

Instrumentation Specialist Job Interview Questions And Answers



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Instrumentation Specialist Interview Questions And Answers Guide.

Question - 1:

Explain what is the use of double seated valve?

Ans:

In double seated valves the upward and downward forces on the plug due to reduction of fluid pressure are nearly equalized. It is generally used on bigger size valves and high pressure systems. Actuator forces required are less.

[View All Answers](#)

Question - 2:

Tell me what happens if transmitter wires get shorted?

Ans:

The barrier if installed limits electrical energy flowing into hazardous area. If there is no barrier, typically a fuse in the power distribution system will blow.

[View All Answers](#)

Question - 3:

Explain how pressure limit switch occurs?

Ans:

A pressure switch typically consists of a spring-loaded plunger actuated by process pressure to operate a micro switch. The pressure at which the micro switch operates is dependent upon spring force, which may be varied by an adjusting nut.

[View All Answers](#)

Question - 4:

Tell me what is the use of single seated valve?

Ans:

The single seated valve is used on smaller sizes where an absolute shut off is required. The use of single seated valve is limited by pressure drop across the valve in the closed or almost closed position.

[View All Answers](#)

Question - 5:

Tell me how the sizes of proximity switches are selected?

Ans:

The sizes of proximity switches are selected based on sensing distance and mounting requirements.

[View All Answers](#)

Question - 6:

Explain what will happen if thermocouple wires get shorted?

Ans:

A cold junction compensated instrument will typically indicate temperature of the location where the T/C wires are shorted.

[View All Answers](#)

Question - 7:

Explain what is solenoid valve? Where it is used?

Ans:



A solenoid is electrically operated valve. It consists of solenoid coil in which magnetic plunger moves. This plunger is connected to the plug and tends to open or close the valve. There are two types of solenoid valves:

1. Normally Open
2. Normally closed

Use: It is used for safety purpose in different electric work

[View All Answers](#)

Question - 8:

Tell me how D.P. transmitter can be applied to close tank?

Ans:

In closed tank, bottom of the tank is connected to the high pressure side of the transmitter. Top of tank is connected to the lower pressure side of the transmitter. In this way vessel pressure can be measured.

[View All Answers](#)

Question - 9:

Tell me what is SPDT relay?

Ans:

The term SPDT refers to single-pole-double-throw relay contact.

[View All Answers](#)

Question - 10:

Do you know types of instrument cables?

Ans:

IS cables & NIS cables

IS - Intrinsic safety & NIS - Non Intrinsic safety

Which cable to use, depends upon hazards condition.

[View All Answers](#)

Question - 11:

Explain difference between PSV & PRV?

Ans:

A pressure safety valve is used to relieve overpressure by releasing relatively small volumes of material and installed on smaller vessels. A pressure relief valve is used to relieve overpressure by releasing relatively large volumes of material and installed on large vessels/tanks.

[View All Answers](#)

Question - 12:

Tell me how do you identify an orifice in the pipeline?

Ans:

An orifice tab is welded on the orifice plate which extends out of the line giving an indication of the orifice plate.

[View All Answers](#)

Question - 13:

Explain construction of micro switch?

Ans:

A microswitch is a small switch consisting of a tiny springloaded plunger which operates an electrical contact when actuated. This arrangement is encaged in a plastic housing. It is very commonly found in pressure switches.

[View All Answers](#)

Question - 14:

Explain what is adapter flange?

Ans:

It is a transmitter part for allowing process connection to pipe/tube.

[View All Answers](#)

Question - 15:

Tell me what is the full form of ASTM standard?

Ans:

ASTM stands for American Society for Testing of Materials.

[View All Answers](#)

Question - 16:

Explain application of PCV?



Ans:

A pcv is a self-actuated pressure control valve used to maintain upstream or downstream pressure at a set pressure using force from the process fluid if necessary.

[View All Answers](#)

Question - 17:

Do you know what is Zero speed?

Ans:

In some equipments a speed below a threshold value but close to zero is referred to as zero speed.

[View All Answers](#)

Question - 18:

Explain what is the sensor used in coriollis mass flow meter to measure density?

Ans:

Density is measured here by measuring the resonant frequency of a vibrating U-tube.

[View All Answers](#)

Question - 19:

Tell me when do we use SOV of rating 110vac and 110vdc?

Ans:

Primarily depends upon the availability of reliable power supply source.

[View All Answers](#)

Question - 20:

Tell me what is differences between DCS & PLC?

Ans:

Distributed control system(DCS) and Programmable logic controller. These are the control systems which handles fields I/Os.

[View All Answers](#)

Question - 21:

Explain what does DN stand for in valve size?

Ans:

DN stands for Diameter Nominal. It is a flange size of the valve.

[View All Answers](#)

Question - 22:

Do you know what is the working of Rota meter?

