THE BJCP EXAM FOR DUMMIES

2018

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BJCP Grand Master VII

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INTRODUCTION

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The **BJCP EXAM FOR DUMMIES** has one purpose – to help you get a passing score on the BJCP Beer Online, Tasting and Written Proficiency examinations. There are better texts available if you want to learn to brew better beer, learn world beer styles, or learn how to taste and evaluate beer. The best use of this guide is to help you cram in the last weeks before the exam. It will reinforce what you've already studied.

Here are several texts recommended to help you study for the BJCP exam:

- BJCP Style Guidelines https://www.bjcp.org/docs/2015_Guidelines_Beer.pdf
- BJCP Study Guide https://www.bjcp.org/docs/BJCP_Study_Guide.pdf
- BJCP Online Exam Study Guide http://dev.bjcp.org/exam-certification/program/studying/online-beer-exam-study-guide/
- BJCP Judge Procedures Manual http://dev.bjcp.org/exam-certification/judge-procedures-manual/
- BJCP Judge Instructions https://www.bjcp.org/docs/SCP_JudgeInstructions.pdf
- BJCP Beer Score Sheet https://www.bjcp.org/docs/SCP_BeerScoreSheet.pdf
- How to Judge Beer https://www.bjcp.org/docs/How_to_Judge_Beer.pdf
- BJCP Beer Faults Trouble-shooter https://www.bjcp.org/docs/Beer_faults.pdf
- BJCP Exam Instructions https://www.bjcp.org/forms2/beer-examinee-scoresheet.pdf
- BJCP Exam Score Sheet http://www.bjcp.org/forms/Examinee_Scoresheets.pdf
- BJCP FAQ http://www.bjcp.org/bjcpfaq.php
- BJCP Members Guide http://www.bjcp.org/membergd.php
- BJCP Classic Styles Spreadsheet http://www.bjcp.org/docs/2018_ClassicStyles.xls
- Exemplary BJCP Score Sheets
  - http://www.bjcp.org/docs/examscore1.pdf
  - http://www.bjcp.org/docs/examscore2.pdf
  - http://www.bjcp.org/docs/examscore3.pdf
  - http://www.bjcp.org/docs/examscore4.pdf
  - http://www.bjcp.org/docs/examscore5.pdf
  - http://www.bjcp.org/docs/examscore6.pdf
- Horrible Scoresheet Examples: https://www.bjcp.org/horrible.php
- Homebrewing Vol. 1, by Al Korzonas
- Dave Miller's Homebrewing Guide or The Complete Handbook of Home Brewing, by Dave Miller
- How to Brew, by John Palmer (http://howtobrew.com)
- Beer Companion, by Michael Jackson
- Classic Beer Style Series, by Brewers Publications
- New Brewing Lager Beer, by Greg Noonan
- Principles of Brewing Science, by George Fix
- Designing Great Beers, by Ray Daniels
- Troubleshooting Special Issue, 1987 Zymurgy (vol. 10, no. 4)

Finally, this is NOT an official BJCP document – it is based on my experience and the experience of many other BJCP members. My thanks to you all for your dedication in helping the hundreds of Beer Judges who have taken our exam prep classes to reach their goals in the BJCP.

- Al Boyce, November 13, 2018

HOW YOUR BJCP SCORE IS DERIVED

THE BJCP BEER JUDGE ONLINE ENTRANCE EXAM

- The Beer Entrance Exam is an online 180-question, one-hour T/F, multiple choice, and multiple answer test – it is pass/fail.
- Once you pass the online Beer Entrance Exam, you are qualified to take the BJCP Beer Tasting Exam.

THE BJCP BEER TASTING EXAM

- The BJCP Beer Tasting Exam consists of judging 6 beers in 90 minutes.
- Your BJCP Rank will be initially be determined by your score on the Beer Tasting Exam – up to a maximum of Certified.
- Your Tasting score will be preserved in the BJCP Database, and should you choose to advance beyond the Certified rank, will be averaged with your BJCP Written Proficiency Exam to determine your score for rank advancement purposes.
- You may retake the BJCP Beer Tasting Exam whenever it is available to improve your score.

THE BJCP WRITTEN PROFICIENCY EXAM

- To advance beyond the Certified rank, you must take the BJCP Written Proficiency Essay Exam – it consists of 20 multiple-choice questions and 5 essay questions in a 90-minute time frame.
- To qualify to be able to take this exam, you must have at least 10 judging points, and a score of at least 80% on the BJCP Tasting Exam.
- You rank is determined by averaging the score on the Written Proficiency Exam and the Beer Tasting Exam
- 50% each from your score on the Beer Tasting Exam and the Written Proficiency Exam (i.e. - 70% on essay, 60% on taste: (70 x 0.5) + (60 x 0.5) = 35 + 30 = 65 Total Score)

Score Guidelines:

<60: Little knowledge of brewing and/or styles, and/or insufficient communication skills to be a judge. Generally has weak tasting skills.

60s: A basic grasp of fundamentals. May have some big knowledge gaps, but still knows most of the basics. Has an acceptable minimum communication and judging skills.

70s: Knows basics well enough not to have to take the test again to be called "Certified." Test can have errors and small gaps in answers. Depth in answers is not necessary.

80s: Good knowledge of all subjects. Some errors allowable, but no significant gaps. Some depth indicated. Taste and essay portions should show similar ability.

90s: Excellent knowledge level. No significant errors, and no gaps. Good depth to answers. Obviously an experienced beer taster. Shows evidence of independent thought.

IN GENERAL:

- **Bring mechanical pencils, not a pen.** Wood pencils have an aroma that will mess up your senses. Bring an extra mechanical pencil or two in case you run out of lead. Erase cleanly if you make a mistake. If you used a pen, it makes it ugly to clean up mistakes. Cross-outs are very difficult to read when grading, and you're bound to lose points for legibility. Speaking of which….

- **Bring an Eraser.** See above. Fully erase all mistakes and the graders won't get confused.

- **Bring a simple calculator.** Cell phones, iPods, iPhones, and other gizmos with "memory" will not be allowed. Just bring one that can add, subtract, multiply and divide.

- **Bring a ruler** – draw quarter to half-inch borders on all of your pages and DON'T write outside of them. Use it to neatly draw your grids also. This can be done prior to the start of the exam.

- **Bring a watch**. Again, no devices with "memory". You have 90 minutes in which to answer 20 multiple choice questions and five essay questions. 90 divided by 6 equals about 15 minutes per item. Do not allow yourself to go over fifteen minutes per item or you will run out of time.

- **Write Neatly!** Print, instead of using cursive if you can. If the graders can't read it, you're not going to get any points no matter HOW GOOD your answer is!

BJCP BEER JUDGE ONLINE ENTRANCE EXAM

Your first step in becoming a BJCP Judge is to take and pass the BJCP Beer Entrance Online Exam.

- It is a timed exam – you will have one hour in which to complete it.
- There are 180 true-false, multiple choice, and multiple answer questions.
  - 92 True/False questions.
  - 54 Multiple Choice questions.
  - 24 Multiple Answer question.
- Each exam is randomly generated – it will be new each time you take it.
- The question pool consists of many thousands of questions. They are not published publicly. A few sample questions are published in the BJCP Online Beer Exam Study Guide. HINT: Buy the 3 for $20 Exam Package, and on the first try use it just to get a feel for what the questions are like without worrying about trying to pass.
- Subjects breakdown for the exam:
  - 20 BJCP Program and Ethics questions
  - 8 Belgian and Sour Ales questions
  - 12 Brown and Dark Ales questions
  - 8 American Ales questions
  - 12 Lager beer questions
  - 4 Wheat beer questions
  - 4 IPA and Strong beer questions
  - 6 Pale Ale comparison questions
  - 6 Dark Ale comparison questions
  - 6 Lager comparison questions
  - 26 Mixed Style comparison questions
  - 36 Technical Beer Characteristics questions
  - 32 Technical Process and Ingredients questions
- The test is “Open Book”, but you only have one hour, so you wouldn’t have time to look up ALL the answers.
- There is no penalty for wrong answers – only correct answers are counted.
- The test is Pass/Fail – if you achieve a score of 64% (116 correctly answered questions,) you will Pass, and become a “Provisional BJCP Judge”, and qualify to register for a BJCP Beer Tasting Exam.
- You will find out if you Passed or Failed immediately after completing the exam.
- The exam will offer you a chance to print your Certificate of Completion if you pass. DO THIS! You will need this certificate to enter the Beer Tasting Exam.
- You must then take your Tasting Exam within one year of passing the online exam, or else you will need to retake it.

To sign up for the BJCP Beer Entrance Online Exam, go to https://beer.coursewebs.com . The cost of the test is $10, and you may take the test as often as you need to in order to pass. There is an option to purchase 3 attempts at the exam for $20, if you’d like to take the pressure off of passing the test on the first attempt.

PLEASE READ THE TEST INSTRUCTIONS CAREFULLY BEFORE YOU PURCHASE, AND BEFORE YOU TAKE YOUR EXAM.

More information about the Beer Judge Online Entrance Exam can be found at:
http://dev.bjcp.org/exam-certification/exam-program-overview/online-exam/

To prepare for this exam, you will need to study:

- The BJCP Online Beer Exam Study Guide
- https://www.bjcp.org/docs/BJCP_Study_Guide.pdf

- The BJCP Style Guidelines
  https://www.bjcp.org/docs/2015_Guidelines_Beer.pdf

- The BJCP Judge Procedures Manual
  http://dev.bjcp.org/exam-certification/judge-procedures-manual/

The answers to all of the questions in the question pool may be found in the texts listed in the INTRODUCTION page of this guide. You don't need to study ALL of them to be prepared for the Online Exam, but you should study at least one or two of them.

You will also benefit from participating in a BJCP Exam Prep Course prior to taking this exam. These are usually sponsored by local homebrew clubs, and generally are held 2-3 months in advance of a scheduled BJCP Beer Tasting Exam. A listing of upcoming BJCP Beer Tasting Exams can be found on the BJCP website at: https://www.bjcp.org/exams.php . Find an exam close to you, and get in touch with the Contact listed for that exam and ask them if they are offering a Prep Course in advance of their exam in that you may join.

Remember, like beer brewing, beer judging is supposed to be FUN! Like Charlie Papazian says, Relax, Don't Worry. Have A Home Brew!

BJCP BEER TASTING EXAM

PREPARING TO TAKE THE BJCP BEER TASTING EXAM

- To find a Tasting Exam near you, go to: https://www.bjcp.org/exams.php
- Talk to the Contact listed for that exam and request to sign up for their test.
- Follow whatever instructions the Contact gives you – they may ask you to pay in advance ($40), they may ask if you wish to participate in their BJCP Tasting Exam Prep Course.
- Show up promptly on the date and time the Contact tells you.
- The BJCP Beer Tasting Exam will take 90 minutes.
- You will be served six beers, and asked to write score sheets for them.
- Beers will be served every 15 minutes.
- Attempt to be DONE with writing the score sheet for the previous beer before the next beer is served. Because the goal is to prepare you for writing score sheets for a beer competition in a fast, thorough, and neat fashion, TIME MANAGEMENT is a BIG part of this exam!
- If you get done early, go back over ALL of your score sheets and double check that you have:
  - Written your Participant ID on each score sheet.
  - Circled the correct Exam Beer Number on each score sheet.
  - Written in the City and Date on each score sheet.
  - Written the correct Category and Subcategory Number on each score sheet.
  - Written the correct Subcategory Name on each score sheet.
  - Written a score for each subsection of each score sheet.
  - Written a correct total the scores of each score sheet.
  - Checked at least one box in the Descriptor Definition checklist for each score sheet.
  - Checked the appropriate boxes in the Stylistic Accuracy grid for each score sheet.
- Order all of your score sheets from one to six, and paper clip them together, if one has been provided.
- If this is your first time taking the BJCP Beer Tasting Exam, your BJCP initial BJCP Rank will be determined by how well you do on the Tasting Exam. If you get a score of 60-69, your Rank will be BJCP Recognized. If you get a score of 70 or above, your Rank will be BJCP Certified, once you earn five Experience (Judging) Points.

THE SCORESHEET – THE SECTIONS YOU WRITE FOR EACH BEER

The first four sections on the score sheet (Aroma, Appearance, Flavor and Mouthfeel) are objective! What do you sense? Don't write about how to improve these sensations in the first four sections. Save those for "Overall". Comment on each "key word" beneath each section of the score sheet. (Some people even make a little check mark on the key word after they've commented on it. This also telegraphs to the grader: "Look, see? I talked about this aspect of the beer!")

1. **AROMA** - ***Key Words:*** Malt, hops, esters, and other aromatics
2. **APPEARANCE** - ***Key Words:*** Color, clarity, head retention, head color, and head texture
3. **FLAVOR** - ***Key Words:*** Malt, hops, fermentation characteristics, balance, finish/aftertaste, and other flavor characteristics
4. **MOUTHFEEL** - ***Key Words:*** Body, carbonation, warmth, creaminess, astringency, and other palate sensations

The fifth section is subjective. How did you enjoy the beer? How could the brewer improve the beer, the recipe and/or the process?

5. **OVERALL** - Overall drinking pleasure associated with entry, give suggestions for Improvement.

HOW THE GRADERS GRADE THE TASTE SECTION

The graders score the TASTE section on 5 segments - each beer gets 20 points for each segment, for each beer, totaling 100 points per beer.

1. SCORE: How close did your score for the beers get to the consensus proctor scores?
2. PERCEPTION: How closely did your descriptions of the beers match those of the proctors? Did you identify the primary characteristics?
3. DESCRIPTION: Were your comments colorful and evocative?
4. FEEDBACK: Did you describe how you enjoyed the beer? Did you give 2-3 specific suggestions for improvement?
5. COMPLETENESS: Did you avoid leaving white space? Did you comment on all sub-key words under all sensory components? Did you fill out the style grid? Did you total your score accurately?

