Engineering Mathematics-I 2019-course Unit-III Partial Differentiation MCQ'S

1) If $u = \log(\tan x + \tan y + \tan z)$ then $\frac{\partial u}{\partial x}$ is

A)$e^u sec^2 x$

B) $e^{-u} sec^2 x$

C) $e^{2u} sec^2 x$

D) $e^{-2u} sec^2 x$

Ans : B

2) If $u = \log(\tan x + \tan y + \tan z)$ then $\frac{\partial u}{\partial y}$ is

A)$e^{-u} sec^2 y$

B) $e^{-u} sec^2 x$

C) $e^{2u} sec^2 x$

D) $e^{-2u} sec^2 y$

Ans:A

3) If $u = \log(\tan x + \tan y + \tan z)$ then $\frac{\partial u}{\partial z}$ is

A)$2e^u sec^2 z$

B) $2e^{-u} sec^2 z$

C) $e^{2u} sec^2 z$

D) $e^{-u} sec^2 z$

Ans:D

4) If $u = x^y$ then u_x is

A) x^{y-1}

B) yx^y

C)yx^{y-1}

D) xy^{x-1}

Ans :C

5) If $u = x^y$ then u_y is

A)$x^y \log x$

B) $x^y \log y$

C) $y^x \log x$

D) $x^{-y} \log x$

Ans:A

6) If $u = x^y$ and $\frac{\partial u}{\partial x} = yx^{y-1}$then $\frac{\partial^2 u}{\partial y \partial x}$ is

A) $x^y[1 + y \log x]$

B)$x^{y-1}[1 + y \log x]$

C) $x^{y-1}[1 + x \log y]$

D) $x^y[1 + y \log x]$

Ans:B

7) If $u = x^y$ and $\frac{\partial u}{\partial y} = x^y \log x$ then $\frac{\partial^2 u}{\partial x \partial y}$ is

A) $x^y[1 + y \log x]$

B)$x^{y-1}[1 + y \log x]$

C) $x^{y-1}[1 + x \log y]$

D) $x^y[1 + y \log x]$)

Ans:B

8) If $u = f(r)$ and $r = \emptyset(x, y, z)$ then

A)$\frac{du}{dx} = f'(r)\frac{\partial r}{\partial x}$

B) $\frac{du}{dx} = f''(r)\frac{\partial r}{\partial x}$

C) $\frac{du}{dx} = f'(r)\frac{dr}{dx}$

D) $\frac{du}{dx} = f''(r)\frac{dr}{dx}$

Ans: A

9) If $u = f(r)$ and $r = \sqrt{x^2 + y^2 + z^2}$ then $\frac{\partial u}{\partial x}$ is

A) $f''(r)\frac{x}{r}$

B) $f'(r)\frac{x}{r^2}$

C) $f''(r)\frac{x}{r^2}$

D)$f'(r)\frac{x}{r}$

Ans: D

10) If $u = f(r)$ and $r = \sqrt{x^2 + y^2 + z^2}$ then $\frac{\partial u}{\partial y}$ is

A) $f'(r)\frac{y}{r}$

B) $f''(r)\frac{y}{r}$

C) $f'(r)\frac{y}{r^2}$

D) $f'(r)\frac{y^2}{r}$

Ans: A

11) If $x = r\cos\theta$ and $y = r\sin\theta$ then $\left(\frac{\partial x}{\partial r}\right)_\theta$ is

A) $r\cos\theta$

B)$\cos\theta$

C) $\sin\theta$

D) $r\sin\theta$

Ans :B

12)) If $x = r\cos\theta$ and $y = r\sin\theta$ then $\left(\frac{\partial y}{\partial r}\right)_x$ is

