

## IWCF Equipment Sample Questions (Combination of Surface and Subsea Stack)

1. Given the volumes below, how much hydraulic fluid will be required to carry out the following operations (no safety margin)?

Operation: close then open

Equipment: one annular preventer

Two pipe rams

One shear/blind ram

Volumes:

Annular Preventer:	19 gallons to close	16 gallons to open
Pipe ram:	7 gallons to close	6 gallons to open
Shear/blind ram:	7 gallons to close	6 gallons to open

- A. 74 gallons
  - B. 61 gallons
  - C. 68 gallons
2. In an emergency situation it is possible to activate a 'secondary seal' on a ram type preventer. Which one of the following pressure will it seal against?
    - A. Closing chamber pressure.
    - B. Wellbore pressure.
    - C. Opening chamber pressure
  3. In which position will the 3-positions/4-way valve for a Cameron U type ram BOP be placed to assist with the opening of the bonnet after backing off the bonnet bolts?
    - A. Closed.
    - B. In any position, it does not matter as the lines are disconnected.
    - C. Open.
    - D. Neutral (Block).
  4. A long series of electric logs will be carried out in a well with limited overbalance value. Which one of the following is the safest action to perform?
    - A. A set of shear/blind rams is replaced with a set of pipe rams.
    - B. No particular equipment or operation is required.
    - C. The correct rams for the riser/lubricator are installed and pressure tested.
  5. What is one of the advantages of having a weep hole on a ram type BOP?
    - A. To indicate if the closing chamber operating pressure is too high.
    - B. To show that the primary ram shaft seal is leaking.
    - C. To indicate if the ram body rubbers are leaking.
    - D. To indicate if the bonnet seals are leaking.

6. What pressure is required to close the shear/blind ram BOP and shear 5 inch Grade G drill pipe?

\_\_\_\_\_ psi

7. Which of the following statements about annular BOPs are correct?

- A. They will allow reciprocating or rotating of the drill string while maintaining a seal against well bore pressure.
- B. They can require a variable hydraulic closing pressure according to the test to be carried out.
- C. They will not allow tool joints to pass through
- D. They will seal around any object in the well bore
- E. They will not seal on a square or hexagonal Kelly
- F. They are a means of secondary well control

8. What pressure must be kept in the annular BOP closing chamber during a stripping operation?

- A. The minimum pressure of BOP closure that ensures proper sealing.
- B. 300 psi less than the closing pressure of the BOP.
- C. The minimum pressure that allows the tool joint to go through the packing.
- D. 500 psi

9. In which order should the valves for the choke line be installed on a Surface BOP with a 'Rated Working Pressure' of 10000 psi, according to best practice?

- A. Inside- a manual valve, Middle- a check valve, Outside- a hydraulically operated valve.
- B. Inside- a manual valve, Outside- a hydraulically operated valve.
- C. Inside- a hydraulically operated valve, Middle- a manual valve, Outside- a hydraulically operated valve.
- D. Inside- a hydraulically operated valve, Outside- a manual valve.
- E. Inside- a check valve, Middle- a hydraulically operated valve, Outside- a hydraulically operated valve.

10. There is only one inside BOP with an NC38 (3-1/2 inch IF) pin/box connection on the rig. The drill string consists of:

- 3-1/2 inch drill pipe (NC38).
- 2-7/8 inch drill pipe (NC31).

Which of the following crossovers must be on the rig floor while tripping?

- A. NC38 (3-1/2 inch IF) box × NC31 (2-7/8 inch IF) pin.
- C. NC46 (4 inch IF) box × NC38 (3-1/2 inch IF) pin.
- D. NC40 (4 inch IF) box × NC26 (2-3/8 inch IF) pin.
- E. NC31 (2-7/8 inch IF) box × NC38 (3-1/2 inch IF) pin.

11. While pulling out of a well a kick is taken. The Hydril 'drop in back pressure valve' is dropped and pumped down and the well shut in.

After a while it is observed that the pressure on the drill pipe gauge continues to increase.

Which of the following are the causes of this pressure increase?

- A. The 'drop in back-pressure valve' is not yet seated.
- B. The bit nozzles are plugged.
- C. The indented surface inner seat is washed out by the mud flow.
- D. The stabilizers are balled up.

12. During a trip out of the well a kick was taken while the bit was half way up inside the casing. A drill pipe safety valve was installed on the drill pipe and closed. There was no float in the drill string. The well was shut in on the Annular BOP.

What is the Driller's next action before commencing to strip back to bottom.

