This Python script reads a text file containing questions, each formatted with specific conventions, extracts the questions, options, correct answers, and solution text, processes them, and then outputs the data in JSON format.

Here's a breakdown of what each function does:

1. **convert\_latex\_to\_math(expression)**: This function converts LaTeX mathematical expressions to a format that Python can evaluate. It replaces LaTeX exponentiation (**^**) with Python's exponentiation (**\*\***), LaTeX fractions (**\frac{numerator}{denominator}**) with Python division (**/**), and LaTeX square roots (**\sqrt{expression}**) with Python's square root (**sqrt(expression)**).
2. **remove\_latex\_commands(text)**: This function removes LaTeX commands and symbols from the text. It uses regular expressions to match and remove any sequence that starts with a backslash **\** followed by alphabetic characters.
3. **extract\_questions(file\_path)**: This is the main function responsible for parsing the text file containing questions. It iterates through each line of the file, identifying question IDs, question texts, options, correct answers, and solution texts. It utilizes regular expressions and string manipulation to extract and process the information.

The script reads each line of the file, checks for specific patterns to identify different components of a question (like question text, options, answers, etc.), and stores them accordingly in a dictionary format. It then converts LaTeX expressions in the question text and options to a format Python can understand. Once a question is fully parsed, it appends it to a list of questions.

After all questions are parsed, the script converts the list of questions to JSON format using **json.dumps()**, with an indentation of 2 for readability. Finally, it writes the JSON data to an output file.