POST MID TERM EXAMINATION 2025-26
APPLIED MATHEMATICS

Class: XI B	MARKING KEY	Time: 1hr
Date: 10/12/25		Max Marks: 25
Admission no:		Roll no:

General Instructions:
Question 1 to 5 carries ONE mark each. Questions 6 to 9 carries TWO marks each.
Questions 10 to 13 carries THREE marks each.

1. $\lim_{x \to 2} \frac{log(x-1)}{x-2}$ is equal to
   a) 0   b) -1   c) 1/2   **d)1**

2. If f(x) = $\begin{cases} \frac{\sqrt{4+x}-2}{x} & x \neq 0 \\ k & x = 0 \end{cases}$ is continous at $x = 0$, then the value of k is:
   a) 1   b) 4   **c) 1/4**   d) 0

3. If y= $\sqrt{x}$ +$\frac{1}{\sqrt{x}}$, then dy/dx at x=1 is :
   a) 1   b) 1/2   c) $1/\sqrt{2}$ **d) 0**

4. The measure of central tendency of a statistical data which takes into account all the data is:
   a) **Mean**   b) Median   c) Mode   d) Range

5. If f(x)= $\frac{(3x+1)(2\sqrt{x}-1}{\sqrt{x}}$
   a) **5**   b) -5   c) 6   d) 11/2

6. Find the derivative of the following function: (ax+b)^2
Sol: $\frac{dy}{dx} = 2(ax + b).a = 2a(ax + b)$.

7. Differentiate the following function wrt x:$\sqrt{2x-3}$, x>$\frac{3}{2}$.
Sol: $\frac{dy}{dx} = \frac{1}{2\sqrt{2x-3}}.2 = \frac{1}{\sqrt{2x-3}}$

8. The marks of 9 students in a test were 13, 17, 20, 5,3,3,18,15 and 20. Find the three quartile.
Sol: 3, 3, 5,13,15,17,18,20,20
   Q1 = $\frac{2nd\ observation+3rd\ observation}{2} = \frac{8}{2} = 4$
   Q2= 5th observation = 15
   Q3= $\frac{7th\ observation+8th\ observation}{2} = \frac{38}{2} = 19$

9. Find the mean and variance of first 10 multiples of 3.
Sol: 10 multiples of 3 : 3,6,9,12,15,18,21,24,27,30
   n=10,
   Mean = 165/10 = 16.5
   Variance= 3456/10 – (16.5)^2 = 345.6 – 272.25 =74.25

10. Find the following limit: $\lim\limits_{x \to 0} \dfrac{\sqrt{1+3x}-\sqrt{1-3x}}{x}$.

Sol; using rationalisation; $\lim\limits_{x \to 0} \dfrac{(1+3x)-(1-3x)}{x\sqrt{1+3x}-\sqrt{1-3}} = \lim\limits_{x \to 0} \dfrac{6x}{x\sqrt{1+3x}-\sqrt{1-3}} = \lim\limits_{x \to 0} \dfrac{6}{x\sqrt{1+3x}-\sqrt{1-3}} = \dfrac{6}{2} = 3$

11. If y= $\sqrt{logx + \sqrt{logx + \sqrt{logx + \cdots \infty}}}$, Prove that x(2y-1)$\dfrac{dy}{dx}$ =1.

Sol: y= $\sqrt{logx + y}$

   y^2=logx+y diff. wrtx, we have x (2y-1)$\dfrac{dy}{dx}$ =1

12. Find the mean deviation about the mean of the following data:

Height in cm	95-105	105-115	115-125	125-135	135-145	145-155
No. of boys	9	13	26	30	12	10

Sol: Assumed mean (a) =120, class size= 10, construction of proper table.

   Mean= 120+5.3 = 125.3

   Mean deviation about mean = 1128.8/100 = 11.288 = 11.29 (aprox)

13. Calculate the mean, variance and standard deviation of the following data:

Classes	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

Sol: Assumed mean (A) = 65, construction of table;

   Mean = 65-3 = 62

   Variance = $10500/50 - (-150/50)^2$ = 210-9 =201.

   Standard deviation = $\sqrt{201}$ = 14.18 (aprox)