IWCF Combined Equipment Exercises

1. **When a subsea annular preventer is closed on which of the following gauges would you see a response? (Two Answers)**
   a. Accumulator pressure gauge.
   b. Manifold pilot regulator gauge.
   c. Annular pilot regulator gauge.
   d. Manifold read-back gauge.
   e. Annular read-back gauge.
2. **What is the purpose of the block function on a subsea BOP control panel?**
   a. To isolate un expected leak in the Power Fluid System above the SPM.
   b. To block pressure to the pilot lines going to the SPM Valves and isolate a leak below the SPM.
3. **From the list below select the correct statement regarding the "Memory" function on the BOP control panel.**
   a. To remind the Driller to shut the well in by sounding an alarm when the well is flowing.
   b. To remind the Driller the position the BOP was in before it was blocked.
   c. To store data in the memory bank of the current pressures on all the panel gauges.
4. **Which one of the following statements about "Memory Function" on a subsea BOP Driller's Panel is true?**
   a. Memory function indicates a malfunction by giving a permanent light on the alarm panel after an alarm has been acknowledged and the audible alarm has stopped.
   b. Memory function reminds the Driller to add anti-freeze fluid when the temperature drops below a set level.
   c. Memory function indicates the previous position of the stack function before the "block position" was selected.
   d. Memory function reminds the Driller to engage Wedge locks before hanging off the drill string on the ram BOPs.
5. **Where are the SPM valves in a subsea pod located?**
   a. Upstream of the regulators.
   b. Downstream of the regulators.
   c. Downstream of the shuttle valves.

6. **From the list below, state the consequences of putting a closed annular preventer into the block position. (Three Answers)**
   a. The accumulator pressure at the unit will be vented.
   b. The pilot pressure to the preventer will be blocked.
   c. The annular read-back pressure will go to zero.
   d. The pilot lines to both pods will be vented.
   e. The manifold read-back pressure will go to zero.
   f. The regulated closing pressure to the preventer will be vented.
7. **A subsea uses two hydraulic systems to operate the BOP, the pilot system and the hydraulic control system. Which statements are correct regarding both systems. (Three Answers)**
   a. If the pilot supply system fails, fluid can be supplied from the main hydraulic control system.
   b. If the main hydraulic control system fails, the pilot is used as a backup.
   c. Fluid from the pilot system is vented back to the surface reservoir, whereas fluid from the main hydraulic control system is vented to the sea.
   d. The accumulator volume of the pilot system is greater than of the main hydraulic control system.
   e. The main hydraulic control pressure can be regulated to a reduced pressure at the subsea pod.
8. **What effect has the operation of a pod select valve have on the pilot system for a subsea BOP system?**
   a. It has no effect on the pilot system.
   b. The pilot system is automatically vented.
   c. Full power fluid pressure is applied to the pilot system.
   d. The pilot system is blocked automatically.
9. **What is the function of the "Pod Select Valve"?**
   a. To vent the redundant pod to the sea.
   b. To direct power fluid to the active pod.
   c. To direct pilot fluid to the active pod.
   d. To operate the BOP function.

10. Which of the following is activated by using pressure?

a. SPM Valves.

b. Shuttle Valves.

c. Flow-meter.

11. When a BOP function is operated from the subsea BOP control panel, which of the following is true?

a. SPM valves will operate in both pods.

b. SPM valves will operate only in the active pod.

c. The shuttle valve will operate first.

12. A subsea BOP control system is divided into a Control System and a Pilot System. Select from the list below which statement best describes the Pilot System.

a. The pilot system dumps fluid to the sea for each operation of a BOP Function.

b. The Pilot System directly controls the position of all shuttle valves on the BOP stack.

c. The Pilot System is a closed dead-end system.

d. Pilot fluid is mixed from mainly potable water and a small amount of additives, and may be a more concentrated mixture than in the Control System.

e. The fluid in the Pilot System flows continuously while a function on the BOP takes place.

13. Which statement are correct about subsea BOP control panel Subsea Plate Mounted (SPM) valves, of the 2 position, 3 way, normally closed, pilot operated, spring return type? (Two Answers)

a. SPM valves are opened by spring force.

b. SPM valves are opened by pressure from the main hydraulic control system.

c. SPM valves are closed by spring force and seawater hydrostatic pressure.

d. SPM valves are opened by pressure from the pilot system.

14. When a ram BOP on a surface stack is closed, what happens to the operating fluid displaced from the opening chamber?

a. The fluid drains into the well bore.

b. The fluid is used to assist closing pressure.

c. The fluid vents overboard.

d. The fluid is returned to the reservoir.

