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TRAINING FOR MARINERS

Gas Turbine Plants

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What type of metallurgical failure does Item A represent in the illustration? Illustration GT-0014
Radial cracking.

Illustrations: GT0014_AO_061515WM

What type of metallurgical failure does Item B represent in the illustration? Illustration GT-0014
Axial cracking.

Illustrations: GT0014_AO_061515WM

Rankine is the temperature scale that corresponds to which of the following?
Absolute reading of a measured temperature in degrees Fahrenheit.

Illustrations: TEMP CONVERSION TABLE
See REF2129

A temperature of 69.5 degrees Fahrenheit converts to approximately what temperature in degrees Rankine?
529.5 degrees R.

Illustrations: TEMP CONVERSION TABLE
See REF2129

A temperature of 32.5 degrees Celsius converts to approximately what temperature in degrees Kelvin?
305.5 degrees K.

Illustrations: TEMP CONVERSION TABLE
See REF2129

The lube oil system shown in the illustration, is designed to lubricate the main bearings by what principle? Illustration GT-0023
Spray lubrication with dry sumps.

Illustrations: GT0023_WM_110118

As shown in the illustration, what is the purpose of pressurizing the main bearing lube oil sumps on a typical marine gas turbine? Illustration GT-0023
Minimizes oil leakage from the rotor shaft.

Illustrations: GT0023_WM_110118

To prevent overheating of the illustrated turbine blade, which of the following fluids is circulated through it via the shaped internal passages? Illustration GT-0029
Bleed air.

Illustrations: GT0029_WM_110118

What is the designed compressor pressure ratio of the gas turbine compressor rotor shown in the illustration? Illustration GT-0004
16 to 1

Illustrations: GT0004_WM_110118

When auto starting a gas turbine engine similar to the one shown in the illustration, a "False Start" indication will initiate if which of the following conditions occurs? Illustration GT-0016
The gas generator rotor fails to reach a preset RPM after the starting motor has been energized for a preset interval.

Illustrations: GT0016_WM_110118

On the marine gas turbine engine panel shown in the illustration, which of the following conditions would prevent the auto-start sequence from successfully completing? Illustration GT-0016
Bleed air valve open

Illustrations: GT0016_WM_110118

During an auto-start sequence on the marine gas turbine control console shown in the illustration, what would be the correct order of events required to occur after the start sequence begins? Illustration GT-0016
NGG reaches ignition RPM, gas temperature greater than 400 degrees F, NGG reaches idle RPM

Illustrations: GT0016_WM_110118

When removing the gas turbine engine as shown in the illustration, how is the engine removal accomplished? Illustration GT-0022
By removing the inlet screen, barrier wall and module front panel, then installing the rails and moving the engine into the engine room and up through the soft patch to the main deck.

Illustrations: GT0022_AO_071015WM

On the gas turbine shown in the illustration, which of the following best describes the main principle of operation of the component contained within the area labeled "C"? Illustration GT-0001
Combustion at a constant pressure

Illustrations: GT0001_AO_052215WM

What type of gas turbine cycle configuration is shown in the illustration? Illustration GT-0031
Intercooled-recuperated type.

Illustrations: GT0031_AO_072115WM

Which of the following statements about the intercooled-recuperated gas turbine cycle is true? Illustration GT-0031
Intercooler serves to reduce the required high-pressure compressor power, while the recuperator utilizes waste heat form the exhaust to decrease required fuel to achieve turbine inlet temperature.

Illustrations: GT0031_AO_072115WM

Why is the cycle efficiency higher in the intercooled-recuperated cycle as compared to a simple cycle gas turbine? Illustration GT-0031
The intercooler serves to reduce the required high-pressure compressor power while the recuperator utilizes waste heat form the exhaust to decrease required fuel to achieve the turbine inlet temperature.

Illustrations: GT0031_AO_072115WM

The secondary passages on the gas turbine engine fuel nozzles shown in the illustration are designed to open at approximately what pressure? Illustration GT-0005
330 PSIG

Illustrations: GT0005_WM_110118

For the gas turbine engine lube oil system shown in the illustration, what is the purpose of the lube oil supply check valves? Illustration GT-0024
Prevent lube oil contained in the LO storage and conditioning tank from draining into gearboxes and sumps.