Ans:

Variable area meters are special form of head meters. Where in the area of flow restrictor is varied. So as to hold the differential pressure constant. The rota meter consists of a vertical tapered tube through which the metered fluid flows in upward direction. As the flow varies the 'float' rises or falls to vary the area of the passages that the differential across it balances the gravitational force on the 'float'. The differential pressure is maintained constant. The position of the 'float' is the measure of the rate of flow.

[View All Answers](#)

Question - 23:

Tell me what is control valve sizing?

Ans:

Control valve sizing refers to calculation of flow capacity of a valve for a given fluid, operating conditions and piping arrangement.

[View All Answers](#)

Question - 24:

Tell me in which applications do we use 4 wire RTD?

Ans:

Three wire is a better alternative. Primary objective of 3-wire and 4-wire arrangements to eliminate effects of lead resistance on temp. measurement.

[View All Answers](#)

Question - 25:

Do you know instrument JB's?

Ans:

Instrument JB's depend upon hazards area classification.

JB's also can be IS or NIS

For IS signal IS JB's used for NIS signal NIS JB's used



For analog I/p & o/p signal we can use same JB.

But for Digital I/p & o/p we have to use separate JB's. Because digital outputs are powered signal, by wrong connection there may be chances to damage the card.
For DCS I/p & o/p and PLC I/p & o/p we used separate JB's.

[View All Answers](#)

Question - 26:

Tell me how Control loop should be tuned in process loop?

Ans:

You may use Ziegler-Nichol's method (open loop / closed loop) or special tuning software tools.

[View All Answers](#)

Question - 27:

Tell me how is cold junction compensation in thermocouple carried?

Ans:

This is typically performed in modern programmable instruments by means of measuring actual reference junction temperature using a temperature sensor mounted close to the ref. junction and compensating for the same using appropriate look-up table stored within the instrument's memory.

[View All Answers](#)

Question - 28:

Tell me what does BENCH RANGE refer to in an actuator?

Ans:

The bench range/set of an actuator/control valve combination refers to the air pressure required to fully open/close the valve out of line when it is not subjected to process fluid forces.

[View All Answers](#)

Question - 29:

Explain how spectacle blind occurs?

Ans:

A spectacle blind is a blind plate and a plate with line size bore connected together and installed between pipe flanges. This blind may be reversed to blind/deblind a line. It also provides a visual clue as to whether a line is blinded at that location or not.

[View All Answers](#)

Question - 30:

Explain how would you choose differential range?

Ans:

The most common range for differential range for liquid measurement is 0-100. This range is high enough to minimize the errors caused by unequal heads in the seal chambers. It is also dependent on the differences in the temperature of the load lines. The 100 range permits an increased in capacity up to 400. While decrease down up to 20 by merely changing the range tubes or range adjustments.

[View All Answers](#)

Question - 31:

Tell me what is the Relationship between AWG & mm²?

Ans:

A) AWG was used prior SI standards to specify the diameter of the core of the electrical wires.

B) Both awg and mm² are used to specify size of cross section of a wire/conductor. The relationship is found in a standard table - westermann's tables.

[View All Answers](#)

Question - 32:

Tell me what are examples of temperature elements?

Ans:

Thermocouples & RTD's.

[View All Answers](#)

Question - 33:

Explain what is Ground Loop? Preventive steps to avoid ground loop?

Ans:

When ground wiring is not done properly, grounding of various points is not effective and potential differences exist between them resulting in currents flowing between them. This leads to measurement errors and is not desirable. It can be eliminated by proper ground wiring.

[View All Answers](#)

Question - 34:

Explain what is force balance principle? State some of its' advantages?



Ans:

Force balance principle: A controller which generates an output signal by opposing torque. The input force is applied on the input bellows which moves the beam. This crackles nozzle back pressure. The nozzle back pressure is sensed by the balancing bellows which brings the beam to balance. The baffle movement is very less about 0.002 for full scale output.

Advantages:

- Moving parts are fewer.
- Baffle movement is negligible
- Frictional losses are less

[View All Answers](#)

Question - 35:

Explain why control mode specification is given in the data sheet of the transmitter?

Ans:

Not mandatory. This is controller specification. Direct OR reverse.

[View All Answers](#)

Question - 36:

Explain what is auto cut in of the pump?

Ans:

Auto cut in of pump refers to automatic startup of a standby pump when a running pump stops or when level in a vessel being emptied becomes high.

[View All Answers](#)

Question - 37:

Explain what is the constant voltage unit?

Ans:

The constant voltage circuit consists of a rectifier, CR and a filter capacitor. It is followed by two stages of zener regulation. A bridge configuration is provided to lamp line voltage zener regulation. Regulation 1 and regulation 2 provides relatively provide constant current. Resistors form a bridge that may remoment line voltage effects.

[View All Answers](#)

Question - 38:

Tell me what is differential tracking system?

Ans:

In differential tracking system set point changes with change in process value in one direction. E.g. there is trip of OMS in MEG plant on high oxygen flow (with diff tracker). Trip value is say 10% more than normal process value. Now suppose process value is reducing than trip set value will also reduce keeping 10% difference. If process value increased than trip set value will not increase and system will trip when trip set value is reached by process value.