- A. Keep the drill pipe safety valve in the closed position.
- B. Install the inside blowout preventer above the drill pipe safety valve and open the drill pipe safety valve.
- C. Install a drill pipe safety valve on top in the closed position.
- D. Open the drill pipe safety valve and install the inside blowout preventer.
- E. Replace the drill pipe safety valve with an inside blow out preventer.

13. If a standard float valve (non-return type) is installed in the string, is it possible to reverse circulate?

- A. Yes
- B. No

14. With a float valve installed in the drill string a kick is taken with the bit 32 stands off bottom.

Is it necessary to install an inside blowout preventer above the safety valve to be able to strip back to bottom?

- A. Yes
- B. No

15. What are the main components of a diverter system?

- A. A vent line of small diameter, sufficient to create a 'back pressure' on bottom while circulating.
- B. A vent line of sufficient diameter to permit safe venting and proper disposal of flow from the well.
- C. A high pressure ram type preventer with a large internal diameter.
- D. A low pressure annular preventer with a large internal diameter.
- E. A vent line of sufficient diameter to permit safe venting using the mud-gas separator.

16. What happens when a diverter is closed?

- A. The diverter packer and vent line valve close at the same time.
- B. The vent line valve opens and then the diverter packer closes.
- C. The diverter packer closes and then the vent line valve opens.

17. How often should all operational components of the surface BOP stack equipment systems be function tested according to API RP53?

- A. Only after installation of the BOP stack.
- B. At least once a week.
- C. Once per shift.

18. When annular BOPs are hydraulically pressure tested, test pressure may have to be charged up two or more times before an acceptable test is obtained.

What is the most likely reason?

- A. The compressibility of the hydraulic fluid from the hydraulic control unit below the closing piston causes the test pressure to drop.
- B. As a result of the applied hydraulic test pressure the packing unit elastomer is flowing into a new shape.
- C. Annular BOPs always leak at first.

19. According to API RP53, the components that could be exposed to well pressure should be tested on location. The first test is called the 'initial high-pressure test'. The following tests are called 'subsequent tests'.

To which pressure should the lower Kelly cock, upper Kelly cock, drill pipe safety valves and inside BOP be tested at the subsequent tests?

- A. Always use a pressure equal to 10000 psi
- B. Twice the rated working pressure of the tool used (up to 5000 psi)
- C. Test to a pressure at least equal to the maximum anticipated surface pressure, but limited to the maximum rated working pressure of the BOP stack in use.
- D. One and a half times the rated working pressure of the tool used.

20. What is the maximum closing time for a 21-1/4 inch annular surface BOP according to API RP 16E?

- A. 45 seconds
- B. 30 seconds
- C. 2 minutes

21. API RP 16E states that each closing unit should be equipped with a sufficient number and size of pumps to satisfactorily perform the closing unit capacity test.

With the accumulator system isolated, the pumps should be capable of closing the annular preventer (excluding the diverter) on the minimum size of drill pipe being used, open the hydraulically operated choke line valve(s) and provide the operating pressure, recommended by the manufacturer of the annular BOP, to effect a seal on the annulus.

This should be achieved within:

- A. 2 minutes.
  - B. 4 minutes.
  - C. 3 minutes.
  - D. 1 minutes.
22. What is the normal operating position of the 3-position/4-way valves on the hydraulic BOP control unit while drilling with a surface BOP stack installed?
- A. All valves in open position.
  - B. All valves in closed position.
  - C. All valves in neutral (Block) position.
  - D. Open or closed depending on BOP stack function.
23. If the manifold gauge on the remote BOP control panel reads zero and other gauges read normal values, which of the following statements is true?
- A. No stack function can be operated from the remote panel.
  - B. Everything is correct.
  - C. All stack functions can be operated from the remote panel.
  - D. The annular preventer can still be operated from the remote panel.
24. What is the function of the master control valve on an air operated remote BOP control panel?
- A. It activates the electric circuit for the open/close lights.
  - B. It activates the air supply to the panel.
  - C. It adjusts pipe ram closing pressure.
  - D. It supplies hydraulic fluid to the panel.
25. What is the minimum pressure at which the charge pumps on the hydraulic BOP control unit start up, according to API RP53?
- A. When the system pressure has decreased to approximately 75% of the system working pressure.
  - B. When the system pressure has decreased to approximately 90% of the system working pressure.
  - C. When the system pressure has decreased to approximately 80% of the system working pressure.

26. An hydraulic BOP control unit accumulator bank has 8 bottles:

Cylinder capacity: 10 gallons

Accumulator pre-charge pressure: 1000 psi

Accumulator operating pressure: 3000 psi

Minimum accumulator operating pressure: 1200 psi

Calculate the total usable fluid volume from the accumulator bank.

