

3-1	Production workers are expected to clean, inspect and perform minor repairs to equipment and machinery. Describe 4 things to look for during a machine inspection. (leaks/visual, odors/smell, abnormal sounds, burnt taste)
3-2	Most maintenance activities require that a machine be stopped. Name 5 energy sources that can be hazardous during maintenance (Some examples of hazardous energy sources include electrical, hydraulic, pneumatic, chemical, thermal or mechanical energy. Hazardous energy can also be stored (e.g. capacitors or gravity equipment, machinery or system components that are suspended, blocked or chocked).
3-3	Scheduled maintenance can reduce equipment breakdowns. Name one routine maintenance activity and explain how it reduces breakdowns. (filter changes, lubricating, cleaning, inspecting)
3-4	Name 3 technologies that can be used to predict machine or component failure. (Ultrasound, Thermography/Infrared, Magnaflux, oil analysis/Tribology)
3-5	Standard Operating Procedures for maintenance activities are usually written by _____ ? (in-house employees)
3-6	Equipment performance baselines should be recorded when equipment is new. Name 3 parameters that could be used as KPI for equipment operation. (parts per hour, defects per day, meantime between failure)
3-7	Thermography records _____ emissions from objects (infrared)
3-8	TPM promotes the uses of the 5S practices that include sift, sort, sweep, standardize, and _____. (sustain)
3-9	Motor shafts provide rotational torque. Name two ways to secure an object to a motor shaft. (set screw, keyway)
3-10	Bolt fasteners are rated for tensile strength. Over tightening bolts may result in stretching of bolt length. The name for the bolt stretch is _____. (necking)
3-11	Name the 2 types of Horizontal misalignment. _____ and _____ (Offset, Angular)
3-12	Drive belt tension should be adjusted to be 1/64" deflection per _____ of belt span (inch)
3-13	A chain that is stretched more than _____ % of its original length should be replaced (3%)
3-14	When a smaller gear drives a larger gear the Torque at the larger gear <u>increases/decreases</u> . (increases)
3-15	Filters that have become clogged have <u>higher/lower</u> differential pressure. (higher)
3-16	A 20w viscosity oil will pour slower than a 10w/30w oil. (10w)
3-17	Electrical current may be defined as the flow of _____ from negative to positive. (electrons)
3-18	Ohms Law is used by maintenance workers to determine if equipment is operating correctly. A resistance of 0 ohms in a length of wire would indicate that it was <u>good/bad</u> . (good)
3-19	The frequency of AC power in the US is _____ Hz. (60)
3-20	Transformers used to step voltage down use magnetic coupling between windings. If the ratio of primary to secondary is 2:1, the secondary voltage will be _____ times the primary. (1/2)
3-21	AC Induction motors do not have any brushes. Explain how a magnetic field is created in the rotor. The changing magnetic field in the stator causes the induction of current in the rotor bars. (induction)
3-22	Most industrial motors use 3 phase power. Each phase is _____ degrees apart. (120)
3-23	Dual voltage motors allow for windings to be connected in series or parallel. Windings connected in parallel would be for <u>high/low</u> voltage connection (low).
3-24	Magnetic motor starters use a <u>high/low</u> voltage control signal to energize motor contacts. (low)
3-25	PLC programs use ladder instructions to test input conditions. An XIO (examine if open)



	instruction would be true if the input tested was <u>on/off</u> . (off)
3-26	<u>Pneumatic/Hydraulic</u> systems utilize a fluid that does not compress. (hydraulic)
3-27	A gauge calibrated for absolute pressure in Denver would report readings <u>higher/lower</u> in Miami. (higher)
3-28	Grounding reduces the risk of electrical shock by providing a <u>low/high</u> resistance path for fault current back to the source. (low)
3-29	Some electrical maintenance work cannot be performed without machine power on. To do power on maintenance, workers will have to do a risk assessment and obtain a _____ signed by management. (hot work permit)

4-1	The process that measures process output and compares it to a standard is a) Quality control b) Parameters c) Calibration d) Process control
4-2	Random variation includes a) Equipment that is not correctly adjusted after normal wear b) Slight differences in machine performance caused by normal wear c) Uncalibrated test equipment d) Defective materials and equipment
4-3	All of the below could be considered a purpose of packaging except a) Protecting the product from damage b) Simplifying storage of the product c) Reducing the production cost of the product d) Making the product attractive to consumer
4-4	The key consideration in manufacturing a quality product is a) Eliminating manufacturing waste b) Conforming to standards c) Meeting customer expectations d) Delivering on time
4-5	The key driver to a quality management systems is a) Lowering production costs b) Meeting customer needs c) Better scheduling d) Decreased inventory
4-6	The PDCA cycle is a process for a) Detecting materials that do not meet specifications b) Determining whether variation is random or assignable c) Implementing continuing improvement d) Shortening manufacturing time