

HW3

1. Hash of the block header is:
0000000000000004e1e5f2733ca98aab7662889b2f772b98e9be754
485172ca6a
It has $14 \times 4 = 56$ bit zero and also 1 bit more comes from "4" in hexadecimal. As a result: $56 + 1 = 57$ bit zero.
2. Miner had 25.09400000 BTC as total reward. 25 BTC is the block reward whereas 0.09400000 BTC is the fee reward. There is nothing that the miner included in the coinbase transaction to work as a nonce to solve the mining puzzle.
3. There are 127 transactions in this block. There are 141 unique incoming and 164 unique outgoing addresses. 100% of the transactions are regular addresses that start with "1". P2SH and BECH32 are absent in the block. This can be considered normal since the block was mined in 2013 where Bech32 is introduced later, and also P2SH was relatively new these days. To mention huge differences between these three numbers; Regular wallets (the ones starting with "1") are widely supported and provides basic functionality and compatibility with most Bitcoin wallets and services, whereas; P2SH addresses offer advanced capabilities and they are commonly used for multisignature cases and complex spending conditions. Bech32 addresses provide SegWit benefits but may have limited compatibility although it improves size and cost efficiency for certain transactions.
4. I found 6 vanity addresses in the block. They have common startings. It is the word "dice" followed by a number. Here is all listed in ascending order by "dice + number" :

1dice1e6pdhLzzWQq7yMidf6j8eAg7pkY

1dice5wwEZT2u6ESAdUGG6MHgCpbQqZiy
1dice6DPtUMBpWgv8i4pG8HMjXv9qDJWN
1dice7fUkz5h4z2wPc1wLMPWgB5mDwKDx
1dice8EMZmqKvrGE4Qc9bUFf9PX3xaYDp
1dice97ECuByXAvqXpaYzSaQuPVvrtmz6

5. I did look into all of 127 transactions and I could not see any hidden messages. At least any meaningful messages. There were some words repeating like "G0D", or "HOE" but I could not decide if they were consciously hidden messages or just coincidence that I realize since I am searching for something to have meaning.

6. Transaction id :

4f294b16b0810bf2a41b25cce6db9a1d9b4c9836108894fa45dbb56
689d2e1da

Hidden Message:

"The greatest glory in living lies not in never falling, but in rising every time we fall." -Nelson Mandela

Hex text:

6a026d24142395f24e80d9d367a78c674a049b4d100fb9946b4c6b
2254686520677265617465737420676c6f727920696e206c697669
6e67206c696573206e6f7420696e206e657665722066616c6c696e
672c2062757420696e20726973696e672065766572792074696d6
52077652066616c6c2e22202d4e656c736f6e204d616e64656c61