Exam Paper

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Test / Exam Name: LIMITS
Student Name: ----------
Standard: 11TH SCIENCE
Section: ----------
Subject: MATHEMATICS
Roll No.: ----------

Questions: 175	Time: 60 Mins	Marks: 175

Instructions

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Q1. $\lim_{\theta \to 0} \sin m^2 \frac{\theta}{\theta}$ is equal to: **1 Marks**

A. 0 B. 1 C. m D. m2

Q2. If f(x) = 2sinx - $3x^4$ + 8, then f ¢(x) is: **1 Marks**

A. 2sinx - 12x3 B. 2cosx - 12x3 C. 2cosx + 12x3 D. 2sinx + 12x3

Q3. $\lim_{x \to 0} \frac{t^x - e \sin x}{2(x - \sin x)}$ = **1 Marks**

A. $-\frac{1}{2}$ B. $\frac{1}{2}$
C. 1 D. $\frac{3}{2}$

Q4. \(\lim_\limits{\text{x} \rightarrow \infty}\dfrac{2\sqrt{\text{x}}+3\sqrt[3]{\text{x}}+4\sqrt[4]{\text{x}}+...+\text{n}\sqrt[\text{n}]{\text{x}}}{\sqrt{(2\text{x}-3}+{\sqrt[3]{(2\text{x}-3)}+{\sqrt[4]{(2\text{x}-3)}+...+}{\sqrt[\text{n}]{(2\text{x}-3)}}}}\) is equal to: **1 Marks**

A. 1 B. 2 C. $\sqrt{2}$ D. None of these

Q5. $\lim_{x \to 3} 2x^2 - 3x - 5$ = **1 Marks**

A. 4 B. 3 C. -4 D. -3

Q6. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x \to 0} \frac{e^{\tan x} - 1}{x}$ is equal to 1.

Reason (R) $\lim_{x \to 0} \left(\frac{e^{4x} - 1}{x} \right)$ is equal to 2.

A. A is true, R is true; R is acorrect explanation of A. B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false D. A is false; R is true.

Q7. What is the value of What is the value of $\lim_{x \to \infty} \frac{x^2 - 9}{x^2 - 3x + 2}$: **1 Marks**

A. 1 B. 2
C. 0 D. Limit does not exist

Q8. Consider the differential equation $\frac{dy}{dx} = \cos x$ Then we observe that: **1 Marks**

A. y = sin x B. y = sin x + 2
C. y = sin x – $\frac{1}{2}$ D. y = sin x + c

Q9. $\lim_{x \to 0} \frac{\sin 5x}{\tan 3x}$ **1 Marks**

A. $-\frac{5}{3}$ B. $\frac{5}{3}$
C. $-\frac{7}{3}$ D. None of these

Q10. What is the value $\lim_{x \to 4} \frac{x^2 - 2x - 8}{x - 4}$: **1 Marks**

A. 0 B. 2 C. 8 D. 6

Q11. $\lim_{\text{x} \rightarrow 1}\frac{1-\text{x}+[\text{x}+1]+[1-\text{x}]}{}$, where [x] denotes greatest integer function, is: **1 Marks**

A. 0 B. 1 C. -1 D. 2

Q12. $\lim_{\text{x} \rightarrow\infty}\dfrac{\sqrt{\text{x}^2+1}-^3\sqrt{\text{x}^2+1}}{^4\sqrt{\text{x}^4+1}-^5\sqrt{\text{x}^4+1}}$ is equal to: **1 Marks**

A. 1 B. -1 C. 0 D. none of these

Q13. Choose the correct answer. **1 Marks**

If $y = \frac{\sin x + \cos x}{\sin x - \cos x}$ then $\frac{dy}{dx}$ at x = 0 is equal to:

A. −2 B. 0 C. $\frac{1}{2}$ D. Does not exist.

Q14. What is the value of $\lim y \rightarrow 2y^2 - 4y - 2$? **1 Marks**

A. 2 B. 4 C. 1 D. 0

Q15. $\lim \tan x = x \rightarrow \frac{\pi}{2}$: **1 Marks**

A. 1 B. 0
C. $\frac{1}{\pi}$ D. does not exisz

Q16. If $y = \frac{\sin(x + 9)}{\cos x}$, then $\frac{dy}{dx}$ at x = 0 is: **1 Marks**

A. cos 9 B. sin 9 C. 0 D. 1

Q17. Choose the correct answer. **1 Marks**

If $f(x) = 1 - x + x^2 - x^3 + ...-x^{99} + x^{100}$, then f'(1) is equal to:

A. 150 B. -50 C. -150 D. -50

Q18. Evaluate $\lim_{x \to 3} (4x^2 + 3)$: **1 Marks**

A. 36 B. 39 C. 40 D. None of these

Q19. What is the value of $\frac{d}{dx}$ (sin x3 cos x2)? **1 Marks**

A. 3x2 cosx2 cos x3 + 2xsin x3 sin x2 B. 3x2 cos 2 cos x3 −2x sin x3 sin x2
C. 2x cos x2 cos x3 −2x sin x3 sin x2 D. 2x cosx2 cos x3 + 3x2 sin x3 sin x2

Q20. Choose the correct answer. **1 Marks**

$\lim_{x \to 0} \frac{\tan 2x - x}{3x - \sin x}$ is equal to:

A. 2 B. $\frac{1}{2}$
C. $-\frac{1}{2}$ D. $\frac{1}{4}$

Q21. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x \to 0} \frac{e^x - e^{\sin x}}{x - \sin x}$ is equal to -1.

