QB365 Question Bank Software Study Materials

Differentials and Partial Derivatives 50 Important 1Marks Questions With Answers (Book Back and Creative)

12th Standard

Maths

Total Marks : 50

50 x 1 = 50

1) A circular template has a radius of 10 cm. The measurement of radius has an approximate error of 0.02 cm. Then the percentage error in calculating area of this template is

(a) 0.2% **(b) 0.4%** (c) 0.04% (d) 0.08%

2) The percentage error of fifth root of 31 is approximately how many times the percentage error in 31?

(a) $\frac{1}{31}$ **(b)** $\frac{1}{5}$ (c) 5 (d) 31

3) If $u(x, y) = e^{x^2+y^2}$,then $\frac{\partial u}{\partial x}$ is equal to

(a) $e^{x^2+y^2}$ **(b) 2xu** (c) x^2u (d) y^2u

4) If v (x, y) = log ($e^x + e^y$), then $\frac{\partial v}{\partial x} + \frac{\partial v}{\partial y}$ is equal to

(a) $e^x + e^y$ (b) $\frac{1}{e^x+e^y}$ (c) 2 **(d) 1**

5) If w (x, y) = x^y, x > 0, then $\frac{\partial w}{\partial x}$ is equal to

(a) $x^y \log x$ (b) y log x **(c)** $\mathbf{yx^{y-1}}$ (d) x log y

6) If f (x, y) = e^{xy} then $\frac{\partial^2 f}{\partial x \partial y}$ is equal to

(a) xye^{xy} **(b)** $\mathbf{(1 + xy)e^{xy}}$ (c) $(1 + y)e^{xy}$ (d) $(1 + x)e^{xy}$

7) If we measure the side of a cube to be 4 cm with an error of 0.1 cm, then the error in our calculation of the volume is

(a) 0.4 cu.cm (b) 0.45 cu.cm (c) 2 cu.cm **(d) 4.8 cu.cm**

8) The change in the surface area S = $6x^2$ of a cube when the edge length varies from x_o to x_o+ dx is

(a) 12 x_o+dx **(b)** $\mathbf{12x_o\ dx}$ (c) $6x_o$ dx (d) $6x_o$+ dx

9) The approximate change in the volume V of a cube of side x metres caused by increasing the side by 1% is

(a) 0.3xdx m^3 (b) 0.03x m^3 **(c)** $\mathbf{0.03x^2\ m^3}$ (d) $0.03x^3\ m^3$

10) If $g(x, y) = 3x^2 - 5y + 2y^2, x(t) = e^t$ and y(t) = cos t, then $\frac{dg}{dt}$ is equal to

(a) $\mathbf{6e^{2t} + 5 \sin t - 4 \cos t \sin t}$ (b) $6e^{2t}$- 5 sin t + 4 cos t sin t (c) $3e^{2t}$+ 5 sin t + 4 cos t sin t

(d) $3e^{2t}$ - 5 sin t + 4 cos t sin t

11) If $f(x) = \frac{x}{x+1}$, then its differential is given by

(a) $\frac{-1}{(x+1)^2}dx$ **(b)** $\frac{1}{(x+1)^2}dx$ (c) $\frac{1}{x+1}dx$ (d) $\frac{-1}{x+1}dx$

12) If u(x, y) = x^2+ 3xy + y - 2019, then $\left.\frac{\partial u}{\partial x}\right|_{(4,-5)}$ is equal to

(a) -4 (b) -3 **(c) -7** (d) 13

13) Linear approximation for g(x) = cos x at $x = \frac{\pi}{2}$ is

(a) $x + \frac{\pi}{2}$ **(b)** $-x + \frac{\pi}{2}$ (c) $x - \frac{\pi}{2}$ (d) $-x - \frac{\pi}{2}$

14) If w (x, y, z) = x^2 (y - z) + y^2 (z - x) + z^2(x - y), then $\frac{\sigma w}{} + \frac{\sigma w}{\partial y} + \frac{\sigma w}{\partial z}$ is