The first two segments, SCORE and PERCEPTION, are dependent on how the proctors scored and perceived the beer.

The last 3 segments, DESCRIPTION, FEEDBACK, and COMPLETENESS are all dependent on you - as long as they're all consistent to each other and all thorough, you should be able to get the maximum points independent of the proctors score sheets.

A. SCORE

(20 points total – based on absolute difference in scores for all six beers)

For SCORE, graders take the absolute difference between your score and the proctors score on each beer, total them, and then compare them to the Score matrix: i.e.

Variance from Proctors	Points/Beer	Variance from Proctors	Points/Beer
0	20	6	14
0.5-1.5	19	6.5	13
2-2.5	18	7	12
3-3.5	17	7.5-8	11
4-4.5	16	8.5-9	10
5-5.5	15	>9.5	9

NOTE: you CAN'T get any fewer than 9 points on the SCORE section, no matter HOW far off you were from the proctors' scores.

There are 20 Score points maximum per beer, for six beers, 120 points total. To figure out how many points you get for the SCORE section of your Taste Exam, add the points for all six of your beers, divide by 120, then multiply by 20. ((B1+B2+B3+B4+B5+B6) / 120) x 20 = Points for SCORE section.

Let's look at a hypothetical exam:

	Proctors' Consensus	Your Score	Absolute Difference	Score Points
Beer 1	43	38	5	15
Beer 2	33	35	2	18
Beer 3	13	15	2	18
Beer 4	27	25	2	18
Beer 5	17	13	4	16
Beer 6	38	38	0	20
			TOTAL	105

(15 + 18 + 18 + 18 + 16 + 20) = 105. (105 / 120) = 0.875. 0.875 x 20 = 17.5 SCORE points awarded to this Exam.

Scoring based on your personal history:

- Think of all the "Calibration Beers" you've ever judged.
- Do you usually judge higher or lower than everyone else?
- Do you have a fondness or dislike for some styles that consistently make you judge them either high or low? If so, score the beers normally, then knock off or add a point or two, per your calibration experiences.

Want to play the averages? (Risky.... use at your own peril!)

- It's considered poor taste to judge a beer below 13, and most people will give no higher than a 45.
- That gives you a 32 point range, not a 50 point range (45-13 = 32).
- The midpoint between 13 and 45 is 29. (32 / 2 = 16, 13 + 16 = 29) Most judges don't sway too far from this.
- IF (and I say IF) a beer on the exam is really poor, give it a 13. Done deal. (One beer in the exam set is supposed to be flawed.)
- If a beer is nearly average, give it near a 29.

Even more risky business… exam administrators are instructed to offer the following beer examples:

- As near as possible to a flawless, "Classic Example" (mid to high 40's score)
- A badly flawed beer (13-20 score)
- A middle-range beer (27-34 score)
- A beer that has a perceptible flavor or aroma component (depends on whether the characteristic is appropriate for the style or not)

If you think you recognize which beer fits which category, and if you think your exam administrator has properly followed directions, then you can set your score based on these hunches. (I told you it was risky!)

B. PERCEPTION

(120 points total - 20 points per beer)

- Did you get the same characteristics in the beer as the proctors and the rest of the examinees?
- Write what you see, hear, smell, taste, and feel.
- Write every little thing – however slight it was.
- Write what wasn't perceived as well as what was perceived, especially for the "key words." (i.e., "No hop aroma", "No astringency", etc.)
- Use as many colorful, descriptive words as you can muster. The more you write, the more likely you'll match some of the perceptions of the proctors
- Use real descriptors - i.e. "Dark Brown to Ruby" instead of "Dark", "Head pours full, gradually dissipates" instead of "Good head"
- There's an element of luck here, as you're trying to match what the proctors perceive.
- Risky Tip: If you know the proctors, recall other judging experiences you've had with them. For example, if you know that a specific judge picks up diacetyl at 0.005 parts per million, be sure to mention Diacetyl in your descriptions....

C. DESCRIPTIVE ABILITY

(120 points total – 20 points per beer)

- Talk about EACH element of the beer: Malt, Water, Yeast, and Hops (bittering, flavor and aroma) in each section where it's appropriate, as well as the balance between them.
- Don't forget: hops have three purposes: Bitterness, Flavor and Aroma - talk about each!
- It's useful to talk about the lack of a descriptor also (i.e., "No floral hop aroma" for a Bohemian pilsner would be an objective, and telling statement)
- Throw in a couple of factoids that show you understand what that world-beer style is supposed to taste like (i.e., in the Overall section, write "Try adding some Lyle's Golden Syrup to create the toffee-like character normally found in an English Bitter....), etc.
- Avoid words like "Nice", "Good", "Appropriate to Style"
- Use instead colorful, evocative language, i.e. "Tan to Brown head, thick and moussy, tiny bubbles, very slowly dissipates to a fine film on the surface"
- Don't forget to comment on sweet-bitter balance
- Use ***DESCRIPTIVE***, colorful words for sensations: color, viscosity, smell, taste, feel. NOT: "Nice", "Good" or "Appropriate to Style"
- Quantify the intensity of the flavor component, i.e. "low", "medium", or "high."

IE:

APPEARANCE: instead of "Nice Head"…
Huge, creamy tan to brown head, tiny bubbles, dissipates gradually. Lace clings to the side of glass. Garnet to Black color, almost opaque. Brilliantly clear.

AROMA: instead of "Good Aroma"…
Bready malt aroma, fruity raisin notes. Spicy hop nose lingers. Some alcohol scent.

FLAVOR: instead of "Great Flavor"…
Rich chocolate and roast malt flavor, with dark fruit overtones. Hop flavor subdued with faint citrus notes, but firm hop bitterness provides balance for huge malt bill, towards the malt side. Slightly medicinal, "Chloraseptic"-like taste very slight, in background.

MOUTHFEEL: instead of "Big Body"…
Thick, chewy body, like a loaf of rye bread in a glass. Creamy, not oily sensation going down. Alcoholic warmth spreads like a fire in my belly. Some astringency, but the sensation is probably hop-based rather than tannin-based.

OVERALL: instead of "Good beer!"… (OK, but don't stop there!)
Good Beer! Chocolate and roast malt comes through strong; base malt provides a solid framework. Hop bitterness was to balance, but the use of citrus hops (Cascades?) is inappropriate for a Russian Imperial Stout. Use English flavor and finishing hops instead. Slight medicinal flavor may indicate sanitation or rinsing issue. If using bleach, be sure to RINSE WELL!

D. FEEDBACK

(120 points total – 20 points per beer)

- Did you tell the brewer how you enjoyed their beer? (HINT: Use the score guidelines, and make sure your enjoyment word matches your score - i.e., Outstanding=45-50, Excellent=38-44, Very Good-30-37, Good=21-29, Fair=14-20, or Problematic-0-13)
- Did you give the brewer at least one specific suggestion to improve the beer? (HINT: You'd BETTER, unless you scored the beer a perfect 50!)
- The lower the score you gave, the more suggestions you should offer!
- Did you give at least 2-3 specific suggestions for improvement on each beer?
- Did you score the beer 13 or higher? (For the purposes of the test, DON'T give a beer below 13, no matter how bad it is!)
- Did you say something positive and encouraging?

E. COMPLETENESS

(120 points total – 20 points per beer)

- Did you fill out all the sections?
- Was each section jam-packed with stuff?
- Did you fill out the Style Grid?
- Did you total your score correctly?
- Did you PRINT LEGIBLY??
- Did you PRINT? (Don't use cursive!)
- Did you leave any whitespace?
- Did you comment on all key-words beneath main sections?
- Did you total your scores accurately? (Simple calculators are ok to use on the test!)

It is important that you FINISH each of the six score sheets! Since this is a timed test, it means you must complete each score sheet in about 15 minutes – roughly the amount of time you'll have to judge a beer and fill out a score sheet in a competition scenario. USE A WATCH, and when 15 minutes goes by, move on to the next beer – or the next question on your test. If you have extra time at the end of the test, you may come back to the score sheets and add more to them.

PRACTICE THIS before undertaking the test! Time yourself as you fill out ten or twelve score sheets in your preparation for the test. Keep them, and compare your first one to your last one to check your improvement.

ADVANCED TOPIC: WRITING FOR YOUR AUDIENCE – THE GRADER

It is worthwhile to take the time to consider who will be reading the score sheets that you are writing, and what they will do with them.

- BJCP Exam Graders are National or higher ranked judges in the BJCP, and they are all volunteers.
- They will typically be grading between 6-12 exams per set.
- There are six score sheets per exam.
- That means they will be grading 36 – 72 score sheets in one exam set.
- When I grade, I will spend on average 15-20 minutes per score sheet.
- That's about 12-24 hours to grade one set of exams!
- There are two graders who will initially grade your exam, a Lead Grader, and a Second Grader.
- After they finish, their results will be re-graded by an Associate Exam Director.
- After the AD finishes, their results will be re-graded by an Exam Director.
- So with four people grading your exam, at 12-24 hours each, that's 48-96 hours that will be spent on grading ONE exam set!

It's time consuming, mostly thankless work! So – let's make it EASY for the graders, and WRITE the exam the way they want to READ it!

The BJCP has published a BJCP Scoresheet guide. It's available for everyone to read, it's no secret. So if you want to write the exam the way that Graders want to READ it, it's worth studying!
http://dev.bjcp.org/exam-certification/exam-grading/bjcp-scoresheet-guide/

This Scoresheet Guide informs graders how they should go about grading a BJCP Beer Tasting Exam. More importantly for YOU, it spells out numerically how many POINTS should be assigned for each element of the Exam. If you know, in advance, how many POINTS you're going to receive for each element of your exam, then it's a simple matter of you setting out to earn all those points!

For example, here is an excerpt from the Scoresheet Guide, which details exactly how to get the maximum 20 points for COMPLETENESS for each beer. Read the Scoresheet Guide for the points awarded for Perception, Description, and Feedback.

Completeness and Communication Competencies

1. (2 points) All applicable components of the aroma listed on the scoresheet are addressed. Partial credit may be awarded.

2. (2 points) All applicable components of the appearance listed on the scoresheet are addressed. Partial credit may be awarded.

3. (2 points) All applicable components of the flavor listed on the scoresheet are addressed. Partial credit may be awarded.

4. (2 points) All applicable components of the mouthfeel listed on the scoresheet are addressed. Partial credit may be awarded.

5. (2 points) The Overall Impression section includes a comment on overall drinking pleasure associated with entry (1 point) and if the total score is less than 45, offers at least one suggestion for improvement (1 point).

6. (4 points) Efficient use of vertical space: For perfect score, fewer than two blank lines remain on the completed scoresheet (these are typically only in the Appearance or Mouthfeel sections on a Master level scoresheet). Deduct 0.5 point for every blank line beyond 2, up to a maximum of 4 points deducted. For example, 5 blank lines would be a (5-2)/2 = 1.5 point deduction.

7. (2 points) Numerical values are assigned for <u>all</u> component scores (1 point) and also for the total score (1 point).

8. (1 point) The stylistic accuracy, technical merit, and intangibles boxes are checked. There is no partial credit here.

9. (1 point) Descriptor definitions are checked when applicable (characteristics are either perceived at moderate or higher levels or are flaws in the style being judged). Partial credit may be awarded.

10. (1 point) Comments are well organized and legible.

11. (1 point) There is efficient use of horizontal space. A complete scoresheet typically has six to seven words per line with a font size and spacing that balances content and legibility. The objective here is to discourage judges from writing in an extremely large font to fill up the space on the scoresheet without conveying much information.

Based on the Scoresheet Guide, I have created a grid that I use when I am grading to track all of the points earned for each scoresheet. (See Appendix Don't get too bogged down with this. Just understand that there is a pre-selected set of criteria that Graders look for on a score sheet, and you can earn ALL of them if you pay attention to what the Grader is looking for!

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BJCP TASTING EXAM CRITERIA WORKSHEET

TOTAL TEST SCORES

Perception _____ / 20 = _____
Description _____ / 20 = _____
Feedback _____ / 20 = _____
Completeness _____ / 20 = _____

		Complete	Description	Perception	Feedback	
Aroma 4 pts	Malt Hops Esters Other Aroma.	___ /4 * 2 = /2	___ /4 * 5 = /5	___ /4 * 5 = /5	Totals Professional Score Style	/2 /1 /1 /2
Appearance 5 pts	Color Clarity Head Ret. Head Color Head Texture	___ /5 * 2 = /2	/5	/5	Technical Characteristic Assumptions Overall Sections	/2 /2 /1 /1 /2
Flavor 5 pts	Malt Hops Ferm.Flavor Balance Finish	___ /5 * 2 = /2	/5	/5	Total _____ /14 _____ *20 _____	
Mouthfeel 5 pts	Body Carbonation Warmth Creaminess Astringency	___ /5 * 2 = /2	/5	/5		
Overall 2 pts	Enjoyment Spec.Sugg.	/2	=_____	=_____		
Description Boxes	(approp.)	/1	Totals	(Component and Total Score)		
Style Grid 1 point	Stylistic Technical Intangibles	/1	Professional Score Style	(and Constructive and Polite) (Feedback is consistent with Score) (Accurate diagnosis of Style flaws)		
Vertical Space	(out of 22)	/4	Technical	(Accurate diagnosis of Technical flaws)		
Horizontal Space	6-7 words/line	/1	Chars.	(Accurate feedback w respect to perceptions)		
Scores Assigned		/1	Assump.	(No Assumptions about process/ingredients)		
Totaled Correctly		/1	Overall	(Feedback in Overall Impression section is consistent)		
Readability		/1	Sections	(Comments in A/A/F/M Sections appropriate)		
		=_____				

VERT = 4 -((___ -2) * 0.5) = _____
Fill in with number of blank lines, then do the equation.