[View All Answers](#)

Question - 39:

Tell me how D.P. transmitter can be applied to open tank?

Ans:

In open tank the lower pressure side is vented to the atmosphere. All pressure is applied to the high pressure side. This vessel pressure is measured through high pressure side.

[View All Answers](#)

Question - 40:

Tell me how to decide cable tray size?

Ans:

According to the no. of cable occupancy in the cable tray and available tray size we have to choose it. they are available in foll. types 80, 150, 300, 450, 600 & 900.

[View All Answers](#)

Question - 41:

Do you know what is open loop & close loop?

Ans:

OPEN LOOP : This is nothing but to sense the process signals from the field and to send it to the control room for operator observation.

CLOSE LOOP : This is measuring the process signals for operator's action. Means Tx sense the process and send it to the control room. Where the operators takes action i.e. control action and that given to the final control element as per the process requirement.

[View All Answers](#)

Question - 42:

Tell me how can we say that the given RTD or Thermocouple is correct?

Ans:

We can only measure sensor output (resistance / maillots) accurately and look-up corresponding temperature in reference tables. The accuracy depends upon quality / condition of the sensor. Degraded sensors may not give accurate readings and must be replaced. To test a sensor, the sensor response may be tested using a high



quality temperature calibrator and compared with reference tables.

[View All Answers](#)

Question - 43:

Explain how will you test a transistor with a multimeter?

Ans:

1. Emitter +ve of meter and base -ve output =Low resistance
2. Emitter -ve of meter and base +ve output =High resistance
3. Collector +ve and base -ve output =Low
4. Collector -ve and base +ve output =Low

Emitter: Collector = High resistance

PNP: Opposite Results

[View All Answers](#)

Question - 44:

Tell me what is the use of the diode in series to the coil in a relay?

Ans:

A diode is often used in parallel with a relay coil to dissipate energy stored in coil inductance when the coil is disconnected from the electric circuit. It is also known as freewheeling diode.

[View All Answers](#)

Question - 45:

Tell me why is dead band (Reset and Set) values kept in proximity switch?

Ans:

I think the question is wrong - it should read pressure switch and not proximity switch. Set and reset points are kept different to avoid chattering of switch contact at the set point and provide a stable switching action.

[View All Answers](#)

Question - 46:

Tell me what is furnace draft control?

Ans:

Balanced draft boilers are generally used negative furnace pressure. When both forced draft and induced draft are used together, at some point in the system the pressure will be same as that of atmosphere. Therefore the furnace pressure must be negative to prevent hot gas leakage. Excessive vacuum in the furnace however produces heat losses through air infiltration. The most desirable condition is that the one have a very slight negative pressure of the top of furnace.

[View All Answers](#)

Question - 47:

Do you know about the burnout feature?

Ans:

Burnout provides the warnsg feature of driving indicator at the end of scale, if the input circuit is open. A burnout resistor is provided which develops a voltage drop between the measuring circuit and amplifier. The polarity of the signal determines the direction of the servo drive upon an open circuit in the input.

Upscale burnout: R value 10 M

Downscale burnout: R value 22 M

[View All Answers](#)

Question - 48:

Explain me why is the orifice tab provided?

Ans:

Following reasons justify for providing orifice tab:

1. Indication of orifice plate in a line
2. The orifice diameter is marked on it.
3. The material of the orifice plate.
4. The tag number of the orifice plate.
5. To mark the inlet of an orifice.

[View All Answers](#)

Question - 49:

Tell me what is the working principle of the magnetic meter?

Ans:

An electric potential is developed when a conductor is moved across the magnetic field. In most electrical machinery the conductor is a wire. The principle is equally applicable to a moving, electrically conductive liquid. The primary device of commercial magnetic meters consist of straight cylindrical electrically insulated tube with a pair of electrodes nearly flush with the tube walls and located at opposite end of a tube diameter. This device is limited to electrically conducting liquids. The magnetic meter is particularly suited to measurement of slurries and dirty fluids.

[View All Answers](#)



Question - 50:

Tell me how Cold Junction Compensation is done for thermocouples?

Ans:

Cold junction compensation is done for temperature measurement using thermocouples. The t/c output is a function of temp. at hot junction as well as temp. at ref. junction. In order to measure hot junction temp. accurately, it is necessary to measure ref. junction temperature and compensate for its variation. This is done by modern digital instruments, by using a ref. junction temp. sensor to measure cold junction temp., and compensating for it using a look-up table corresponding to the t/c.

[View All Answers](#)

Question - 51:

Explain what does ARRH and # refer to in valve specification?

Ans:

AARRH refers to average roughness height and is a measure of roughness of sealing surface of a flange. The # refers to ANSI class of flange/valve and is indicative of its pressure rating.

[View All Answers](#)

Question - 52:

Tell me what is zener diode? What is voltage regulator?

