SET - II



RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATIONS

MATRIC PRACTICE PAPER (2024)

(Mathematics)

Grade: XII Chapter: Differentials And Partial Derivatives Marks: 40 marks Time: 90 minutes

SECTION A

(5x1=5)

Choose the correct option.

- 1. If $f(x) = \frac{x}{x+1}$, then its differential is (a) $\frac{1}{x+1}dx$ (b) $\frac{-1}{x+1}dx$ (c) $\frac{1}{(x+1)^2}dx$ (d) $\frac{-1}{(x+1)^2}dx$
- 2. If $u(x,y) = x^2 + 3xy + y 2019$, then $\frac{\partial u}{\partial x}|_{(4,-5)}$ is equal to (a) -4 (b) -3 (c) -7 (d) 13
- 3. A circular template has a radius of 10cm. The measurement of radius has an approximate error of 0.02cm. Then the percentage error in calculating area of this template is

 (a) 0.2%
 (b) 0.4%
 (c) 0.04%
 (d) 0.08%
- 4. If $f(x,y) = e^{xy}$, then $\frac{\partial^2 f}{\partial x \partial y}$ is equal to (a) xye^{xy} (b) $(1+xy)e^{xy}$ (c) $(1+y)e^{xy}$ (d) $(1+x)e^{xy}$
- 5. If f(x,y,z) = xy+yz+xz, then f_x-f_z is equal to (a) z-x (b) y-z (c) x-z (d) y-x

SECTION B

(3x2=6)

Answer the following.

- 6. For the function $f(x) = x^2+3x$, calculate the differential df when x=2 and dx=0.1.
- 7. If $f(x,y) = x^3-3x^2+y^2+5x+6$, then find f_x at (1,-2).
- 8. If the radius of a sphere with radius 10cm has to decrease by 0.1cm, approximately how much will its volume decrease?

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SECTION C

Answer the following.

- 9. Use the linear approximation to find approximate value of $(123)^{\frac{2}{3}}$.
- 10. Assume that the cross section of the artery of human is circular. A drug is given to a patient to dilate his arteries. If the radius of an artery is increased from 2mm to 2.1mm, how much is cross-sectional area increased approximately?
- 11.Let $g(x,y) = 2y+x^2$; x=2r-s; $y=r^2+2s$; $r,s\in \mathbb{R}$, find $\frac{\partial g}{\partial r}$ and $\frac{\partial g}{\partial s}$.

SECTION D

Answer the following.

12. If w(x,y,z) = log(
$$\frac{5x^3y^4 + 7y^2xz^4 - 75y^3z^4}{x^2 + y^2}$$
), find $x\frac{\partial w}{\partial x} + y\frac{\partial w}{\partial y} + z\frac{\partial w}{\partial z}$.

13.Let
$$f(x,y) = \frac{y^2 - xy}{\sqrt{x} - \sqrt{y}}$$
 for $(x,y) \neq (0,0)$. Show that $\lim_{(x,y) \to (0,0)} f(x,y) = 0$.

- 14. The relation between the number of words y a person learns in x hours is given by $y=52\sqrt{x}$, $0 \le x \le 9$. What is the approximate number of words learned when x changes from
 - (i) 1 to 1.1 hour (ii) 4 to 4.1 hour
- 15. The radius of a circular plate is measured as 12.65cm instead of the actual length 12.5cm. Find the following in calculating the area of the circular plate.
 - (i) Absolute error
 - (ii) Percentage error
 - (iii) Relative error

(4x5=20)