15. **When a ram BOP on a subsea stack is closed, what happens to the operating fluid displaced from the opening chamber?**
    a. The fluid drains into the wellbore.
    b. The fluid is used to assist closing pressure.
    c. The fluid vents to the sea.
    d. The fluid is returned to the reservoir.
16. **When a function on a subsea BOP is activated from the Driller's remote panel, what happens?**
    a. Pilot pressure is sent to the relevant SPM valves in both pods.
    b. Pilot pressure activated the relevant SPM valve only in the selected pod.
    c. The selected function is activated only from control fluid stored in the Subsea accumulator bottles.
    d. Pilot pressure regulated at 1,500 psi operated the selected function.
    e. The selected function is activated only from control fluid stored in the surface accumulators.
17. **For subsea BOP's the closing system should be capable of closing a ram preventer within a limited time period. What is the time that should not be exceeded?**
    a. 30 seconds.
    b. 35 seconds.
    c. 40 seconds.
    d. 45 seconds.
18. **API 16E recommends that subsea annulars smaller than 18-3/4" must close on the size of drill pipe in use at the time of operation within:**
    a. 30 seconds.
    b. 60 seconds.
    c. 45 seconds.
    d. 40 seconds.
19. **For subsea BOP's API 16E states that the accumulator system should be capable of closing annular preventers larger than 18-3/4" within:**
    a. 30 seconds.
    b. 60 seconds.
    c. 45 seconds.
    d. 40 seconds.

20. For a subsea BOP system, API RP 53 requirements for charge pumps are that they should be capable of charging the accumulator bank from pre-charge to maximum rated working pressure within:

a. Less than 12 minutes.

b. Less than 15 minutes.

c. Less than 24 minutes.

d. Less than 18 minute.

21. Which of the following gaskets are fitted into a H-4 Wellhead Connector?

a. BX Ring Gasket.

b. RX Ring Gasket.

c. VX Ring Gasket.

22. Which of the following statements are true regarding wellhead connectors?

a. The piston area for latching is greater than the piston area for unlatching.

b. The piston area for latching is smaller than the piston area for unlatching.

23. What is the maximum hydraulic pressure available for an emergency release of an H-4 Wellhead Connector?

a. 1500 psi.

b. 3000 psi.

c. 5000 psi.

24. In order to verify the actual pressure supplied to an annular or ram preventer on a subsea stack, a read-back signal is returned to the control panel at surface. Where is the signal sent from?

a. Upstream of the regulator in the pod.

b. The regulator itself.

c. Down steam of the SPM valve.

d. Downstream of the regulator in the pod.

25. "Blow –Down" lines are normally found:

a. Upstream of the remote choke.

b. Downstream of the remote choke.

c. On the standpipe manifold.

d. At the shakers.

26. An automatic riser fill-up valve can be fitted to the riser. What is the purpose of a riser fill-up valve? (Two Answers)

a. It will automatically open if there is a considerable reduction in the density of the mud in the riser.

b. It will automatically open if there is a reduction in fluid level in the riser due to lost circulation.

c. It will help in disconnecting the riser.

d. It can be used as a mud booster.

27. From the list below select the reason why a "riser fill-up valve" might be installed in a marine riser.

a. To increase buoyancy on the riser in order to relieve the riser tensioning system on the rig.

b. To prevent the collapse of the riser when diverting a shallow gas kick.

c. To reduce the pressure on the BOP stack when diverting a shallow gas kick.

d. To save the time taken to fill the hole when tripping out.

28. There are several accumulator bottles on a frame on the subsea BOP stack. These bottles will be pre-charged with nitrogen while on surface.

The pre-charge for these bottles will be:

a. The same as the surface bottles.

b. The same as the surface bottles plus seawater hydrostatic pressure.

c. The same as the surface bottles minus seawater hydrostatic pressure.

d. The same as the working pressure of the surface accumulator pressure.

29. An accumulator cylinder at surface has a pre-charge pressure of 1000 psi. the pressure gradient for seawater is 0.445 psi/ft.

What will be the correct pre-charge pressure if the cylinder is used subsea in 1000 feet of water?

…… Psi.

30. What mechanisms are used to close the choke and kill line valves on a subsea BOP? (Two Answers)

a. Hydraulic motor.

b. Pneumatic motor.

c. Spring force.

d. Hydraulic pressure.

e. Wellbore pressure.