BJCP WRITTEN PROFICIENCY EXAM

The BJCP Written Proficiency Exam may be taken by Judges trying to increase their BJCP Rank to National or above. The score of the Written exam is weighted at 50%, and is combined with the score of the Judge's Tasting exam do determine their Total Judge Score for the purposes of rank advancement. For example, if a judge has 80% on their Tasting score, and they get a 70% on their Written score, their Total score would be 75. ((80 x 0.5) + (70 x 0.5)) = 75

To qualify to take the Written, you must:

- Have at least 10 Judging Experience points.
- Be a National Judge, or have a score of at least 80 Tasting exam

20 T/F QUESTIONS, 5 ESSAY QUESTIONS (worth 50% of your total score)

- **Just before the exam: if you have time, cram on names of Commercial Examples.** It's only one point, but it's one point on two different questions. Memorize only ONE for each style. There are no bonus points for two!
- **Don't sweat the statistics.** They're NOT required on the classic examples questions, and on the recipe question, they are only ONE point.
- **Pre-label your blank pages - write the question numbers at the top left hand corner of each page for Section 2, questions 1 – 5** (Write "Q.1. Page 1 of ___". This allows you to start easily at any question you like. This page incrementor is for the PAGE only, so if you only use one page, it will read "Q.1. Page 1 of 1". You can do this, and the next two hints, before the Exam Administrator tells you to start to help you get organized. (See "Sample Lined Page for Exam" in the Appendix.)
- **Pre-label the bottom-right corner of each page, inside your margins, with "PAGE ___ of ___".** Do NOT fill in either blank at this time! Do that last, after you've organized all of your questions in the proper order. (See "Sample Lined Page for Exam" in the Appendix.)
- **At the top right corner of each page write your participant number.** It will be the last two digits of the year, the two-digit month code, the two-character State Code abbreviation, a two letter city code and an incremental participant number. For example, an exam given in New York, NY on 6/17/2015 for examinee #3 would be 1506NYNY-03. Your exam admin will assign you this number.
- **Start a new page for each question**. The Exam Admin will gladly give you more paper if you need it.
- **Spend a few seconds to underline each of the elements of each question on the test pages themselves.** This will aid you in constructing your grids, and will help you not to skip any details required by the question.
- **Try to answer each question on a single page**, but if you need more pages, don't forget to pre-label them with the characteristics listed above.
- **Don't write on the back sides of the paper.** This information may not be photocopied on the pages that are sent to the graders, and hence may not be graded.
- **Create Grids for your answers.** If there are three of a thing (styles, malt types, etc), put them across the top as column heads. Put the characteristics for those things down the side as row heads (i.e., Style Name, Aroma, Appearance, Flavor, Mouthfeel, Distinguishing Characteristics, Classic Example, Similarities, Differences)
- **Bullet answers to questions inside the grids** are not only allowed, but encouraged!

  - Shows organization in your answer
  - Allows you to answer more quickly than if you were writing lengthy descriptions
  - Can cram in more info than if writing full prose sentences
  - If you write SOMETHING in each cell of the grid, you're likely to get at least partial credit.
  - Much easier for the grader to review
  - See?
- **There are two types of questions on the BJCP Exam –"Technical" and "Style"**
- **The "Style" questions REQUIRE that you address the four objective categories from the** tasting section about EACH BEER on the question:
  - Aroma
  - Appearance
  - Flavor
  - Mouthfeel
- **Use all of the sub-section "helper words" from the BJCP score sheet** when you are describing each of these elements. For example, for APPEARANCE, comment on:
  - Color
  - Head Clarity
  - Head Color
  - Head Texture
  - Head Duration
- **Guessing – DO it!** Leaving a question blank guarantees that you'll get no points for it. You don't get negative points for guessing wrong, and you MIGHT get it right! Good things to guess:
  - Aroma: guess "grainy, sweet malty aroma, slight floral hop nose"
  - Appearance: guess "thin off-white head, small bubbles, yellow color"
  - Flavor: guess "grainy, sweet malty flavor, slight floral hop flavor"
  - Mouthfeel: guess "Medium body, moderate carbonation, mild alcohol warmth, no astringency, no creaminess"

- **READ THE EXAM COVER SHEET CAREFULLY!** Some instructions for the test are stated in the Cover Sheet of the exam, and are equally valid as if they were asked in the question itself. (Cover sheet below is from the BJCP website as of 11/13/2018).

COVER SHEET

Beer Judge Certification Program

5115 Excelsior Blvd, #326
St. Louis Park, MN 55416

www.bjcp.org

Beer Written Proficiency Exam Instructions

Answer the questions completely, but don't be verbose. The challenge is to organize your thoughts and express them well in the 90 minute time period. For a passing score, beer style descriptions must include the aroma, appearance, flavor, and mouthfeel descriptions as in the BJCP Style Guidelines. If time permits, for maximum credit, a more complete answer should consider the history of the style, geography, commercial examples, style parameters, unique ingredients, and fermentation techniques and conditions. When a question asks for a *classic* commercial example of a style the correct answer is one of the styles listed in the BJCP Style Guidelines.

- Add you exam participant number on each answer page – **do not include your name.**
- Only write on one side of the paper, back sides are not copied.
- Number all pages (1 of n, 2 of n. etc.).
- Start each question on a new sheet of paper.
- Write firmly (with dark pencil/ink) to facilitate photocopying of your exam.
- Do not write to the very edge of the page since that will make it difficult to photocopy and portions of your answer may not get to the graders.
- Please write neatly; handwriting is meant to be read, and not to be solved.
- Manage your time carefully!

Do not return this form with your examination paperwork.

SECTION 1 - BJCP/ETHICS/JUDGING PROCESS

The Process/Ethics part of Section I is not worth any points, but rather there are deductions of 0.5 points for each incorrect selection, for a maximum penalty of 10 points if all selections were wrong.

For the following 20 questions circle the "T" if the statement is true or circle the "F" if the statement is false.

….20 T/F questions will be listed here…

There are a pool of 124 T/F questions in the on pages 23-29 of the December 2017 revision of the BJCP Beer Exam Study Guide from which these questions will be drawn. Some of them may be rephrased to call for a FALSE answer instead of a TRUE answer, or vice versa – so read carefully! For example, the following question would have a TRUE answer:

T ***A competition organizer may serve as the judge director and may also serve as a judge, provided this person has no knowledge of entries and entrants.***

…but by negating the intent of the question, it would require a FALSE answer:

F ***A competition organizer may <u>not</u> serve as the judge director or as a judge, even if this person has no knowledge of entries and entrants.***

These are not "trick" questions – you just have to read them carefully. If you LEARN them (not just MEMORIZE them), you will get them all correct and not get any penalties from this section.

SECTION 2 – ESSAY PORTION

The remainder of the written portion of the exam consists of five free-form essay questions, each worth 20% of the total essay score. They will be a two ***Style*** questions, one ***Troubleshooting*** question, and one either ***Ingredients*** or ***Brewing Process*** question, based on the idea that knowledge of brewing techniques is as important to a beer judge as knowledge of beer styles

1. & 3. DESCRIBE AND DIFFERENTIATE BEER STYLES

S.0. For each of the three styles, provide a statement describing the styles

as well as the difference and similarities between them by addressing each of the following topics:

25 points	**Compare and contrast** the three styles based on their ingredients, characteristics or background information (history, fermentation or serving methods).
10 points	For each of the styles name one classic **commercial example** as listed in the 2015 BJCP Style Guidelines.
15 points	**Parameters:** Provide typical values or ranges for the original gravity (OG), IBU, ABV and color (SRM or textual description) of the three styles
50 points	**Describe** the aroma, appearance, flavor and mouthfeel of each style according to the BJCP Style Guidelines.

Three beers will be given, usually from very similar categories of beer. The potential list of beers to be compared is in the appendix of this study guide, under "**COMBINED Possible (named) Section II Beers.**" Note: The "Classic Commercial Example" MUST BE one that is listed in the BJCP Style Guidelines to get credit (also listed in the December 2017 revision of the BJCP Exam Study Guide.)

The easiest way to make sure you address all of the elements asked for in the question is to create a grid, with the characteristics down the left side, and the three styles listed across the top. The elements of the question are underlined in the question grid above. (Again, underlines are MINE – they will not be underlined on the actual exam unless YOU do it – hint, hint.) Once you create your grid (a ruler helps…), then all you have to do is "bullet" the appropriate information in each cell. DO NOT LEAVE ANY CELL BLANK! It's better for the aroma cell to guess either "malty" or "low malt" and "hoppy" or "no hop aroma" than to skip it. The grader can't give you partial credit – if you didn't try to answer the question.

Under each major section of a score sheet (Aroma, Appearance, Flavor, Mouthfeel, and Overall) will be several "key words" (i.e. under Aroma - malt, hops, esters, and other aromatics.) Try to address EACH of those key words in your bullets for maximum points. On the next page is a sample answer to this question:

STYLE	**Dry Stout**	**Strong Bitter (EPA)**	**Robust Porter**
AROMA	* Roast accentuated * Some coffee * Slight chocolate * No diacetyl * Esters low to none * Hops low to none	* Mod high to mod low hops * Med to Med high malt * Low to moderately strong caramel * Med low to Med high fruitiness * Low diacetyl OK * Slight sulfur/alcohol OK	* Roasty, "burnt" malt * Grainy, bready, toffee-like, caramel, chocolate, coffee OK * Rich, sweet * Hops low to high * Fruitiness mod to none * Diacetyl low to none

APPEARANCE	* Black to Brown * Can be opaque, else clear * Thick, creamy tan head, long lasting	* Golden to deep copper * Brilliantly clear * White/off-white head * Low head, dissipates gradually	* Med to dark brown or black * Can be opaque, else clear * Full, tan head, lingers
FLAVOR	* Moderate roast * Optional acidic sour * Med to high bitterness * Dry, coffee like finish * Bittersweet chocolate * Med low to no fruitiness * Med low to no hop flavor * No diacetyl	* Med to med-high bitterness * Even balance malt-to-hops, or slightly to bitter * Supporting malt * Moderately low to strong caramel sweetness * Moderate to moderately high hops * Hops should not dominate malt * Nutty, biscuity * Low sulfur, alcohol, mineral OK * Slight diacetyl OK	* Strong malt flavor * Burnt, black malt * Chocolate, coffee ok * Roasty dry finish * Dry to medium sweet * Med to high bitterness * Hop flavor low to moderately high * Diacetyl low to none *Fruitiness moderate to none
MOUTHFEEL	* Med light to full body * Creamy * Low to Moderate carbonation * Light astringency from roast grains * Low alcohol warmth	* Med light to med full body * Low to moderate carbonation * Slight alcohol warmth * No astringency * No creaminess	* Med to med full body * Moderately low to mod high carbonation * Slight alcohol warmth * Slight astringency from roast grains * Slight creaminess OK
DISTINGUISH	* Originally a fuller, creamier version of London Porter – no longer true * Sometimes called “Irish” Stout	* High gravity Bitter * Often bottled vs. casked * Broad style, open to interpretation	* Stronger, hoppier, roastier version of Porter * English version have subtle English hops * Malty, complex and flavorful
CLASSIC	Guinness Draught Stout	Fuller’s ESB	Anchor Porter
SIMILARITIES	* 30+ IBU levels * English Ingredients * Malt emphasis * Dark like Porter	* 30+ IBU levels * English Style, like Porter * English Ingredients * Malt emphasis	* 30+ IBU levels * English, like Bitter * English Ingredients * Malt emphasis * Dark like Stout
DIFFERENCES	* Irish Style, not English * Darker than Bitter * Least alcohol	* Lighter than Stout or Porter * Most Hop Flavor/ Aroma	* Darker than Bitter * More Chocolate than Stout * Less Roast than Stout

	* Less Chocolate than Stout * More Roast than Stout * Less Hop Flavor/ Aroma than Bitter	* More Caramel * Roast or Chocolate inappropriate	* Less Hop Flavor/ Aroma than Bitter

2. RECIPE QUESTION

T.14. Provide a complete ALL-GRAIN recipe for brewing a(n) _____,

List ingredients and their quantities, procedure, and carbonation. Give volume, as well as original and final gravities. Explain how the recipe fits the style's characteristics for aroma, flavor, appearance, mouthfeel, and other significant aspects of the style.

Please use the table below to help organize your response.

This is **NOT** the best demo for how to create a recipe. The purpose of this demo is how to get the best score on the Recipe Creation question on the BJCP Exam. First, let's look at the question:

15 pts	**Style Description:** Provide a brief description of the of the target style according to the 2015 BJCP Style Guidelines
15 pts	Provide the **target parameters** for your recipe, including starting batch size, specific gravity (OG), final specific gravity (FG), and bitterness in IBUs or HBUs, and color (SRM or a textual description).
40 pts	List the **ingredients**, explain why they are appropriate for target style, provide their quantities, and explain how the quantities were calculated.
30 pts	Discuss the complete **brewing procedure** from mashing through packaging, and give style-based reasoning to support each aspect of the process.

The recipe creation question is worth 25% of the total written part of the exam and is divided into four sections. Let's call them:

1. Description - 15 points maximum (4 items - 1.75 points each)
2. Parameters - 15 point maximum (4 items - 1.75 points each)
3. Ingredients - 40 points maximum (5 items - 8 points each)
4. Procedures - 30 points maximum (4 items – 7.5 points each)

Note: You can get up to 70 points on this question if you don't list any statistics or ingredients! (I'm not saying you shouldn't know statistics or ingredients – it's just an interesting point.)