Ans:

The breakdown region of a p-n diode can be made very sharp and almost vertical diodes with almost vertical breakdown region are known as zener diodes. A zener diode operating in the breakdown region is equivalent to a battery. Because of this current through zener diode can change but the voltage remains constant. It is this constant voltage that has made the zener diode an important device in voltage regulation.

Voltage regulator: The output remains constant despite changes in the input voltage due to zener effect.

[View All Answers](#)

Question - 53:

Explain what is cable tray? Its type? Its size? Its support?

Ans:

Cable tray is nothing but the way or media through which we lay the field cables in plant. There are two basic types

- 1) Ladder type (made in Rungs type construction)
- 2) Perforated Type (Solid sheath consist of Holes for ventilation). Basically discussing about tray support than we could say it depends on the site conditions. Only care has to be taken considering adequate space for laying cable, considering their bends. Etc.

[View All Answers](#)

Question - 54:

Tell me while making Datasheets which things are to be considered?

Ans:

Basically it depends on the instrument item for which you are preparing the datasheet. As an Example. Temperature Element. We have collect following information to prepare D/s.

- 1) Type of Temperature Sensor (T/C or RTD, in case of T/c which type J,K,R,S etc.)
 - 2) Head details a: Screw-cap and chain, b: material, c: conduit connections, d: terminal block > single or duplex.
 - 3) Thermowell Details a: material, b: Construction, c: dimension, e: connection. Etc.
- In case of valve 1) Process Details 2) Material of construction (Valve body, Trim),
3) Operating action,
4) Type of operating characteristics
5) Stroke time 6) Accessories attached Etc.

[View All Answers](#)

Question - 55:

Explain what are Analog Input/output & Digital Input/output?

Ans:

4-20 mA signals from instrument (transmitters) are analog input to control system.

4-20 mA signals to instrument (I/p & electro pneumatic positioner) are analog output from control system.

Volt free (24V) contact (NO/NC) by instruments (all type of switches, ex. Limit switch, press,temp,flow,level switch) are digital input to control system.

All powered signals (24V,48V,110V....) from system to instruments (SOV) are Digital outputs.

[View All Answers](#)

Question - 56:

Explain what is intrinsically safe system?

Ans:

Intrinsic safety is a technique for designing electrical equipment for safe use in locations made hazardous by the presence of flammable gas or vapours in the air. Intrinsically safe circuit is one in which any spark or thermal effect produce either normally or under specified fault conditions is incapable of causing ignition of a specified gas or vapour in air mixture at the most ignited concentration.

[View All Answers](#)

Question - 57:



Explain me what is orifice sizing and how it is done?

Ans:

Orifice sizing is done using following information:

- 1) flow measurement range
- 2) corresponding diff. Pressure
- 3) piping dimensions
- 4) tap locations
- 5) fluid properties at operating conditions (like density/temp/pressure etc.) Standard formulas are used.

[View All Answers](#)

Question - 58:

Tell me what are different types of control valves?

Ans:

The commonly used control valves can be defined as follows:

- a. Depending on Action:
Depending on action there are two types of control valves 1. Air to close 2. Air to open
- b. Depending on body:
Depending on body there are 4 types of control valves
 1. Globe valves single or double seated
 2. Angle valves
 3. Butterfly valves
 4. Three way valves

[View All Answers](#)

Question - 59:

Do you know what are de-saturators?

Ans:

When, in some processes, e.g. batch processes, long transient responses are expected during which a sustained deviation is present the controller integral action continuously drives the output to a minimum or maximum value. This phenomenon is called 'integral saturation of the control unit'. When this condition is met, then this unit is de-saturated.

[View All Answers](#)

Question - 60:

Do you know what are different types of orifice plates? State their uses?

Ans:

Different orifice plates are: 1. Concentric 2. Segmental 3. Eccentric

* Concentric: These plates are used for ideal liquid as well as gases and steam service. Concentric holes are present in these plates, that's why it is known as concentric orifice.

* Segmental: This plate has hole in the form of segment of the circle. This plate is used for colloidal and sherry flow measurement.

* Eccentric: This plate has the eccentric holes. This plate is used in viscous and sherry flow measurement.

[View All Answers](#)

Question - 61:

Do you know Bernoulli's theorem. State its application?

Ans:

Bernoulli's theorem states that the 'total energy of a liquid flowing from one point to another remains constant'. It is applicable for non-compressible liquids. For different types of liquid flow Bernoulli's equation changes. There is direct proportion between speed of fluid and its dynamic pressure and its kinetic energy. It can be used in various real life situations like measuring pressure on aircraft wing and calibrating the airspeed indicator. It can also be used to low pressure in the venturi tubes present in carburetor.

[View All Answers](#)

Question - 62:

Tell me the working of an electronic level troll?

Ans:

The variation in level of buoyancy resulting from a change in liquid level varies the net weight of the displacer increasing or decreasing the load on the torque arm. This change is directly proportional to change in level and specific gravity of the liquid. The resulting torque tube movement varies the angular motion of the rotor in RVDT providing a rotor change proportional to the rotor displacement, which is converted and amplified to a D.C. current.

