PHASE 1 INSTRUMENTS

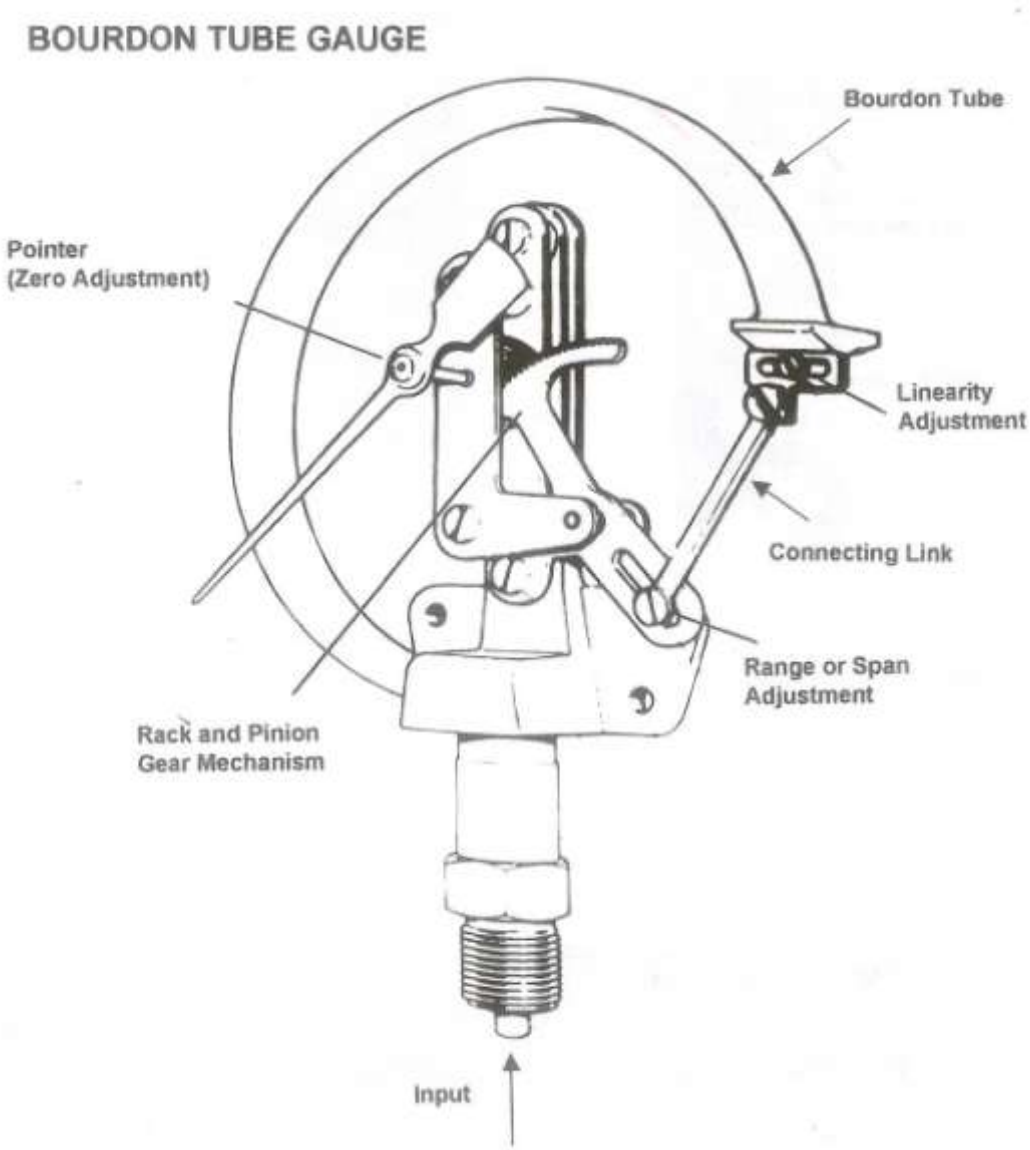
Project Write-up

Name:…… Group:……

Module Title: Pressure Measurement MODULE NO: I-3

PROJECT DESCRIPTION: Bourdon Tube Gauges

Project No: 3 a Objective Nos: 6, 7, 8, 11,14,15,18.



