



# BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS  
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL



PERIODIC TEST-2 2024-25

APPLIED MATHEMATICS (241)

CLASS: XI COMM  
TIME: 1 HR

MAX. MARKS: 25  
DATE: 06 / 12 / 24

## MARKING KEY

### General Instructions:

1. This Question Paper has 3 Sections A, B and C.
2. Section A has 10 MCQs carrying 1 mark each
3. Section B has 3 questions carrying 02 marks each.
4. Section C has 3 questions carrying 03 marks each.
5. All Questions are compulsory.

### SECTION A

- |    |  |                   |                       |                   |
|----|--|-------------------|-----------------------|-------------------|
| 1. | The value of $\lim_{x \rightarrow 0} [x]$  |                   |                       | 1                 |
|    | (a) -1 ans   | (b) 0             | (c) 1                 | (d) none of these |
| 2. | $\lim_{x \rightarrow 1} \frac{x^m - 1}{x^n - 1}$ is equal to   |                   |                       | 1                 |
|    | (a) 1  | (b) m/n ans       | (c) -m/n              | (d) $m^2/n^2$     |
| 3. | $\lim_{x \rightarrow \infty} \frac{1+2+3+\dots+n}{n^2}$ , (n is a natural number) is equal to                        |                   |                       | 1                 |
|    | (a) 0  | (b) 1             | (c) $\frac{1}{2}$ ans | (d) none of these |
| 4. | The function $f(x) = \begin{cases} 1 & \text{if } x \neq 0 \\ 2 & \text{if } x = 0 \end{cases}$ is not continuous at |                   |                       | 1                 |
|    | (a) $x = 0$ ans  | (b) $x = 1$       | (c) $x = 2$           | (d) none of these |
| 5. | If $f(x) = x^2 + 5x + 2$ , then $f'(3)$ is   |                   |                       | 1                 |
|    | (a) 12   | (b) 10            | (c) 11 ans            | (d) none of these |
| 6. | The derivative of $\log(e^{x^2})$ is   |                   |                       | 1                 |
|    | (a) $e^{x^3}$  | (b) $2x$ ans      | (c) 2                 | (d) none of these |
| 7. | If $f(x) = \frac{x-4}{2\sqrt{x}}$ , then $f'(1)$ is  |                   |                       | 1                 |
|    | (a) $5/4$ ans  | (b) $4/5$         | (c) 1                 | (d) none of these |
| 8. | If $y = \sqrt{x} + \frac{1}{\sqrt{x}}$ then derivative of y w.r.t x at 1 is  |                   |                       | 1                 |
|    | (a) 1  | (b) $\frac{1}{2}$ | (c) 0 ans             | (d) none of these |
| 9. | Assertion: The derivative of $x^3$ is $3x$ .<br>Reason: If $f(x)$ is $x^n$ then $f'(x) = nx^{n-1}$ .                 |                   |                       | 1                 |

(a) Both assertion (A) and reason (R) are true and reason(R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason(R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true. ans

10. Assertion:  $f(x) = |x|$  is continuous at  $x = 0$ .  
Reason: The left hand limit and right hand limit of  $f(x)$  at  $x = 0$  are equal
- (a) Both assertion (A) and reason (R) are true and reason(R) is the correct explanation of assertion (A). ans
- (b) Both assertion (A) and reason (R) are true but reason(R) is not the correct explanation of assertion (A).
- (c) Assertion (A) is true but reason (R) is false.
- (d) Assertion (A) is false but reason (R) is true.

### SECTION B

11. For what value of k is the function  $f(x) = \begin{cases} kx^2, & x \geq 1 \\ 4, & x < 1 \end{cases}$  is continuous at  $x = 1$ . 2
- A:- Put Left hand limit equal to right hand limit 1m  
 $K = 4$  1m
12. Find the derivatives of  $f(x) = (2x+3)\sqrt{x}$  w.r.t x. 2
- A:- Product rule 1m  
 $f'(x) = \frac{3(2x+1)}{2\sqrt{x}}$  1m
13. If  $f(x) = 2x^2 + 3x - 5$ . Prove that  $f'(0) + 3f'(-1) = 0$  2
- A:-  $f'(-1) = -1$  1m  
 $f'(0) = 3$  1m

### SECTION C

14. Evaluate the following limit, if it exists 3  
 $\lim_{x \rightarrow 4} \sqrt{8 - 2x}$
- A:- L.H.L is 0 1m  
R.H.L is not defined 1m  
limit does not exist 1m
15. If  $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x^1 - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$ , find the value of k. 3
- A:- .....  
 $4 = 3k/2$  2m  
.....  
 $K = 8/3$  1m
16. Find the derivative of  $f(x) = 1/x^2$  by first principle. 3
- A:- .....  
 $= \lim_{h \rightarrow 0} \frac{(x - x - h)(x + x + h)}{h \cdot x^2 (x + h)^2}$  2m  
.....  
 $= \frac{-2}{x^3}$  1m

\*\*BEST OF LUCK\*\*