

## Engineer Your Beer

1. **True** or False: Simply put, mashing is a *continuation* of the malting process.
2. True or **False**: Beta glucans are a type of protein.
3. Which of the following is *not* part of the mashing process?
  - a. starch gelatinization
  - b. starch solubilization
  - c. starch hydrolysis
  - d. All of the above
  - e. None of the above**
4. The role of yeast is well known as a significant factor for the attenuation of the final beer. What is the primary factor for attenuation?
  - a. Malt varieties
  - b. Fermentation temperature
  - c. Mash temperature**
  - d. Mash and Sparge water pH
  - e. The yeast
5. True or **False**: Gelatinization of starch is *not* necessary for full conversion because unmalted grains possess an enzyme that will readily cleave native starch.
6. You are judging a beer that has a viscous body. Which of the following is most likely responsible?
  - a. High beta glucan levels
  - b. High soluble protein Levels
  - c. High mashing temperature
  - d. A and C**
  - e. B and C
7. True/ **False**: Due to the fact that the density of ethanol is approximately .800, real attenuation is always higher than apparent attenuation.
8. You are judging a beer that seems too dry for the style. What temperature range would you suggest they mash at in order to decrease the attenuation?
  - a. 120-130F
  - b. 140-150F
  - c. 150-155F
  - d. 155-160F**
  - e. 160-170F

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9. True or **False**: The proportion of foam-active proteins to haze-active proteins can be manipulated by varying the protein rest temperatures within the range of 95-150°F (35-65°C).
10. **True** or False: Endoprotease enzymes produce soluble proteins and exopeptidases produce amino acids.
11. You are judging a pale beer with a dry, bitter (astringent) aftertaste. What should you suggest they do to improve the beer?
- Reduce the hop IBUs.
  - Add gypsum.
  - Mash at a higher temperature for less attenuation.
  - Monitor the mash and runnings pH.
  - B and D.**
12. When should a protein rest be used with well-modified malts?
- To promote clarity in high-protein worts.
  - To provide FAN in high-adjunct worts.
  - To improve lautability in high-protein worts.
  - All of the above**
  - None of the above
13. Why would one choose to do a decoction mash?
- To create melanoidins.
  - To increase extraction.
  - When using less-modified malts in recipe.
  - When using cereal grains like corn or rice in a recipe.
  - All of the above.**
14. You are judging a dark beer with an acrid, bitter aftertaste. What should you suggest they do to improve the beer?
- Reduce the hop IBUs.
  - Reduce the sparge water temperature.
  - Add gypsum.
  - Add calcium carbonate.**
  - All of the above.
15. Rank the following adjuncts for beta glucan levels from high to low (1 to 5).
- 1** Flaked Barley
  - 4** Flaked Wheat
  - 5** Flaked Corn
  - 3** Flaked Oats
  - 2** Flaked Rye