PROJECT WRITE UP SHEET (generic)

Instruments Phase I

Principle/Theory of Operation

What does the hairspring do?

How is the zero adjusted?

How is the span adjusted?

How is the linearity adjusted?

What is the purpose of the blow out disc?

In normal, operation whereabouts on the scale should the pointer be? (%)

List the tube materials used and their respective pressure ranges.

1

2

3

What is a receiver gauge?

What is the scale on a receiver gauge normally scaled in?

What is another name for the diaphragm gauge?

What is the bursting disc gauge designed to do?

How can a gauge be connected to the process?

Why are pigtails or siphons used?

PHASE 1 INSTRUMENTS

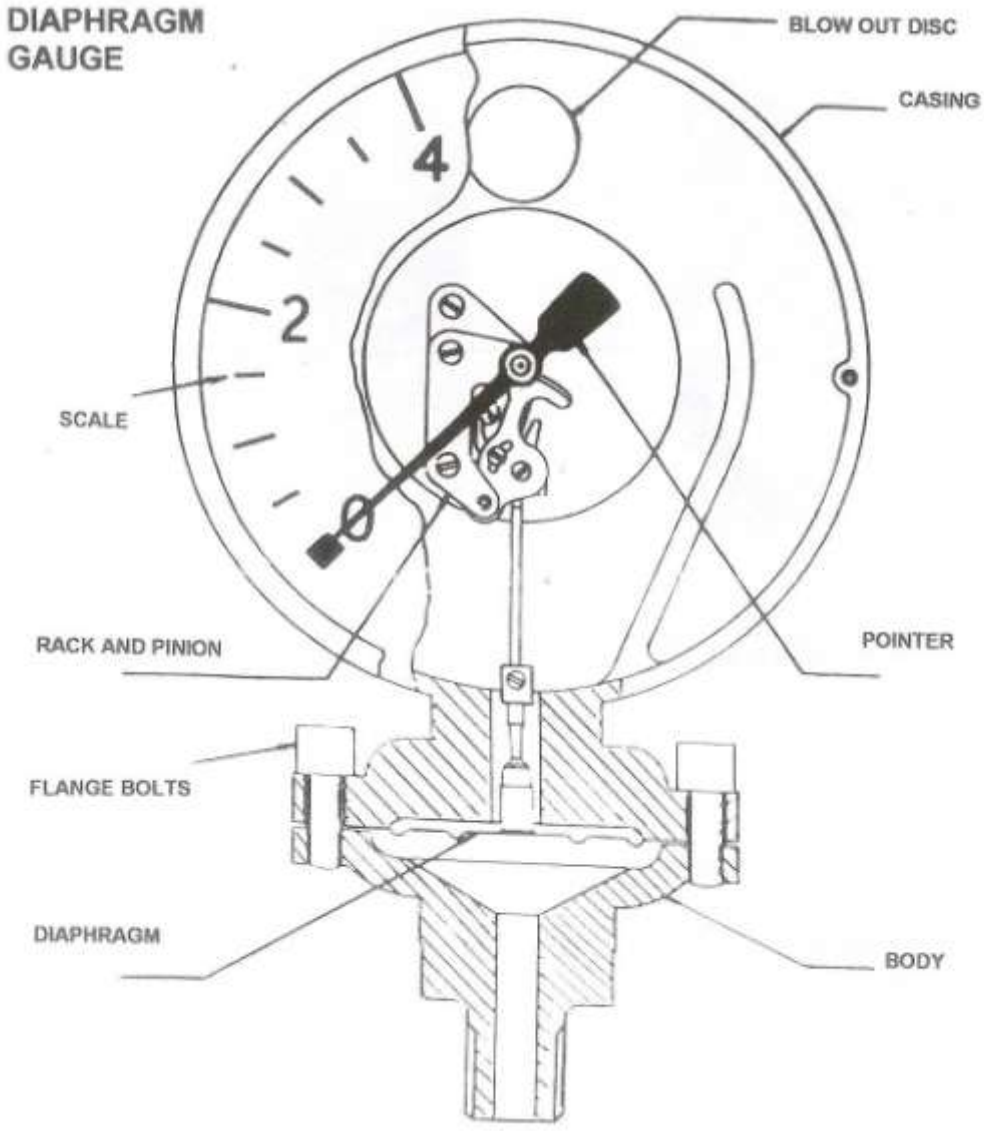
Project Write-up

Name:…… Group:……

Module Title: Pressure Measurement MODULE NO: P1 005 1

PROJECT DESCRIPTION: Diaphragm or Schaffer Gauge

Project No: 3 b Objective Nos: 6, 7, 8, 11,14,15,18.



PROJECT WRITE UP SHEET (generic)
Instruments Phase I

Principle/Theory of Operation

What would the area of the diaphragm be for a gauge measuring

low pressures -

high pressures -

What is a major advantage of a diaphragm gauge?