Reason (R) $\lim_{x \to 0} \left(\frac{3^{2x} - 2^{3x}}{x}\right)$ is equal to $\log\left(\frac{9}{8}\right)$

A. A is true, R is true; R is acorrect explanation of A. B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false D. A is false; R is true.

Q22. \(\lim_\limits{\text{x} \rightarrow \text{a}}\dfrac{1}{(\text{x}-\text{a})^{2\text{n}-1}}(\text{n ϵ N})\) equals: **1 Marks**

A. ∞ B. −∞ C. 0 D. does not exist

Q23. Find the value of $\lim_{x\to 0} \frac{2x^2 + 3x + 4}{2}$: **1 Marks**

A. 2 B. 1 C. $3\sqrt{5}$ D. $2\sqrt{5}$

Q24. Choose the correct answer. **1 Marks**

$\lim_{x\to \pi} \frac{x^2 \cos x}{1 - \cos x}$ is equal to:

A. 2 B. $\frac{3}{2}$ C. $-\frac{3}{2}$ D. 1

Q25. If $z_r = \cos \frac{r\alpha}{n^2} + i \sin \frac{r\alpha}{n^2}$ where r = 1, 2, 3, ...n then $\lim_{n\to\infty} (z_1.z_2.....z_n)$ is equal to: **1 Marks**

A. $\cos \frac{\alpha}{2}$ B. $\sin \frac{\alpha}{2}$

C. $e^{i\alpha}$ D. $\sqrt{e^{i\alpha}}$

Q26. The value of n in the expansion of $(a + b)^n$ if the first three terms of the expansion are 729, 7290 and 30375, respectively is: **1 Marks**

A. 2 B. 4 C. 6 D. 8

Q27. **1 Marks**

The greatest coefficient in the expansion of $(1 + x)^{10}$ is:

A. 10!(5!) B. $\frac{10}{(5!)^2}$

C. 10!(5! × 4!)2 D. 0!(5! × 4!)

Q28. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 0} \frac{ax + x \cos x}{b \sin x}$ is equal to $\frac{a+1}{b}$.

Reason (R) $\lim_{x\to 0} x \sec x$ is equal to 1.

A. A is true, R is true; R is acorrect explanation of A. B. A is true, R is true; R is not a correct explanation of A.

C. A is true; R is false D. A is false; R is true.

Q29. If f′ (0) = 0 and f(x) is a differentiable and increasing function,then $\lim x \to 0 \frac{x, f(x)^2}{f(x)}$: **1 Marks**

A. Is always equal to zero B. May not exist as left hand limit may not exist

C. May not exist as left hand limit may not exist D. Right hand limit is always zero

Q30. If $f(x)\frac{\sin(x + 9)}{\cos x}$ then f(x) at x = 0 is: **1 Marks**

A. cos 9 B. sin 9 C. 0 D. 1

Q31. $\lim_{x\to 0} \frac{\sin 7x}{\sin 3x}$ equals: **1 Marks**

A. $\frac{7}{3}$ B. $\frac{10}{3}$

C. $\frac{14}{3}$ D. $\frac{1}{3}$

Q32. Evaluate: $\lim_{n\to\infty} \frac{n!}{(n + 1)! - n!}$ **1 Marks**

A. 0 B. 1 C. 2 D. 3

Q33. In the binomial expansion of $(a + b)^n$, the coefficient of fourth and thirteenth terms are equal to each other, then the value of n is: **1 Marks**

A. 10 B. 15 C. 20 D. 25

Q34. What is the value of $(x + y)^2$ y if x = et sint and y = et cost? **1 Marks**

A. 12(y + y)
B. 2(y - y)
C. 2(xy + y)
D. 2(xy - y)

Q35. What is the value of ddx (sin x tan x)? **1 Marks**

A. sin x + tan x sec x
B. cos x + tan x sec x
C. sin x + tan x
D. sin x + tan x sec2x

Q36. Mark the correct alternative in each of the following: **1 Marks**
If f(x) = x sin x, then $f'\left(\frac{x}{2}\right)$ =

A. 0 B. 1 C. −1 D. $\frac{1}{2}$

Q37. What is the number of critical points of $f(x) = \frac{|x2 - 1|}{x2}$? **1 Marks**

A. 0 B. 1 C. 2 D. 3

Q38. **1 Marks**
$\lim_{x\to 0}\left(\frac{(1+x)^2}{e^x}\right)^{\frac{4}{\sin x}}$ is:

A. e^2
B. e^4
C. e^8
D. e^9

Q39. Evaluate: $\lim_{x\to 2} x^2 - 5x + 6$: **1 Marks**

A. 1 B. -5 C. 0 D. 4

Q40. **1 Marks**
If n is a positive integer, then $(\sqrt{3} + 1)^{2n+1} + (\sqrt{3} - 1)^{2n+1}$ is:

A. an even positive integer
B. a rational number
C. an odd positive integer
D. an irrational number

Q41. What is the derivative of f(x) = x|x|? **1 Marks**

A. |x| + x B. 2x C. 2|x| D. -2|x|

Q42. **1 Marks**
Evaluate: $\lim_{x\to 0}\left(\frac{a^x + b^x + c^x}{3}\right)^{\frac{2}{x}}$

A. a + b + c
B. $(abc)^{\frac{2}{4}}$
C. $(abc)^2$
D. $(abc)^{\frac{2}{3}}$

Q43. $f(x) = \frac{3x^2 + ax + a + 1}{x^2 + x - 2}$ and \(\lim_\limits{\text{x} \rightarrow -2}\text{f}(\text{x})\) exists. Then the value of (a - 4) is? **1 Marks**

A. 9 B. 10 C. 11 D. 12

Q44. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**
Assertion (A) $\lim_{x\to 0}\frac{e^x - e^{-x}}{x}$ is equal to 2
Reason (R) $\lim_{x\to 0}\frac{e^x - 1}{x} = 1$.