\_\_\_\_\_ gallons.

27. 3 position/4way valves are used on the hydraulic BOP control unit to control surface stack functions. Which of the following statements about their operation are true?

- A. They can be placed in 4 positions.
- B. They can be manually operated.
- C. They cannot be operated from the remote BOP control panel.
- D. They have four active hydraulic connections (inlets/outlets).

28. When closing the upper rams from the remote control panel on the rig floor the green light indicator goes out but the red light indicator does not come on. The Accumulator pressure and the manifold pressure readings decrease and then return to normal.

What could be the reason for this?

- A. There is a leakage on the hydraulic circuit.
- B. There is an electrical fault with the lights.
- C. The ram did not close.
- D. The 3-positions/4-way valves on the hydraulic BOP control unit did not move.

29. On a Driller's remote BOP control panel on a surface installed BOP a ram close function was activated and the following observations were made:

Green light went out

Red light came on.

Annular pressure remained steady.

Manifold pressure remained steady.

Accumulator pressure remained steady.

What is the cause of this problem?

- A. The hydraulic line is blocked between the hydraulic BOP control unit and the BOP.
- B. The pressure switch for the pumps on the hydraulic BOP control unit is malfunctioning.
- C. There is a leak in the hydraulic line between the hydraulic BOP control unit and the BOP
- D. The selector (operating) valve (3-position/4-way valve) is stuck in the 'Ram open position'.
- E. The electric driven triplex pump on the hydraulic BOP control unit is malfunctioning.

30. The gauges on the Driller's remote BOP control panel are used to observe the status of the surface BOP control unit while drilling. The BOP has not been operated and the electrically driven pump is not running.

The following has been observed:

Accumulator Pressure: 2500 psi (decreasing)

Manifold Pressure: 1500 psi (constant)

Annular Pressure: 1500 psi (constant)

What is the reason for these readings?

- A. Accumulator pre-charge pressure is too low.
  - B. Accumulator pre-charge pressure is too high.
  - C. Problem with the hydraulic pumps.
  - D. leakage in the hydraulic circuit.
31. What is the main function of the choke in the overall BOP system?
- A. To direct hydrocarbons to the flare.
  - B. To direct well bore fluids to the mud/gas separator.
  - C. To shut the well in safely.
  - D. To control back-pressure while circulating out a kick.
32. A mud gas separator should be used with a pressure sensor or gauge to monitor the pressure inside the vessel.
- Why is this?
- A. To avoid the loss of the liquid seal thus allowing gas to the shakers.
  - B. To determine the amount of gas being vented.
  - C. To know when the vent line is plugging.
33. Why can a Vacuum Degasser not be used in place of a Mud/Gas Separator during a well kill operation?
- A. Because cuttings must be removed first.
  - B. Because it is not suited in an explosive proof area.
  - C. Because it has capacity limitation.

34. Which one of the following ram lock systems locks at a single position regardless of wear on the front ram packer elastomers?

- A. Shaffer type Ultralock.
- B. Koomey type Autolock.
- C. Hydril type MPL.
- D. Shaffer type Poslock.
- E. Cameron type Wedgelock.

35. Several accumulator bottles can be installed on a subsea BOP stack. Before the BOP stack is run to bottom these bottles have to be pre-charged to the correct pressure by nitrogen gas.

What is the correct pre-charge for these bottles?

- A. Equal to twice pre-charge pressure of the surface installed bottles.
- B. Equal to the pre-charge pressure of the surface installed bottles.
- C. Equal to the pre-charge pressure of the surface installed bottles minus the hydrostatic pressure between surface and sea bed.
- D. Equal to the pre-charge pressure of the surface installed bottles plus the hydrostatic pressure between surface and sea bed.

36. What will enable or affect the closing of the choke and kill line valves on a subsea stack?

- A. Spring force.
- B. Well bore pressure.
- C. Pneumatic motor.
- D. Sea water depth.
- E. Hydraulic motor.

37. On a subsea BOP installation, what is the advantage of using a kill line gauge to monitor changes in pressure during a well kill operation?

- A. Maintain a constant pressure on the kill line gauge while starting or stopping the pump compensates for the effect of choke line friction.
- B. The effect of choke line friction is reduced to a quarter when monitoring on the kill line gauge during the kill operation.
- C. The kill line gauge is always more accurate.
- D. The effect of choke line friction is reduced to half when monitoring on the kill line gauge during well kill operation.