31. When a subsea annular preventer is closed which of the following statements indicate that the function has taken place? (Four Answers)

a. Light change from Green to Red.
b. Accumulator pressure decreases then increases.
c. Rig air pressure decreases then increases.
d. Manifold read-back pressure decreases then increases.
e. Manifold pilot pressure decreases then increases.
f. Annular read-back pressure decreases then increases.
g. Annular pilot pressure decreases then increases.
h. Flow meter runs then stops after the required volume of fluid.

32. 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. The kill line gauge is always more accurate.
b. The effect of choke line friction is reduced to a half when monitoring on the kill line gauge during the kill operation.
c. The effect of choke line friction is reduced to a quarter when monitoring on the kill line gauge during the kill operation.
d. Maintaining a constant pressure on the kill line gauge while starting or stopping the pump compensates for the effect of choke line friction.

33. What is the maximum hydraulic pressure available, through the control system, for an emergency disconnect of a hydraulic BOP or wellhead connector?

a. 1,200 psi.
b. 1,500 psi.
c. 2,000 psi.
d. 3,000 psi.

34. What reasons does a Driller on a floating rig need information about tide and rig heave? (Two Answers)

a. To adjust marine riser tensioners.
b. To know the position of tool joints in the stack relative to the rams.
c. To calculate marine riser tensioners ton miles.
d. To correctly hang off during a well control operation.
e. To set ram closing pressures correctly.

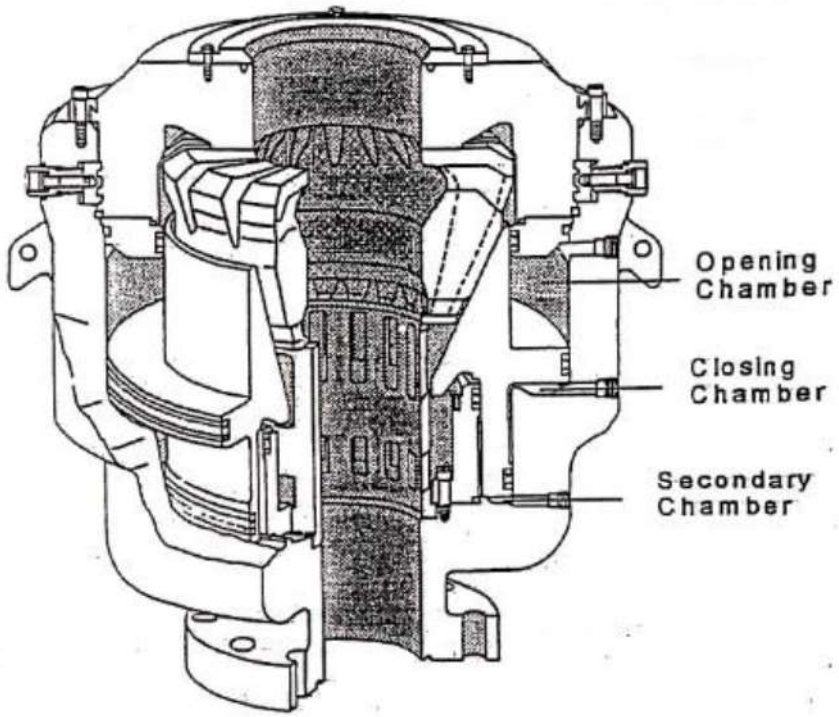
35. Status indicator lights are installed on the Driller's remote control panel on the subsea BOP. The standard colors are Red, Amber and Green.
According to API RP16E what color sequence should be illuminated during normal drilling operations?

a. All function illuminate RED.
b. Rams and Annular functions illuminate the GREEN. Failsafe valve functions illuminate RED.
c. All functions should illuminate AMBER.
d. Ram functions illuminate GREEN. Annular functions illuminate RED. Failsafe valve functions illuminate AMBER.
e. Rams, Annular and Failsafe valve functions illuminate GREEN.

36. What is type of the valves that would be found in a subsea BOP system control unit?

a. Manipulator valve.
b. Selector valve.
c. SPM valve.

37. Figure below illustrate a Hydril GL annular BOP, which of the following statements are correct when this preventer is used subsea operation?



(Two Answers)

a. Lowest required hydraulic closing pressure when closing chamber and secondary chamber are connected.
b. Lowest required hydraulic closing pressure when opening chamber and secondary chamber are connected.
c. The secondary chamber allows balancing the opening force on the piston created by drilling fluid hydrostatic pressure in the marine riser.