(a) xy + yz + zx (b) x(y + z) (c) y(z + x) **(d) 0**

15) If f(x,y, z) = xy +yz +zx, then f_x - f_z is equal to

(a) z - x (b) y - z (c) x - z (d) y - x

16) If y = x^4 - 10 and if x changes from 2 to 1.99, the approximate change in y is _____

(a) -32 **(b) -0.32** (c) - 10 (d) 10

17) If the radius of the sphere is measured as 9 cm with an error of 0.03 cm, the approximate error in calculating its volume is _____

(a) 9.72 cm^3 (b) 0.972 cm^3 (c) 0.972π cm^3 (d) 9.72π cm^3

18) If $\log_e 4$ = 1.3868, then $\log_e 4.01$ = _____

(a) 1.3968 (b) 1.3898 **(c) 1.3893** (d) none

19) If u = log $\sqrt{x^2 + y^2}$, then $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}$ is _____

(a) $\sqrt{x^2 + y^2}$ **(b) 0** (c) u (d) 2u

20) If u = x^y + y^x then u_x + u_y at x = y = 1 is _____

(a) 0 **(b) 2** (c) 1 (d) ∞

21) If u = $(x-y)^4$+$(y-z)^4$ +$(z-x)^4$ then $\sum \frac{\partial u}{\partial x}$ = _____

(a) 4 (b) 1 **(c) 0** (d) -4

22) If f(x, y, z) = sin (xy) + sin (yz) + sin (zx) then f_{xx} is _____

(a) -y sin (xy) + z^2 cos (xz) (b) y sin (xy) - z^2 cos (xz) (c) y sin (xy) + z^2 cos (xz) **(d) -y^2 sin (xy) - z^2 cos (xz)**

23) If u = log (x^3 + y^3 + z^3 - 3xyz) then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$ = _____

(a) $\frac{3}{x+y+z}$ (b) x+y+z (c) $\frac{-9}{(x+y+z)^2}$ (d) $\frac{-9}{(x+y+z)^2}$

24) If f(x, y) = $2x^2$ - 3xy + 5y + 7 then f(0, 0) and f(1, 1) is _____

(a) 7, 11 (b) 11, 7 (c) 0, 7 (d) 1, 0

25) The approximate value of $(627)^{\frac{1}{4}}$ is .....

(a) 5.002 (b) 5.003 (c) 5.005 **(d) 5.004**

26) The cube root of 127 is .....

(a) 5.026 (b) 5.26 (c) 5.028 (d) 5.075

27) If u = y^x then $\frac{\partial u}{\partial y}$ = ...

(a) xy^{x-1} (b) yx^{y-1} (c) 0 (d) 1

28) If u = sin-1 $\left(\frac{x^4+y^4}{x^2+y^2}\right)$ and f = sin u then f is a homogeneous function of degree .....

(a) 0 (b) 1 **(c) 2** (d) 4

29) The percentage error in the 11^{th} root of the number 28 is approximately ..... times the percentage error in 28.

(a) $\frac{1}{28}$ **(b)** $\frac{1}{11}$ (c) 11 (d) 28

30) If u = $\left(\frac{y}{x}\right)$ then x $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ = ...

(a) 0 (b) 1 (c) 2u (d) u

31) If u = y sin x then $\frac{\partial^2 u}{\partial x \partial y}$ = ...

(a) cos x (b) cos y (c) sin x (d) 0

32) If is a homogeneous function of x and y of degree n, then $x\frac{\partial^2 u}{\partial x^2} + y\frac{\partial^2 u}{\partial x \partial y}$ = ... $\frac{\partial u}{\partial x}$

(a) n (b) 0 (c) 1 **(d) n - 1**

33) If $y = x^4 - 10$ and x changes from 2 to 1.99 then what is the change in y?

