1. Company policy states that an accumulator must provide sufficient volume to close, open and close again, all rams and the annular. Using the information below, calculate the required volume.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>OPENING VOL</th>
<th>CLOSING VOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annular</td>
<td>27 gal</td>
<td>29 gal</td>
</tr>
<tr>
<td>Rams</td>
<td>13 gal. ea.</td>
<td>15 gal. ea.</td>
</tr>
</tbody>
</table>

Required Volume = 214 gal

<table>
<thead>
<tr>
<th></th>
<th>closed</th>
<th>open</th>
<th>closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ann</td>
<td>29</td>
<td>27</td>
<td>29</td>
</tr>
<tr>
<td>Ram</td>
<td>15</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Ram</td>
<td>15</td>
<td>13</td>
<td>15</td>
</tr>
</tbody>
</table>

74 66 74 = 214

2. According to API RP-53 what is the maximum allowable closing time for annular preventers 18 ¾” and above?

A. 30 seconds
B. 60 seconds
C. 2 minutes
D. 45 seconds (Correct Answer)
3. Indicate the activities that may take place with the BOP illustrated below.

A. Can the spool be repaired? With no drill pipe in the holes: and the well shut in Under pressure?
   Yes / No (Correct Answer)

B. Can the pipe rams be changed to blind ram? With Drill pipe in the hole: and the well shut in under pressure?
   Yes / No (Correct Answer)

C. Can the well be killed with the Wait and Weight method? The well is shut in with drill pipe in the hole.
   Yes (Correct Answer) / No

D. Can the side outlets on the spool be repaired? Drill pipe in the hole and the well shut in under pressure.
   Yes (Correct Answer) / No
4. Indicate the activities that may be carried out with the BOP stack illustrated below.

A. Can the spool be repaired with no drill pipe in the hole: and the well shut in under pressure?
   Yes / **No (Correct Answer)**

B. Can the pipe rams be changed to blind rams with drill pipe in the hole: and the well is under pressure?
   Yes / **No (Correct Answer)**

C. Can this well be killed with the Wait and Weight Method? The well is shut in with drill pipe in the hole.
   **Yes (Correct Answer) / No**

D. Can the side outlets on the spool be repaired? With drill pipe in the hole and the well shut in under pressure?
   Yes / **No (Correct Answer)**
5. According to API RP-53, what is the recommended reservoir capacity for a BOP closing unit.

A. **2 times the useable accumulator volume (Correct Answer)**
B. 2 times the accumulator volume
C. 5 times the total accumulator volume

6. Identify the components that are controlled by manifold pressure. (THREE ANSWERS)

A. **Pipe rams (Correct Answer)**
B. **Blind rams (Correct Answer)**
C. Annular
D. **HCR valves (Correct Answer)**

7. Which **TWO** pressure readings would decrease if you operated the pipe rams?

A. **Manifold pressure (Correct Answer)**
B. Annular pressure
C. **Accumulator pressure (Correct Answer)**
D. Precharge pressure

8. Which of the two tools below would you use if you wanted to test the BOP stack and the upper casing seals?

A. Plug type tester
B. **Cup type tester (Correct Answer)**

9. Identify which type of valve should be used for the operations listed.

1. A full opening safety valve (TIW)
2. A stab-in non-return valve (Gray Valve)

Place a “1” or “2” in the blanks provided

A. Stabbing onto a strong flow up the drill string
B. Is closed manually with a tool
C. May develop a leak around the key
D. May be pumped open
E. May not be run in the hole in the closed position
F. Wireline may be run through it

1 1 1 2 1 1
10. Identify the situation in which a BOP pressure test is recommended as per API RP-53. (TWO ANSWERS)
   
   A. After circulating out a gas kick  
   B. When two months have elapsed since the last test 
   C. **After changing out BOP components (Correct Answer)**  
   D. **After setting a casing string (Correct Answer)**  

11. According to API RP-53, how often does API recommend BOP pressure tests?  
   
   A. Every 7 days  
   B. Every 14 days  
   C. **Every 21 days (Correct Answer)**  
   D. Every 28 days  

12. You have only one full opening drill string safety valve with an NC-50 lower connection on your rig but the drill string consists of 5” HWDP and 8” collars. Which of the following cross-overs would you have to have on the floor in case of a kick while tripping?  
   
   A. 5 5/8” Reg Box X 7 5/8” Reg Pin  
   B. NC-50 Pin X 6 5/8” Reg Pin  
   C. NC-50 Box X 7 5/8” Reg Pin  
   D. **NC-50 Box X 6 5/8” Reg Pin (Correct Answer)**  

13. Mark the following with advantage or a disadvantage when a drill string float is used.  
   
   A. Surge pressure  
   B. Reverse circulation  
   C. Flowback through the drill pipe  
   D. Reading SIDPP  

   _**Disadvantage**_  
   _**Disadvantage**_  
   _**Advantage**_  
   _**Disadvantage**_
14. Identify from the sketch below, which valves should be opened to circulate down the drill string with the mud pump through the remote adjustable choke and the mud/gas separator. The well is closed in with the annular.