[View All Answers](#)

Question - 63:

Explain me why thermo wells are used? What materials are used in thermo wells?

Ans:

In numerous applications, it is neither desirable nor practical to expose a temperature sensor directly to a material. Wells are therefore used to protect against damage corrosion, abrasion, and high pressure processes. A thermo well is also useful in protecting a sensor from physical damage during handling and normal operations.

Materials used in thermo wells: Stainless steel, Inconel, Monel, Alloy Steel, Hastelloy

[View All Answers](#)



Question - 64:

Tell me why do we use pipelines for transmitters in steam service and tubes in any other service?

Ans:

A) Pipe as well as tubes can be used for steam line transmitters. However pipe walls being thicker provide more corrosion allowance.
B) For steam services, with high temp and pressure needs IBR standard. Max. Working pressure is 153 kg/cm² at 38 degC for 1/2" O.D tube as per design standard. So tube is not suitable.

[View All Answers](#)

Question - 65:

Tell me why is earthing provided in the rack room if the power supplies present are floating?

Ans:

Earthing is provided in rack room for purpose of safety. Even if power supplies are kept floating.

[View All Answers](#)

Question - 66:

Tell me where should we use top mounted or side mounted level switch?

Ans:

The type of switch to use depends on size of the vessel and the location of actuating level. If the vessel is small or actuating level is near the top, top mounted switch can be used. In a large vessel with intermediate actuation points, side mounted switch is used. A top mounted switch needs a stilling well.

[View All Answers](#)

Question - 67:

Tell me what is the difference between a protocol and a field bus?

Ans:

A protocol defines a standard method for communications. A fieldbus is a multi dropping arrangement where multiple instruments communicate with special interface hardware using the same pair of wires and in most of the cases draw power from the same pair of wires.

[View All Answers](#)

Question - 68:

Tell me what if thermocouple wire is opened in the field? What signal goes to DCS?

Ans:

In most modern instruments the signal may be programmed to go to either maximum or minimum depending upon end user's requirement.

[View All Answers](#)

Question - 69:

Tell me in a globe type control valve, what is the importance of flow direction (top to bottom or bottom to top)?

Ans:

Control valves must be installed as per direction marking provided by the manufacturers or instruction manuals. Though people tend to generalize, this is often misleading.

[View All Answers](#)

Question - 70:

Explain what is meant by instrument location & JB location?

Ans:

This consist of Instrument location considering the piping drawing given from Piping dept. We identifies the locations of the instrument in the equipment layouts and put the bubbles and elevation and JB nos for the location. Same way depending upon the accessibility we decide the location of JB and marking of it into the instrument location plan is JB location. There is no need to make a different drawing for this.

[View All Answers](#)

Question - 71:

Tell me what is Foundation field bus?

Ans:

FOUNDATION Fieldbus is an all-digital, serial, two-way communications system that serves as the base-level network in a plant or factory automation environment. It is an open architecture, developed and administered by the Fieldbus Foundation.

It is targeted for applications using basic and advanced regulatory control, and for much of the discrete control associated with those functions. Foundation fieldbus technology is mostly used in process industries, but has recently been implemented in powerplants.

Two related implementations of FOUNDATION fieldbus have been introduced to meet different needs within the process automation environment. These two implementations use different physical media and communication speeds.

* FOUNDATION Fieldbus H1 - Operates at 31.25 kbit/s and is generally used to connect to field devices and host systems. It provides communication and power over standard stranded twisted-pair wiring in both conventional and intrinsic safety applications. H1 is currently the most common implementation.

* HSE (High-speed Ethernet) - Operates at 100/1000 Mbit/s and generally connects input/output subsystems, host systems, linking devices and gateways. It doesn't currently provide power over the cable, although work is under way to address this using the IEEE802.3af Power on Ethernet (PoE) standard.

[View All Answers](#)

**Question - 72:**

Tell me what is the significance of single ended & differential ended input for PLC? Application wise comparison of these two types of inputs?

Ans:

Differential inputs provide better common mode rejection and signal-to-noise ratio.

[View All Answers](#)

Question - 73:

Tell me why do we require loop-terminating resistor in any digital communication loop?

Ans:

A minimum loop resistance is required so that modulated current signal produces a modulated voltage signal, which may be detected by the receiving equipment.

[View All Answers](#)

Question - 74:

Tell me what if the power supply connections to a two-wire transmitter get interchanged? What signal will go to DCS?

Ans:

Usually there is a blocking diode to protect the transmitter against supply reversal and almost zero current signal should be transmitted.

[View All Answers](#)

Question - 75:

Explain me how to calculate the safe distance between cables to avoid electromagnetic interference of each other?

Ans:

The design engineers / equipment manufacturers follow/publish certain guidelines w.r.t. different types of cables and the voltages/currents and types of signals carried by them.

[View All Answers](#)

Question - 76:

Tell me in split range control, whether the signal is splitted through I/P convertor or the convertor itself?

