ is rational} \end{cases} \). Then
a) \( f \) is discontinuous at every point of \( \mathbb{R} \)
b) \( f \) is discontinuous at finite number of points of \( \mathbb{R} \)
c) \( f \) is discontinuous at \( x = 0 \) only
d) None of the above
Answer: a)

9) Let \( f(x) = \begin{cases} \sin 2x & \text{when } x \neq 0 \\ 1 & \text{when } x = 0 \end{cases} \). Then
a) \( f \) has removal discontinuity at \( x = 0 \)
b) \( f \) has discontinuity of first kind at \( x = 0 \)
c) \( f \) has discontinuity of first kind from the right at \( x = 0 \)
d) \( f \) has discontinuity of second kind at \( x = 0 \)
Answer: a)

10) Let \( f(x) = \begin{cases} x, & \text{when } x \text{ is irrational} \\ -x, & \text{when } x \text{ is rational} \end{cases} \). Then
a) \( f \) is continuous at every point of \( \mathbb{R} \)
b) \( f \) is discontinuous at finite number of points of \( \mathbb{R} \)
c) \( f \) is continuous at \( x = 0 \) only
d) None of the above
Answer: c)