Illustrations: GT0024_WM_110118

What is the purpose of the air/oil separator shown in the illustration of the gas turbine lube oil system? Illustration GT-0024
Minimize oil consumption by separating oily vapors being vented to the atmosphere.

Illustrations: GT0024_WM_110118

On the gas turbine engine lube oil system shown in the illustration, air and oil are primarily separated in the air/oil separator through the use of which of the following? Illustration GT- 0024
Impeller

Illustrations: GT0024_WM_110118

The lube oil system shown in the illustration, consists of which of the following sub-systems? Illustration GT-0024
Lube oil scavenging.
Sump venting.
Lube oil supply.
All of the above.

Illustrations: GT0024_WM_110118

Which of the following components are installed in the lube oil system shown in the illustration? Illustration GT-0024
pressurized sumps
air/oil separators
pressurized supply lines with separate scavenging return lines
All of the above.

Illustrations: GT0024_WM_110118

How many lube oil sumps are installed on the marine gas turbine engine shown in the illustration? Illustration GT-0024
4

Illustrations: GT0024_WM_110118

Which of the following is true concerning the main engine lube oil system of the marine gas turbine shown in the illustration? Illustration GT-0024
The system includes a single combined lube oil supply and scavenge pump.

Illustrations: GT0024_WM_110118

What type of engine starter motor is commonly found on the marine gas turbine shown in the illustration? Illustration GT-0006
Hydraulic motor

Illustrations: GT0006_WM_110118

The six borescope ports located in the compressor rear frame casing of the marine propulsion gas turbine shown, can be used to inspect all EXCEPT which of the following components? Illustration GT-0006
14th stage compressor blades.

Illustrations: GT0006_WM_110118

As shown in the illustration, the HP turbine 2nd stage blades are cooled by convection, with the cooling air being discharged at which of the following? Illustration GT-0011
Blade tips.

Illustrations: GT0011_WM_110118

For the GE LM2500 gas turbine engine shown in the illustration, the HP turbine 2nd stage blades are cooled by convection, with the cooling air being discharged where? Illustration GT-0011
Blade tips.

Illustrations: GT0011_WM_110118

In the marine gas turbine engine shown in the illustration, the HP turbine 1st stage nozzle vanes are cooled by which of the following? Illustration GT-0020
16th stage compressor air.

Illustrations: GT0020_WM_110118

For the GE LM2500 gas turbine engine shown in the illustration, the HP turbine 2nd stage nozzle vanes are cooled by which of the following? Illustration GT-0020
16th stage compressor air.

Illustrations: GT0020_WM_110118

For the GE LM2500 gas turbine engine shown in the illustration, the HP turbine 1st stage nozzle vanes are cooled by which of the following? Illustration GT-0020
16th stage compressor air.

Illustrations: GT0020_WM_110118

In the marine gas turbine engine shown in the illustration, the HP turbine 2nd stage nozzle vanes are cooled by which of the following? Illustration GT-0020
13th stage compressor air.

Illustrations: GT0020_WM_110118

As shown in the illustration of a gas turbine fuel oil system, when the engine fuel oil valves are de-energized, the remaining fuel left in the system is recirculated back to which of the following? Illustration GT-0021
Fuel pump inlet.

Illustrations: GT0021_WM_110118

The fuel oil back pressure regulator on the fuel system shown in the illustration, returns fuel to the which of the following? Illustration GT-0021
Booster pump discharge.

Illustrations: GT0021_WM_110118

The main fuel control module used on a marine gas turbine engine as shown in the illustration, is responsible for managing which function(s)? Illustration GT-0021
deceleration schedule
variable stator vane feedback lever
acceleration schedule
All of the above.

Illustrations: GT0021_WM_110118

As shown in the illustration of a gas turbine fuel oil system, when the engine fuel oil valves are de-energized, the remaining fuel left in the system is recirculated back to which of the following? Illustration GT-0021
fuel pump inlet

Illustrations: GT0021_WM_110118

How is the clutch shown in the attached illustration engaged? Illustration GT-0018
Clutch engages automatically when input shaft flange is rotating faster than the output assembly.