PHASE 1 INSTRUMENTS

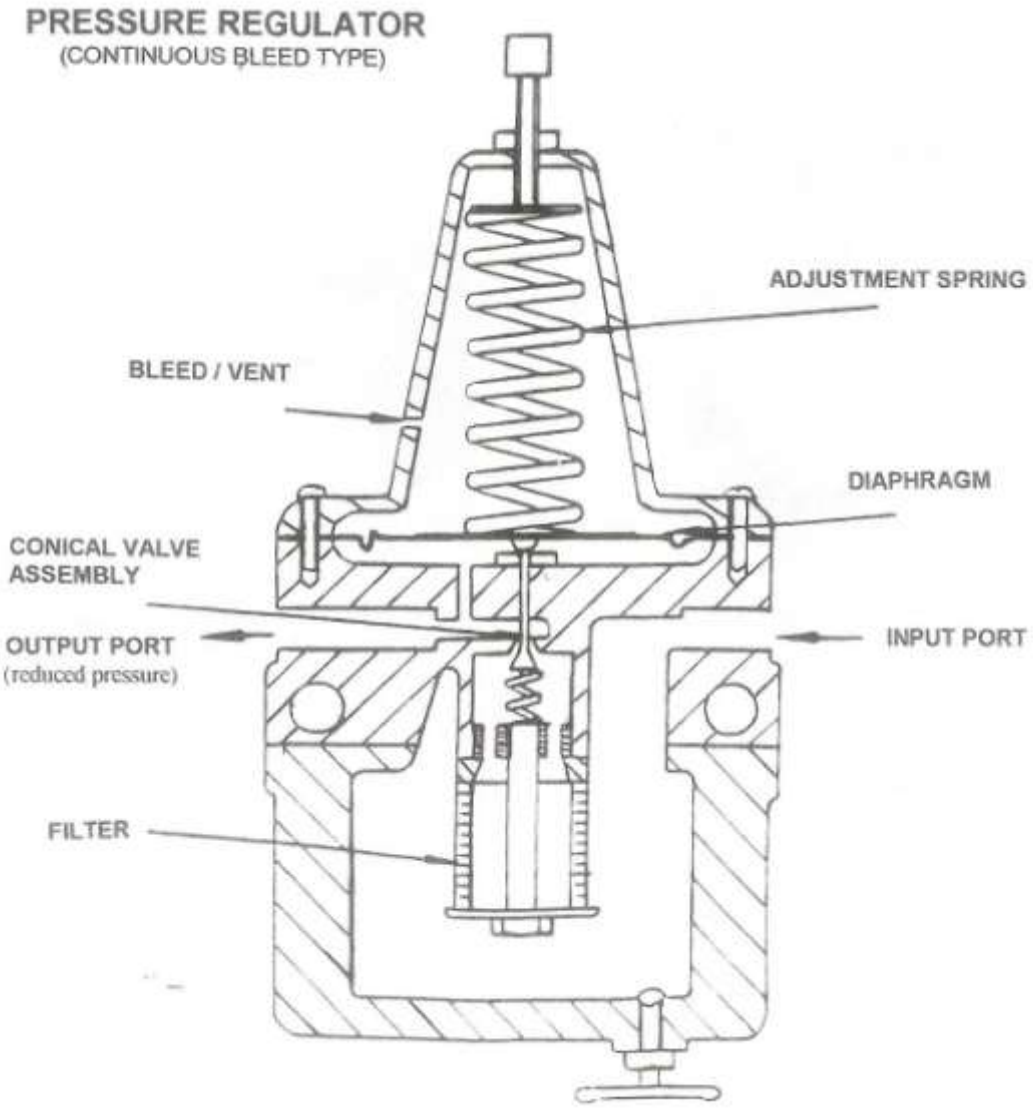
Project Write-up

Name:…… Group:……

Module Title: Pressure Measurement MODULE NO: P1 005 1

PROJECT DESCRIPTION: Pressure Regulator

Project No: P5 Objective Nos: 12, 13, 19.



PROJECT WRITE UP SHEET (generic)
Instruments Phase I

Principle/Theory of Operation

What is the purpose of a regulator?

What varieties are there and which would normally be used in instrumentation?

On what application would non bleed regulators be used?

What is the drain valve used for?