Ans:

This can be typically achieved by two ways:

By connecting o/p of one I/P converter to two positioners adjusted suitably for split range operation of control valves. Taking two AO from DCS. Split range to be defined in DCS. Both I/P converters and positioners to be calibrated with input as 4to20 ma dc and 3to15 psi respectively.

[View All Answers](#)

Question - 77:

Explain me why and where do we use seal pots and condensate pots in level transmitters?

Ans:

Seal pots or condensate pots are used to provide buffer volume of liquid for impulse lines where wet leg measurement is used. Small quantities of draining from these lines produces very small changes in head pressure and therefore reduces errors compared to the case when no seal pots are used. Also in many seal pots it is possible to fill liquid into the impulse line when the line is completely drained.

[View All Answers](#)

Question - 78:

Explain what are primary elements of measuring pressure? Which type of pressure can be measured by these elements?

Ans:

Primary elements of measuring pressure are:

- Bourdon Tube
- Diaphragm
- Capsule
- Bellows
- Pressure springs

These elements are known as elastic deformation pressure elements.

[View All Answers](#)

Question - 79:

Explain different parts of a pressure gauge. Explain the use of hair spring in the pressure gauge

Ans:

Pressure gauge includes following components:

- 'C' type bourdon tube.
- Connecting link
- Sector gear
- Pinion Gear
- Hair spring
- Pointer
- Dial

Use of hair spring: Hair spring is responsible for controlling torque. It is also used to eliminate any play into linkages.



[View All Answers](#)

Question - 80:

Tell me while locating Instrument & JB which things we have to consider?

Ans:

Transmitter : Tube routing, maintenance area, man approach, Valve : Hand wheel operations, Maintenance area, Etc. Loop power indicators: Man approach Illumination from Electrical if instrument is not going to provide.

[View All Answers](#)

Question - 81:

Explain what is ATEX directives / FM Approval / CSA approved / CE certified ? What is the importance of individual certification? Are all these certification required for each instruments? Which certification do we prefer?

Ans:

ATEX/FM/CSA certifications generally refer to certification for suitability of instruments for use in hazardous area when installed in accordance with recommended guidelines. Any certification, which is locally acceptable as per statutory requirements, may be used. We typically accept American/European/Indian certifications/approvals in India.

[View All Answers](#)

Question - 82:

Tell me in some cases we have to select the cam position in a control valve for different application? How do we select that?

Ans:

Refer to instruction manual for the positioner / control valve. The cams are often marked with limited amount of information, which may help an experienced person.

[View All Answers](#)

Question - 83:

General Instrumentation Specialist Job Interview Questions:

Ans:

- * How can I make calculation to Install level transmitter (DP) for open tank and close tank?
- * What is difference between DO and DI?
- * What is loop1 and loop2 in MTS LT?
- * How to calibration a control valve?
- * What is dry leg calibration and where is it used?
- * How flow can be measured with dp?
- * Why MMWC unit is used?
- * How HART protocol can be connected with control valves?
- * What is the meaning of slope in PH transmitter?
- * What is Difference between PLC and CNC?
- * If we have 450 mm height boiler drum level, so what is span & zero value for a dpt transmitter?
- * How can level transmitter in closed tank application be used?
- * Why ac supply load cell is used? Can we use the dc supply load cell?
- * What are advantages and disadvantage of the ac supply load cell?
- * What is coriolis principle for mass flow meter?
- * What are the automatic controller MODES?
- * What is Cryogenic?
- * What happen if we install my pressure transmitter below the elevation of pipe in natural gas service?
- * What are the reliability data, like failure rate etc, for Bentley Nevada systems & vibration probes?
- * What is the meaning of wet leg & where is it used?

[View All Answers](#)

Question - 84:

Professional Instrumentation Specialist Job Interview Questions:

Ans:

- * What are the key components of control loop?
- * Working principle of lvdt?
- * What is difference between differential pressure & delta pressure?
- * How to trim the pressure transmitter?
- * What are different types of cable?
- * What is the use of control cable?
- * Which type of diaphragm use in costic line, DM water line, natural gas line, oil line?
- * What are different types of valves?
- * What is the hydra step level sensor output value (measuring level of steam drum)?
- * What is mean by live zero and dead zero?
- * When a magnet is heated?
- * Why the degree of valve plugs and valve seat is slightly different I control valve trim design?
- * What is modbus, profibus, fieldbus?
- * What is the use of gauge?
- * How to calibrate differential pressure switch?

[View All Answers](#)

Question - 85:



Basic Instrumentation Specialist Job Interview Questions:

Ans:

- * How can leveltrol be installed in steam drum for measuring the level of steam drum?
- * What is ultrasonic flowmeter?
- * Differentiate between ultrasonic flowmeter and radar type flow meter.
- * What is the use of temperature compensation?
- * What is modbus?
- * How signals can be taken through modbus?
- * How earthing can be checked?
- * How many ohms are required for proper earthing?
- * Explain signal isolator.
- * Which wiring connection is preferred in motor for industrial use?
- * What do you mean by trim?
- * How DP Transmitter can be calibrated for crude application in floating roof tank?
- * What is the principle of capacitance type level transmitter?
- * How process line mpm calculation is done?
- * Explain PLC Level and its type?
- * What is procedure on mmwc in to tph?
- * How an rtd work, and what volts/current goes to a RTD to measure the resistance?
- * What is consistency transmitter and describe its working?
- * How to calculate MMWC values into tonnes?