Illustrations: GT0018_WM_110118

What does the term "lock-out" of a synchro-self-shifting (SSS) clutch system mean? Illustration GT-0018
SSS clutch will not engage.

Illustrations: GT0018_WM_110118

How is the clutch shown in the attached illustration engaged? Illustration GT-0018
Clutch engages automatically when input shaft flange is rotating faster than the output assembly.

Illustrations: GT0018_WM_110118

The lube oil scavenge pressure on the marine gas turbine shown in the illustration is sensed by which of the following? Illustration GT-0017
Transducer.

Illustrations: GT0017_WM_110118

On a ship with a marine gas turbine as shown in the illustration, a fire emergency stop is initiated when _____. Illustration GT-0017
one of the UV flame detectors is activated
either the primary or reserve GTM CO2 system activates
the GTM fire emergency shutdown switch located on the module is activated
All of the above.

Illustrations: GT0017_WM_110118

On the marine gas turbine engine shown in the illustration, what temperature should be carefully monitored following a shutdown for an engine fire? Illustration GT-0017
power turbine inlet

Illustrations: GT0017_WM_110118

On the marine gas turbine engine shown in the illustration, the 8th stage bleed air is used for which of the following? Illustration GT-0017
Lube oil sump pressurization and cooling.

Illustrations: GT0017_WM_110118

For the GE LM2500 gas turbine engine shown in the illustration, the 13th stage bleed air is used for which of the following? Illustration GT-0017
High pressure turbine 2nd stage nozzle cooling.

Illustrations: GT0017_WM_110118

On the marine gas turbine shown in the illustration, the gas generator speed sensor is located where? Illustration GT-0017
On the accessory gearbox.

Illustrations: GT0017_WM_110118

Which of the following statements is true concerning the fuel oil ignition system of the gas turbine engine shown in the illustration? Illustration GT-0017
The igniters will de-energize when the gas generator exceeds a preset RPM.

Illustrations: GT0017_WM_110118

How many fuel igniters would be installed on the marine gas turbine engine shown in the illustration? Illustration GT-0017
2

Illustrations: GT0017_WM_110118

If the lube oil scavenge temperature exceeds 300 degrees Fahrenheit on the gas turbine engine shown in the illustration, and reducing power does NOT bring the temperature within limits, the operator should do which of the following? Illustration GT-0017
Shutdown the engine and troubleshoot.

Illustrations: GT0017_WM_110118

While standing watch on a ship equipped with the gas turbine engine shown in the illustration, a fire emergency stop is initiated when which of the following situations occur? Illustration GT-0017
either the primary or reserve GTM CO2 system activates
the GTM fire emergency shutdown switch located on the module is activated
one of the UV flame detectors is activated
All of the above.

Illustrations: GT0017_WM_110118

All clock positions, engine references, and enclosure references apply to viewing the gas turbine engine shown in the illustration from which of the following locations? Illustration GT-0017
Rear (exhaust end), looking toward the intake end.

Illustrations: GT0017_WM_110118

What type of main lube oil supply and scavenging pump is installed on the marine gas turbine engine shown in the illustration? Illustration GT-0017
Vane.

Illustrations: GT0017_WM_110118

Routine water washing of the gas turbine engine compressor shown in the illustration, is usually performed while operating under which of the following conditions? Illustration GT-0017
With the starter motor drive.

Illustrations: GT0017_WM_110118

In the marine gas turbine engine shown in the illustration, the 9th stage bleed air is used for which of the following? Illustration GT-0017
Power turbine cooling.

Illustrations: GT0017_WM_110118

In the marine gas turbine engine shown in the illustration, the 13th stage bleed air is used for which of the following? Illustration GT-0017
High pressure turbine 2nd stage nozzle cooling.

Illustrations: GT0017_WM_110118

In which of the following ways can compressor surge cause excessive temperatures in the turbine section?
By providing inadequate secondary air

How is the HP turbine rotor of the GE LM2500 gas turbine cooled?
By a continuous flow of compressor discharge air

Which of the following statements is true about the "lockout control" on a synchronous self-shifting (SSS) clutch?
Permits operation of the GTE without the rotation of the main reduction gear.