PHASE 1 INSTRUMENTS

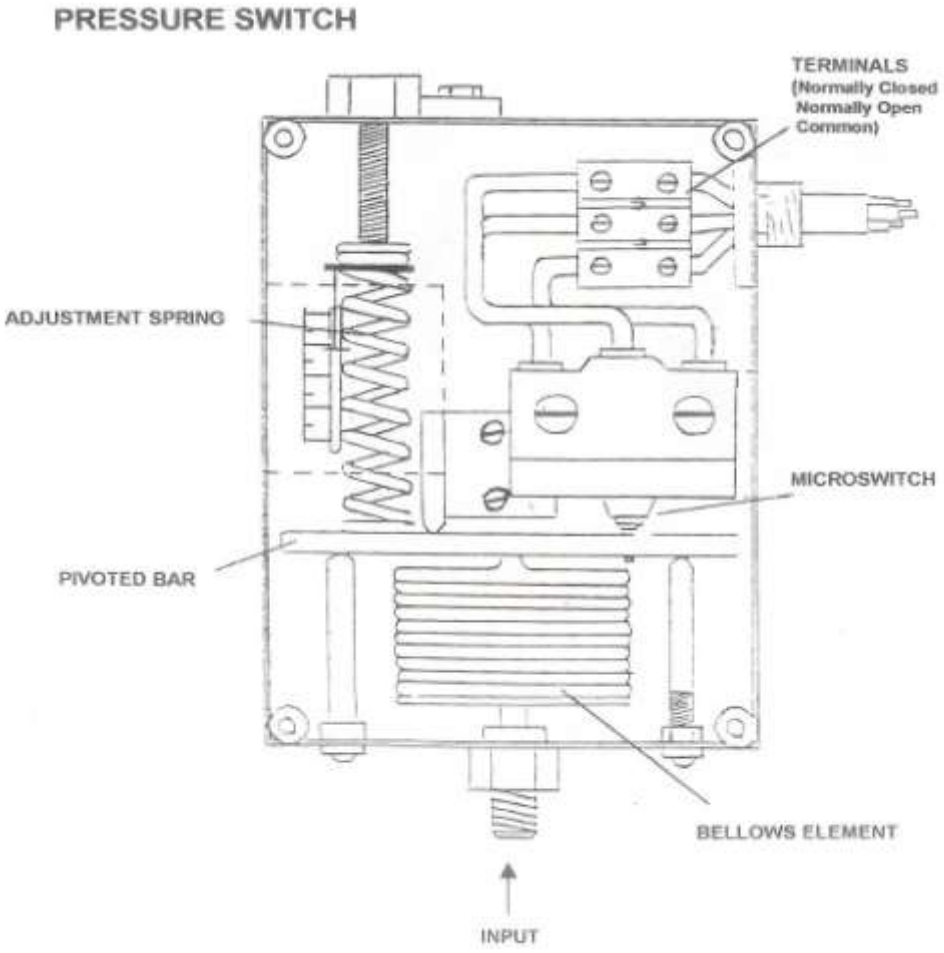
Project Write-up

Name:…… Group:……

Module Title: Pressure Measurement **MODULE NO: P1 005 1**

PROJECT DESCRIPTION: Pressure Switch

Project No: P6 **Objective Nos: 15, 20.**



PROJECT WRITE UP SHEET (generic)
Instruments Phase I

Principle/Theory of Operation

Name the three types of pressure elements used in a pressure switch and their respective pressure ranges.

How is the alarm position changed?

What does ‘micro’ in microswitch refer to?

What is meant by ‘failsafe’?

