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Check your expert knowledge!

How good is your expert knowledge of beer brewing? The following questions cover a broad range of facts which a professional brewer should be familiar with. The questions are taken from the final examination which a professional brewer and maltster in Germany has to pass after an apprenticeship of three years in a brewery.

1. **It is not so much the bitter substances that go into solution when adding hops, but primarily the flavor substances. What amount of type 90 pellets is required to obtain a distinct hop aroma?**
 - a) 100–250 mg/l
 - b) 100–250 g/l
 - c) 100–250 g/hl
 - d) 50–100 g/l
 - e) 100–150 g/hl
2. **There are several disadvantages of dry hopping by adding the pellets to the bottle being filled. What are they?**
 - a) Haze in the bottled beer
 - b) No transfer of the hop oils
 - c) Microbial risk due to the pellets
 - d) Sealing the bottles is more difficult
 - e) Difficult handling of hop dosage
3. **Approved food-safe lubricants in the brewery should be able to dissolve sugars, among other things. Why?**
 - a) Otherwise sugars in the wort would caramelize on friction points and change the beer flavor
 - b) Otherwise sugar would gum up moving parts (such as sampling cocks)
 - c) Sugar would make the lubricants pasty due to its crystalline structure
 - d) Sugar and the synthetic oils would form compounds hazardous to health due to chemical reactions
4. **Pneumatic and mechanical transport systems are used in the brewery and malting. Which transport system is pneumatic?**
 - a) Downpipe
 - b) Freight lift
 - c) Belt conveyor
 - d) Tube chain conveyor
 - e) Compressed air conveying system
5. **As the main ingredient of brewing malt, carbohydrates are very important for us brewers in the production of wort and beer. One important carbohydrate in brewing malt is not digestible by the human organism. Which one?**
 - a) Glucose
 - b) Maltose
 - c) Amylose
 - d) Amylopectin
 - e) Cellulose
6. **Pitching wort should contain sufficient first sugar so fermentation begins quickly. Which of these sugars is such a first sugar?**
 - a) Glucose
 - b) Maltose
 - c) Maltotriose
 - d) Raffinose
 - e) Amylose
7. **Which alcohol is produced by brewing yeast during alcoholic fermentation?**
 - a) CH₃OH
 - b) CH₃ – CH₂OH
 - c) CH₃ – CH₂ – CH₂OH
 - d) CH₃ – CH₂ – CH₂ – CH₂OH
 - e) (CH₃)₂ – CH – CH₂OH
8. **A patent application for the first crown cork was submitted by William Painter of Baltimore, entitled 'Crown Cork'. That was in the year:**
 - a) 1838
 - b) 1871
 - c) 1892
 - d) 1906
 - e) 1914
9. **Which effect should be avoided in modern wort boiling systems?**
 - a) Saving primary energy
 - b) Reducing total evaporation
 - c) Increasing the total boiling time
 - d) Reducing the thermal exposure of the wort
 - e) Increasing the thiobarbituric acid amount (TBA)
10. **Among other things, compressed air is used in the brewery to drive valves and butterfly valves. What working pressure do these valves generally require?**
 - a) 0 bar
 - b) 1–3 bar
 - c) 5–8 bar
 - d) At least 10 bar
 - e) More than 20 bar
11. **When air is compressed, the gas volume decreases while the pressure increases. What else happens during compression?**
 - a) The temperature of the gas decreases
 - b) The temperature of the gas increases
 - c) The moisture content of the gas increases
 - d) The moisture content of the gas decreases
 - e) The air becomes inert
12. **Melanoidins are produced during curing of the malt at the latest. The coloring and aromatic substances are produced...**
 - a) from the degradation products of proteins and carbohydrates
 - b) by a Maillard reaction of cellulose
 - c) by fatty acids and monosaccharides
 - d) by the caramelization of monosaccharides
 - e) exclusively at temperatures above 100°C
13. **Cell wall, protein, and carbohydrate breakdown occurs during substance conversion in the malting. In which answer are the enzymes correctly assigned to the respective substrate?**
 - a) Cytases – cell walls; proteases – proteins; amylases – carbohydrates



The answers can be found at
www.vlb-berlin.org/en/quiz

- b) Cytases – proteins; proteases – cell walls; amylases – carbohydrates
- c) Cytases – proteins; proteases – carbohydrates; amylases – cell walls
- d) Cytases – carbohydrates; proteases – proteins; amylases – cell walls
- e) Cytases – carbohydrates; proteases – cell walls; amylases – protein

14. A hearty flavor is desirable when brewing dark beer. What proportion of mashing-in liquor to sparge liquor is advisable to accomplish this?