38. Which statements is correct relating to shuttle valves? (Two Answers)

a. Shuttle valves are pilot operated.
b. Shuttle valves allow retrieving of a malfunctioning pod without losing hydraulic BOP control.
c. Shuttle valves automatically seal any hydraulic leaks in the active pod.
d. Shuttle valves isolate pressurized control fluid communications between the active system and the redundant system.

39. Which statement about the shuttle valves on a subsea BOP stack is correct?

a. The shuttle valves isolate the control fluid system between the active and the redundant pods.
b. The shuttle valves require 3000 psi to operate.
c. The shuttle valves are 3 position/4 way valves,
d. The shuttle valves are directly controlled by pilot fluid.
e. The shuttle valves isolate the hydraulic pilot system from the hydraulic control system.

40. On a BOP accumulator control unit manifold for a subsea BOP a number of Manipulator valves are installed. Manipulator valves control the SPM valves on the subsea pods. From the list below which is the correct description of a Manipulator valve?

a. A manipulator valve is a 3 position – 4 way directional control valve that has the pressure inlet port blocked and the operator ports vented when in the center (or block) position.
b. A manipulator valve is a 3 position – 4 way directional control valve that has all ports blocked when in the center (or block) position.
c. A manipulator valve has two or more supply pressure ports and only one outlet port. When fluid is flowing through one of the supply ports the internal shuttle seals off the other inlet port and allows flow to the outlet port only.
d. A manipulator valve is an electrically operated valve that controls a hydraulic or pneumatic pilot signal of function.

41. On a floating rig with a MUX control system, how does the BOP stack shuttle valve operate?

a. Fluid pressure from the active pod main supply-line moves the shuttle valve, closing the supply inlet on the redundant pod.
b. Fluid pressure from the redundant pod main supply-line moves the shuttle valve towards the active pod.
c. The electronic module sends a hydraulic pilot signal to the shuttle valve.
d. The electronic module sends an electric signal to the shuttle valve.

42. On a rig with a MUX BOP Control System, you are supervising a function test. The Driller tells you that there is a problem with the upper-annular 'close' function. The light on the BOP panel changes to 'close' but there is no flow count or pressure drop on the annular read back gauge. What could be the problem?

a. The accumulator charge pump has failed.
b. The signal from the electronic module to the upper annular "close" solenoid valve has failed.
c. There is a leak in the upper annular closing line.
d. The lower annular "close" solenoid valve has failed.

43. What is the role of the Sub-Plate Mounted (SPM) valve in the BOP control system?

a. It is fitted to each control circuit, to reduce harmful water-hammer effect.
b. It is used to increase the pressure of the hydraulic control fluid to operate the intended BOP function in the circuit.
c. It regulates hydraulic control fluid to operate the intended BOP function in the circuit.
d. Operated by pilot pressure, it allows the BOP function to be operated by regulated hydraulic control fluid.

44. When drilling ahead on a floating rig with a MUX BOP Control System, the Driller tells you that the low surface accumulator pressure alarm has activated, and the flow meter is counting rapidly. No BOP functions have been operated.

What could be the cause of the problem?

a. A ram regulator has malfunctioned and is leaking.
b. A shuttle valve in the Lower Marine Riser Package (LMRP) is leaking.
c. The main power fluid line to the BOP is leaking.
d. The subsea accumulator is leaking.

45. While using the yellow pod to operate the subsea BOP Stack, the upper annular 'close' function fails. The Subsea Engineer switches to the blue pod, and the upper-annular 'close' function operates as normal. What is most likely cause of the yellow pod upper-annular 'close' function failure?

a. The blue pod 'open' function operated before the yellow pod 'close' function.
b. The shuttle valve is leaking.
c. The shuttle valve is stuck and has failed to move.
d. The yellow pod SPM has sent the wrong pilot pressure to the shuttle valve.

46. When testing a subsea BOP stack with an inverted test ram, how will the string weight affect the pressure test requirements?

a. A high hook load requires the string to be hung-off on the test rams.
b. Hook load is less than the pipe tensile strength, so closing pressure can be reduced to 1000 psi.
c. String weight will not affect test requirements.
d. Tension in the drill string will lower the pipe collapse pressure.

47. On a subsea BOP, you close the annular, the lights changed and the annular read-back pressure drops. The flow meter stars counting. At the required volume to close the annular, the flow meter continues to count and the read-back does not return to original value. Pilot pressure is stable and well is still flowing.