When you read the question, take a minute to underline all of the items the question is asking for. Before answering the question, if you take a moment to organize the task by making a form (like the form on Section 2 – Number 2 in the appendix), then your work is cut out for you. Just fill in the blanks. Just WHAT to put in the blanks is another story…. In this discussion I will number each item by the number it is given in the form in the appendix.

One more thing which will prove useful - here's a table of the beers that may be used in this question. I have "dumbed it down" by looking for average common statistics amongst the styles. The exceptions have been shaded.

STYLE	OG	FG	IBU	SRM/COLOR
Double IPA	**1075**	1010	60	6
American IPA	**1075**	1010	40	6
Belgian Tripel	**1075**	1010	**25**	6
Doppelbock	**1075**	**1016**	**25**	6
Festbier	1055	1010	25	6
Czech Premium Pale Lager	1050	**1016**	40	6

Märzen	1050	**1016**	**25**	**7**
American Porter	1050	**1016**	40	**25**
Irish Stout	1050	1010	40	**25**
German Pils	1050	1010	40	**5**
Strong Bitter	1050	1010	40	**8**
Weissbier	1050	1010	**10**	6

1. **OG** – Original Gravity. 1.050 is OK for most beers that are commonly used for this question (not the IPAs, Tripel or Doppelbock – they are 1075.) These are defined by the style; they just have to be memorized. Just write down 1050 or 1075!

2. **FG** – Final Gravity. 1.010 is OK for most beers, except for Bohemian Pilsner, Doppelbock, Robust Porter and Oktoberfest – use 1.016 for them. (Think: "sweeter beers")

CALCULATING FINAL GRAVITY:
NOTE: *You don't need to know the stuff in this box for the test. This is just to explain why we're using 1010 and 1016*

Final gravity is determined by several things, but key amongst them is yeast attenuation. This means how much of the sugar in the beer will the yeast consume, and they differ a bit from one variety of yeast to another. The average attenuation rate of most yeast, however, is 75%. If you have a starting gravity of 1.050 (really, 1.050 – just think "50") and take 75% of that

50 x .75 = 37.5

50 – 37.5 = 12.5 is the gravity of what remains. 1.0125 is your final gravity

1.010 is the low end of the scale by the guidelines, and it happens to be the number that is common to most of these styles, and is easier to remember.

3. **IBUs** – "International Bittering Units" - shorthand for "How bitter do you want your beer?" 40 IBUs will work for most of the commonly tested beers. The Tripel, Doppelbock, and Oktoberfest need 25 IBUs, the Weissbier only needs 10. IBUs, like Original Gravity, is a characteristic of the style, and must just be memorized.

4. **SRM** – "Standard Reference Method" - shorthand for "Color".
   5 SRM will work for German Pils ("Pale Straw".)
   6 SRM will work for most of the commonly tested beers. (Think "Pale Gold".)
   7 SRM will work for Marzen (Think "Yellow".)
   25 SRM will work for Irish Stout and American Porter (Think "Dark Brown".)
   Why not 6 for German Pilsner, Strong Bitter and Marzen? That would be just too easy then, wouldn't it?

5. **BATCH SIZE** – 5 Gallons. You could pick any number you want for this, as long as you list something. But 5 gallons makes the rest of this demo work – so USE FIVE GALLONS!

6. **GRIST** – first. Start with EFFICIENCY – an easy one – always 75%. Why?
   Because you're going to use 10 pounds of grain (except for the IPA, the Double IPA, the Tripel, and the Doppelbock – those use 15 lbs.) Why 10 lbs? Because….

CALCULATING ORIGINAL GRAVITY:
NOTE: *You don't need to know the stuff in this box for the test. This is just to explain why we're using an efficiency of 75% and 10 lbs of grain.*

There is a fancy formula for figuring out your potential original gravity. It relies on your knowing the extraction rates for different types of grain. Sugar itself yields 46 gravity points. Base malt yields 33. There are others, but that's going to be close enough for our purposes.

- 10 pounds of grain times 33 points per pound equals 330 points.
- We divide 330 points by the total gallons (5, remember?)
- 330 / 5 = 66 (or an original gravity of 1.066).
- But 66 is our MAXIMUM potential. We're only getting 75% efficiency, remember?
- 75% x 66 = 49.5… round up to 50 – or an OG of 1050.

THAT'S why we always say 75% efficiency!

- Keep the actual grain bill VERY simple!
- Forget "special ingredients" for the purposes of the test.
- Use malts from the country of origin of the beer.
- If you don't know malts from that country, remember most beers will start with "pale malt".

Here are the grain bills for the most commonly tested styles.

STYLE	**GRIST**
Double IPA	2-Row 90%, Cara-Pils 3%, Crystal 40L 3%, Sugar 4%
American IPA	2-Row 80%, Crystal 20L 15%, Crystal 60L 5%
Belgian Tripel	Pilsner Malt 80%, White Sugar 20%
Doppelbock	Munich 75%, Vienna 25%
Festbier	Pils 65%, Vienna 35%
Czech Premium Pale Lager	100% Moravian Pilsner
Marzen	Vienna 50%, Pils 40%, Munich 5%, Crystal 15L 5%
American Porter	English Pale Ale Malt 80%, Crystal 80L 10%, Choc 5%, Black Patent 5%
Irish Stout	Maris Otter 65%, Roast Unmalted Barley 8%, Flaked Unmalted Barley 20%, Black 7%
German Pils	Pilsner 100%
Weissbier	Wheat 70%, Pilsner 30%
Strong Bitter	English Pale Ale Malt 90%, Crystal 20L 5%, Crystal 40L 5%

Now, just multiply the percentage listed by 10 lbs (we always use ten pounds, remember, except for 15 lbs for IPAs, Tripels and Doppelbocks) and you have your quantity!

7. HOPS

- Always 5% Alpha Acid (AA), regardless of what hops you choose (see box below)
- Stick to Bittering, Flavor, and Aroma additions for the purposes of the test
- Ignore Mash hop, First Wort Hop and Dry hop techniques for the purposes of the test
- Mention "Assumed Utilization Rates" - 25% Bittering, 5% Flavor, 0% Aroma

IN GENERAL

TYPE:

Use hops from the country of origin for the beer:

COUNTRY OF ORIGIN	HOP VARIETIES
England	UK hops (East Kent Goldings, Fuggles)
Germany	Noble Hops (Hallertauer, Spalt, Tettnanger)
Czechoslovakia	Saaz
USA	Pacific Northwest "C" Hops (Centennial, Chinook, Cascade)
Belgium	Styrian Goldings

HOW MUCH:

Use 2 oz BITTERING hops for 40 IBUs
Use 1 oz BITTERING hops for 25 IBUs
Use 0.5 oz BITTERING hops for 10 IBUs

Use one-half to one ounce of flavor and/or aroma hops – if a beer is supposed to have hop flavor or aroma. They're FREE (Utilization-wise)!

CALCULATING HOP AMOUNTS:

NOTE: *You don't need to know the stuff in this box for the test. This is just to explain why we're using a utilization of 25% and AA% of 5%*

There is a fancy formula for figuring out the weight of your hops. It relies on your knowing your target IBUs:

- For beers commonly tested, usually 40, sometimes 25, rarely 10)
- The volume of your beer (always 5)
- Your alpha acid (always 5%)
- Your utilization (bittering always 25% - since flavor is only 5% and aroma is 0%, we're not going to bother with them.)

The formula is:

Weight= IBU * V(Gallons) / (AA% * 7490 * Utilization)

Why 7490? Because this formula was originally figured out in all METRIC units, and 7490 covers the conversion. Skip that unless you're going for the MASTER score!

So to figure out how much BITTERING hops to use for 40 IBUs:

40 IBUs x 5 Gallons / (.05 AA% x 7490 x .25 Utilization)
200 / 93.626
2.13 oz (round down to 2 oz. for memorization sake)

Based on these GENERALITIES, here are some potential hop bills for the commonly tested styles:

STYLE	BITTERING HOPS	FLAVOR HOPS	AROMA HOPS
Double IPA	4 oz Columbus	2 oz Simcoe	2 oz Centennial
American IPA	2 oz Centennial	1 oz Cascade	1 oz Cascade
Belgian Tripel	1 oz Styrian Goldings	1 oz Styrian Goldings	
Doppelbock	1 oz Hallertauer	0.5 oz Tettnanger	
Festbier	1 oz Hallertauer		0.5 oz Hallertauer
Czech Premium Pale Lager	2 oz Saaz	1 oz Saaz	
Marzen	1 oz Hallertauer	1 oz Hallertauer	
American Porter	2 oz Fuggles	0.5 oz Fuggles	
Irish Stout	2 oz East Kent Goldings	1 oz Fuggles	1 oz Fuggles
German Pils	2 oz Hallertauer	1 oz Hallertauer	1 oz Hallertauer
Weissbier	0.5 oz Hallertauer		
Strong Bitter	2 oz Fuggles		1 oz Fuggles

8. **WATER** – Always:
   9 total gallons of water
   3.5 gallons of strike water at 163F for a mash temperature of 150F
   5.5 gallons of sparge water at 168F, acidified with 1 tsp phosphoric acid.
   …**UNLESS**, you're doing an IPA, Tripel or Doppelbock. Then use 1.5 times these amounts

   Why?....

CALCULATING WATER VOLUMES AND TEMPERATURES:
NOTE: *You don't need to know the stuff in this box for the test. This is just to explain how we're getting the water volumes and temperatures.*

VOLUMES OF WATER:
There is a fancy formula for figuring out how much water you need for mashing and sparging. It relies on your knowing:
- The amount of grain you'll be mashing (always 10 lbs)
- The target volume of your batch (always 5 gallons)

THE FORMULA FOR MASH WATER VOLUME:

Volume= Weight x 1.25 quarts

THE FORMULA FOR TOTAL WATER VOLUME NEEDED:
- (BatchVolume plus TrubVolume)
- divided by
- 1 minus (WortShrinkagePct divided by 100
- divided by
- (1 minus (BoilTime times (BoiloffPct divided by100)))
- plus
- EquipmentLossVol
- plus (GrainVolume times AbsorptionRate)

You'll have to trust me on these numbers:

BatchVolume = 5
TrubVolume = .5
WortShrinkagePct = 4
Boil Time = 1
BoilOffPct = 10
EquipmentLossVol = 1
GrainVolume = 10
AbsorbtionRate = .13

Thanks to Brew365 for this formula! http://www.brew365.com/mash_sparge_water_calculator.php

FORMULA FOR SPARGE WATER VOLUME:

Volume= Total Water needed – Mash Water

TEMPERATURES OF WATER:

There are two temperature ranges where a single infusion mash can convert starches in the grain to sugars: the Beta Amylase range (130-150F), and the Alpha Amylase range (149-158F). Mashing in the Beta Amylase range will convert more of the starches to sugar, and will produce thinner beers with more alcohol (use the mnemonic M.A.L.T. – More Alcohol, Lower Temperature.) Mashing in the higher, Alpha Amylase range will convert less of the starches to sugar, yielding sweeter beers with a thicker body. We chose 150F for our mash temperature because it's at the point where the beta and alpha amylase temperature ranges overlap.

STRIKE TEMPERATURE FORMULA

The formula for determining the "strike temperature" of water for a specified target temperature is as follows:

Tw = (0.2 ÷ R) X (T2 – T1) + T2

Tw = the actual temperature of the infusion water (what we're solving for…)
R = the ratio of water to grain in quarts per pound (1.25)
T1 = the initial temperature of the mash (or dry grain) (70F – room temperature)
T2 = the target temperature of the mash (153F)

Using our weights and volumes, we get:

Tw = (0.2 ÷ 1.25) x (150 – 70) + 153F
Tw = (0.16) x (80) + 150F
Tw = 12.8 + 150F
Tw = 162.8F (rounded to 163F)

There is another formula for figuring out what temperature of water to ADD to a mash to get to the next temperature rest, but fortunately we're only doing a SINGLE INFUSION mash, so we don't need to know that….

What? You want to know it ANYWAY? (sigh…) OK, here it is…

INFUSION TEMPERATURE FORMULA:

Wa = (T2 – T1) X (0.2 x G + Wm) ÷ (Tw – T2)

We need a few new variables, in addition to the ones above

Wa = the amount of boiling water added in quarts (what we're solving for)
Wm = the total amount of water in the mash in quarts (1.25 qts/lb x 10 lbs grain)
G = the amount of grain in the mash in pounds (10)

Let's say we want to have a MASH-OUT for our single-infusion mash at 168F (mash-outs are not necessary, and you won't lose points for not describing them.). 168F is the highest temperature you can use without the risk of extracting tannins. We need to figure out how much boiling water to add to get the mash temperature to 168F. Our formula is:

Wa = (T2 – T1)	X (0.2 x G + Wm)	÷ (Tw – T2)
Wa = (168 – 150)	X (0.2 x 10 + (1.25 x 10))	÷ (212 – 168)
Wa = 18	X (2 + 12.5)	÷ (44)
Wa = (18 X 14.5)		÷ (44)
Wa = 261		÷ 44
Wa = 5.93 quarts		

9. YEAST

Remember three things:
- Ale or Lager,
- Country of origin
- "Create a 1 quart starter"

If you can't think of a specific yeast name, just say [Country] [Type]… i.e. "German Lager". This question should be a gimme - every yeast will get the job done! :-D

STYLE	BEER TYPE	COUNTRY	YEAST
Double IPA	Ale	USA	American Ale
American IPA	Ale	America	American Ale
Belgian Tripel	Ale	Belgium	Trappist High Gravity
Doppelbock	Lager	Germany	Bavarian Lager
Festbier	Lager	Germany	Bavarian Lager
Czech Premium Pale Lager	Lager	Czechoslovakia	Budjevoice Lager
Marzen	Lager	Germany	Munich Lager
American Porter	Ale	America	American Ale
Irish Stout	Ale	Ireland	Irish Ale
German Pils	Lager	Germany	German Lager
Weissbier	Ale	Germany	Weihenstephan Ale
Strong Bitter	Ale	England	London Ale

10. MASH

Techniques:	Single Infusion	
(Choose one)	Multi-Step	
	Decoction	
	Double Mash (also called a Cereal Mash)	
Rests:	Acid Rest	(95-120F – 60-120 minutes)
	Protein Rest	(122F – 20 min)
	Beta Amylase Saccharification Rest	(130-150F – 30 min)
	Alpha Amylase Saccharification Rest	(149-158F)
	Mash-Out	(168F 15 min)

Vorlauf (recirculate.): 30 minutes

Sparge/Lauter: 168F, 5.5 gallons, 45 minutes

BIG HINT: ALL of these styles can be made with a Single-Infusion mash! But to get all the points, you need to say:

"The CLASSIC mash style used for this beer would be the ____ mash technique, but due to the highly modified malts available today, I'll use the Single Infusion mash." *(**NOTE**: There are some styles such as Doppelbock where a decoction mash can significantly enhance the flavor and aroma profile, and some graders may not award all possible points without a description of the decoction.)*

If you DO decide to use one of the other mash types, be SURE to detail all the steps!

