Model Question Paper

Differetial Calculus Part II- Part I

12th Standard

Maths

Reg.No. : | | | | | | |

I.Answer all questions.

II.Use blue pen only.

Time : 01:00:00 Hrs

Total Marks : 85

Section-A

3 x 1 = 3

1) If $u = x^y$ then $\frac{\partial u}{\partial x}$ is equal to

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

2) 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

3) If $u = \frac{1}{\sqrt{x^2+y^2}}$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is equal to

(a) $\frac{1}{2}u$ (b) u (c) $\frac{3}{2}u$ (d) $-u$

Section-B

3 x 3 = 9

4) ,Find the differential dy and evaluate dy for the given values of x and dx: $y = 1 - x^2, \quad x = 5, \quad dx = \frac{1}{2}$

5) $u = \sqrt{x^2 + y^2}$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = u$

6) The radius of a sphere was measured and found to be 21 cm with a possible error in measurement of atmost $0.05cm$. What is the maximum error in using this value of the radius to compute the volume of the sphere?

Section-C

5 x 6 = 30

7) Use differentials to find an approximate value for the given number $(1.97)^6$

8) The edge of a cube was found to be $30cm$ with a possible error in measurement of $0.1cm$. Use differentials to estimate the maximum possible error in computing the volume of the cube

9) The radius of a circular disc is given as $24cm$ with a maximum error in measurement of $0.02cm$. Use differentials to estimate the maximum error in the calculated area of the disc.

10) Suppose that $z = ye^{x^2}$ where $x = 2t$ and $y = 1 - t$ then find $\frac{dz}{dt}$

11) If $w = x + 2y + z^2$ and $x = cost$; $y = sint$; $z = t$ Find $\frac{dw}{dt}$

Section-D

5 x 10 = 50

12) Trace the curve $y = x^3 + 1$

13) Trace the curve $y^2 = 2x^3$

14) If $w = u^2e^v$ where $u = \frac{x}{y}$ and $v = ylogx$, find $\frac{\partial w}{\partial x}$ and $\frac{\partial w}{\partial y}$

15) a) Using Euler's theorem, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \frac{1}{2}tan\, u$,if $u = sin^{-1}(\frac{x-y}{\sqrt{x}+\sqrt{y}})$

(OR)

b) Verify $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$ for $u = \frac{x}{y^2} - \frac{y}{x^2}$

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