PHASE 1 INSTRUMENTS

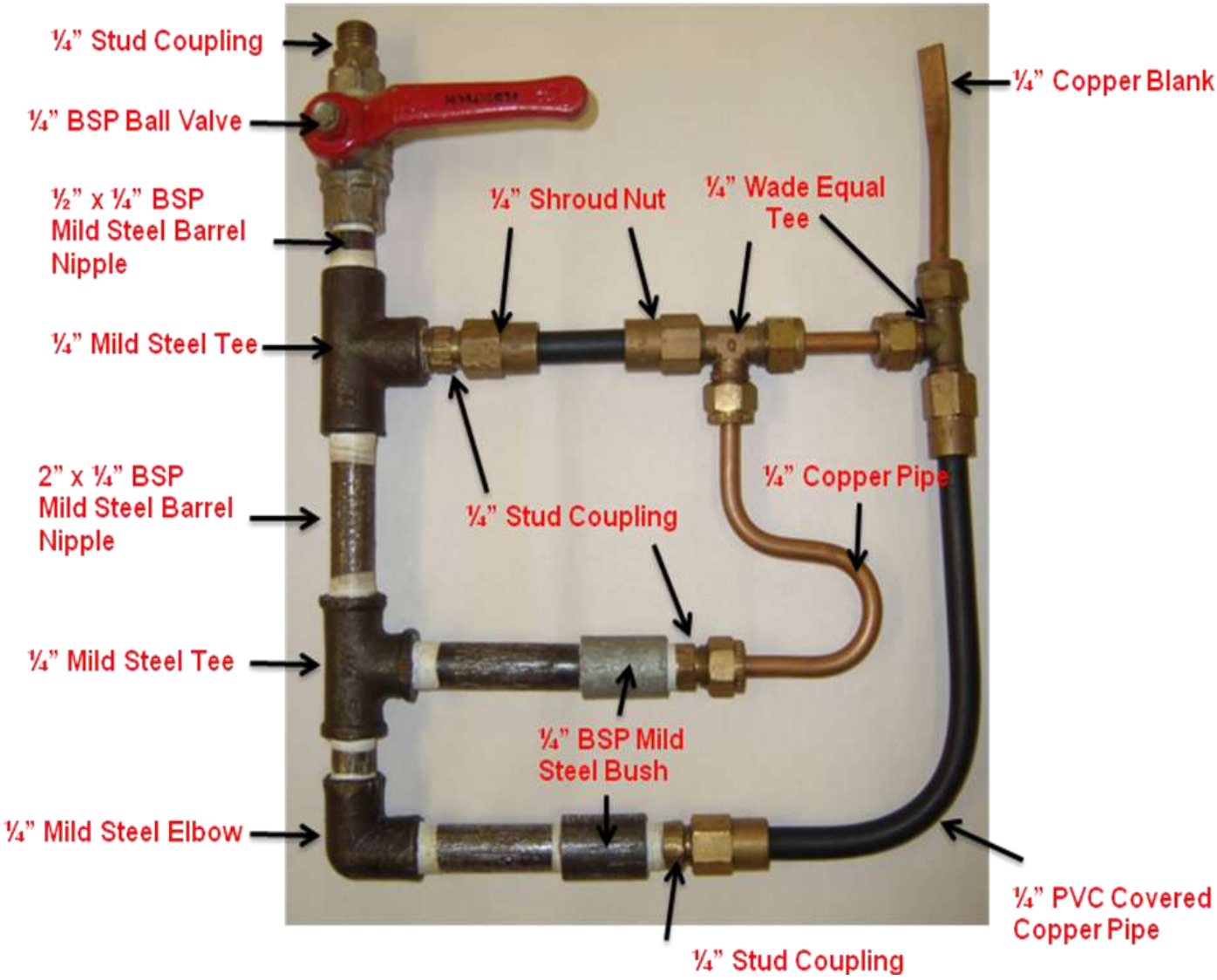
Project Write-up

Name:…… Group:……

Module Title: Pressure Measurement **MODULE NO: P1 005 1**

PROJECT DESCRIPTION: Pipes and Pipefittings