STYLE	CLASSIC MASH TYPE
Double IPA	Multi-Step
American IPA	Multi-Step
Belgian Tripel	Multi-Step
Doppelbock	Decoction
Festbier	Decoction
Czech Premium Pale Lager	Decoction
Marzen	Decoction
American Porter	Single Infusion
Irish Stout	Single Infusion
German Pils	Decoction
Weissbier	Decoction
Strong Bitter	Multi-Step

11. BOIL/CHILL

Boil: ALWAYS: "75 minutes, full rolling boil to facilitate hot break, adding hops according to schedule above.
Finings: Irish Moss, added at 5 minutes before the end of the boil.
Chill: Counter-flow method, to facilitate cold break, to 70F prior to pitching yeast (cooler temperatures for lagers.)"

EXCEPT FOR: Weizen – state "NO FININGS due to desired cloudiness in finished beer."

12. FERMENTATION: Ales or Lagers (see yeast chart above)

Ales:
Primary: 68F for 7 days
Secondary: 68F for 21 days

Lagers:
Primary: 55F for 14 days
Diacetyl Rest: 65F for 2 days
Secondary: 32F for 60 days

13. PACKAGING

Always: Bottle condition: ¾ cup of corn sugar at bottling.
(Using kegging requires knowing the pressures of the various beers – you already have enough to remember!)

For the next four points, read and use the "helper words" from the beer score sheet. (They are on the "Classic Example" score sheet for Question #9.) Say something on each of these attributes. If it DOESN'T have that characteristic – SAY SO! (i.e. – "No alcohol warmth.")

14. AROMA

Comment on malt aroma, hop aroma, esters, and other aromatics

15. APPEARANCE

Comment on color, clarity, and head retention, head color, and head texture

16. FLAVOR

Comment on malt flavor, malt sweetness or dryness, hop flavor, hop bitterness, fermentation Characteristics (esters/phenols), balance between sweetness and hop bitterness, finish/aftertaste, and other flavor characteristics

17. MOUTHFEEL

Comment on body, carbonation, alcohol warmth, creaminess, astringency, and other palate sensations

18. HOW INGREDIENTS/PROCEDURES IMPACT THE STYLE?

Easy way: "The malt, hops, and yeast used in this recipe work together to produce the aroma, appearance, flavor and mouthfeel representative of a _____ style." If you've got LOTS of time at the END of the test, come back to this part and elaborate more, if you know it.

See the appendix for a sample "grid" with which to answer this question.

4. TROUBLESHOOTING

T.1. Describe and discuss the following beer characteristics

a) characteristic-1, b) characteristic-2, and c) characteristic-3. What causes them and how are they avoided and controlled? Are they ever appropriate, and if so, in what beer styles? Address the following topics:

30 points	Describe each characteristic and how it is perceived.
40 points	Identify the causes and controls for each characteristic.
30 points	Identify styles in which each characteristic is appropriate and inappropriate

Start by building a grid like this that takes up the entire page. Fill in the characteristics you're describing in place of #1, #2, and #3:

	Characteristic #1	**Characteristic #2**	**Characteristic #3**
Describe			
How caused? Avoided/Controlled?			
Ever Appropriate? If so, which styles?			

The grid below has been turned the other way, in order to more easily cover all the troubleshooting categories:

Characteristic	**Describe**	**Ever Appropriate? If so, which styles?**	**How is it caused?**	**How can it be avoided/controlled?**
Acetaldehyde	* Green apples * Grassy	Yes, Light American Lagers	* Premature removal from yeast * Bacterial Spoilage, * Oxidation	* Allow ferment to complete, * Practice good sanitation and beer handling to avoid O2 contact
Alcoholic	* Spicy * Vinous * Prickly mouthfeel * Fusels	Yes, Strong Ales and Lagers	* High amt of fermentables * Under pitching * Low O2 or FAN	* Pitch sufficient yeast quantity * Aerate wort pre-pitching
Astringency	* Mouth-puckering * Flavor * Mouthfeel	Yes, Flanders Red	* Extraction of tannins – over crushing, oversparging * alkaline water * Lengthy hop immersion times * Polyphenols from acetobacter	* Don't over crush * Keep sparge temp low * Use acidified water in sparge, * Reduce hop immersion time * Practice good sanitation * Reduce spice additions

			* Oxidation * Spices	
Bitterness	* Mouth-puckering * Bitter * Aroma * Flavor * Mouthfeel	Yes, * IPAs * Pale Ales * English Bitters	* High AAU hops * Lengthy hop boil times	* Use hops with lower alpha acids * Reduce hop boil times
Buttery	* Butterscotch * Diacetyl * Aroma * Flavor * Mouthfeel	Yes, * Scotch Ales * Bitters * Czech Pils * Northern English Brown	**Diacetyl:** * Premature racking * Low ferment temps * Mutant yeast * Lactic acid bacteria	* Reduced by yeast - allow complete fermentation * Properly aerate wort prior to pitching * Do a diacetyl rest (2 days at the end of primary @ 65 F) * Use healthy pure yeast, * Practice good sanitation
Cardboard	* Papery * Stale * Flavor * Aroma	No, N/A	* Aeration of hot wort * Exposure of higher alcohols in finished beer to oxygen * Old beer	* Avoid splashing hot wort * Carefully package beer to avoid oxygen contact * Serve beer in an appropriate amount of time
Cloudiness	* Cloudy * Appearance	Yes, * Wheat Beers * Lambic * American Wheat	**Chill Haze:** Insufficient conversion time **Permanent Haze:** High Sparge temps **Bacterial Haze**: Poor Sanitation **Powdery yeast**	* Longer mash * Use Protein rest * Use finings * Use filtration * Reduce Sparge Temps * Practice better sanitation * Choose a less powdery yeast
Cooked Corn	* DMS (dimethyl sulfide) * Vegetal * Aroma * Flavor * Precursor (dimethyl sulfoxide) occur naturally in malt, turned into DMS with heat, evaporates	Yes, * American lagers * Cream ales	* Covered boil * Zymomonas bacteria * High level of adjuncts	* Use uncovered full-rolling boil * Practice good sanitation * Reduce adjuncts in mash

Fruitiness	Esters: * Strawberries * Plums * Apricots etc. * Flavor * Aroma	Yes, * American Pale Ale * Kolsch	* Alcohols combining with acids at higher ferment temps (Ethyl acetate, Isoamyl acetate, Ethyl Hexanoate)	* Reduce fermentation temperatures * Choose a different yeast strain
Light Body	* Watery * Weak * Mouthfeel	Yes, * American Light Lagers * Lambics	* Lack of dextrins * Poor quality malt * Large pct. of sugar * Over-long protein rest * Low mash temperature	* Use quality malt * Keep percentage of sugar small * Reduce length of protein rest * Use dextrin or wheat malt, flaked wheat * Raise mash temperature
Low Head Retention	* Flat * Appearance * Mouthfeel	Yes, * Lambics * High Alcohol Beers	* Insufficient proteins in beer causes high surface tension * Dirty/oily glasses * Low protein grist	* Shorten protein rest * Use clean well-rinsed glasses * Use flaked wheat or barley * Lower alcohol by lowering grist bill * Use hops with high isoalpha acids
Phenolic	* Band-aid * Medicinal * Clove-like * Plastic * Smoky * Peppery * Aroma * Flavor	Yes, * Some Belgian Ales * Smoke beers * Some Wheat beers	* Wild yeasts * Improper sanitation * Some malt types * Some yeast types	* Use pure yeast strains * Practice good sanitation * Use “clean” malt * Use yeast less prone to phenol production
Sherry-like	* Sherry * Vinous * Wine-like * Paper like * Old	Yes, * Barleywines * English Old Ales	* Oxidative yeasts acting on higher alcohol beers creates aldehydes (i.e. 2-trans-nonenal)	* Use a different yeast strain * Create less alcohol by lowering grist bill * Serve beer younger * Ferment cooler
Sourness	* Tart * Sour * Aroma * Flavor * Mouthfeel	Yes * Lambics * Flanders Ale * Berliner Weisse	* Lactic Acid (from lactic acid bacteria) * Acetobacter (from Acetic acid)	* Practice proper sanitation * Don’t employ over-lengthy mash or low temp mash

T.3. What are body and mouthfeel?

Explain how the brewer controls body and mouthfeel in his/her beer, addressing the following topics:

40 points	Define body, describe how is it perceived, discuss how the brewer controls the body of the beer, and provide examples of styles in which is is desirable to have a light or full body.
45 points	List three aspects of Mouthfeel (excluding Body), describe how they are perceived, and discuss how the brewer can control these characteristics.
15 points	Provide examples of styles in which each of these three Mouthfeel characteristics is appropriate

	What is it?	**How to control?**	**Style Examples**
BODY	* **Body** is a sub-characteristic of Mouthfeel	(See below)	(See below)
MOUTHFEEL	* **Mouthfeel** is the tactile character of beer, how it "feels" in your mouth. It has five sub-components: Body, Alcohol Warmth, Creaminess, Astringency and Carbonation.	***** Primarily controlled by the amount of dextrins and medium length proteins in the finished beer.	(See below)
	* **Body** is the viscosity of a beer. On a viscosity scale of water to molasses, water is a "thin" body, and molasses would be a "thick" body.	* Increasing unfermented dextrins will give the perception of a "bigger, thicker" body – use more grist, mash hotter (153 F) * Reducing unfermented dextrins will give the perception of a "smaller, thinner" body – use less grist, mash cooler (148F)	* Barleywine should have a big body * American Light lager should have a low body
	* **Alcohol warmth** is the sensation of warmth or burning you feel as the beer goes down your throat. Whiskey would be at the high end of alcohol warmth.	* Reduce fermentables, ferment cooler to reduce alcohol warmth and fusels * Increase fermentables, ferment warmer to increase alcohol warmth and fusels * Choose yeast for alcohol tolerance desired	* Eisbeer should have high alcohol warmth * English Dark Mild should have low alcohol warmth
	* **Creaminess** is the sensation of "smoothness" or "roundness" in a beer. It is the opposite of "Crispness."	* A percentage of Oats in the grist can cause a creamy sensation. * Use nitrogen to "carbonate" * Use lactose to increase perception	* Oatmeal Stout should have high creaminess * Lambic should have low creaminess

	* **Astringency** is the puckery sensation you get from a beer.	* Primarily caused by tannins (sometimes mistakenly attributed to hop bitterness) * Can also be caused by a high percentage of roast or dark malt in the grist * Can also be cause by lingering hop bitterness * Reduce tannins by: - Keeping sparge under 168F - Ending sparge when gravity of runoff reaches 1004	* American IPA may have a higher astringency due to lingering hop bitterness * Astringency is usually considered a fault
	* **Carbonation** is the sparkling sensation you feel in your mouth, or in extreme cases, in your nose. Champagne or Seven-Up soda would be at the high end of carbonation.	* To increase bottle carbonation, add more priming sugar and/or a small amount of fresh yeast at bottling. * To increase carbonation in kegging, increase the CO2 pressure. * Unwanted high carbonation can be decreased by completely fermenting the beer prior to packaging.	* Berliner Weiss should have high carbonation * Old Ale may have low carbonation due to high alcohol level and age

5. INGREDIENTS

T.4. Discuss hops, and their role in determining beer flavor and aroma.

Your answer should address Discuss how the hop characteristics are extractedthe following topics:

30 points	Describe hop characteristics and their impact on beer flavor and aroma.
30 points	Discuss how the hop characteristics are extracted.
40 points	Discuss how the hop characteristics are extracted

Discuss hops:

1. Active ingredient: Lupulin, gland of the female plant of Humulus Lupus
2. Oils and Resins: Resins contain Alpha and Beta acids, Oils contain aromatics
3. Humulone and Cohumulone
4. Alpha and Beta acids – Alpha cause the bittering to occur in beer, Beta do not isomerize, but contribute to aroma
5. Isomerization – Through boiling, changing the structure of the molecules in hop alpha and beta acids so as to make them water soluble.
6. IBUs/Formula: $IBU = \frac{7490 \times Weight(oz) \times AA\% \times U}{V(gallons)}$

Hop Characteristics	**How these characteristics are extracted**
Antibacterial/Preservative	Boiling hops in wort.
Bitterness	Boiled for 60 minutes or longer from the end of the boil. Hop utilization is about 25% in this phase.
Flavor	Boiled for 40-25 minutes from the end of the boil. Hop utilization is about 10% in this phase.
Aroma	Boiled for 15 minutes or less from the end of the boil. May also be steeped by throwing them in after flame-out. Hop utilization is 5% or less in this phase.
Aroma	Dry Hopping. Added to the secondary fermenter for aroma only.