What could be the problem?

a. The annular open sub-plate mounted (SPM) valve did not fully operate and is venting power fluid to the sea.
b. The annular close sub-plate mounted (SPM) valve did not fully operate and is venting power fluid to sea.
c. There is a partial blockage in the subsea accumulator supply line.
d. The surface 4-way valve did not operate correctly.

48. On a subsea with two pods (blue and yellow), how many Sub-Plate Mounted (SPM) valves are required to open and close the upper pipe ram?

a. 2.
b. 4.
c. 1.
d. 3.

49. The driller operates a function on a subsea BOP from the driller's electric BOP panel. The lights change, the flow meter runs then stops after the required volume of fluid is used, and the annular read back pressure decreases then increases.

What other indicator will confirm that the function successfully operated?

a. Rig air pressure decreases then increases.

b. Manifold pilot pressure decreases then increases.

c. Accumulator pressure decreases then increases.

d. Manifold read back pressure decreases then increases.

50. On a subsea BOP stack, what is the purpose of the BOP ''auto shear'' system?

a. It automatically shuts in the well if there is loss of hydraulic supply and control of both pods.

b. It activates the ROV panel on the stack.

c. When activated, it automatically shears the tubulars, seals the tubulars, seals the well, and then disconnects the Lower marine Riser Package (LMRP).

d. Autoshear is a safety system that is designed to automatically shut-in the wellbore in the event of an accidental disconnect of the LMRP.

51. What is the function of the ''Dead Man'' system?

a. It automatically shuts in the wellbore in the event of a simultaneous absence of hydraulic supply and control of both subsea control pods.

b. When activated, it disconnects the Lower Marine Riser Package (LMRP), and then automatically shuts in the well.

52. In a subsea BOP the driller closed the top ram, then he sees the following readings:

Accumulator pressure **3000 psi constant.**

Manifold pressure **1500 psi constant.**

Lights changed from green to red

What happened?

a. Function completed.

b. The function valve at surface failed to operate.

c. Leak in the hydraulic system.

d. Shuttled valve failed to shift.

53. On a conventional hydraulic BOP operation system you operate ram close function on the driller remote panel. What type of signal is sent to the subsea "control room"?

a. Air signal is sent to operate a solenoid that opens and send hydraulic pressure to the rams' 3 position 4 way vavle.
b. Electrical signal sent to operate a solenoid that allows air to operate the rams' 3 position 4 way valve.
c. Hydraulic pressure is sent to operate solenoid that opens and send air pressure to the rams' 3 position 4 way valve.

54. When tripping on a subsea installation, the driller tells you that the low surface accumulator pressure alarm has activated and the flow meter is counting rapidly. No BOP function has been operated. What action should be taken?

a. Put all the rams, annular preventers and HCR valves' 4 way valves on the block position, then continue tripping.
b. Put all rams and annular preventers' 4 way valves in the block position and continue tripping.
c. Put the selector pod valve in the block position and continue tripping.
d. Put the pod selector valve in the block position, and check if the leak stops (switch the other pod, and retrieve the defected pod)

55. On a floating rig, what is the purpose of the Emergency Disconnect Sequence (EDS)?

a. It automatically shuts in the wellbore in the event of a simultaneous absence of the hydraulic supply and control of both subsea control pods.
b. When activated, it automatically shears the string and seals the well then disconnects the Lower Marine Riser Package (LMRP)

56. What is the advantage to use inverted preventer?

a. Allow the driller to make test BOP with higher pressures.
b. Reduce the wear of pipe ram elastomer while testing.
c. Save the tripping time is the test plug will be used for the test.
d. Allow killing the well with reverse circulation.

57. To activate the riser and wellhead connector which pod should be used?

a. Put the pod valve in "block" position, riser and connector can be activated without the pod.
b. Blue pod only.
c. Yellow pod only.
d. It depends on which pod is used.

Model Answer:

1. A, E
2. B
3. B
4. C
5. B
6. B, D, F
7. A, C, E
8. A
9. B
10. A
11. A
12. C
13. C, D
14. D
15. C
16. A
17. D
18. B
19. B
20. B
21. C
22. B
23. B
24. D
25. B
26. A, B
27. B
28. B
29. 1445
30. C, D
31. A, B, F, H
32. D
33. D
34. B, D
35. E
36. A
37. A, C
38. B, D
39. A
40. A
41. A
42. B
43. D
44. C
45. C
46. D
47. B
48. A
49. C
50. D
51. A
52. D
53. B
54. D
55. B
56. C
57. D