Project No: P7 **Objective Nos: 16, 17.**



PROJECT WRITE UP SHEET (generic)
Instruments Phase I

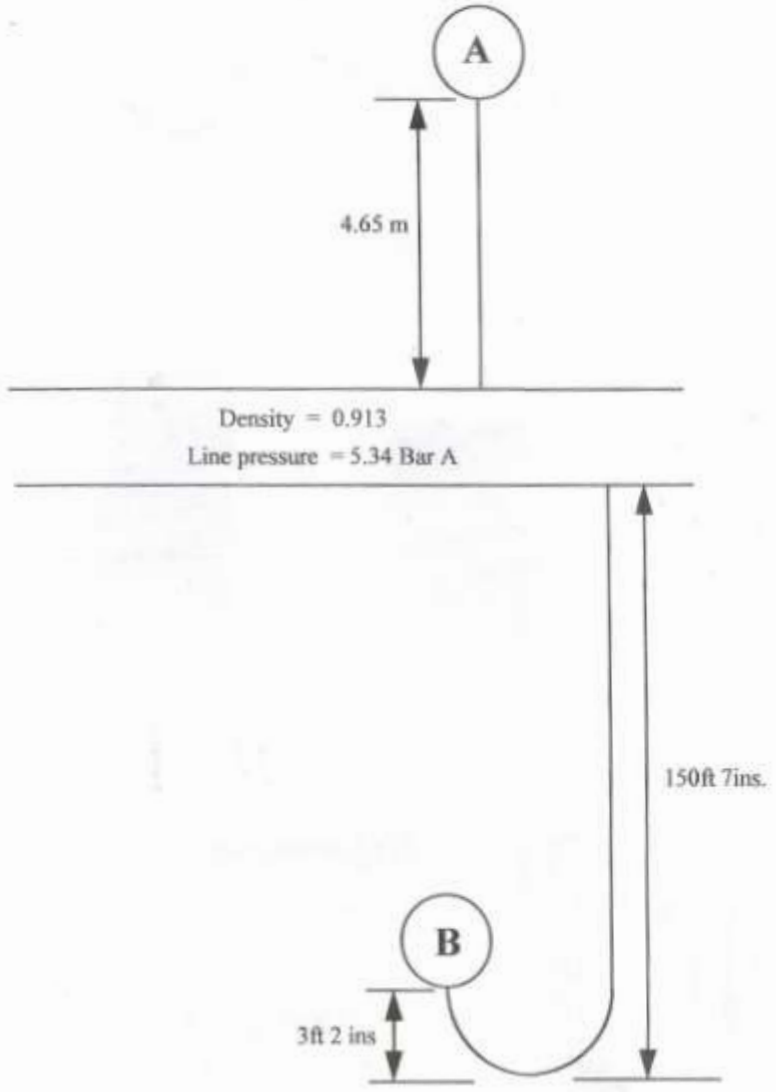
1	Principle/Theory of Operation
2	Practical Applications
3	Common Faults/Limitations