Identify at least four distinct beer styles with which different varieties of hops are associated:

Hop Variety	**Country**	**Characteristics**	**Associated Style**
Hallertauer, Tettnanger, Spalt	Germany	Noble hops. Low in bitterness, high on aroma, spicy, floral	German Pilsner, Bocks, Alts
East Kent Goldings, Fuggles	England	English hops: Good for bittering, flavor and aroma, earthy, tobacco	English Pale Ale, Porter
Saaz	Czech Republic	Floral, mild, sweet	Bohemian Pilsner
Cascade, Centennial, Columbus, Amarillo	America (Pacific Northwest)	Citrusy, grapefruity	American IPA, American Pale Ale
Northern Brewer	Europe, America	Rustic, Woody	California Common
Styrian Goldings	Austria and Slovenia	Spicy	Witbier, Belg. Pale Ale

T.8. Discuss the importance of water characteristics in the brewing process

Your answer should address the following topics:

20 points	Discuss two characteristics of water that are important for the brewing process
20 points	Summarize two methods brewers use to adjust and control the pH of their brewing water.
60 points	Discuss how the mineral content of the water played a role in the development of four world beer styles.

In my opinion, this is one of the more difficult questions that can be on the BJCP exam. Water is obviously a VERY important part of brewing, and books have been written about it. The example below is one way of answering this question that SHOULD get you a fairly decent score.

WATER TREATMENT METHODS

METHOD	IMPORTANCE
Boiling	* Removes chlorine, kills bacteria
Charcoal Filtration	* Removes chloramines
Reverse Osmosis	* 100% r/o not recommended – strips out needed minerals
Minerals	Essential for healthy fermentation * Iron * Manganese * Copper * Zinc
Salts	Commonly used: Gypsum, ($CaSO_4$), Calcium Carbonate ($CaCO_3$), Magnesium Sulfate ($MgSO_4$) Cations * Calcium – 10-20ppm needed for yeast nutrition * Sodium – Accentuates sweetness at low levels Anions * Bicarbonate – Neutralizes acids in dark malt * Chloride – Accentuates sweetness at low levels * Sulfate – Accentuates hop bitterness
Acids	Used to reduce alkalinity (if necessary) * Lactic acid * Sulfuric acid

pH (Power of Hydrogen):

WATER TYPE	pH
Pure Water	7.0
Acidic	0 – 6 pH
Alkaline	8-14 pH
Proper mashing level	5.2 – 5.7 pH

BEER STYLES (choose at least 4)

City	Beer Style	How mineral content played a role
Plzen	Bohemian Pilsner	Soft, low mineral content across the board, tends to decrease the perception of hop bitterness. The most ion-free brewing water in the

		world. Decoction mashing needed due to lack of minerals to aid enzymatic reactions.
Dortmund	Dortmunder Export	High sulfates accentuate hop bitterness. Tastes "minerally".
Munich	Oktoberfest	High alkaline and carbonate water balances acidifying effect of dark malts.
Munich	Dunkel	High in carbonates, Carbonates increase color extraction during sparging which makes production of light colored worts difficult, hence the development of Munich Dunkel. Waters high in carbonate tend to be alkaline and make a shift to a more acidic pH, favorable for mash conditions, difficult. Additions of small amounts of dark roast malts help shift the pH to more acidic conditions. This again favors the Dunkel style.
Vienna	Vienna Lager	Hard, carbonate-rich water extracts the color from Vienna malt.
Burton	English Pale Ales	Extremely hard water - CaSO4 (Calcium Sulfate) & HCO3-(Hydrocarbonate), accentuates bitterness, gives drier and fuller flavor, and emphasizes hop bitterness.
Dublin	Dry Stout	High in Ca++(Calcium) & HCO3-(Hydrocarbonate), similar to Munich but slightly higher in mineral content across the board. Waters high in carbonate tend to be alkaline and make a shift to a more acidic pH, favorable for mash conditions, difficult. Additions of small amounts of dark roast malts help shift the pH to more acidic conditions.
Edinburgh	Scottish Ales	Local water often lends a "smoky" character when combined with yeast and lower fermentation temperatures.
London	Porter	High alkaline and carbonate water balances acidifying effect of dark malts. Very similar to Dublin.

T.15. Discuss the role of malt and yeast in determining beer characteristics.

Your answer should address the following topics:

45 points	Identify and describe different types of malts by their colors and the flavors they impart to the beer
20 points	List four distinct beer styles with which specific malts are associated
35 points	List five distinct yeast strain selection considerations and describe their impact on the finished beer

A. Identify and describe the different types of malts by their color and the flavor they impart to the beer. Give at least four distinct styles with which specific malts are associated.

Identify	Describe	Color	Flavor	Styles
Base Malts	• 2 and 6 row barley • Fully modified • Kilned at 130-180F	• Straw • Gold • Yellow	• Bread crumbs • Crackers	• Pale Ales • Pilsner • Tripel
Toasted Malts	• Victory, Vienna, Munich	• Amber • Copper • Red	• Biscuit • Toasted Breadcrumb • Baking Bread	• California Common • N.German Alt
Crystal Malts	• Various Lovibond-rated Crystal and Caramel • Fully modified • Heated at 50% moisture content to 150-170F • Mashes starches inside husk • Kilned to desired color	• Amber • Copper • Red	• Caramel • Toffee • Cookies	• Dark American Lager • American Amber
Roast Malts	• Chocolate, Black, Roast • Under modified • Kilned at 5% moisture • Kilned at 420-450F for up to 2 hours • No diastatic ability	• Brown • Black	• Chocolate • Coffee	• Stouts • Porters
Non-Barley	• Wheat, Rye, Corn, Rice • May require more intensive mash process	• May cause cloudiness	• Bready, wheat, corn • Minty • Peppery	• Weizen • Roggenbier • American Lagers • Cl. American Pilsner

B. Provide five distinct yeast strain selection considerations.

Consideration	Effect on Beer
Apparent Attenuation	• Less residual sweetness (lager yeast) • More alcohol • Less body
Alcohol Tolerance	• Greater Alcohol by Volume
Flocculation	• Less time required for clearing • Potentially clearer beer
Temperature	• Fruity esters for ale yeasts (higher temperatures) • Clean, ester-free beers for lager yeasts (lower temps) • Lager yeasts require longer time to finish
Ester/Phenol Production	• Fruity flavors/aromas for yeasts high in ester production • Clean, crisp flavors/aromas for yeasts low in ester production • Spicy, clove or peppery phenols in Belgian styles and Bavarian Wheat beers
Diacetyl Production	• Butter or Butterscotch flavors • Acceptable in low amounts in some styles

5. THE BREWING PROCESS

T.9. Define these brewing techniques and discuss the effect they have on the finished beer.

30 points	Kräusening
30 points	Adding Gypsum
40 points	Fining

	Describe	**Effect on Beer**
Kräuesening	* The addition of a portion of actively fermenting wort to a wort that has finished fermenting.	* To provide "natural" carbonation. * Also reduces residual diacetyl * Used for most German and American Lagers * May contribute acetaldehyde ("green" beer character) in the finished beer. * Consistent with Rheinheitsgebot – adding CO2 not allowed
Adding Gypsum	* Gypsum is Calcium Sulfate * Common brewing salt * Key salt for "Burtonization"	***** Increases Ca++ and SO4— * Calcium helps yeast metabolism in proper levels, * Calcium allows the wort to acidify * Critical to proper enzyme function. * Sulfate lends a soft edge to hop bitterness by affecting alpha-acid extraction and creating a synergistic perception effect.
Fining	* The addition of a compound to wort or beer. * Added to the boil for hot break: Irish moss or Whirlfloc * Added to the secondary: Isinglass, Bentonite, Polyclar, Sparkloid	***** Coagulates proteins to clarify beer * Precipitate tannins and/or proteins that may cause haze, or even flavor instability.

T.11. Define diastatic and proteolytic enzymes, discuss their roles in the brewing process, and describe how they affect the characteristics of the finished beer. Address the following topics:

20 points	Define each enzyme.
40 points	Discuss their role in the brewing process.
40 points	Discuss how they impact the characteristics of the finished beer.

	Proteolytic	**Diastatic**	
Works on	Proteins	Starches	
Subset	Proteolytic	Beta Amylase	Alpha Amlyase
Temperature	113-127F (aka "Protein" rest)	130-150F (aka "Saccharification")	149-158F (aka "Saccharification")
Describe/Explain	* Proteinase breaks down proteins into smaller fractions such as polypeptides – necessary for good head retention. * Peptidase breaks down polypeptides into peptides and amino acids, essential for proper yeast growth and development	* Starches are gelatinized * Beta amylase enzymes breaks off maltose units from reducing ends of starches * Unable to break down largest units of starches	* Alpha amylase enzymes breaks 1-4 links from starches at random * Unable to break down into smallest units of starches
Effect on Beer	* Reduces cloudiness * Too long a protein rest can reduce head	* Creates more fermentable wort * Thinner bodied beer	* Creates more dextrinous wort * Thicker bodied beer

NOTE: If you get this question, the big hint is the word "Proteolytic" – remember "Proteo" means "proteins." You'll just have to remember that the OTHER type of enzyme – Diastatic – works on starches, but the root of the word "Diastatic" ("Dia-") should remind you that it has two components, Beta and Alpha. Beta-Amylase enzymes are activated first in the temperature scale – in the lower range, and Alpha-Amylase is activated second – at the higher range. You could remember "Alpha" as in "Alpha-male" – the TOP of the temperature range. Note that the two ranges overlap at 149-150F, so to take advantage of BOTH the Beta and Alpha Amylase enzymes, choose that temperature for your Saccharification rest.

T.13. Discuss the mashing process.

Your answer should address the following topics:

50 points	Explain what happens in the mashing process, including times and temperatures as appropriate.
30 points	Identify and describe three mashing techniques.
20 points	Describe the advantages and disadvantages of each of the mashing techniques identified.

A. Explain what happens during the mashing process, including times and temperatures as appropriate.

Mashing Step	Temperature	Time	Active Enzymes	Description
Milling Grain	n/a	n/a	n/a	* Crushing grain kernels to expose starches
Dough-in	10-15F higher than first rest to raise grain temperature	n/a	n/a	* Mixing grist with water * 1.3 qts per pound of grist * Break all clumps so no dry grist remains
Acid Rest	95-120F	60-120 min	* Phytase * Beta Glucanase	* For under-modified malt only * Lowers mash PH when using low calcium brewing liquor * Breaks down phytin into calcium- and magnesium-phosphate and phytic acid * Breaks down hemicellulose and gums in the cell walls
Protein Rest	113-127F	15-60 min	* Proteinase * Peptidase	* Proteolytic enzymes * Breaks down proteins into smaller fractions such as polypeptides * Breaks down polypeptides into peptides and amino acids, essential for proper yeast growth and development
Saccharification	See descriptions for Beta and Alpha Amylase enzymes			* Breaks down starches into dextrins and fermentable sugars **Produces:** * Monosaccharides: Glucose, Fructose, Mannose, Galactose * Disaccharides: Maltose, Isomaltose, Fructose, Melibiose, Lactose * Trisaccharides: Maltriose * Oligosaccharides: “dextrins” – glucose chains
Saccharification – Beta Amylase	130-150F	15-90 min	* Beta Amylase	* Subset of Diastatic enzymes * Yields wort very low in dextrins, high in fermentables * M.A.L.T. – More Alcohol, Lower Temperature

				* Breaks off maltose units from reducing ends of starches
Saccharification – Alpha Amylase	149-158F	15-30 min	* Alpha Amylase	* Subset of Diastatic enzymes * Wort high in dextrins, low in fermentables * Breaks 1-4 links from starches at random
Mash-Out	168-172F	5-15 min	n/a	* Denatures enzymes, stops conversion * Reduces viscosity, aids run-off of mash

B. Describe three different mashing techniques and the advantages and disadvantages of each.

Mash-Type	Describe	Advantages	Disadvantages
Infusion Mash	* Mixing grain with a single temperature of water and resting at that temp for the entire mash	* Requires minimum of labor, equipment, energy and time	* Prohibits the use of under modified malt or adjuncts
Step Mash	* Mashing in with a low temp of water * Raising mash temps to achieve conversion goals * Temp raised by adding boiling water or direct heat	* Allows flexibility in use of different temp steps * Under modified malts may be used.	* Requires more resources (labor, time, equipment)
Decoction Mash	* Removal of a thick third of mash * Raise to brief saccharification rest * Boil for 15-30 minutes * Mixing it back into the main mash * Repeat up to 3 times to reach beta amylase, alpha amylase, and mash-out temps	* Explode starch granules * Breaks down the protein matrix in under modified malt * Improves extraction efficiency * Promotes the formation of melanoidins.	* Most resource intensive (time, labor, equipment) * May extract higher levels of tannins and DMS precursors from grain husks
Cereal Mash (Double Mash)	* Two separate mashes: main mash is crushed malt, cereal mash is raw adjuncts and a bit of crushed malt * Boiled for 1+ hours to gelatinize the starches * Added to main mash, which has undergone an acid rest	* Allows use of adjuncts as alternate source of sugar	* Needs to be boiled or hot-flaked before adding to mash * Time and resource intensive

APPENDIX – Sample Text Questions

This section contains sample questions, and the blank grid in which you may write your answer. NOTE: The exam will NOT give you these grids! If you wish to use the grid and bullet system to structure your answers, you will have to create the grid yourself prior to writing your answers. If you have studied the BJCP EXAM FOR DUMMIES well, this should be second nature to you by now.