A. A is true, R is true; R is acorrect explanation of A.
B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false
D. A is false; R is true.

Q45. Choose the correct answer. **1 Marks**

If $y = \frac{\sin(x+9)}{\cos x}$ then $\frac{dy}{dx}$ at $x = 0$ is equal to:

A. cos 9 B. sin 9 C. 0 D. 1

Q46. Choose the correct answer. **1 Marks**

$\lim_{x\to 0} \frac{(\sqrt{x}-1)(2x-3)}{2x^2+x-3}$ is:

A. $\frac{1}{10}$ B. $-\frac{1}{10}$

C. 1 D. None of these.

Q47. Given that f(x) is a differentiable function of x and that f(x) f(y) = f(x) + f(y) + f(xy) −2 and that f(2) = 5.Then f(3) is equal to? **1 Marks**

A. 6 B. 24 C. 15 D. 19

Q48. If f(x) is a quadratic expression which is positive for all real vaues of x and g(x) = f(x) + f′(x) + f′′(x) then for any real value of x: **1 Marks**

A. g(x) < 0 B. g(x) > 0 C. g(x) = 0 D. g(x) > 0

Q49. $\lim_{X\to 0} 2\sin\frac{23x}{x2}$ is equal to: **1 Marks**

A. 12 B. 18 C. 0 D. 6

Q50. \(\lim_\limits{\text{n} \rightarrow \infty}\dfrac{\text{n}(2\text{n}+1)2}{(\text{n}+2)(\text{n}2+3\text{n}−1)}\) is equal to: **1 Marks**

A. 0 B. 2 C. 4 D. ∞

Q51. Let f(x) = x − [x], x ∈ R, then $f'\left(\frac{1}{2}\right)$ is: **1 Marks**

A. $\frac{3}{2}$ B. 1

C. 0 D. -1

Q52. Choose the correct answer. **1 Marks**

$\lim_{x\to 0} \frac{\sec^2 x - 2}{\tan x - 1}$ is:

A. 3 B. 1 C. 0 D. 2

Q53. **1 Marks**

The coefficient of y in the expansion of $\left(y^2+\frac{c}{y}\right)5$ is:

A. 10c B. 10c2 C. 10c3 D. None of these

Q54. What is the value of $\lim_{y\to 0}(32x^2\text{cosec}^2 4x)$? **1 Marks**

A. 1 B. 4 C. 2 D. 3

Q55. What is the value of the limit $f(x) = x2 + 2x\sqrt{x2-4x}$ if x approaches infinity? **1 Marks**

A. 0 B. 2 C. $\frac{1}{2}$ D. 4

Q56. If x is very large, then $\frac{2x}{1+x}$ is: **1 Marks**

A. Close to 0 B. Arbitrarily large

C. Lie between 2 and 3 D. Close to 2

Q57. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 1} \frac{ax^2+bx+c}{cx^2+bx+a}$ equal to 1, where $a + b + c \neq 0$.

Reason (R) $\lim_{x\to -2} \frac{\frac{1}{x}+\frac{1}{2}}{x+2}$ is equal to $\frac{1}{4}$.

A. A is true, R is true; R is acorrect explanation of A.
B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false
D. A is false; R is true.

Q58. Choose the correct answer. **1 Marks**

If $f(x) = \sqrt{x} + \frac{1}{\sqrt{x}}$ then $\frac{dy}{dx}$ at x = 1 is equal to:

A. 1
B. $\frac{1}{2}$
C. $\frac{1}{\sqrt{2}}$
D. 0

Q59. What is the value of \(\lim_\limits{\text{y} \rightarrow 2}\big(1+\dfrac{1}{\text{n}}\big)^\text{n}\text{y}^2-4\text{y}-2?\) **1 Marks**

A. 2
B. 4
C. 1
D. 0

Q60. What is the value of the limit $f(x) = x2 + \sqrt{2x}\sqrt{x2}-4x$ if x approaches infinity? **1 Marks**

A. 0
B. 2
C. 5
D. 4

Q61. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 0} \frac{\sin ax}{bx}$ is equal to $\frac{a}{b}$.

Reason (R) $\lim_{x\to 0} \frac{\sin x}{x} = 1$.

A. A is true, R is true; R is acorrect explanation of A.
B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false
D. A is false; R is true.

Q62. The derivative of $x^2 \cos x$ is: **1 Marks**

A. $2x \sin x - x^2 \sin x$
B. $2x \cos x - x^2 \sin x$
C. $2x \sin x - x^2 \sin 2x$
D. $2x \sin 3x - x^2 \sin 2x$

Q63. Choose the correct answer. **1 Marks**

If $f(x) = x - [x], \in R$ then $f'\left(\frac{1}{2}\right)$ is equal to:

A. $\frac{3}{2}$
B. 1
C. 0
D. −1

Q64. Choose the correct answer. **1 Marks**

$\lim_{x\to \pi} \frac{\sin x}{x - \pi}$ is:

A. 1
B. 2
C. -1
D. -2

Q65. If $f(x) = 1 - x + x^2 - x^3 + \cdots - x^{99} + x^{100}$, then f'(1) equals **1 Marks**