**Circle the correct answers.....**

A. 2,4,5,6,7,8,9,11,12,16  
B. 1,3,7,8,9,11,12,15  
C. 2,3,7,8,9,11,12,16 *(Correct Answer)*
In each of the following problems (15 through 17) below write the letter from the list below that best describes the reason for the pressure gauge readings.

15.

Problem

NOTE: A function test has just been performed and the pump is still running

Normal Readings:
Annular  
Manifold  
Accum.  

A. Everything is OK (Correct Answer)
B. Malfunctioning pressure regulator (valve)
C. Malfunctioning hydro-electric pressure switch
D. Leak in hydraulic circuit
E. Precharge pressure is too low
16.

Problem ________

NOTE: The pump has just kicked in.

**Normal Readings:**

<table>
<thead>
<tr>
<th>Annular</th>
<th>900 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifold</td>
<td>1500 psi</td>
</tr>
<tr>
<td>Accum.</td>
<td>3000 psi</td>
</tr>
</tbody>
</table>

A. Everything is OK

**B. Malfunctioning pressure regulator (valve) (Correct Answer)**

C. Malfunctioning hydro-electric pressure switch

D. Leak in hydraulic circuit

E. Precharge pressure is too low
Problem __________

NOTE: No function test has been performed. The pump is running.

**Normal Readings:**
- Annular: 900 psi
- Manifold: 1500 psi
- Accum.: 3000 psi

A. Everything is OK
B. Malfunctioning pressure regulator (valve)
C. Malfunctioning hydro-electric pressure switch

**D. Leak in hydraulic circuit (Correct Answer)**

E. Precharge pressure is too low
18.

Problem __________

NOTE: The pump is running.

Normal Readings:
Annular 900 psi
Manifold 1500 psi
Accum. 3000 psi

A. Everything is OK
B. Malfunctioning pressure regulator (valve)
C. Malfunctioning hydro-electric pressure switch (Correct Answer)
D. Leak in hydraulic circuit
E. Precharge pressure is too low
19. The following statements relate to the driller’s remote control BOP control panel located on the rig floor. Indicate if the statements are TRUE or FALSE.

A. If you operate a function without operating the master control valve that function will not work.  
   **TRUE (Correct Answer)**

B. The master control valve on an air operated panel allows air pressure to go to each function in preparation for operating the function.  
   **TRUE (Correct Answer)**

C. The master control valve must be held depressed while BOP functions are operated.  
   **TRUE (Correct Answer)**

D. The master control valve must be depressed for five seconds then released before operating a BOP function.  
   **FALSE (Correct Answer)**

20. A BOP operating unit has 8 bottles, each with a capacity of 10 gallons. Maximum pressure is 3000 psi and the precharge pressure is 1000 psi.

A. What is the total useable fluid volume when the minimum BOP operating pressure is 1200 psi?
   
   **40** gallons

   \[\text{Equation } \#19 - \text{Accumulator} \quad \frac{1000 \text{ precharge}}{1200 \text{ minimum}} - \frac{1000 \text{ precharge}}{3000 \text{ system psi}} = .833 - .333 = .5 \times 10 \text{ gal} = 5 \text{ gal}\]

   \[5 \text{ gal} \times 8 \text{ bottles} = 40 \text{ gallons}\]

B. What is the total useable fluid volume when the minimum BOP operating pressure is 1500 psi?

   **26.6** gallons

   \[\text{Equation } \#19 - \text{Accumulator} \quad \frac{1000 \text{ precharge}}{1500 \text{ minimum}} - \frac{1000 \text{ precharge}}{3000 \text{ system psi}} = .666 - .333 = .333 \times 10 \text{ gal} = 3.33 \text{ gal}\]

   \[3.33 \text{ gal} \times 8 \text{ bottles} = 26.6 \text{ gallons}\]

21. Which of the following statements is **TRUE** concerning ram packing elements?

   A. Motion reversal of pipe increases the wear on the seals
   B. Closing pipe rams on the open hole may damage the elements
   C. The ram packer should normally be checked and if worn, changed whenever the bonnet is opened
   D. **All of the above (Correct Answer)**

22. The kill line should enter a stack so that......

   A. The well can be circulated if the blind rams are closed
   B. The well can be circulated if the pipe rams are being used
   C. **Both of the above (Correct Answer)**
Use the diagrams below to answer the following questions:

1. Air
2. Accumulator
3. Manifold
4. Annular

23. On a 3000 psi accumulator system what are the normal operating pressures seen on the following gauges. Use the list below and right to fill in the blanks.

   A. Gauge #1 __120__ psi 120 psi
   B. Gauge #2 __3000__ psi 900 psi
   C. Gauge #3 __1500__ psi 1500 psi
   D. Gauge #4 __900__ psi 3000 psi

24. On which TWO gauges on the remote panel would you expect to see reduction in pressure when the annular preventer is closed?