4	Maintenance/Overhaul Guidelines
5	Specific Installation Requirements:
6	Additional Notes

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

PROJECT P1 - Calculate the readings on gauges A and B in pressure units of psi

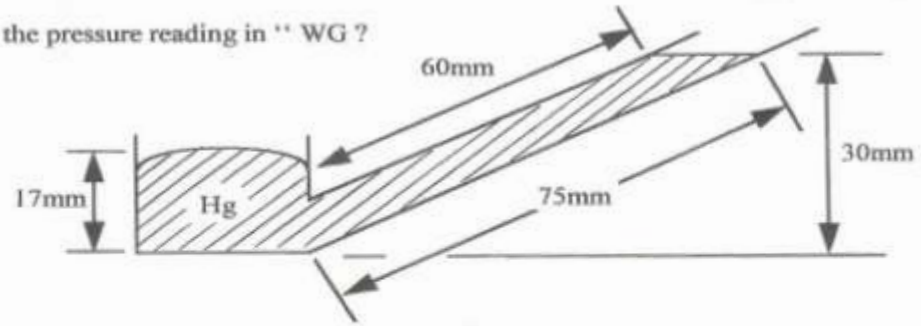


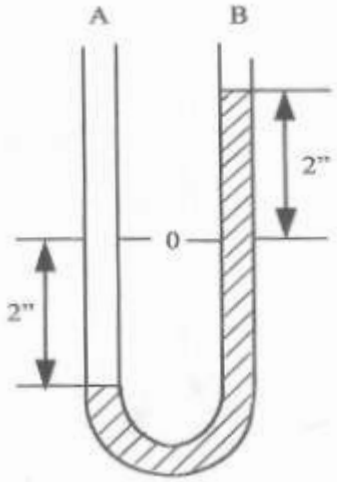
PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

PROJECT P2

What is the pressure reading in '' WG ?





1) What is the pressure reading on the Manometer ?

.....

2) On which leg would a +ve pressure have been applied ?

.....

3) On which leg would a -ve pressure have been applied ?

.....

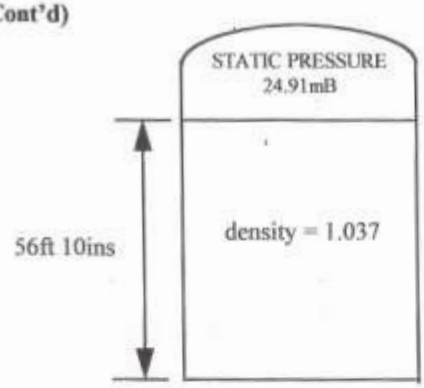
How could the range of the manometer be increased without altering its physical size?

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

OBJECTIVENos:.16,17

PROJECT P2 (Cont'd)



1) What is the pressure at the base of the tank (answer in units of " Hg)

2) What is the differential pressure between the base of the tank and the vapour space at the top. (Answer in "wg)

3) Calculate the pressure applied to an area of 98sq. ft by a force of 400 tons

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

1. Using a graph, briefly explain the difference between _____and _____ pressure.

_____ - zero is at _____

_____ - zero is at atmospheric _____

2. To convert from absolute to _____ pressure, we _____ 14.7 psi.

When testing the contacts on a switch, we use the _____ or the

_____ range on a multimeter. Prior to performing the test, the

leads should be _____ which will give a reading of _____ ohms

or the meter should _____ if on the _____ range.

3. If a receiver gauge was reading below the zero mark on the scale, the cause/causes could be –

a/ _____

b/ _____

c/ _____

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement MODULE No. P1 005 1

4. If the drain plug on a regulator was opened and water came out, the possible cause could be the _____ _____ _____ system on the _____ is not functioning correctly.

