

# Pool Physics Quiz

from [billiards.colostate.edu](http://billiards.colostate.edu)

PLEASE CIRCLE THE LETTER FOR EACH CORRECT ANSWER

## TERMINOLOGY:

**CB:** cue ball, **OB:** object ball

**CIT:** cut-induced throw, **SIT:** spin-induced throw

1. What is the cut angle for a ½-ball hit?
  - a. 0°
  - b. 30°
  - c. 45°
  - d. 60°
  - e. 90°
2. What does stun mean?
  - a. spinning in place
  - b. hit a frozen ball
  - c. hit a ball frozen to a cushion
  - d. sliding with no topspin or backspin
  - e. rolling with natural topspin
3. For a stop shot (where the CB stops dead after hitting the OB), what must be true?
  - a. The CB must have stun when it hits the OB, and the CB stops dead for any cut angle.
  - b. The CB must have stun when it hits the OB, and the shot must be straight.
  - c. The CB must have backspin when it hits the OB, and the CB stops dead for any cut angle.
  - d. The CB must have backspin when it hits the OB, and the shot must be straight.
4. Which of the following conditions guarantee draw?
  - a. hitting the CB below center
  - b. hitting the CB with fast speed with any tip position
  - c. the CB having stun when it reaches the OB
  - d. the CB having bottom or back spin when it reaches the OB
  - e. the CB having topspin when it reaches the OB
5. To draw the CB the largest possible distance on a long straight shot, what combination of things is required?
  - a. slow shot speed, a center-ball hit, and slow/non-slick cloth
  - b. slow shot speed, a low tip position, and fast/slick cloth
  - c. fast shot speed, a center-ball hit, and slow/non-slick cloth
  - d. fast shot speed, a low tip position, and slow/non-slick cloth
  - e. fast shot speed, a low tip position, and fast/slick cloth
6. With a stun shot at an angle, after hitting the OB, the CB heads:
  - a. in the natural angle direction
  - b. along the line of centers
  - c. along the aiming line
  - d. along the tangent line
  - e. along the secant line
7. If you aim with a level cue for a center-ball hit and then jack up the cue, keeping the tip contact point at the same front-center point of the CB on its horizontal equator, what kind of spin will be imparted to the CB with the elevated hit?
  - a. no spin
  - b. topspin
  - c. bottom spin

8. If you hit a firm follow shot with lots of topspin with the CB fairly close to the OB, why does the shot get overcut, even with a seemingly accurate hit?
  - a. The topspin causes the OB to hop and throw offline.
  - b. The topspin causes the OB to swerve significantly.
  - c. The topspin causes the CB to ride up on the OB, which changes the cut angle.
  - d. The CB hops into the OB hitting it above its equator.
  - e. The only explanation is inaccurate aim.
9. The narrowest (or smallest) rolling-CB carom angle off an OB, for fixed CB and OB positions with a ½-ball hit, occurs with:
  - a. no sidespin
  - b. inside spin
  - c. outside spin
10. Besides being used to control the amount of topspin or bottom spin the CB has when it reaches the OB, why is a drag shot used?
  - a. to limit table roll-off or to increase the effect of sidespin
  - b. to increase table roll-off or to increase the effect of sidespin
  - c. to limit table roll-off or to decrease the effect of sidespin
  - d. to increase table roll-off or to decrease the effect of sidespin
  - e. the only effect is to control CB top or bottom spin
11. When a ball rolls straight into a cushion with naturally rolling topspin, what type of spin does the ball have immediately after rebounding, assuming typical cloth and ball conditions?
  - a. stun (no spin)
  - b. sliding backspin (in the same direction as the original topspin coming into the cushion)
  - c. rolling topspin (in the opposite direction as the original topspin coming into the cushion)
12. Sidespin with a cut shot is used mostly to:
  - a. change the direction the CB heads off the OB.
  - b. change the direction the OB heads.
  - c. change the rebound angle when the CB hits a cushion.
  - d. create draw or follow action on the shot.
13. When using sidespin, which effects come into play?
  - a. stun, draw, follow
  - b. stun, cling, skid
  - c. stun, cling, squirt
  - d. cling, squirt, swerve
  - e. squirt, swerve, throw
14. If you cut an OB to the left (with the CB hitting the right side of the OB) using right sidespin, the spin can be referred to as:
  - a. inside spin
  - b. outside spin
  - c. running spin
  - d. reverse spin
15. If you cut an OB to the right (with the CB hitting the left side of the OB) using right sidespin, the spin can be referred to as:
  - a. inside spin
  - b. outside spin
  - c. running spin
  - d. reverse spin

