Model Question Paper

Differetial Calculus Part II - Part IV

12th Standard

Maths

Reg.No. :

I.Answer all questions

II.Use blue pen only.

Time : 01:00:00 Hrs

Total Marks : 90

Section-A

3 x 1 = 3

1) If $f(x,y)$ is a homogeneous functions of degree n then $x\frac{\partial f}{\partial x}+y\frac{\partial f}{\partial y}=$

   (a) f (b) nf (c) $n(n-1)f$ (d) $n(n+1)f$

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

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

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

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

Section-B

7 x 6 = 42

4) If $u=\log(tanx+tany+tanz)$, prove that $\sum sin2x\frac{\partial u}{\partial x}=2$

5) If $U=(x-y)(y-z)(z-x)$ then show that $U_x+U_y+U_z=0$

6) If u is a homogenous function of x and y of degree n , prove that$x\frac{\partial^2 u}{\partial x \partial y}+y\frac{\partial^2 u}{\partial y^2}=(n-1)\frac{\partial u}{\partial y}$

7) Using chain rule find $\frac{dw}{dt}$ for each of the following $w=log(x^2+y^2)$where $x=e^t, y=e^{-t}$

8) Using chain rule find $\frac{dw}{dt}$ for each of the following $w=\frac{x}{(x^2+y^2)}$ where $x=cost, y=sint$

9) Using chain rule find $\frac{dw}{dt}$ for each of the following $w=xy+z$where $x=cost, y=sint, z=t$

10) Use differentials to find an approximate value for the given number $\sqrt{36.1}$

Section-C

5 x 10 = 50

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

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

13) Using Euler's theorem prove the following : if $u=tan^{-1}(\frac{x^3+y^3}{x-y})$,Prove that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=sin\ 2u$

14) Verify $\frac{\partial^2 u}{\partial x \partial y}=\frac{\partial^2 u}{\partial y \partial x}$ for $u=sin3xcos4y$

15) Verify $\frac{\partial^2 u}{\partial x \partial y}=\frac{\partial^2 u}{\partial y \partial x}$ for $u=tan^{-1}(\frac{x}{y})$

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