- a) 0.5:1.5 b) 0.7:1.3 c) 1:1
- d) 1.3:0.7 e) 1.5:0.5

15. Part of the starch in the malt consists of amylose. What is the special characteristics or peculiarity of amylose?

- a) It contains α -1.4 bonds and α -1.6 bonds
- b) It contains only α -1.6 bonds
- c) It accounts for 80% of the starch
- d) It consists of around 2000 glucose molecules
- e) It has a branched structure

16. The breakdown of starch during mashing starts with gelatinization. What happens during this process?

- a) Hydrogen bridges form between the starch chains
- b) The water that penetrates the starch chains causes the starch granules to burst
- c) The starch coagulates at temperatures over 50°C
- d) The sugar molecules that enclose the starch bind water, causing them to gel
- e) The sugars at the ends of the starch chains gel

17. Zinc is an important trace element for the brewing process and beer production. What is the effect of insufficient zinc in the beer wort?

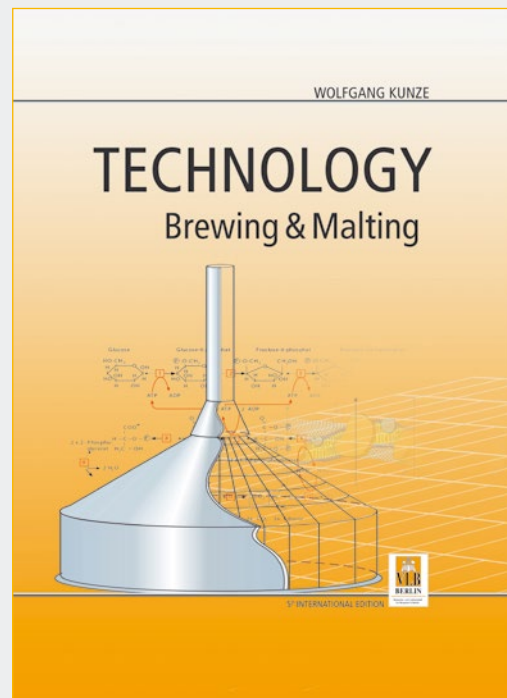
- a) The color of the finished beer is darker
- b) The ability of the beer to bind CO₂ is reduced
- c) The beer has a tendency of gushing
- d) Fermentation is more sluggish
- e) The foam stability of the finished beer is reduced

18. Gushing is a recurring problem for breweries at irregular intervals. What does gushing mean?

- a) A tendency for the finished, packaged beer to form haze
- b) Blowing off the sealed bottles through the crown cork
- c) Flocculation of protein due to cold temperatures
- d) Development of an aging flavor due to UV exposure
- e) Spontaneous foaming over of the beer when the bottle is opened

19. What can trigger primary gushing?

- a) Dark malt
- b) Low protein content of the malt
- c) Use of winter barley
- d) Microbiological infestation of the barley
- e) Excessively dry barley storage



Answers:

1. c) 100–250 g/h
2. a) Haze in the bottled beer
c) Microbial risk due to the pellet
e) Difficult handling of hop dosage
3. b) Otherwise sugar would gum up moving parts (such as sampling cocks)
e) Compressed air conveying system
4. e) Cellulose
5. a) Glucose
6. b) CH₃ – CH₂OH
7. c) 1892
8. e) Increasing the thiobarbituric acid amount (TBA)
9. c) 5–8 bar
10. b) The temperature of the gas increases
11. a) from the degradation products of proteins and carbohydrates
12. a) Cytases – cell walls; proteases – proteins; amylases – carbohydrates
13. b) 0.7:1.3
14. d) It consists of around 2,000 glucose molecules
15. b) The water that penetrates the starch chains causes the starch granules to burst
16. d) Fermentation is more sluggish
17. e) Spontaneous foaming over of the beer when the bottle is opened
18. d) Microbiological infestation of the barley