16. When sidespin is used to easily send the CB around the table off multiple cushions, it is called:
- running spin
  - reverse spin
  - outside spin
  - inside spin
17. When sidespin is used to help hold up or slow down the CB off a cushion, it is called:
- running spin
  - reverse spin
  - outside spin
  - inside spin
18. When cutting an OB frozen to a long rail with running sidespin and stun, what must be true to send the CB straight across the table to have the sidespin change the rebound angle off the opposite long rail instead of the first rail?
- you must hit the OB first
  - you must hit the cushion first
  - it does not matter which you hit first since both would send the CB straight across the table
  - it is not possible to send the CB across the table with stun and running spin
19. Another term sometimes used for CB deflection is:
- squirt
  - swerve
  - throw
  - kick
  - skid
20. The terms cling, skid, and kick are used to refer to a shot where:
- the cue tip is still in contact with the CB when the CB hits the OB.
  - the CB reverses direction off a cushion.
  - the OB reverses direction off a cushion.
  - there is an excessive amount of throw.
  - there is an excessive amount of CB deflection.
21. An LD shaft produces less:
- squirt
  - swerve
  - throw
  - kick
  - skid
22. What shaft property is mostly responsible for reducing CB deflection?
- stiffer than normal
  - less stiff than normal
  - less weight over its entire length
  - less weight close to the joint
  - less weight close to the tip
23. When an OB gets pushed off the line-of-centers direction due to CB friction, the effect is called:
- squirt
  - swerve
  - throw
  - kick
  - skid

24. If you replace an old and dirty cloth with new and slick cloth, net CB deflection (the net effect of squirt and swerve) will be:
- less
  - more
  - the same as before
25. The type of sidespin that results in absolutely no throw is called:
- inside spin
  - running spin
  - reverse spin
  - gearing inside spin
  - gearing outside spin
26. When a combination is frozen and wired straight to the center of a pocket, and the CB is offline from the frozen balls, what type of hit will send the ball into the heart of the pocket?
- only a hit along the line of centers with gearing outside spin
  - only a  $\frac{1}{2}$ -ball hit on the 1<sup>st</sup> ball
  - only a square hit of the 1<sup>st</sup> ball
  - only a back cut of the 1<sup>st</sup> ball
  - any hit at all
27. With a straight, slow stun shot, SIT is maximum with:
- no sidespin
  - maximum sidespin
  - only a small amount of sidespin
  - a large (but not maximum) amount of sidespin
  - only about half of maximum sidespin
28. For a cut shot with no sidespin, CIT is maximum with:
- fast speed and topspin
  - fast speed and bottom spin
  - slow speed and topspin
  - slow speed and bottom spin
  - slow speed and stun
29. Stun shot CIT is maximum close to a:
- full hit
  - thin hit
  - $\frac{1}{4}$ -ball hit
  - $\frac{1}{2}$ -ball hit
  - $\frac{3}{4}$ -ball hit
30. What effect does backspin or topspin have on CIT for a cut shot in comparison to a stun shot, where the CB speed at the OB is the same in the comparison?
- backspin decreases CIT and topspin increases CIT
  - backspin increases CIT and topspin decreases CIT
  - both backspin and topspin increase CIT
  - both backspin and topspin decrease CIT
  - CIT is the same with stun, backspin, and topspin
31. With a  $\frac{1}{2}$ -ball hit stun shot, what happens to the amount of throw if you add inside spin?
- stays the same
  - increases
  - decreases