A. 150
B. -50
C. -150
D. 50

Q66. Let f(x) = x - [x] ∈ R, then $f\left(\frac{1}{2}\right)$ is: **1 Marks**

A. $\frac{3}{2}$
B. 1
C. 0
D. -1

Q67. Derivative of the function f(x) = (x - 1) (x - 2) is: **1 Marks**

A. 2x + 3
B. 3x - 2
C. 3x + 2
D. 2x - 3

Q68. Evaluate: $\lim_{x\to 0} \frac{\sin x + \cos x}{\sin x - \cos x}$: **1 Marks**

A. 0
B. 1
C. -1
D. ∞

Q69. If, $y = (\sin^{-1} x)^2$, then what is the value of $(1 - x^2)y - xy + 4$? **1 Marks**

A. 2
B. 4
C. 6
D. 8

Q70. **1 Marks**

The coefficient of x^n in the expansion of $(1 - 2x + 3x^2 - 4x^3 + \ldots\ldots)^{-n}$ is:

A. $(2n)!n!$

B. $\frac{(2n)!}{(n!)^2}$

C. $(2n)!\{2\times(n!)^2\}$

D. None of these

Q71. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 0}\frac{\sin ax}{\sin bx}$ is equal to $\frac{a}{b}$.

Reason (R) $\lim_{x\to 0}\frac{\sin x}{x} = 1$.

A. A is true, R is true; R is acorrect explanation of A.

B. A is true, R is true; R is not a correct explanation of A.

C. A is true; R is false

D. A is false; R is true.

Q72. Choose the correct answer. **1 Marks**

If $y = \frac{1+\frac{1}{x^2}}{1-\frac{1}{x^2}}$ then $\frac{dy}{dx}$ is equal to:

A. $\frac{-4x}{(x^2-1)^2}$

B. $\frac{-4x}{(x^2-1)^2}$

C. $\frac{1-x^2}{4x}$

D. $\frac{4x}{x^2-1}$

Q73. Choose the correct answer. **1 Marks**

If $f(x) = \frac{x-4}{2\sqrt{x}}$ then f'(1) is equal to:

A. $\frac{5}{4}$

B. $\frac{4}{5}$

C. 1

D. 0

Q74. Choose the correct answer. **1 Marks**

If $f(x) = \begin{cases} x^2 - 1 & 0 < x < 2 \\ 2x + 3, & 2 \geq 3 < 3 \end{cases}$ then the quadeatic equation whose roots are $\lim_{x\to 2^-} f(x)$ and $\lim_{x\to 2^+} f(x)$ is:

A. $x^2 - 6x + 9 = 0$

B. $x^2 - 7x + 8 = 0$

C. $x^2 + 14x + 49 = 0$

D. $x^2 - 10x + 21 = 0$ vvvv

Q75. Let f(x) = (x - a) (x - b) (x - c), a < b < c. Then f(x) = 0 has two roots. At which interval does these roots belongs? **1 Marks**

A. Both the roots in (a, b)

B. At least one root in (a, b) and at least one root in (b, c)

C. Both the roots in (b, c)

D. Neither in (a, b) nor in (b, c)

Q76. What is the derivative of $\lim_{x\to\infty}\left(x\sin x(\frac{2}{x})\right)$? **1 Marks**

A. 2

B. 1

C. 3

D. ∞

Q77. \(\lim_\limits{\text{x} \rightarrow 1}(1+\sin\pi)π\text{x}:\) **1 Marks**

A. π

B. π^2

C. π^3

D. $\pi 1$

Q78. f f(x) = 3cosx, then f ¢(x) at $x = \frac{\Pi}{2}$ = is: **1 Marks**

A. -3

B. 3

C. 0

D. -1

Q79. \(\lim_\limits{\text{x}→1} \sqrt{x +1) (2x - 3)} \sqrt{2x3 + x -3}\) is: **1 Marks**

A. 1

B. $\frac{1}{10}$

C. 1

D. None of these

Q80. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 0}\frac{e^{3+x} - \sin x - e^3}{x}$ is equal to $e^3 + 1$.

Reason (R) $\lim_{x\to 0}\frac{\tan 4x}{\sin 2x}$ is equal to 2.

A. A is true, R is true; R is acorrect explanation of A.

B. A is true, R is true; R is not a correct explanation of A.

C. A is true; R is false

D. A is false; R is true.

Q81. \({\lim _\limits{\text{x}\to 1}}\dfrac{\text{x}^\text{n-1}}{\text{x}-1}\) is equal to: **1 Marks**

A. 1 B. 2 C. n D. none of these

Q82. Is Rolle's theorem valid for f(x) = x2 - 3x + 4 in the interval [1, 2]? **1 Marks**

A. Yes

B. No

C. Depends on x

D. Data not sufficient

Q83. What is the value of the \(\lim_\limits{\text{x} \rightarrow 5}\dfrac{32\text{x}+1}{\text{x}^2-5\text{x}}?\) **1 Marks**

A. 6.2 B. 6.4 C. 6.3 D. 6.1

Q84. **1 Marks**

if n is a positive ineger then 2^{3n} n - 7n - 1 is divisible by:

A. 7 B. 9 C. 49 D. 81

Q85. Choose the correct answer. **1 Marks**

If f(x) = $1 + x + \frac{x^2}{2} + ... + \frac{x^{100}}{100}$ then f'(1) is equal to:

A. $\frac{1}{100}$

B. 100

C. does not exist

D. 0

Q86. If f(x) = |4x - x^2 - 3| when x € [0, 4], then, which of the following is correct? **1 Marks**

A. x = 1 is the global maximum

B. x = 2 is the global maximum

C. x = 3 is the global maximum

D. x = 0 is the global maximum

Q87. What is the value of the $\lim_{x\to 5} \frac{32x + 1}{x^2 - 5x}$? **1 Marks**