[View All Answers](#)

Question - 86:

Tell me why PSV in Cooling water line at outlet of a heat exchanger is required?

Ans:

The PSV in cooling water line at the outlet of a heat exchanger is actually a thermal safety valve and is used to relieve overpressure due to thermal expansion of water.

Comparison of PD meter, turbine meter & Coriolis meter in Custody transfer applications..(Accuracy wise)

A PD meter, a turbine meter or a coriolis meter may all be used in custody transfer. A PD meter or a turbine meter typically deliver accuracy around 0.5% and contain moving parts and require more maintenance and indicate volumetric flow. A good coriolis meter involves almost no wear and tear, needs less maintenance effort, delivers accuracy close to 0.1% and directly indicates mass flow. For custody transfer of gas service ultrasonic multi-path flow meters are also used with accuracy up to 0.35%. They are maintenance free and having very good diagnostic features.

[View All Answers](#)

Question - 87:

Explain what is galvanic isolation?

Ans:

The term galvanic isolation refers to electric isolation of two circuits using a transformer or an optoisolator. However a transformer provides a better isolation.

[View All Answers](#)

Question - 88:

Do you know the mechanism behind the turbine meter?

Ans:

Turbine meters consist of straight flow tube within which a turbine or fan is free to rotate about its axis which is fixed along the centre line of the tube. Mostly, a magnetic pick up system senses the rotation of the rotor through the tube walls. The turbine meter is a flow rate device, since the rotor speed is directly proportional to the flow rate. The output is usually in the form of electric pulses from the magnetic pick up with a frequency proportional to the flow rate.

[View All Answers](#)

Question - 89:

Explain difference between transducer and converter in instrumentation

Ans:

Pretty much the same thing since both convert one type of energy into a proportional different type of energy. Like the pressure cell inside a pressure transmitter which we call a transducer or sensor and a I/P converter which we call a converter. Other examples are an analog to digital converters or the sensors in a car's engine which are also called transducers since they are stand alone and their transmitters or monitors are in a different place.

[View All Answers](#)

Question - 90:

Do you know how can a D.P. transmitter be calibrated?

Ans:

D.P. transmitter can be calibrated using following steps:

1. Adjust zero of Xmtrs.
2. Perform static pressure test: Give equal pressure on both sides of transmitter. Zero should not shift either side. If the zero shifts then carry out static alignment.
3. Perform vacuum test: Apply equal vacuum to both the sides. Zero should not shift.
4. Calibration procedure: Give 20 psi air supply to the transmitter and vent L.P. side to atmosphere. Connect output of the instrument to the standard test gauge. Adjust zero. Apply required pressure to the high pressure side and adjust the span. Adjust zero gain if necessary.

[View All Answers](#)

Question - 91:



Explain me different types of bourdon tubes?

Ans:

Types of bourdon tubes:

1. C type
2. Spiral
3. Helix

[View All Answers](#)

Question - 92:

Do you know what is the difference between offset and hysteresis?

Ans:

A) An offset is difference between a desired value and an actual value. The phenomenon of a dependent variable assuming a different set of values when the corresponding independent variable is increasing than when it is decreasing is known as hysteresis.

B) Offset is fixed bias from desired value. Hysteresis is difference between set and reset.

" Pressure switch with setting of 0.5 kg/cm² (head pressure included) was found in calibration report . What is the significance of head pressure?

Head pressure refers to the pressure exerted by fluid inside the impulse pipe connecting the pressure switch to the vessel. This pressure acts in addition to the actual process pressure in the vessel. Pressure acting on switch = process pressure + head pressure.

[View All Answers](#)

Question - 93:

Tell me where and Why are "O" Rings used in DPT"?

Ans:

For providing leak proof seal.

[View All Answers](#)

Question - 94:

Tell me what is potential free contact? What is the significance and application of this contact?

Ans:

Contacts having not potential. E.g. Relay contacts/ field switches contacts. They are used in logic circuits. A potential free contact is usually wired into an electrical circuit. However it must be ensured that the contact ratings are suitable for the service in which it is used.

[View All Answers](#)

Question - 95:

Do you know ratio control system?

Ans:

A ratio control system is characterized by the fact that variations in the secondary variable don't reflect back on the primary variable. A ratio control system is the system where secondary flow is hold in some proportion to a primary uncontrollable flow.

If we assume that the output of a primary transmitter is A, and the output of the secondary transmitter is B, and that the multiplication factor of the ratio relay is K, then for equilibrium conditions which means set valve is equal to measured valve, we find the following relation:

$KA-B=0$ or $B/A = K$ where 'K' is the ratio setting off the relay.

