

PART 1 - MATHEMATICS

Topic : Relations and functions (class 12)

SECTION-1 : (Maximum Marks : 4)

- This section contains **ONE** question.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks	: +4	ONLY if (all) the correct option(s) is(are) chosen;
Partial Marks	: +3	If all the four options are correct but ONLY three options are chosen;
Partial Marks	: +2	If three or more options are correct but ONLY two options are chosen, both of which are correct;
Partial Marks	: +1	If two or more options are correct but ONLY one option is chosen and it is a correct option;
Zero Marks	: 0	If none of the options is chosen (i.e. the question is unanswered);
Negative Marks	: -2	In all other cases.
- For example, in a question, if **(A), (B) and (D)** are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get -2 marks.

1. Let N denote the set of all natural numbers, and Z denote the set of all integers. Consider the functions $f: N \rightarrow Z$ and $g: Z \rightarrow N$ defined by

$$f(n) = \begin{cases} (n+1)/2 & \text{if } n \text{ is odd,} \\ (4-n)/2 & \text{if } n \text{ is even,} \end{cases}$$

and

$$g(n) = \begin{cases} 3 + 2n & \text{if } n \geq 0, \\ -2n & \text{if } n < 0. \end{cases}$$

Define $(g \circ f)(n) = g(f(n))$ for all $n \in N$, and $(f \circ g)(n) = f(g(n))$ for all $n \in Z$.

Then which of the following statements is (are) TRUE?

[JEE Advanced 2025 Paper 1]

- (A) $g \circ f$ is NOT one-one and $g \circ f$ is NOT onto (B) $f \circ g$ is NOT one-one but $f \circ g$ is onto
 (C) g is one-one and g is onto (D) f is NOT one-one but f is onto

Scan or tap for the full solution



Space for Rough Work

JEE ADVANCED RELATIONS AND FUNCTIONS (CLASS 12) —
COMPOSITION OF FUNCTIONS — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-1																								
Ques.	1																							
Ans.	A, D																							