A. 6.2 B. 6.4 C. 6.3 D. 6.1

Q88. What is the value of \(\lim_\limits{\text{x} \rightarrow 0}\dfrac{\text{e}^\text{X}(\sin^2\text{x})}{\text{x}^3}?\) **1 Marks**

A. 2 B. 3 C. 1 D. 0

Q89. If f′(x) = g(x) and g′(x) = −f(x) for all x and f(2) = 4 = g(2), then $f^2(24)+g^2(24)$ is: **1 Marks**

A. 32 B. 24 C. 64 D. 48

Q90. Evaluate the following limit : $\lim_{x\to 0} \frac{\sin^2 3x}{x^2}$ **1 Marks**

A. 1 B. 3 C. 9 D. 0

Q91. What is the value of $\frac{d}{dx}$(ex sinx + ex cos x)? **1 Marks**

A. 0

B. 2 cosx

C. 2ex.sin x

D. 2ex.cos x

Q92. \(\lim_\limits{\text{x} \rightarrow \text{a}}\dfrac{\text{x}-\text{a}}{|\text{x}-\text{a}|}=\) **1 Marks**

A. 0 B. 1 C. -1 D. does not exist

Q93. If L = $\lim_{x\to 0} \frac{a \sin x - \sin^2 x}{\tan^3 x}$ is finite, then the value of L is: **1 Marks**

A. 1 B. 2 C. 3 D. -1

Q94. If f(x) = $\begin{cases} 2x + b(x < \alpha) \\ x + d(x \geq \alpha) \end{cases}$ is such that \(\lim_\limits{\text{x} \rightarrow \text{a}}\text{f}(\text{x}=\text{L})\),then L. **1 Marks**

A. 2d - b B. b - db C. d + bd D. b - 2d

Q95. The value of $\lim_{x \to 3+} \frac{|x-3|}{x-3}$ equals: **1 Marks**

A. 1 B. -1 C. 0 D. Does not exist

Q96. Evaluate: $\lim_{x \to 2} \frac{x^2-4}{x+3}$: **1 Marks**

A. 0 B. 1 C. -1 D. None of these

Q97. \(\lim_\limits{\text{x} \rightarrow 2}\Bigg(\dfrac{\sqrt{1-\text{cos}{2(\text{x}-2)}}}{\text{x}-2}\Bigg):\) **1 Marks**

A. does not exist B. equals $\sqrt{2}$

C. equals $-\sqrt{2}$ D. equals $\frac{-\sqrt{2}}{1}$

Q98. If f(x) = 2x - 3, a = 2, l = 1f(x) = 2x - 3, a = 2, l = 1 and $\epsilon = 0.001$ then $\delta > 0$ satisfying $0<|x - a|< \delta$, $|f(x) - l| < \epsilon$, is: **1 Marks**

A. 0.0050 B. 0.0005 C. 0.001 D. 0.0001

Q99. If $y = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$, then $\frac{dy}{dx}$ = **1 Marks**

A. y + 1 B. y - 1 C. y D. y^2

Q100. What is the number of critical points for f(x) = max(sinx, cosx) for x belonging to (0, 2π)? **1 Marks**

A. 2 B. 5 C. 3 D. 4

Q101. If $f(x) = \frac{x^n - a^n}{x-a}$, then $f'(a)$ is: **1 Marks**

A. 1 B. 0 C. $\frac{1}{2}$ D. dose not exist

Q102. In the expansion of $(a + b)^n$, if n is odd then the number of middle term is: **1 Marks**

A. 0 B. 1 C. 2 D. More than 2

Q103. What is the value of \(\lim_\limits{\text{x} \rightarrow 3}\dfrac{\text{x}^2-9}{\text{x}-3}?\) **1 Marks**

A. 0 B. 3 C. Infinity D. 6

Q104. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x \to 0} \frac{x-1}{\log_e x}$ is equal to 1.

Reason (R) $\lim_{x \to 0} \frac{\log(\sin x+1)}{x}$ is equal to $9 \log 2$

A. A is true, R is true; R is acorrect explanation of A. B. A is true, R is true; R is not a correct explanation of A.

C. A is true; R is false D. A is false; R is true.

Q105. Choose the correct answer. **1 Marks**

$\lim_{x \to 0} \frac{|\sin x|}{x}$ is equal to:

A. 1 B. -1

C. Does not exist D. None of these.

Q106. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x \to 0} \frac{\cos 2x-1}{\cos x - 1}$ is equal to 4

Reason (R) $\lim_{x \to 0} \frac{\tan x}{x} = 1$.

A. A is true, R is true; R is acorrect explanation of A. B. A is true, R is true; R is not a correct explanation of A.

C. A is true; R is false D. A is false; R is true.

Q107. If $y = \frac{1 + \frac{1}{x^2}}{1 - \frac{1}{x^2}}$, then $\frac{dy}{dx} = z$ **1 Marks**

A. $-\frac{4x}{(x^2-1)^2}$ B. $-\frac{4x}{x^2-1}$

C. $\frac{1-x^2}{4x} =$ D. $\frac{4x}{x^2-1}$

Q108. $\lim_{x \rightarrow 0}\frac{2x^2+3x+4}{2}=$ **1 Marks**

A. 2 B. 1 C. $3\sqrt{5}$ D. $2\sqrt{5}$

Q109. **1 Marks**

if f(x) = x, x < 0: f(x) = 0, x = 0; f(x) = x, x > 0, then $\lim_{x\rightarrow 0} f(x)$ is equal to:

A. Does not exist B. 0 C. -1 D. 1

Q110. if $f(x) = \begin{vmatrix} \cos x & x & 1 \\ 2\sin x & x^2 & 2x \\ \tan x & x & 1 \end{vmatrix}$, then $\lim_{x\to 0} \frac{f(x)}{x}$. **1 Marks**

A. Exists and is equal to -2 B. Does not exist

C. Exist and is equal to 0 D. Exists and is equal to 2

Q111. $\lim_{x \rightarrow 0}\frac{\sin|x|}{x}$ is equal to: **1 Marks**

A. 1 B. 0

C. Positive infinity D. Does not exist

Q112. $\lim_{x \rightarrow 0}\frac{3\sin(2x^2)}{x^2}=$ Athen the value of A is: **1 Marks**

A. 2 B. 4 C. 6 D. 8

Q113. Identify the value of $\lim_{x\to 2} x^2 - 5x + 6$ **1 Marks**

A. 1 B. -5 C. 0 D. 4

Q114. $\lim_{n\to\infty} \frac{np\sin^2(n!)}{n+1}$, 0 < p < 1 is equal to: **1 Marks**

A. 0 B. ∞ C. 1 D. None

Q115. $\lim_{x\to 0} \frac{ae^x + b\cos x + c.e^x}{\sin^2 x} = 4$ then b: **1 Marks**

A. 2 B. 4 C. 2 D. -4

Q116. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 0} \frac{\sin ax + bx}{ax + \sin bx}$ is equal to -2.

Reason (R) $\lim_{x\to 1} (5x^3 + 5x + 1)$ is equal to 11.

A. A is true, R is true; R is acorrect explanation of A. B. A is true, R is true; R is not a correct explanation of A.

C. A is true; R is false D. A is false; R is true.

Q117. Choose the correct answer. **1 Marks**

$\lim_{x\to 0} \frac{\text{cosec} - \cot x}{x}$ is equal to:

A. $-\frac{1}{2}$ B. 1

C. $\frac{1}{2}$ D. −1

Q118. If A(x_1, y_1) and B(x_2, y_2) be two points on the curve $y = ax^2 + bx + c$, then as perLagrange's mean value theorem whichof the following is correct? **1 Marks**

A. At least one point C(x3, y3) where the tangent will be intersecting the chord AB

B. At least one point C(x3, y3) where the tangent will be overlapping to the chord AB

C. At least two points where the tangent will be parallel to the chord AB

D. At least one point C(x3, y3) where the tangent will be parallel to the chord AB

Q119. The value of the limit $\lim _\limits{ \text{x}\rightarrow 1 }{ \dfrac { \sin { \left({ \text{e} }^{ \text{x}-1 }-1 \right) } }{ \log { \text{x} } } }$ is: **1 Marks**

A. 0 B. e C. 2 D. 1

Q120. Find the derivative of e^{x^2}: **1 Marks**

A. ex2 B. 2x C. 2ex2 D. 2xex2

Q121. if $f(x) = x^{100} + x^{99} + \cdots + x + 1$, then f'(1) is equal to **1 Marks**

A. 5050 B. 5049 C. 5051 D. 50051

Q122. $\lim_\limits{\text{x}→0}\dfrac{| \sin \text{x}|}{\text{x}}$ is equal to: **1 Marks**

A. 1 B. -1 C. 0 D. does not exist

Q123. Evaluate the following limit $\lim_{x→0} \frac{1 - \cos 2x}{x^2}$: **1 Marks**

A. 0 B. 1 C. 2 D. None of these

Q124. If $y = 5x^2 + 8x$ find $\frac{dy}{dx}$ **1 Marks**

A. 10x + 8 B. 5x + 8 C. 10x2 + 8x D. None of these

Q125. Choose the correct answer. **1 Marks**

$\lim_{x→0} \frac{x^m - 1}{x^n - 1}$ is equal to:

A. 1 B. $\frac{m}{n}$

C. $\frac{-m}{n}$ D. m^2n^2

Q126. **1 Marks**

If the third term in the binomial expansion of $(1 + x)^m$ is $\frac{-1}{8}x^2$ then the rational value of m is:

A. 2 B. $\frac{1}{2}$ C. 3 D. 4

Q127. Choose the correct answer. **1 Marks**

$\lim_{x→0} \frac{1 - \cos 4\theta}{1 - \cos 6\theta}$ is equal to:

A. $\frac{4}{9}$ B. $\frac{1}{2}$

C. $\frac{-1}{2}$ D. −1

Q128. $\lim_\limits{\text{x} \rightarrow -1}\dfrac{\text{x}^2}{\text{x}-1}=$_____. **1 Marks**

A. 0 B. 1

C. $\frac{-1}{2}$ D. -2

Q129. **1 Marks**

What is the value of the limit $f(x) = \frac{\sin^2 x + 2\sqrt{\sin x}}{x^2 - 4x}$ if x approaches 0?

A. $\frac{1}{\sqrt{2}}$ B. $\frac{-1}{\sqrt{2}}$

C. $\frac{-1}{2\sqrt{2}}$ D. $\frac{-1}{\sqrt{-2}}$

Q130. If $y = \sqrt{x} + \frac{1}{\sqrt{x}}$, then $\frac{dy}{dx}$ at x = 1 is **1 Marks**

A. 1 B. $\frac{1}{2}$ C. $\frac{1}{\sqrt{2}}$ D. 0

Q131. $\lim_{x\to\infty} \sin x$ equals: **1 Marks**

A. 1 B. 0 C. ∞ D. does not exist

Q132. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 0} \frac{e^x - 1}{\sqrt{1 - \cos 2x}}$ — is equal to $\frac{1}{\sqrt{2}}$

Reason (R) $\lim_{x\to 1} \frac{x^2 - 1}{x - 1}$ is equal to 1.