SECTION 1 - BJCP/ETHICS/JUDGING PROCESS

For the following 20 questions circle the "T" if the statement is true or circle the "F" if the statement is false. There are no points for these, but there is a 0.5 point deduction for each question unanswered or answered incorrectly, for a maximum of a 10 point deduction.

No.	Choice	Question
1	T / F	A competition organizer may serve as the judge director and may also serve as a judge provided this person has no knowledge of the association between entries and entrants.
2	T / F	A competition's judge director may serve as a judge provided this person has no knowledge of the association between entries and entrants.
3	T / F	A competition organizer may serve as the judge director provided this person has no knowledge of the association between entries and entrants.
4	T / F	A competition's judge director may not serve as a judge even if this person has no knowledge of the association between entries and entrants.
5	T / F	A competition organizer may not serve as a judge even if this person has no knowledge of the association between entries and entrants.
6	T / F	A competition's judge director may serve as the competition organizer and may also serve as a judge provided this person has no knowledge of the association between entries and entrants.
7	T / F	An individual with knowledge of the association between entries and entrants may not serve as a judge.
8	T / F	A member of the competition staff with access to information that associates entries with entrants may serve as a judge provided this person has no knowledge of the association between entries and entrants.
9	T / F	The "head" judge at a table should try to tutor apprentice or lower-rank judges if time permits.
10	T / F	The steward at the table has sole responsibility for completing the Cover Sheets for beers in each flight.
11	T / F	The "head" judge at the table has sole responsibility for completing the Cover Sheets for beers in each flight.
12	T / F	The "head" judge at a table should fill out Cover Sheets for beers in his or her flight as directed by the competition management.
13	T / F	The "head" judge at a table has no responsibility for filling out Cover Sheets for beers in his or her flight unless directed to do so by the competition management.
14	T / F	The "head" judge at the table has sole responsibility for completing the Cover Sheets for beers in each flight but with the agreement of the steward may delegate the completion of the Cover Sheets to the steward.
15	T / F	The "head" judge with the agreement of the steward may delegate filling in of the Cover Sheets for beers in his or her flight to the steward.
16	T / F	There is no need for the "head" judge to complete the Flight Summary Sheet - the competition organizer can obtain all that information from the cover sheets. But the competition organizer can NOT receive judging experience points if they serve as a judge.
17	T / F	If possible there should be at least one BJCP-ranked judge in every flight.

18	T / F	When Non-BJCP judges evaluate entries in a competition each Non-BJCP judge should be paired with a BJCP judge.
19	T / F	Non-BJCP judges may only evaluate entries if authorized by the judge director and Non-BJCP judges should be paired with BJCP judges when possible.
20	T / F	To reduce stray odors and flavors present beverages and foods other than water, bread, or crackers should not be brought to the judging table.
21	T / F	It is acceptable to bring food items other than bread, crackers, and water to the judging table.
22	T / F	You must filter out strong scents from fellow judges or the environment from your mind rather than discussing the problem with the competition organizer.
23	T / F	Strong scents from the environment or other judges or stewards should be brought to the attention of the competition organizer.
24	T / F	Because entries cannot have any identifying marks, it is OK for a judge to judge beers in a category he or she has entered.
25	T / F	If a judge is assigned to judge a category that he/she has entered, that judge should ask the competition organizer to reassign him/her to another category.
26	T / F	If a judge is assigned to a category that he or she has entered, the judge should go ahead and evaluate the entries in that category without notifying the judge director or competition organizer.
27	T / F	Judges should not review the style being judged from the BJCP Style Guidelines while at the judging table prior to judging that style.
28	T / F	Judges may invite stewards to taste the beers in a flight, if there's enough sample to share.
29	T / F	It is acceptable to change the order in which you judge the beers on your flight sheet from how it was printed.
30	T / F	Beers must be evaluated in the sequence specified on the flight sheet.
31	T / F	If you have eaten spicy or greasy food within a few hours prior to judging you should use mouthwash or antiseptic rinse before judging.
32	T / F	You should avoid eating spicy or greasy food within a few hours prior to judging.
33	T / F	Spicy or greasy foods should be avoided prior to a judging event because they can reduce a judge's sensitivity to the aromas and flavors of beer.
34	T / F	Perfumed shampoos and colognes should be avoided prior to a judging event because they can reduce a judge's sensitivity to the aromas of beer.
35	T / F	It is a good idea to take a decongestant prior to a judging event to increase your sensitivity to the aromas of beer.
36	T / F	Calibrations beers are selected to be the standard against which entries should be judged.
37	T / F	It is the responsibility of the “head” judge, in consultation with the other judges in a flight, to assign a consensus score to each entry.
38	T / F	It is not necessary for scores produced by the judges on a panel to be within seven points (or less if directed by the competition director) of each other.
39	T / F	After discussing the initial scores, judges should adjust their final scores to be within seven points (or less if directed by the competition director).
40	T / F	Judges must adjust their scores to be within seven points (or less if directed by the competition director) of each other as part of developing a consensus score for the beer.

41	T / F	The consensus score assigned to the beer is not necessarily an average score.
42	T / F	When judging, It is important to evaluate entries quickly and also complete the score sheets thoroughly and completely.
43	T / F	On average, experienced judges should be able to completely evaluate a beer, including arriving at a consensus, in 10 minutes.
44	T / F	When there is a discrepancy in the scores for a given beer, the lower-ranked judges should yield to the opinion of the highest ranked BJCP judge at the table.
45	T / F	It is acceptable to remove offensive smelling entries from the judging table after they have been evaluated.
46	T / F	A judge must disqualify an entry if the bottle has raised lettering or the cap has identifying marks.
47	T / F	A judge may disqualify an entry if it has an improper bottle or cap. 48 T Only the judge director or competition organizer can disqualify an entry.
49	T / F	The results of the bottle inspection does not affect the scoring.
50	T / F	Snide or rude comments are unacceptable on scoresheets.
51	T / F	Pour each entry in a manner that gives it its optimum appearance, keeping in mind that some entries may be over- or under-carbonated.
52	T / F	When you suspect an entry has been placed in the wrong flight based on the style being judged, you should request that it be judged in a different flight instead.
53	T / F	When you suspect an entry has been placed in the wrong flight based on the style being judged, you should consult with the judge director or competition organizer.
54	T / F	Sniff the entry immediately after pouring to ensure proper evaluation of volatile aromatics.
55	T / F	There is no need to sniff the aroma immediately after pouring the entry into the glass.
56	T / F	Judges should complete the evaluation of each entry before moving on to the next.
57	T / F	It is not necessary to offer any feedback for improvement if you score a beer above 40.
58	T / F	It is common practice to refrain from sharing your thoughts while judging a beer until the other judges have completed their score sheet.
59	T / F	If you are very familiar with a beer style, it is preferable to disregard the BJCP Style Guidelines and rely on your personal expertise instead.
60	T / F	If rushed, it's acceptable to write only comments and an overall score on a score sheet, leaving the scores for the subsections blank.
61	T / F	If rushed, it's acceptable to write only 1-2 comments on a score sheet as long as the numeric score is filled out.
62	T / F	If a beer is a "gusher" or has an unpleasant aroma upon opening, a judge may assign a courtesy score of 13 without tasting and commenting on the characteristics of the beer.
63	T / F	All beers should be tasted and scored, even if they are "gushers" or have an unpleasant aroma upon opening.
64	T / F	It is appropriate to penalize the entrant if the beer is not served at the proper temperature.
65	T / F	If the beers are not served at the proper temperature, judges should work with the competition staff to resolve the problem.
66	T / F	In each section of a score sheet, you should only comment upon the most prominent features of each entry, not subtle characteristics.

67	T / F	Judges' comments must not include phrases like “if you used ...”
68	T / F	Judges' comments must not include phrases like “did you ...”
69	T / F	Judges' comments must include a complete evaluation of the sensory aspects of the entry and how those aspects relate to the style guidelines.
70	T / F	Judges' comments should be constructive and reflect knowledge of the brewing, fermentation, bottling, and handling process
71	T / F	Judges' comments need to provide information on how to improve the entry as warranted.
72	T / F	Scores should not be assigned to the aroma section immediately because the entry's aroma profile may change over time.
73	T / F	Each section must be scored with a number prior to writing any comments, to best capture your first impressions.
74	T / F	To assure objectivity, you should never write your full name or put contact information on the score sheet.
75	T / F	You should write your full name and judging rank on each score sheet.
76	T / F	You should always fill out the “Style Scales” on the score sheet, as a good check against your scores.
77	T / F	You should use the “Overall Impression” section of the score sheet to refer to how the entry compares to other entries in the flight.
78	T / F	You should use the “Overall Impression” section of the score sheet to comment on how much you enjoyed the entry or provide suggestions for how to improve the beer.
79	T / F	A score in the "Outstanding" range is reserved for entries that not only lack flaws but also have the hard-to-define "extraordinary" character that great beers have.
80	T / F	The courteous lower limit for scores assigned to "Problematic" beers is 6 points, with one point for each section of the score sheet.
81	T / F	The courteous lower limit for scores assigned to “Problematic” beers is 13 points.
82	T / F	If judges require more pours than one bottle to judge an entry, the “head” judge should ask the steward to request a second bottle from the cellar master.
83	T / F	It is preferable to use ink on scoresheets so that your scores and comments cannot be altered by contest personnel.
84	T / F	It is preferable to use mechanical pencils, rather than wooden pencils, on scoresheets so that wood odors do not interfere with beer aromas.
85	T / F	It is acceptable to request a second bottle to give the entry a fair chance at an accurate judging if a beer is a “gusher” or tastes infected.
86	T / F	Entrants may contact the judge, the competition director, or their BJCP Regional Representative if they are dissatisfied with any aspect of their scoresheets.
87	T / F	When your flight has finished, you should avoid having conversations that might distract other judges who have not yet finished their flights.
88	T / F	When your flight has finished, it is acceptable to visit other flights still in progress to see how beers you have entered are faring.
89	T / F	Because it may have been entered by a person in the room, it is polite to refrain from publicly deriding a “problem” beer that you have scored during a competition.
90	T / F	Judges from outside the table should not be consulted on a beer unless the judges at the table cannot reach a consensus score, and then only if they all agree to the consultation.
91	T / F	BJCP Apprentice judges have not yet taken the BJCP Beer Judging Exam.

92	T / F	Novice is not an official BJCP judge rank.
93	T / F	One can obtain the BJCP Recognized rank without acquiring judging experience points.
94	T / F	One can obtain the BJCP Recognized rank without acquiring non-judging experience points.
95	T / F	To become a BJCP Certified judge, it is sufficient to pass the Entrance Exam, score at least 70% on the Beer Judging Exam and earn 5 judging points.
96	T / F	To become a BJCP Certified judge, it is sufficient to pass the Entrance Exam, score at least 70% on the Beer Judging Exam and earn 5 experience points.
97	T / F	The maximum score on the Beer Judging Exam for the BJCP Certified rank is 79%.
98	T / F	To become a BJCP National judge, it is sufficient to score 80% on the Beer Judging Exam and accumulate 20 experience points.
99	T / F	To become a BJCP National judge, it is sufficient to score 80% on the Beer Judging Exam and accumulate 20 experience points, with at least half of them from judging.
100	T / F	One can obtain the BJCP National rank without acquiring judging experience points.
101	T / F	One can obtain the BJCP National rank without acquiring non-judging experience points.
102	T / F	BJCP Master judges must have a minimum score of 90% on the combined written and tasting exams and at least 40 judging points.
103	T / F	BJCP Master judges must score at least 90% on the combined written and tasting exams and earn at least 50 experience points, with at least half of them from judging.
104	T / F	The maximum score on the combined written and tasting exams for the BJCP National rank is 89%.
105	T / F	BJCP Master judges must score at least 90% on the combined written and tasting exams and fulfill a Grand Master Service Requirement.
106	T / F	BJCP Grand Master judges must score at least 95% on the combined written and tasting exams.
107	T / F	BJCP Grand Master judges must score at least 90% on the combined written and tasting exams.
108	T / F	Each additional BJCP Grand Master level requires an additional 100 experience points.
109	T / F	BJCP Honorary Grand Master judges do not have to take the BJCP exam.
110	T / F	The BJCP Honorary Grand Master rank is bestowed upon professional brewers when they judge at homebrew competitions.
111	T / F	Honorary Master is a temporary rank bestowed on operatives of the BJCP.
112	T / F	The BJCP Grand Master rank requires the same minimum score on the combined written and tasting exams as the Master rank.
113	T / F	The BJCP Grand Master rank requires the same minimum experience points as the Master rank.
114	T / F	The only difference in requirements between the BJCP Master and Grand Master ranks is that the Grand Master rank requires a GMSR.
115	T / F	Each BJCP Grand Master level has additional requirements for exam grading.
116	T / F	A BJCP Grand Master Service Requirement can be fulfilled by grading exams.
117	T / F	A BJCP Grand Master Service Requirement can be fulfilled by organizing competitions.
118	T / F	A BJCP Grand Master Service Requirement can be fulfilled just by serving on the BJCP Board.

119	T / F	At least one-half of the experience points required for any BJCP judge rank must be from judging.
120	T / F	Judging at homebrew competitions is the only way to earn BJCP judging points.
121	T / F	BJCP judges can earn non-judging experience points for participating in BJCP Continuing Education Program activities.
122	T / F	Judging experience points can only be earned by judging in a competition or proctoring a BJCP exam.
123	T / F	Stewards at homebrew competitions earn BJCP judging points if they taste the beers with the judges.
124	T / F	Stewards at homebrew competitions earn BJCP experience points.

