CONTINUITY AND DIFFERENTIABILITY

LOGARITHMIC DIFFERENTIATION

EXERCISE

Q.1 The derivative of x^{a^x} is -

(A) x^{a^x} $[a^x x^{-1} + a^x \log a \log x]$

(B) x^{a^x} $[xa^x + a^x \log x]$

(C) x^{a^x} $[a^x + xa^x \log x]$

(D) None of these

Q.2 If $y = \log (x^x)$, then $\frac{dy}{dx}$ equals -

(A) log (ex)

(B) log (e/x)

(C) log (x/e)

(D) 1

Q.3 The derivative of $x^{1/x}$ equals-

(A) $x^{1/x}$ log (ex)

(B) $x^{1/x}$ log (e/x)

(C) $x^{1/x}$ log (x/e)

(D) None of these

Q.4 If $y = e^{\log(\sin^{-1} x)}$, then $\frac{dy}{dx}$ equals-

(A) $\cos^{-1} x$

(B) $1/\sin^{-1} x$

(C) $1/\sqrt{1-x^2}$

(D) $x/\sqrt{1-x^2}$

Q.5 If $xy = e^y$, then $\frac{dy}{dx}$ equals-

(A) $\frac{x}{y(y-1)}$

(B) $\frac{y}{x(y-1)}$

(C) $\frac{x(y-1)}{y}$

(D) $-\frac{x}{y(y-1)}$

Q.6 If $(\cos x)^y = (\sin y)^x$, then $\frac{dy}{dx}$ equals-

(A) $\frac{\log \sin y - y \tan x}{\log \cos x + x \cot y}$ (B) $\frac{\log \sin y + y \tan x}{\log \cos x - x \cot y}$

(C) $\frac{\log \sin y + y \tan x}{\log \cos x + x \cot y}$ (D) None of these

Q.7 The derivative of $(\tan x)^x$ is equal to-

(A) $x (\tan x)^{x-1}$ (B) $(\tan x)^x [\sec x + \tan x]$

(C) $(\tan x)^x [x \sec x \operatorname{cosec} x + \log \tan x]$ (D) $(\tan x)^x [\sec^2 x + x \tan x]$

Q.8 $\frac{d}{dx}(x^{\log x})$ is equal to-

(A) $2x^{\log x - 1} \log x$ (B) $x^{\log x - 1}$

(C) $\frac{2}{3}(\log x)$ (D) $x^{\log x - 1} \cdot \log x$

Q.9 If $y = e^{\log \cos^{-1} x} + e^{\log \sin^{-1} x}$, $0 < x < 1$, then which of the following statement is true –

(A) $y_1 = 0$ (B) $y_2 = 5$

(C) y_1 does not exist (D) None of these

Q.10 If $y = e^{ax+b}$, then $(y_2)_0$ is equal to –

(A) ae^b (B) e^b

(C) a^2e^a (D) a^2e^b

Q.11 Differential coefficient of $x^{\log x}$ is –

(A) $2x^{\log x} \cdot \log x$ (B) $2x^{\log(x/e)} \log x$

(C) $2x^{\log(ex)} \cdot \log x$ (D) None of these

Q.12 If $y = x^x$, then the value of $\frac{dy}{dx}$ is–

(A) x^x

(B) $x^x \log (ex)$

(C) $x^x \log \left(\frac{x}{e}\right)$

(D) $x^{x-1} \log$

ANSWER KEY

1. (A)

2. (A)

3. (D)

4. (C)

5. (B)

6. (B)

7. (C)

8. (A)

9. (A)

10. (D)

11. (B)

12. (B)