A. A is true, R is true; R is acorrect explanation of A.
B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false
D. A is false; R is true.

Q133. **1 Marks**

If $\lim_{x\to 0} (\cos x + a \sin bx)^{\frac{1}{x}} = e^2$ then

the possible values of a & bare:'a'&'b'are:

A. a = 1, b = 2 B. a = 2, b = 1 C. a = 3, b = 2 D. a = 2, b = 3

Q134. if $f(x) = 1 + x + \frac{x^2}{2} + \cdots + \frac{x^{100}}{100}$,then f'(1) is equal to: **1 Marks**

A. $\frac{1}{100}$
B. 100
C. 50
D. 0

Q135. The limit of $\left[\frac{1}{x^2} + \frac{(2013)^x}{e^x - 1} - \frac{1}{e^x - 1}\right]$ as $x \to 0$: **1 Marks**

A. Approaches +∞
B. Approaches −∞
C. Is equal to loge(2013)
D. Does not exist

Q136. \(= \lim_\limits{\text{x}→0} \text{x}\sin\dfrac{1}{\text{x}}\)is equal to: **1 Marks**

A. 0 B. 1 C. $\frac{1}{2}$ D. does not exist

Q137. If $f(x) = x \sin x$, then $f\left(\frac{\Pi}{2}\right)$ is equal to: **1 Marks**

A. 0 B. 1 C. 1 D. $\frac{1}{2}$

Q138. What is the value of $\lim_{y\to 4} f(y)$? It is given that $f(y) = y^2 + 6y$ $(y \geq 2)$ and $f(y) = 0 (y < 2)$: **1 Marks**

A. 40 B. 16 C. 0 D. 30

Q139. is $f(x) = \frac{x^2 + 6x}{\sin x}$ then\(\lim_\limits{\text{x} \rightarrow 0} \text{f(x)=}\) **1 Marks**

A. 2 B. 4 C. 6 D. 8

Q140. If $\lim_{x\to a} \frac{x^5 - a^5}{x - a} = 80$ then the value of aa is: **1 Marks**

A. 4 B. 2 C. 3 D. 5

Q141. Choose the correct answer. **1 Marks**

If $\begin{cases} \frac{\sin[x]}{[x]} & x \neq 0 \\ 0, & [x] = 0 \end{cases}$ where [.] denotes the greatest integer function. then $\lim_{x\to 0} f(x)$ is equal to :

A. 1 B. 0 C. -1 D. None of these.

Q142. $f(x) = x - 1 + x - 3$ then f (2) =: **1 Marks**

A. −2 B. 2 C. 0 D. 1

Q143. Evaluate: $\lim_{x\to 1} \frac{2x^2 + 4x + 4}{2x - 1}$: **1 Marks**

A. 1 B. 10 C. 20 D. 5

Q144. $\lim_{x\to\infty} [x - 1]$ - where [.] is greatest integer function, is equal to: **1 Marks**

A. 1 B. 2 C. 0 D. does not exists

Q145. What is the value of $\lim_{x\to 3} \frac{x^2 - 9}{x - 3}$: **1 Marks**

A. 0 B. 3 C. Infinity D. 6

Q146. if a differentiable function f defined for x > 0 satisfies the relation $f(x^2) = x^3$, x > 0, then what is the value of f(4) ? **1 Marks**

A. 1 B. 2 C. 3 D. 4

Q147. Choose the correct answer. **1 Marks**

$\lim_{x\to 0} \frac{(1 + x)^n - 1}{x}$ is equal to:

A. n B. 1

C. −n D. 0

Q148. If $\lim_{x\to 5} \frac{Xk - 5K}{x - 5} = 500$ then k is equal to: **1 Marks**

A. 3 B. 4 C. 5 D. 6

Q149. **1 Marks**

$(1.1)^{10000}$ is _____ 1000:

A. greater than B. less than C. equal D. None of these

Q150. What is the number of critical points of $f(x) = \frac{|x^2 - 1|}{x^2}$? **1 Marks**

A. 0 B. 1 C. 2 D. 3

Q151. What is the number of critical points for $f(x) = \max(\sin x, \cos x)$ for x belonging to $(0, 2\pi)$? **1 Marks**

A. 2 B. 5 C. 3 D. 4

Q152. Let f:(a, b) → R be a differentiable function. Which of the following statements is true: **1 Marks**

A. $\lim_{x\to a} f(x) = \infty \implies \lim_{x\to a} |f(x)| = \infty$

B. $\lim_{x\to a} f(y) = \infty \implies \lim_{x\to a} |f(y)| = \infty$

C. $\lim_{x\to a} f(y) = \infty \implies \lim_{x\to a} |f(y)| = \infty\pi$

D. $\lim_{b\to a} f(y) = \infty \implies \lim_{x\to a} |f(y)| = \infty\pi$

Q153. \(\lim_\limits{\text{x} \rightarrow 1}\dfrac{(1-\text{x})(1-\text{x}^2)...(1-\text{x}^{2\text{n}})}{[(1-\text{x})(1-\text{x}^2)...(1-\text{x}^{2\text{}})]^2}\),n ∈ N, equals: **1 Marks**

A. ^{2n}P B. $^{2n}C_n$

C. (2n)! D. None of these

Q154. What is the value of \(\lim_\limits{\text{x} \rightarrow 0}\dfrac{\text{x}^2\sec\text{x}}{\sin\text{x}}?\) **1 Marks**

A. 3 B. 2 C. 1 D. 0

Q155. **1 Marks**

The fourth term in the expansion $(x - 2y)^{12}$ is:

A. -1670 x9 × y3 B. -7160 x9 × y3

C. -1760 x9 × y3 D. -1607 x9 × y3

Q156. What is the value of $\lim_{y \to \frac{\pi}{2}} \frac{\sin}{x}$? **1 Marks**

A. $\frac{2}{\pi}$ B. $\frac{\pi}{2}$ C. 1 D. 0

Q157. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x \to 0} \frac{3^x - 2^x}{\tan x}$ is equal to $\log\left(\frac{3}{2}\right)$

Reason (R) $\lim_{x \to 0} \frac{\log(1+x)}{\tan x}$ is equal to 2.