(a) 0.32 (b) 32 **(c) -0.32** (d) -32

34) The approximate change in the volume V of a cube of side x m caused by increasing the side by 1% is _____

(a) $0.03\ x^2$ **(b) $0.03\ x^3$** (c) 0.03 (d) 0.03 x

35) For the function $y = x^3 + 2x^2$, the value of dy when x = 2 and dx = 0.1 is _____

(a) 1 **(b) 2** (c) 3 (d) 4

36) if $u = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial u}{\partial x}$ _____

(a) $4x^3 + 6xy^2 + 6xy$ (b) $3x^2 + 6xy^2 + 3xy^2$ (c) $4x^3 - 6x^2y + 6xy^2$ (d) $4x^3 + 6x^2y^2 + 3xy$

37) The Linear approximation of $f(x) = x^2 - 2$ at $\mathbf{x}_0 = 3$ is _____

(a) x - 2 (b) 2x - 2 **(c) 6x - 11** (d) 18x - 10

38) The linear approximation of $f(x) = x^3 + 2x + 1$ at $x_0 = 1$ is _____

(a) $x^3 + 2x + 1$ (b) $3x^2 + 2$ **(c) 5x - 1** (d) 4

39) If u = f(x, y) is a differentiable function of x and y x and y are differentiable function of t then _____

(a) $\frac{du}{dt} = \frac{\partial f}{\partial x}\frac{\partial x}{\partial t} + \frac{\partial f}{\partial y}\frac{\partial y}{\partial t}$ **(b)** $\frac{du}{dt} = \frac{\partial f}{\partial x}\frac{dx}{dt} + \frac{\partial f}{\partial y}\frac{dy}{dt}$ (c) $\frac{du}{dt} = \frac{\partial f}{\partial x}\frac{dx}{dt} + \frac{\partial f}{\partial y}\frac{dx}{dt}$ (d) $\frac{\partial u}{\partial t} = \frac{\partial f}{\partial x}\frac{\partial x}{\partial t} + \frac{\partial f}{\partial y}\frac{\partial y}{\partial t}$

40) If $u(x, y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial y^2}$ _____

(a) $6y + 6x^2$ (b) $12xy - 6x$ (c) $12x^2y - 6x$ (d) $3y^2 + 6x^2y + 3x^2$

41) If $f = x\cos y$ then $\frac{\partial^2 f}{\partial x \partial y}$ is _____

(a) cos y (b) - cos y (c) sin y **(d) - sin y**

42) If f = y sin 2x then $\frac{\partial^2 f}{\partial x^2}$ is _____

(a) f **(b) - 4 f** (c) 4 f (d) 2 f

43) The differential of y if $y = \frac{x-2}{2x+3}$ is _____

(a) $-\frac{7}{(2x+3)^2}dx$ (b) $\frac{1}{(2x+3)^2}dx$ **(c)** $\frac{7}{(2x+3)^2}dx$ (d) $\frac{7}{(2x+3)^2}$

44) If $u = e^{xy}$ then $\frac{\partial^2 u}{\partial x^2}$ is _____

(a) u **(b)** x^2e^{xy} (c) y^2e^{xy} (d) 0

45) If $f = \log(x^2 + y^2)$ then $\times \frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} =$ _____

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

46) If $u = \log\frac{x^2+y^2}{xy}$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is _____

(a) 0 (b) u (c) 2u (d) u^{-1}

47) If $u = (x - y)^2$, then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y}$ is _____

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

48) If $f(x) = \frac{x-1}{x+1}$ then its differential is given by _____

(a) $\frac{2}{(x+1)^2}dx$ (b) $-\frac{2}{(x+1)^2}dx$ (c) $\frac{x}{(x+1)^2}dx$ (d) $\frac{-x}{(x+1)^2}dx$

49) The percentage error in the 11^{th} root of the number 28 is approximately times _____ the percentage error in 28.

(a) $\frac{1}{28}$ **(b)** $\frac{1}{11}$ (c) 11 (d) 28

50) The function f(x) = x^2 in the interval [0, ∞] is

(a) cannot be determined (b) increasing function **(c) increasing and decreasing function** (d) decreasing function