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Question - 96:

Tell me what are the possible reasons for the failure of barrier?

Ans:

Fuse blowing sometimes. Power circuits are most likely to fail.

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Question - 97:

Tell me advantages of tachometer as speed measuring device compared to inductive type proximity switches?

Ans:

Some tachometers provide analog output with almost instantaneous response time. They are highly suitable for speed control in some applications.

[View All Answers](#)

Question - 98:

Explain me what is the use for cable entry in control room?

Ans:

In the process plant Control room built considering the non-hazardous area. So in case if fire/Explosion takes place in the plant than that has to be restricted from entering into the control room. So MCT(Multiple cable transient) blocks are used. They are designed to sustain the fire for a fixed time duration. That block hold the cables which are entering into the CCR.

[View All Answers](#)

Question - 99:

Tell me what are thermocouple & RTD's principles & types?



Ans:

For more than 400 or 450 degree Centigrade thermocouple is used, below this temperature RTD is used?

[View All Answers](#)

Question - 100:

Tell me application wise advantages of Inductive type proximity switches over capacitive type switches?

Ans:

Inductive proximity switches are better suited for detection of conducting metal objects and are easily tested for proper operation. Capacitive switches are typically used for detecting non-conductive materials.

[View All Answers](#)

Question - 101:

Explain basic difference between DCS & PLC?

Ans:

- 1) DCS handles more nos of I/Os rather than PLC.
- 2) PLC is faster system than DCS.
- 3) DCS can handles handsome quantity of I/Os so that can be used for total plant automation. Where as PLC has own limitations so it generally used for small but for important(Safety point of view) units, like boiler automation, Make-up compressor automations Etc.
- 4) In the above mentioned case the these PLC's can be get connected with the DCS with the help of soft link. Generally this is used to make alert to both the operator.
- 5) As I heard the PLC used to handle the DI/DO signals so it can take fast actions. Some of the time it is used to handle few nos of AI/AO.
- 6) DCS & PLC's speed depends on the scan rate of I/Os.
- 6) For both the system Marshaling panels, Consoles and other faculties of Ethernet Etc can be used according to the need.
- 7) According to the Cause and effects diagrams the System programmer assigns the control action block into the system, we can call them as memory assigning.

[View All Answers](#)

Question - 102:

Tell me what is motion balance principle?

Ans:

A controller which generates an output signal by motion of its parts. The increase in the baffle is to move towards the nozzle. The nozzle back pressure will increase. This increase in the back pressure acting on the balancing bellows, will expand the bellows. The nozzle is moved upward due to this. The nozzle will move until motion almost equals the input baffle motion.

[View All Answers](#)

Question - 103:

Explain what is a thermal relief valve?

Ans:

A thermal relief valve is typically used to relieve over pressure due to thermal expansion of liquid in pipelines.

[View All Answers](#)

Question - 104:

Do you know advantages of Displacer type Level switch to float type switch?

Ans:

Displacer type switches involve very little movement whereas float type switches involve large movement of float and hence are more likely to get stuck-up. However float switches can be used over a much longer range than a displacer switch.

[View All Answers](#)

Question - 105:

Explain me where should we use " Open to alarm " and "Close to alarm "?

Ans:

- A) Where probability of an open circuit fault is higher we use "open to alarm" and where probability of a closed circuit fault is higher we use "close to alarm" strategy. "Open to alarm" strategy is usually preferred.
- B) Selection should be such that whenever component/ instrument/ system fault occurs, system should give alarm.

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Question - 106:

Explain what is the purpose of measuring dissolved oxygen?

Ans:

Dissolved oxygen is measured in boiler feed water for addition of dosing compounds to remove oxygen to avoid corrosion in steam boilers. In wastewater plants it is measured to estimate quality of effluent. (oxygen demand)

[View All Answers](#)

Question - 107:

Tell me what is the use of valve positioner?

Ans:



Valve positioner can be used for following reasons:

- a. Quick action
- b. Valve hysteresis
- c. Viscous liquids
- d. Split range.
- e. Line pressure changes on valve
- f. Bench set not standard
- g. Reverse valve operations

[View All Answers](#)

Question - 108:

Tell me how is automatic reference junction compensation carried out in temperature recorders?

Ans:

In automatic reference junction compensation, variable nickel resistor is used. As the temperature changes, so does its resistance. This reference junction compensator is located, so that it will be at the temperature of the reference junction. The reference junction is at the point where the dissimilar wire of the thermocouple is rejoined. This joint is invariably at the terminal strip of the instrument.

[View All Answers](#)

Question - 109:

Do you know how is flow measured in square root?

Ans:

Flow varies directly as the square root of pressure. Thus, $F=K$ of square root of applied pressure. Since this flow varies as the square root of differential pressure. The pressure pen does not directly indicate flow. Thus flow can be determined by taking the square root of the pen. Assume the pen reads 50% of the chart. So, flow can be calculated using the pen measure in the chart.

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