32. With a ½-ball hit stun shot, what happens to the amount of throw if you increase shot speed?
- stays the same
  - increases
  - decreases
33. With a ½-ball hit stun shot, if you use less than gearing outside spin (but still have some outside spin), the OB:
- does not throw at all.
  - throws in the CIT direction.
  - throws in the SIT direction.
34. With a ½-ball hit, if you use more than gearing outside spin, the OB:
- does not throw at all.
  - throws in the CIT direction.
  - throws in the SIT direction.
35. If you cut a slow stun shot to the right (with the CB hitting the left side of the OB), what type of sidespin is transferred to the OB?
- left
  - right
  - none
36. What is the main cause of cling/skid/kick?
- a chalk mark at the contact point between the balls
  - humidity
  - dirty cloth
  - static electricity
  - balls of inferior quality
37. With a frozen combination wired to the heart of a pocket, if you send the 1st ball to the right relative to the wired line, which way will the 2<sup>nd</sup> OB throw?
- it won't throw at all since the combo is wired
  - to the right
  - to the left
38. With a frozen combination, if you hit the 1st ball perfectly square in-line with the combo with bottom spin, what will happen to the 1<sup>st</sup> ball after the hit?
- It will not move.
  - It will follow forward.
  - It will draw back.
39. If the gap size between two OBs is less than 3/8" (9 mm) and you send the 1<sup>st</sup> OB at a small angle to the right relative to a line through the two OBs, which way will the 2<sup>nd</sup> OB go?
- perfectly straight along the line of the combo
  - to the right slightly due to throw
  - to the left slightly due to the cut
40. If the gap size between two OBs is greater than 3/8" (9 mm) and you send the 1<sup>st</sup> OB at a small angle to the right relative to a line through the two OBs, which way will the 2<sup>nd</sup> OB go?
- perfectly straight along the line of the combo
  - to the right slightly due to throw
  - to the left slightly due to the cut
41. If the CB is heavier than the OB, which of the following will be true?
- The CB will head forward of the tangent line on stun shots, and it is easier to hit draw shots.
  - The CB will come back from the tangent line on stun shots, and it is easier to hit draw shots.
  - The CB will head forward of the tangent line on stun shots, and it is more difficult to hit draw shots.
  - The CB will come back from the tangent line on stun shots, and it is more difficult to hit draw shots.
  - Tangent line motion and draw shots will be no different than with equal-weight balls.

42. How does higher humidity affect how a table plays?
- The cloth plays faster, banks go shorter, and pockets play tighter.
  - The cloth plays faster, banks go longer, and pockets play less tight.
  - The cloth plays faster, banks go shorter, and pockets play less tight.
  - The cloth plays slower, banks go shorter, and pockets play tighter.
  - The cloth plays slower, banks go longer, and pockets play less tight.
43. With a jump shot, if the CB hits the OB while airborne, what effect does this have on the resulting cut, assuming your line of aim points at the ideal ghost-ball position?
- The cut angle will be as expected.
  - The shot will be undercut.
  - The shot will be overcut.
44. What is the main reason the CB hops after hitting the 1 ball during a power break shot?
- The CB has topspin that makes it ride up the 1 ball.
  - The CB has bottom spin that makes it rebound off the slate after hitting the 1 ball.
  - The rack of balls is heavier than the CB.
  - The CB is airborne when it hits 1 ball.
  - The weight of the rack makes the 1 ball sit lower than the CB.
45. What type of spin should you use with a medium-angle kick shot to have the CB rebound at the steepest angle possible (most perpendicular to the rail)?
- backspin with running sidespin
  - backspin with reverse sidespin
  - topspin with running sidespin
  - topspin with reverse sidespin
  - stun with reverse sidespin
46. If you are hitting a center-ball, square-hit bank shot with the OB very close to the cushion, where the angle into the rail is large enough to prevent a double-kiss, what affect does speed have on the shot?
- Faster speed makes the bank go much shorter.
  - Faster speed makes the bank go much longer.
  - Faster speed sends to OB in a very similar (or same) direction as slow speed.
47. How do you need to adjust your aim for an outside-cut (a back-cut) bank compared to a square-hit bank with the OB in the same position?
- You need to overcut an outside-cut (a back-cut) bank a little (i.e., hit it a little thinner).
  - You need to undercut an outside-cut (a back-cut) bank a little (i.e., hit it a little fuller).
  - The aim is no different for an outside-cut (a back-cut) bank.
48. How do you need to adjust your aim for an inside-cut (a cross-over) bank compared to a square-hit bank with the OB in the same position?
- You need to overcut an inside-cut (a cross-over) bank a little (i.e., hit it a little thinner)
  - You need to undercut an inside-cut (a cross-over) bank a little (i.e., hit it a little fuller)
  - The aim is no different for an inside-cut (a cross-over) bank.
49. If you use right sidespin with a square-hit bank shot, and the CB hits the OB in the desired square-hit ghost-ball position, the banked OB will go:
- more to the right than with no sidespin
  - more to the left than with no sidespin
  - in the same direction as with no sidespin
50. If you replace an old and dirty cloth with new and slick cloth, kick and bank shots will tend to go:
- longer
  - shorter
  - in the same directions as before