5. Draw a simple diagram showing how a pressure gauge would be connected to a vessel, allowing safe removal and draining/venting.

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

1. When would you use a Receiver gauge?

2. When would you use a Bourdon gauge?

3. When would you use a Diaphragm gauge?

4. What is a compound gauge?

5. What is a Duplex gauge?

6. What is special about the scale on a bursting disc gauge?

7. What precautions must you take when fitting a gauge for:

   a) Oxygen duty

   b) Acetylene duty

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement MODULE No. P1 005 1

PROJECT P4:

1. State the basic principle behind the dead-weight tester.

2. If the piston a dead weight tester has an area of 0.125 sq.", how much weight must be applied to achieve a pressure of 160psi?

PROJECT 5:

1. By increasing the force on a Regulator spring, do we?

   a. Increase the output pressure
   b. Decrease the output pressure

2. If we needed to regulate an output pressure at 20psi, how much force do we need to apply to the spring if the diaphragm had a surface area of 12sq."?

3. If we apply this downward force to open the valve inside the regulator, what is it that provides the upward force to close it?

4. What has the greater purity?

   a. Instrument air
   b. General purpose (GP) air

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

PROJECT P6:

Fill in the missing words:

A basic local pressure recorder works by amplifying the small……of a

……or……..via a series

of…….and……..to move

a…….across a paper……

A supply of…….at the pointer's tip, will trace

a……of the pressure being recorded.

Should the pressure element fail on a pressure gauge, it is essential that the fascia glass does not break. To do this, a device called a _____ _____ _____ is used to relieve the pressure at the _____ of the case, thereby reducing the risk.

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement MODULE No. P1 005 1

PROJECT P7:

1. Give a typical example of where a pressure switch may be used.

2. What is meant by rising and falling switch settings?

3. Fill in the blanks:

A pressure switch works when the……..of a bellows element or diaphragm causes a pivoted……..bar to act against an electrical……which then switches an electrical circuit……..or…….

The movement of the bellows or diaphragm is opposed by the……..of a spring which when……..,……..the switch setting.

The microswitch has a choice of normally……..or…….contacts which will either switch the electric circuit on or off when the microswitch has activated.

For……...….alarms, the switch must be calibrated at set on a …….pressure.

For……..…alarms, this must be done on a ……..pressure.

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement MODULE No. P1 005 1

The difference between the points at which a switch activates and then resets is known

as…….. …….and cannot be

accounted for.

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

PROJECT P8:

You will be asked to select and identify the following fittings and state, in each case, if thread tape should be used.

	Yes PTFE	NO
¼" mild steel Barrel Nipple		
¼" mild steel elbow		
¼" mild steel bend		
¼" Wade stud coupling		
¼" Wade straight coupling		
¼" Wade stud elbow		

Make a diagram of the pressure manifold you have made, and identify the components of it.

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

Briefly describe the 2 primary methods used to seal instrument pipework.

Explain how you would carry out a simple pressure test on a small rig and a large system.

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

Calibrate Bourdon tube pressure gauge.

1.

a) Calibrate a bourdon tube gauge, noting it's reading **before** any adjustments are made.

b) Re-calibrate before taking a final set of readings

c) State the type of error(s) you found

0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0 bar	Test pressure (bar)
											Before calibration
											After calibration

T.O. to check calibration

Check the calibration of the gauge by applying bottom scale and top scale pressure values and noting down the readings.

Calibrate the gauge using the appropriate values and note down the readings at appropriate intervals.

If the gauge reading is different to the applied pressure, state what type of error may be causing it.

PHASE 1 INSTRUMENTS

MODULE TITLE: Pressure Measurement **MODULE No. P1 005 1**

Q – If you were asked to calibrate the gauge using values other than 0% and 100% of scale range -, why do you think that is?

EQUIPMENT

Pressure calibration device