The main thrust bearing directly positions which part(s) of the main reduction gear?
Bull gear.

Compared to other types of engines, what is the biggest advantage of a gas turbine engine?
Highest power-to-weight ratio.

When conducting a borescope inspection, you must be aware of all of the following factors EXCEPT which?
The engineers experience.
See REF2126

The circle of turbine stationary vanes that convert pressure and thermal energy to velocity energy and direct the combustion gases in the direction of turbine wheel rotation is referred to as what?
Nozzle assembly.

Why is safety-wiring, or lock wiring of gas turbine parts required?
Prevent disengagement of parts.

What is the disadvantage of a dual-entry centrifugal compressor compared to a single-entry centrifugal compressor?
The dual-entry compressor utilizes a more complicated inlet ducting.

Two functions of the compressor stator vanes include which of the following?
Direct air flow to each rotor stage at the correct angle and deliver air to the combustor at the correct velocity and pressure.

Compressor tip clang can be usually attributed to which of the following operating conditions?
Compressor stall.

Which of the following components removes the oil from the transfer gearbox?
Lube and scavenge pump

What is the primary function of the main fuel control on the GE LM2500 gas turbine engine?
To control stator vane angle and GG speed

The lubrication principal used by the Kingsbury thrust bearing is which of the following?
Wedge-shaped oil film.

An open cycle gas turbine engine is best described by which of the following statements?
Working fluids are taken in, transformed, and then discarded.

A gas turbine that has a regenerator between the compression and combustion sections in which exhaust gas heat energy is added to the air charge is classified as what type of engine?
Semi-closed cycle engine.

You are preparing for a borescope inspection of a GE LM2500 gas turbine engine. You are reviewing the correct geometric orientation nomenclature which includes which of the following?
All references left, right, and radial are orientated as viewed from aft looking forward on the engine.

What method is utilized to allow turbine nozzle blades to withstand high inlet temperatures?
Air cooling

On a gas turbine powered vessel, what is the last step after an off-line water wash?
Start the engine to dry it out.

Kelvin is the absolute temperature scale that corresponds to which of the following?
Absolute reading of a measured temperature in degrees Celsius.
See REF2129

A centrifugal compressor assembly consists of which of the following?
A rotating impeller and a stationary diffuser.

The primary function of an axial compressor rotor blade is which of the following?
To impart acceleration to the air mass, resulting in an increase in velocity.

Compressor rotor blade tip curl is usually caused by which of the following?
Blade rub.

On a vessel equipped with propulsion gas turbines, the operators initial response to a high vibration alarm should be which of the following?
Reduce the engine speed.

How do you manually lockout an SSS clutch?
Using the special wrench provided.

When performing a static check to determine tooth contact, you should use which of the following compounds to coat the gear teeth?
Prussian Blue.

What is the difference between an open cycle and a closed cycle gas turbine engine?
An open cycle discards the working fluid and a closed cycle retains the working fluid.

The term used to describe a gas turbine in which air drawn from the atmosphere passes through the engine only once is which of the following?
Open cycle.

Which of the following designs is the most satisfactory method for attaching turbine blades to the rotor disk?
Fir-tree design.

How is the lube oil supplied to each bearing in a gas turbine engine controlled?
Calibrated orifice.

The effectiveness of an off-line water wash of a GE LM2500 gas turbine engine can be enhanced by doing which of the following?
Stroking the Variable Stator Vanes to the maximum open position.

Which of the following is the definition of absolute temperature?
Temperature measured with reference to the theoretical temperature at which all molecular motion stops.

Which of the following statements is true regarding centrifugal compressors?
The centrifugal compressor is frequently used on small, low power turbines.

What are the two common forms of axial compressor rotor blade roots?
Fir tree and bulb.

Once a compressor is broken in, which of the following factors will most likely cause blade tips to rub?
Failure of a rotor bearing

Compressor characteristics are normally summarized in the form of which of the following?
Compressor map.