   A. Gauge #1
   B. **Gauge #2 (Correct Answer)**
   C. Gauge #3
   D. **Gauge #4 (Correct Answer)**

25. If Gauge #1 reads 0 psi, which of the following statements is TRUE?

   A. **No stack function can be operated from the remote panel (Correct Answer)**
   B. All stack functions can be operated from the remote panel
   C. Choke and kill line valves can still be operated from the remote panel
   D. The annular preventer can still be operated from the remote panel
26. Mark an “X” in the box where the problem relates to the cause.

<table>
<thead>
<tr>
<th>Causes →</th>
<th>4-way valve on accumulator failed to shift</th>
<th>Closing line to BOP blocked</th>
<th>Leak in hydraulic lines to BOP or BOP itself</th>
<th>Air pressure lost to panel</th>
<th>Bulb has blown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Close light does not illuminate but pressure drops and later increases.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2. Light does not illuminate and pressure gauge does not drop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3. Pressure gauge drops but does not rise back up.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4. Light illuminates but pressure gauge does not drop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
27. Which one of the previous problems (1, 2, 3, or 4) did not stop the BOP from closing?

A. 1 (Correct Answer)
B. 2
C. 3
D. 4

28. Indicate the letters in the following blanks which correspond to the items in the illustration below:

A. Closing chamber  
B. Opening chamber  
C. Wear plate  
D. Piston travel indicator  
E. Piston  
F. Packing element

Hydrel GK Annular
29. Indicate the letters in the following blanks which correspond to the items in the illustration below:

A. Closing chamber  
B. Opening chamber  
C. Packing unit  
D. Adapter ring  
E. Piston

A.  
B.  
C.  
D.  
E.  

Diagram:

- A
- B
- C
- D
- E
30. Indicate the letters in the following blanks that correspond to the items in the illustration:

A. Packing element  
B. Donut
C. Operating piston
D. Opening chamber
E. Closing chamber
F. Pusher plate
G. Packer insert
H. Vent/Weep hole

Cameron Model D Annular
31. Indicate the letters in the following blanks which correspond to the items listed in the illustration below:

A. Packing element  
B. Opening chamber  
C. Opening chamber head  
D. Closing chamber  
E. Piston  
F. Secondary chamber  

Hydri GL Annular
32. Identify the ram preventer components.

<table>
<thead>
<tr>
<th>Part</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>12</td>
</tr>
<tr>
<td>Bonnet</td>
<td>5</td>
</tr>
<tr>
<td>Lock Screw</td>
<td>3</td>
</tr>
<tr>
<td>Lock Screw Housing</td>
<td>4</td>
</tr>
<tr>
<td>Ram Change Cylinder</td>
<td>9</td>
</tr>
<tr>
<td>Operating Cylinder</td>
<td>8</td>
</tr>
<tr>
<td>Operating Piston</td>
<td>7</td>
</tr>
<tr>
<td>Ram Assembly</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate Flange</td>
<td>6</td>
</tr>
<tr>
<td>Bonnet Door Seal</td>
<td>2</td>
</tr>
</tbody>
</table>
33. When using the Driller’s Method of well control with pipe in the hole can you circulate if...

A. The upper pipe rams are closed?
   YES (Correct Answer) NO
B. The annular preventer is closed
   YES (Correct Answer) NO
C. The lower pipe rams are closed
   YES NO (Correct Answer)

34. From the diagram with the well shut in....

A. Can you repair the side outlets with pipe in the hole?
   YES (Correct Answer) NO
B. Can you repair the outlets with no pipe in the hole?
   YES NO (Correct Answer)
C. Is it possible to shut in on drill pipe in the hole and circulate through the drill pipe?
   YES (Correct Answer) NO
35. From the diagram with the well shut in........

A. With drill pipe in the hole can we repair the side outlets?
   YES          NO (Correct Answer)

B. With no drill pipe in the hole, can you shut in and repair the drilling spool?
   YES          NO (Correct Answer)

C. With drill pipe in the hole, can you circulate across the drilling spool?
   YES (Correct Answer)   NO
36. Match the numbers to the following parts in the picture below.

- Lower Ram Assembly: 7
- Top Seal: 6
- Side Packers: 4, 5
- Blade Packer: 3
- Upper Body: 2
- Upper Ram Assembly: 1
37. Using the remote panel we close the annular preventer. Which **TWO** gauges on the panel reduce in pressure?

A. Air  
B. **Annular (Correct Answer)**  
C. Manifold  
D. **Accumulator (Correct Answer)**  
E. By-pass

38. When drilling, the 4-way valves on the BOP accumulator unit should be in which position?

A. Open  
B. Closed  
C. Neutral  
D. **Open or closed depending on the BOP stack function (Correct Answer)**

39. While testing the BOP stack, it is noticed that well bore fluid is leaking past the weep hole. Which of the following best describes the proper action to be taken?

A. Energize the plastic seal and repair the BOP at the next scheduled maintenance  
B. **A primary seal is leaking. Immediately secure the well and renew the seal. (Correct Answer)**  
C. The ram packer is leaking due to wear. Change the worn packer.  
D. Do nothing, the seal requires a slight leak for lubrication purposes.