A. A is true, R is true; R is acorrect explanation of A.
B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false
D. A is false; R is true.

Q158. Differentiate with respect to x $x^4 + 3x^2 - 2x$: **1 Marks**

A. 4x3 + 6x − 2
B. 4x3 + 6x − 3
C. 4x4 + 6x − 2
D. None of the above

Q159. What is the value of $\lim_{\text{y} \rightarrow \infty}\dfrac{2}{\text{y}}?$ **1 Marks**

A. 0 B. 1 C. 2 D. Infinity

Q160. $\lim_{\text{x}\to 0} \sin\text{x} (\sqrt{\text{x} + 1} - \sqrt{(1- \text{x})})$ is: **1 Marks**

A. 2 B. 0 C. 1 D. -1

Q161. If $f(x) = \frac{x - 4}{2\sqrt{x}}$, then f'(1) is: **1 Marks**

A. $\frac{5}{4}$ B. $\frac{4}{5}$ C. 1 D. 0

Q162. If $\lim_{\text{x}\rightarrow \text{a}}\text{f}(\text{x})=\text{L},$ then for eac $\epsilon > 0$, there exists $\delta > 0$ so that: **1 Marks**

A. 0 <| x−a |< $\delta \Rightarrow$| f(x)−L |≥ ϵ
B. 0 <| x−a |< $\delta \Rightarrow$| f(x)−L |< ϵ
C. a < x < a + $\delta \Rightarrow$ f(x)−L < ϵ
D. $a - \delta < x < a \Rightarrow |f(x) - L| < \epsilon$

Q163. The derivative of $f(x) = \sin^2 x$ is: **1 Marks**

A. cos 2x B. tan 2x C. sin 2x D. cosec 2x

Q164. **$\lim_{\text{x}\to 4} \dfrac{|x-4|}{x - 4}$** is equal to: **1 Marks**

A. 1 B. -1 C. does not exist D. None of these

Q165. The value of $\lim_{x \to a} \frac{\sqrt{x-b} - \sqrt{a-b}}{x^2 - a^2}$(a > b) : **1 Marks**

A. $\frac{1}{4a}$
B. $\frac{1}{a\sqrt{a - b}}$
C. $\frac{2}{a\sqrt{a - b}}$
D. $\frac{1}{4a\sqrt{a - b}}$

Q166. Choose the correct answer. **1 Marks**

If $f(x) = x^{100} + x^{99}$ ..... + x + 1, then f'(1) is equal to:

A. 5050 B. 5049 C. 5051 D. 50051

Q167. Choose the correct answer. **1 Marks**

$\lim_{x \to 0} \frac{\sin x}{\sqrt{x + 1} - \sqrt{1 - x}}$ is:

A. 2 B. 0 C. 1 D. −1

Q168. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x \to \pi} \frac{\sin(\pi - x)}{\pi(\pi - x)}$ is equal to π

Reason (R) $\lim_{x\to 0} \frac{\cos x}{\pi - x}$ is equal to $\frac{1}{\pi}$.

A. A is true, R is true; R is acorrect explanation of A.
B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false
D. A is false; R is true.

Q169. Let $3f(x) - 2f(\frac{1}{x}) = x$ then f(2) is equal to: **1 Marks**

A. $\frac{2}{7}$ B. $\frac{1}{2}$ C. 2 D. 7

Q170. **1 Marks**

What is the value of \(\lim_\limits{\text{x}\rightarrow 0}\dfrac{\text{x}\tan\text{x}}{\cot\text{x}} ?\)

A. 0 B. 1 C. 2 D. $\frac{1}{2}$

Q171. If $y = \frac{\sin x + \cos x}{\sin x - \cos x}$, then $\frac{dy}{dx}$ at x = 0 is: **1 Marks**

A. -2 B. 0 C. $\frac{1}{2}$ D. does not existvv

Q172. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following: **1 Marks**

Assertion (A) $\lim_{x\to 0} \frac{3^{2+x} - 9}{x}$ is equal to $9 \log 2$

Reason (R) $\lim_{x\to 0} \frac{a^{\sin x} - 1}{\sin x}$ is equal to $\log a$.

A. A is true, R is true; R is acorrect explanation of A.
B. A is true, R is true; R is not a correct explanation of A.
C. A is true; R is false
D. A is false; R is true.

Q173. If $f(x) = x^{100} + x^{99} + \ldots + x + 1$, then f(1) is equal to: **1 Marks**

A. 5050 B. 5049 C. 5051 D. 50051

Q174. What is the value of $\frac{d}{dx}(e^x \tan x)$at x = 0? **1 Marks**

A. 0 B. 1 C. -1 D. 2

Q175. Derivative of the function $f(x) = 7x^{-3}$ is: **1 Marks**

A. 21x-4 B. -21x-4 C. 21x4 D. -21x4