SECTION 2 - STYLES/BREWING TECHNIQUES

S.0. Describe, compare, and contrast these three styles: A, B, and C

Your answer should address the following topics:

25 points	**Compare and** contrast the three styles based on their ingredients, characteristics or background information (history, fermentation or serving methods).
10 points	For each of the styles, name one classic **commercial example** as listed in the 2015 BJCP Style Guidelines.
15 points	**Parameters:** Provide typical values or ranges for the original gravity (OG), IBU, ABV and color (SRM or textual description) of the three styles.
50 points	**Describe** the aroma, appearance, flavor and mouthfeel of each style according to the BJCP Beer Style Guidelines.

STYLE			
AROMA			
APPEARANCE			
FLAVOR			
MOUTHFEEL			
DISTINGUISH			
OG			
IBU			
ABV			
SRM			
COMMERCIAL			
SIMILARITIES			
DIFFERENCES			

T.1.Describe and discuss the following beer characteristics.

What causes them and how are they avoided and controlled? Are they ever appropriate, and if so, in what beer styles?

30 points	Describe each characteristic and how it is perceived.
40 points	Identify the causes and controls for each characteristic.
30 points	Identify styles in which each characteristic is appropriate and inappropriate

	1.	**2.**	**3.**
Describe/Discuss			
How caused?			
How avoided/ controlled?			
Ever Appropriate?			
If so, which Style?			

T.3. What are body and mouthfeel?

Explain how the brewer controls body and mouthfeel in his/her beer, addressing the following topics:

40 points	Define body, describe how is it perceived, discuss how the brewer controls the body of the beer, and provide examples of styles in which is is desirable to have a light or full body.
45 points	List three aspects of Mouthfeel (excluding Body), describe how they are perceived, and discuss how the brewer can control these characteristics.
15 points	Provide examples of styles in which each of these three Mouthfeel characteristics is appropriate.

	Describe	**Causes and Controls**	**Style Examples**
BODY			
MOUTHFEEL **1.**			
2.			
3.			

T.4. Discuss hops, and their role in determining beer flavor and aroma.

Your answer should address the following topics:

30 points	Describe hop characteristics and their impact on beer flavor and aroma
30 points	Discuss how the hop characteristics are extracted.
40 points	Identify five distinct beer styles with which specific or historical varieties are associated.

Discuss hops:

1.

2.

3.

4.

5.

6.

Hop Characteristics	How these characteristics are extracted

Hop Variety	Country	Characteristics	Associated Style

T.8. Discuss the importance of water characteristics in the brewing process

Your answer should address the following topics:

20 points	Discuss two characteristics of water that are important for the brewing process.
20 points	Summarize two methods brewers use to adjust and control the pH of their brewing water
60 points	Discuss how the mineral content of the water played a role in the development of four world beer styles.

IMPORTANT WATER CHARACTERISTICS

Characteristic	Why Important

TWO WATER ADJUSTMENT METHODS TO CONTROL pH

Method	How it adjusts/controls pH

BEER STYLES

City	Beer Style	How Mineral Content Played A Role

T.9. Define these brewing techniques, and discuss their effects on the finished beer.

30 points	Kräusening
30 points	Adding Gypsum
40 points	Fining

	Describe	**Effect on Beer**
Kräuesening		
Adding Gypsum		
Fining		

T.11. Define diastatic and proteolytic enzymes, discuss their role in the brewing process, and describe how they affect the characteristics of the finished beer.

20 points	Define each enzyme.
40 points	Discuss their roles in the brewing process.
40 points	Discuss how they impact the characteristics of the finished beer.

	Proteolytic	**Diastatic**	
Works on			
Subset			
Temperature			
Describe/Explain			
Effect on Beer			

T.13. Discuss the mashing process.

Your answer should address the following topics:

50 points	Explain what happens in the mashing process, including times and temperatures as appropriate.
30 points	Identify and describe three mashing techniques.
20 points	Discuss the advantages and disadvantages of each of the mashing techniques identified.

A. Explain what happens during the mashing process, including times and temperatures as appropriate.

Mashing Step	Temperature	Time	Active Enzymes	Description

B. Describe three different mashing techniques and the advantages and disadvantages of each.

Mash-Type	Describe	Advantages	Disadvantages

T.14. Provide a complete ALL-GRAIN recipe and procedure for a _____,

Please use the table below to help organize your response.

15 pts	**Style Description:** Provide a brief description of the of the target style according to the 2015 BJCP Style Guidelines.
15 pts	Provide the **target parameters** for your recipe, including starting batch size, specific gravity (OG), final specific gravity (FG), and bitterness in IBUs or HBUs, and color (SRM or a textual description).
40 pts	List the **ingredients**, explain why they are appropriate for target style, provide their quantities, and explain how the quantities were calculated.
30 pts	Discuss the complete **brewing procedure** from mashing through packaging, and give style-based reasoning to support each aspect of the process

1. Aroma:_____

2. Appearance: _____

3. Flavor:_____

4. Mouthfeel: _____

5. Batch Size _____ gallons

6. OG:_____ **7. IBUs _____**

8. FG:_____ **9. SRM/Color_____**

10. Grist: (_____% efficiency)

____lb _____

____lb _____

____lb _____

11. Hops:

__oz bittering: _____ ____%AA _____min., 25%Util.

__oz flavor:_____ ____%AA _____min., 5%Util.

__oz aroma:_____ ____%AA _____min., 0%Util.

12. Water: _____

_____

13. Yeast: _____ variety, pitched post-chill, at _____ºF, aerated by_____

14. How ingredients/procedures impact the style: _____

_____

_____

_____

15. Mash: _____ technique

_____ rest _____ºF _____ minutes

_____ rest _____ºF _____ minutes

_____ rest _____ºF _____ minutes

Vorlauf: _____ minutes

Sparge/Lauter _____ºF, _____gallons, _____minutes

16. Boil/Chill:

Boil _____minutes, full rolling boil to facilitate hot break, adding hops according to schedule above.

Finings: _____, Added at _____minutes

Chill: Use _____method to facilitate cold break, to _____ºF, prior to pitching yeast

17. Fermentation:

Primary: _____ºF, _____days

Diacetyl Rest: _____ºF, _____days

Secondary: _____ºF, _____days

18. Packaging:

Bottle Condition: _____cup priming sugar at bottling **OR** Keg with _____ volumes CO2 at kegging

T.15. Discuss the role of malt and yeast in determining beer characteristics.

Your answer should address the following topics:

45 points	Identify and describe different types of malts by their colors and the flavors they impart to the beer
20 points	List four distinct beer styles with which specific malts are associated.
35 points	List five distinct yeast strain selection considerations and describe their impact on the finished beer

A. Identify and describe the different types of malts by their color and the flavor they impart to the beer. Give at least four distinct styles with which specific malts are associated.

Identify	Describe	Color	Flavor	Styles

B. Provide five distinct yeast strain selection considerations.

Consideration	Effect on Beer

COMBINED Possible (named) Section II Beers (91 possible)

ID	Style-1	Style-2	Style-3
1	American Amber Ale	American Brown Ale	American Pale Ale
2	American Amber Ale	American Pale Ale	California Common
3	American Barleywine	Double IPA	English Barleywine
4	American Barleywine	English Barleywine	Wee Heavy
5	American Barleywine	Old Ale	Wee Heavy
6	American Brown Ale	American Pale Ale	California Common
7	American Brown Ale	British Brown Ale	Dark Mild
8	Pairing removed		
9	American IPA	Double IPA	English IPA
10	American Pale Ale	Belgian Pale Ale	Strong Bitter
11	American Pale Ale	English Barleywine	Wee Heavy
12	American Stout	Foreign Extra Stout	Irish Stout
13	American Stout	Irish Stout	Oatmeal Stout
14	American Stout	American Porter	Irish Stout
15	American Stout	Irish Stout	Sweet Stout
16	American Stout	Foreign Extra Stout	Oatmeal Stout
17	American Porter	American Stout	Foreign Extra Stout
18	American Stout	Foreign Extra Stout	Sweet Stout
19	Pairing removed		
20	Pairing removed		
21	American Wheat Beer	Lambic	Weissbier
22	American Wheat Beer	Weissbier	Witbier
23	Baltic Porter	Belgian Dk Strong	Imperial Stout
24	Belgian Blond Ale	Belgian Dubbel	Belgian Tripel
25	Belgian Blond Ale	Belgian Gold Strong	Belgian Tripel
26	Belgian Blond Ale	Belgian Pale Ale	Saison
27	Belgian Dark Strong Ale	Double IPA	Wee Heavy
28	Belgian Dark Strong Ale	Belgian Dubbel	Weizenbock
29	Belgian Pale Ale	Bière de Garde	Saison
30	Berliner Weisse	Flanders Red Ale	Lambic
31	Berliner Weisse	Gueuze	Lambic
32	Berliner Weisse	Weissbier	Witbier
33	Pairing removed		
34	Bière de Garde	California Common	International Amber Lager
35	Blonde Ale	Cream Ale	Kölsch
36	Pairing removed		
37	Czech Premium Pale Lager	German Pils	International Pale Lager
38	American Lager	Cz Prem Pale Lager	German Pils
39	American Porter	English Porter	Irish Stout
40	Pairing removed		
41	British Brown Ale	English Porter	Munich Dunkel
42	English Porter	Munich Dunkel	Schwarzbier
43	Pairing removed		
44	California Common	Irish Red Ale	Märzen
45	Pairing removed		

46	Cream Ale	Kölsch Munich	Helles	
47	International Dark Lager	Munich Dunkel	Schwarzbier	
48	Doppelbock	Eisbock	Helles Bock	
49	Doppelbock	Dunkles Bock	Eisbock	
50	Doppelbock	Dunkles Bock	Helles Bock	
51	Doppelbock	Dunkles Bock	Weizenbock	
52	German Pils	German Helles Exportbier		Munich Helles
53	Foreign Extra Stout	Irish Stout	Sweet Stout	
54	American Porter	Irish Stout	Schwarzbier	
55	Pairing removed			
56	Dunkles Weissbier	Weissbier	Weizenbock	
57	Altbier	Intl Amber Lager	Irish Red Ale	
58	Altbier	Intl Amber Lager	Märzen	
59	Altbier	Best Bitter	Märzen	
60	Altbier	Märzen	Vienna Lager	
61	Dunkles Bock	Eisbock	Helles Bock	
62	English Barleywine	Imperial Stout	Wee Heavy	
63	English Barleywine	Old Ale	Wee Heavy	
64	Flanders Red Ale	Lambic	Oud Bruin	
65	American Porter	Baltic Porter	Foreign Extra Stout	
66	American Porter	Foreign Extra Stout	Sweet Stout	
67	Fruit Lambic	Gueuze	Lambic	
68	German Pils	Munich Helles	Schwarzbier	
69	International Amber Lager	Irish Red Ale	Märzen	
70	American Lager	American Lt Lager	International Pale Lager	
71	Dark Mild	Ordinary Bitter	Scottish Light	
72	Pairing removed			
73	Munich Helles	Munich Dunkel	Märzen	
74	Munich Helles	Märzen	Vienna Lager	
75	Best Bitter	Intl Amber Lager	Märzen	
76	Dunkles Bock	Märzen	Rauchbier	
77	Scottish Export	Scottish Heavy	Wee Heavy	
78	Dark Mild	Scottish Heavy	Scottish Light	
79	Scottish Export	Scottish Heavy	Scottish Light	
80	Ordinary Bitter	Scottish Heavy	Scottish Light	
81	Scottish Heavy	Scottish Light	Wee Heavy	
82	Scottish Export	Scottish Light	Wee Heavy	
83	Pairing removed			
84	Best Bitter	Ordinary Bitter	Strong Bitter	
85	Lambic	Weissbier	Witbier	
86	Dunkles Bock	Märzen	Munich Dunkel	
87	American Lager	Am. Wheat Beer	Cream Ale	
88	American Light Lager	Czech Pale Lager	German Leichtbier	
89	Festbier	Helles Bock	Munich Helles	
90	Czech Amber Lager	Dunkles Bock	Märzen	
91	American Pale Ale	Best Bitter British	Golden Ale	
92	Australian Sparkling Ale	Best Bitter British	Golden Ale	
93	Foreign Extra Stout	Irish Extra Stout	Irish Stout	
94	Foreign Extra Stout	Sweet Stout	Tropical Stout	

95	British Strong Ale	English Barleywine	Old Ale
96	American IPA	Belgian Gold Strong	Belgian IPA
97	Pairing removed		
98	Pairing removed		
99	Pairing removed		
100	Pairing removed		
101	Pairing removed		
102	Pairing removed		
103	Pairing removed		
104	Pairing removed		
105	American Barleywine	American Strong Ale	Double IPA
106	Belgian Tripel	German Pils	Trappist Single
107	Czech Amber Lager	Intl Amber Lager	Vienna
108	Czech Pale Lager	Cz Prem Pale Lager	German Pils
109	American Barleywine	Am. Wheat Beer	Wheatwine
110	American Porter	American Stout	Imperial Stout

(Named) Beers/Meads/Ciders that WON'T be on the (ESSAY) test (33):

- Belgian Specialty Ale
- Fruit Lambic
- Fruit Beer
- Spice Herb Vegetable Beer
- Christmas/Winter Specialty Beer
- Other Smoked Beer
- Wood Aged Beer
- Specialty Beer
- Dry Mead
- Semi-Sweet Mead
- Sweet Mead
- Cyser
- Pyment
- Other Fruit Melomel
- Metheglin
- Braggot
- Open Category Mead
- Common Cider
- English Cider
- French Cider
- Common Perry
- Traditional Perry
- New England Cider
- Fruit Cider
- Applewine
- Other/Specialty Cider/Perry

Sample Lined page for exam

Q#_____, Page ___ of ____ **Participant _____-____-____**

Page ___ of ____