Q1. 22 January Shift 2

Let $[\cdot]$ denote the greatest integer function, and let $f(x)=\min\left\{\sqrt{2}x, x^2\right\}$. Let $S=\{x\in(-2,2): \text{the function } g(x)=|x|\left[x^2\right] \text{ is discontinuous at } x\}$. Then $\sum_{x\in S} f(x)$ equals

(1) $\sqrt{6}-2\sqrt{2}$ (2) $1-\sqrt{2}$ (3) $2-\sqrt{2}$ (4) $2\sqrt{6}-3\sqrt{2}$

Q2. 23 January Shift 1

Let $f(x)=\begin{cases}\frac{ax^2+2ax+3}{4x^2+4x-3} & , x\neq -\frac{3}{2},\frac{1}{2}\\ b & , x=-\frac{3}{2},\frac{1}{2}\end{cases}$

be continuous at $x=-\frac{3}{2}$. If $f\circ f(x)=\frac{7}{5}$, then x is equal to:

(1) 4 (2) 0 (3) 2 (4) 1

Q3. 23 January Shift 2

If $f(x)=\begin{cases}\frac{a|x|+x^2-2(\sin|x|)(\cos|x|)}{x} & , x\neq 0\\ b & , x=0\end{cases}$

is continuous at $x=0$, then $a+b$ is equal to

(1) 4 (2) 1 (3) 2 (4) 0

Q4. 24 January Shift 1

If the function $f(x)=\frac{e^x\left(e^{\tan x-x}-1\right)+\log_e(\sec x+\tan x)-x}{\tan x-x}$ is continuous at $x=0$, then the value of $f(0)$ is equal to

(1) $\frac{2}{3}$ (2) 2 (3) $\frac{3}{2}$ (4) $\frac{1}{2}$

Q5. 24 January Shift 1

Let $\alpha,\beta\in\mathbb{R}$ be such that the function $f(x)=\begin{cases}2\alpha\left(x^2-2\right)+2\beta x & , x<1\\ (\alpha+3)x+(\alpha-\beta) & , x\geq 1\end{cases}$

be differentiable at all $x\in\mathbb{R}$. Then $34(\alpha+\beta)$ is equal to

(1) 36 (2) 24 (3) 84 (4) 48

Q6. 24 January Shift 2

Let $[t]$ denote the greatest integer less than or equal to t. If the function

$f(x)=\begin{cases}b^2\sin\left(\frac{\pi}{2}\left[\frac{\pi}{2}(\cos x+\sin x)\cos x\right]\right), & x<0\\ \frac{\sin x-\frac{1}{2}\sin 2x}{x^3} & , x>0\\ a & , x=0\end{cases}$ is continuous at $x=0$, then a^2+b^2 is equal to

(1) $\frac{5}{8}$ (2) $\frac{1}{2}$ (3) $\frac{9}{16}$ (4) $\frac{3}{4}$

ANSWER KEYS

1. (2)	**2.** (1)	**3.** (3)	**4.** (3)	**5.** (4)	**6.** (4)