GATE ALL BRANCHES CRASH COURSE 2025

ENGINEERING MATHEMATICS

CALCULUS

DPP

Q1 The value of $\lim_{n\to\infty}\left(\frac{n+1}{n-1}\right)^{2n}$ is-

(A) e^4 (B) e^{-4}

(C) e^2 (D) e^{-2}

Q2 If the function $f(x)=\frac{2}{x^2-5x+16}$, x∈ R is not continuous at the point x = a, x = b where a < b. Then the value of a/b is _____. (Round off to three decimal places).

Q3 Which of the following function is/are Not differentiable at $x=\frac{\pi}{2}$?

(A) $\left|x-\frac{\pi}{2}\right|$

(B) $\frac{\sin x}{\cos x}$

(C) $\frac{8}{8x^2-6\pi x+\pi^2}$

(D) e^{-x}

Q4 The value of $\lim_{x\to 0}\frac{|x|\cdot\sin x}{x}$ is_____.

Q5 The value of $\lim_{x\to\infty}\frac{\sin x}{x}$ is_____.

(A) 1 (B) 0

(C) –1 (D) $-\frac{1}{4}$

Q6 Which of the following function (s) is Not discontinuous at x =0.

(A) $\frac{\sin x}{x}$ (B) $e^x + e^{-x}$

(C) tan x (D) $\log_e(x+4)$

Q7 The value of $\lim_{x\to 0}\frac{\sin x}{x}+\lim_{x\to 8}\frac{x^{\frac{1}{3}}-8^{\frac{1}{3}}}{x-8}$ is _____. (Round of to two decimals)

Q8 For f(x) = [x] ; where [x] is greatest integer function. The value of

$\lim_{x\to -2.8}[x]+\lim_{x\to 4.03}[x]$ is

(A) –3 (B) 4

(C) 1 (D) –1

Q9 The value of $\lim_{x\to\frac{\pi}{2}}\frac{\sin x-1}{x-\frac{\pi}{2}}$ is_____. (Enter in Integer)

Q10 The value of $\lim_{h\to 0}\frac{e^{(x+h)^2}-e^{x^2}}{h}$ at x = 1 is_____. (Round of to two decimal places).

Q11 The value of $\lim_{x\to\infty}\left(\frac{3^{\frac{1}{x}}+4^{\frac{1}{x}}}{2}\right)^x=\sqrt{k}$. The value of 'k' is ____.

Q12 The coefficient of x^2 in Taylor series expansion of $f(x)=e^{\sin^2 x}$ about the point $x=\frac{\pi}{2}$

(A) –2e (B) 2e

(C) 4e (D) –4e

Q13 The value of hte summation $\sum_{i=1}^{\infty} i\cdot\left(\frac{1}{2}\right)^i$ is ___.

(A) 1 (B) $\frac{1}{2}$

(C) 2 (D) $\frac{1}{4}$

Q14 The mean value 'c' calculated for the function $f(x) = e^x(\sin x - \tan x)$ in $[0, \pi]$ using mean value theorem is

(A) 0

(B) $\frac{\pi}{2}$

(C) $\frac{3\pi}{4}$

(D) Mean value theorem can't be applied

Q15 The maximum value of $\frac{\sin x}{x}$ + The minimum value of x^x is ____ . (Round off to two decimal places).

Q16 The maximum value of $f(x) = 2x^2 - 5x + 6$ in the interval [0, 4] is ____.

(A) 2.875 (B) 6

(C) 18 (D) 14

Q17 The value of

$$\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx + \int_0^{\pi/2} \frac{\sqrt{x}}{\sqrt{x}+\sqrt{\frac{\pi}{2}-x}}\,dx \text{ is.}$$

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$

(C) $\frac{\pi}{8}$ (D) $\frac{2\pi}{7}$

Q18 If the value of $\int_0^1 x^2 \cdot (1-x)^7$ is $\frac{1}{k}$. Then the value of $\sqrt{(k+1)}$ is ___ (Enter is integer)

Q19 The area bounded by the curves $y = e^x$; x = 0, x = 2 and x -axis is ____.
(Round to two decimal places).

Q20 The value of the expression

$\int_0^{\infty} \frac{1}{16+x^2}\,dx + \int_{-4}^{4} \sqrt{8-x^2}\,dx$ is kπ. The value of 'k' is

(A) $\frac{31}{8}$ (B) $\frac{27}{8}$

(C) $\frac{33}{8}$ (D) $\frac{61}{8}$

Q21 The length of the curve $y = \sqrt{4-x^2}$ between the points x = 1 to x = 2 is ____.

(A) $\frac{\pi}{3}$ (B) $\frac{2\pi}{3}$

(C) π (D) $\frac{4\pi}{3}$

Q22 The value of $\int_0^{\infty} \frac{\sin 2t}{t}\,dt$ is a, and the value of $\int_0^{\infty} \frac{\sin 3t}{t}\,dt$ is (b). The value of a^b is ____ (Enter in Integer)

Q23 The value of $\int_2^{\infty} \frac{1}{1\sqrt{2\pi}} \exp\left\{\frac{-(x-2)^2}{1}\right\} dx$ is _____.
(Enter in one decimal place)

Q24 The value of $\lim_{x\to 0} \frac{5^x-3^x}{3^x-2^x}$ is

(A) $\log_e 5/3$ (B) $\log_e 3/2$

(C) $\log_{(3/2)} (5/3)$ (D) $\log_{(5/3)} (3/2)$

Q25 A function f(x) is defined as

$f(x) = \frac{\cos(\sin x)-\cos x}{x^2}$, $x \neq 0$ and f(0) = a. If f(x) is continuous at x = 0 then 'a' equals _____.

Answer Key

Q1	A
Q2	0.665~0.669
Q3	A, B, C
Q4	0~0
Q5	B
Q6	B, C, D
Q7	1.05~1.11
Q8	C
Q9	0~0
Q10	5.41~5.47
Q11	12~12
Q12	A
Q13	A
Q14	D
Q15	1.64~1.72
Q16	C
Q17	B
Q18	19~19
Q19	6.32~6.43
Q20	C
Q21	B
Q22	0.99~1.01
Q23	0.5~0.5
Q24	C
Q25	0~0

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:
(A)

Q2 Text Solution:
0.667

Q3 Text Solution:
(A, B, C)

Q4 Text Solution:
0

Q5 Text Solution:
(B)

Q6 Text Solution:
(B, C, D)

Q7 Text Solution:
1.05~1.11

Q8 Text Solution:
(C)

Q9 Text Solution:
0

Q10 Text Solution:
5.45

Q11 Text Solution:
12

Q12 Text Solution:
(A)

Q13 Text Solution:
(A)

Q14 Text Solution:
(D)

Q15 Text Solution:
1.64~1.72

Q16 Text Solution:
(C)

Q17 Text Solution:
(B)

Q18 Text Solution:
19

Q19 Text Solution:
6.32~6.43

Q20 Text Solution:
(C)

Q21 Text Solution:
(B)

Q22 Text Solution:
0.99~1.01

Q23 Text Solution:
0.5~0.5

Q24 Text Solution:
(C)

Q25 Text Solution:
0~0