The two main types of compressor stall are known as what?
Steady state and transient.

If a fire is detected in a main propulsion gas turbine enclosure, which of the following would occur prior to automatic release of the fire extinguishing agent?
If open, bleed air valves would be closed.

all or roller antifriction bearings are used to support gas turbine rotors for all EXCEPT which of the following?
To offer maximum rotational resistance

What is the purpose of the GE LM2500 gas turbine enclosure heater?
To ensure fuel viscosity is maintained while the GTE is secured

The term "lockout" on the Synchro-Self-Shifting (SSS) clutch system means that the _____.
SSS clutch will not engage

Gear backlash is best described as which of the following?
Play between the surfaces of the teeth in mesh.

The Brayton Cycle is a series of events best described by which of the following statements?
Intake, compression, combustion, expansion, exhaust.

The term used to describe a gas turbine in which the turbine exhaust passes through a cooler and back to the compressor inlet is which of the following?
Closed cycle.

On an GE LM2500 gas turbine powered vessel you are conducting a borescope inspection of the compressor. What is used on each compressor stage as a reference for indexing the blades?
The locking lug blades.

Turbine disks are commonly attached to the shaft by which of the following methods?
Bolted or welded.

On a gas turbine propulsion vessel, you notice a slow but steady increase in gas turbine vibration and specific fuel consumption as the voyage has progressed. What would be a good maintenance technique to use to correct these increases?
Secure the engine and water wash the compressor off-line.

Thermal energy is the only form of energy that can be added to or removed from a substance. How is thermal energy that is added to a substance stored?
In the form of internal energy.
See REF2130

While air is being compressed in a centrifugal flow gas turbine, what happens to the direction of air flow?
Changes at each separate component.

What is a compressor midspan shrould?
A brace built into the middle of a rotor blade for damping.

Accelerometers are generally used on gas turbine engines to sense which of the following?
High frequency vibration.

Which of the following could cause compressor stall?
The angle at which the air strikes the compressor rotor blades is too high.

If after reducing power to a gas turbine engine in response to a high lube oil supply temperature alarm, the temperature continues to rise, your next step should be which of the following?
Shutdown the engine.

What type of air seal is used in the sump and turbine areas of a gas turbine engine?
Labyrinth-Honeycomb

How many stages are in the HP turbine of the GE LM2500 gas turbine engine?
Two

The bleed air surge relief valve differs from a normal relief valve in which of the following ways?
Opens completely at a specified lift pressure and remains open until a preset pressure is attained.

In cases where both the pinion and gear teeth of the main reduction gear have been slightly indented by foreign material, what action should you take?
Both the pinion and gear should be relieved of all raised metal around the indentation.

Why is a gas turbine considered to operate on the Brayton cycle?
Combustion occurs with no increase in pressure.
See REF2124

In a regenerative or recuperative gas turbine cycle configuration, the heat of the turbine exhaust gas is used to do what?
Heat the compressor discharge air before it enters the combustor.

Zero reference for the GE LM2500 gas turbine engine is established by the use of which of the following engine components?
Locking lug blades.

HP turbine blades are generally cooled by which of the following methods?
Compressed air entering the root and exiting the tip.

How do you gain access to the burner units of a can-annular combustor to perform maintenance?
By sliding the can-annular case aside

"Standard Day" conditions, as defined by the ISO, is which of the following?
29.92 in HG @ 15 deg C.
14.69 psi @ 59 deg F.
Both A and B.

In a centrifugal compressor, which component reduces the velocity and increases the static pressure of the air?
Diffuser

Why are loose-fitting blades used on the first several stages of large axial compressors?
To minimize vibration while the engine is passing through critical speed ranges.

Displacement, velocity and acceleration describe three types of which of the following?
Vibration sensors.

How can compressor stall be prevented?
Utilize a two-spool compressor rotor.
Lowering the angle of attack on the front stages.
Installing air bleed valves in the middle of the compressor.
All of the above.

During an operation of a main propulsion gas turbine, the engine shuts down. Which of the following is the most probable reason for the shutdown?
High vibration on the gas generator.