A)$\frac{r^2}{y}$

B)$\frac{r}{y^2}$

C)$\frac{r}{y}$

D)$\frac{r^2}{y^2}$

Ans : C

13)If z is a homogeneous function of x, y of degree n then

A) $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = u$

B) $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = nu$

C) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=nu$

D) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=u$

Ans:B

14) If z is a homogeneous function of x, y of degree n then

A)$x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=n(n+1)u$

B) $x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=(n-1)u$

C) $x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=nu$

D) $x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=n(n-1)u$

Ans:D

15) If z is a homogeneous function of x, y of degree n and $z=f(u)$ then

A) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=n\frac{f(u)}{f'(u)}$

B) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=nu$

C)$x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=n\frac{f'(u)}{f(u)}$

D)$x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=\frac{f(u)}{f'(u)}$

Ans:A

16) If z is a homogeneous function of x, y of degree n and $z=f(u)$ then

A)$x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=g(u)[g'(u)+1]$ where $g(u)=n\frac{f(u)}{f'(u)}$

B)$x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=g'(u)[g'(u)-1]$ where $g(u)=n\frac{f(u)}{f'(u)}$

C)$x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=g(u)[g'(u)-1]$ where $g(u)=n\frac{f(u)}{f'(u)}$

D)$x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}=[g'(u)-1]$ where $g(u)=n\frac{f(u)}{f'(u)}$

Ans:C

17)$\cos\left(\frac{xy+yz}{x^2+y^2+z^2}\right)$ is a

A) Non-homogeneous function.

B) Homogeneous function of degree zero.

C) Homogeneous function of degree one.

D) Homogeneous function of degree two.

Ans: B

18) If $u = \tan^{-1}\left[\frac{x^2+y^2}{x+y}\right]$ then

A) u is a homogeneous function of degree one.

B) $\tan u$ is a homogeneous function of degree one.

C) u is a homogeneous function of degree zero.

D) $\tan u$ is a homogeneous function of degree zero.

Ans: B

19)If $x^2 = a\sqrt{u} + b\sqrt{v}$ and $y^2 = a\sqrt{u} - b\sqrt{v}$ where a, b are constants then $\left(\frac{\partial x}{\partial u}\right)_v$ is

A) $\frac{a}{x\sqrt{u}}$

B) $\frac{a}{4\sqrt{u}}$

C) $\frac{a}{4x\sqrt{u}}$

D) $\frac{a}{4x^2\sqrt{u}}$

Ans: C

20) If $x^2 = a\sqrt{u} + b\sqrt{v}$ and $y^2 = a\sqrt{u} - b\sqrt{v}$ where a, b are constants then $\left(\frac{\partial y}{\partial v}\right)_u$ is

A) $-\frac{b}{4y\sqrt{v}}$

B) $\frac{b}{4y\sqrt{v}}$

C) $-\frac{b}{4\sqrt{v}}$

D) $-\frac{b}{y\sqrt{v}}$

Ans: A

21)If $x = u\tan v, y = u\sec v$ then $\left(\frac{\partial u}{\partial x}\right)_y$ is

A) $-\frac{x}{u^2}$

B) $\frac{x^2}{u}$

C) $\frac{x}{u}$

D) $-\frac{x}{u}$

Ans: D

22) If $x = u\tan v, y = u\sec v$ then $\left(\frac{\partial u}{\partial y}\right)_x$ is

A) $\frac{y}{u}$

B) $-\frac{y}{u}$

C) $\frac{y}{u^2}$

D) $\frac{y^2}{u}$

Ans: A

23) If x and y are independent variables and z is a function of $x, y\ \ z^3 - zx - y = 4$ then $\frac{\partial z}{\partial x}$ is

A) $\frac{z}{3z^2+x}$

B) $\frac{1}{3z^2-x}$

C) $\frac{z}{3z^2-x}$

D) $\frac{z^2}{3z^2-x}$

Ans: C

24) If x and y are independent variables and z is a function of $x, y\ \ z^3 - zx - y = 4$ then $\frac{\partial z}{\partial y}$ is

A) $\frac{z}{3z^2+x}$

B) $\frac{1}{3z^2-x}$

C) $\frac{z}{3z^2-x}$

D) $\frac{z^2}{3z^2-x}$

Ans: B

25) If $u = \log(x^2 + y^2)$ then $\frac{\partial^2 u}{\partial y \partial x}$ is

A) $\frac{-4xy}{(x^2+y^2)^2}$

B) $\frac{4xy}{(x^2+y^2)^2}$

C) $\frac{-4}{(x^2+y^2)^2}$

D) $\frac{4}{(x^2+y^2)^2}$

Ans: A