What type of air seal is used in the combustor and turbine midframe of a gas turbine?
Fishmouth

The power turbine (PT) of the GE LM2500 gas turbine engine has a total of how many stages?
Six

The purpose of the main reduction gear in a marine gas turbine propulsion installation is which of the following?
Transfer high-speed gas turbine rotation to low-speed propeller rotation.

The fuel oil system of a gas turbine engine provides all EXCEPT which of the following?
Acts as a cooling medium for the lube oil cooler

The thermal energy added to the gas as it flows through the combustion section has what effect on the gas?
Increase volume.

When conducting a borescope inspection of the compressor, why can airfoil and tip cracks be difficult to detect?
Rotating the rotor too fast.
Borescope optics have deteriorated.
The cracks are generally tight and shallow in depth.
All of the above.
See REF2126

To keep the exit pressures relatively constant across a HP turbine blade, which type of construction is generally utilized?
Impulse-Reaction.

What are the two prime sources of deposits that build up on compressor blades?
Lube oil mist and salt spray

Under standard atmospheric conditions, 208.7 PSIG converts to approximately what in absolute pressure?
223.4 PSIA.

Before combustion can occur, the combustion air must be delivered to the combustor at a high-pressure and low-velocity. High-velocity, low-pressure air is converted to high-pressure, low-velocity air at what part of a centrifugal-type compressor?
Diffuser.

Which of the following statements is true about an axial compressor disk-type rotor?
Rotor disks are shrunk fit onto a steel shaft.

You are conducting a borescope inspection of the compressor section of a GE LM2500 gas turbine. In stage four, you see a slight tilt to one blade and the blade platform is raised higher than the other blades. What could be a cause of this condition and what would be your course of action?
Condition could be the result of blade root failure. Engine should be taken out of service until condition can be evaluated.

In order to get a ready indication for a normal start with a GE LM2500 gas turbine engine, what permissive(s) must be met?
Bleed air valve must be closed.
GG speed must be less than 1200 RPM and all engine trips reset.
Fuel supply pressure must be greater than 8 psig
All of the above.

What is the term given to the condition in which cyclic pressure changes result in a repetitive failure and recovery of compressor air flow?
Surge.

Which of the following is the most likely cause for the main propulsion gas turbine engine tripping during start up?
Failure to achieve the minimum rpm in a certain period of time.

What type of seal is used in the gearbox of a gas turbine engine?
Carbon ring

A total of how many shock mounts are used to secure the LM2500 enclosure to the ship's foundation?
32

What type of main reduction gear arrangement prevents independent axial and rotational movement of the pinions?
Locked train

Gas turbine fuel manifold pressure is established by which of the following actions?
Rotating the gas generator.

In a gas turbine, the air charge is permitted to be compressed adiabatically by what factor, process, or condition?
Speed of the process

When inspecting the combustion section of a gas turbine engine, what wattage light source should you use?
1000 watt.

Assuming you maintain the same power output, how will a decrease in the compressor inlet air temperature effect a gas turbine engine's efficiency and fuel consumption?
Efficiency will increase and fuel consumption will decrease.

What is the power source for the ignition exciter of a gas turbine engine?
Ship's 115 volt AC system.

A pressure stage of an axial-type compressor consists of which of the following?
Set of rotor blades and a set of stator blades.

In a gas turbine engine, the majority of the energy is added to the working fluid in which of the following components?
Combustor.

What is the primary function of the main fuel control on the GE LM2500 gas turbine engine?
To control stator vane angle and GG speed

What type of main reduction gear arrangement prevents independent axial and rotational movement of the pinions?
Locked train

A gas turbine engine is experiencing a high rate of corrosion in the hot section of the engine. Which of the following fuel contamination issues could be associated with this problem?
High saltwater content in the fuel.

Boyle's law can best be defined as which of the following?
The volume of an enclosed gas varies inversely with the applied pressure, provided the temperature remains constant.
See REF2125

You are preparing for a borescope inspection of a gas turbine engine. Prior to the inspection it is recommended that you do which of the following?
Water wash the compressor.

How do the high-velocity high-temperature gases cause the gas turbine rotor to rotate?
By transferring velocity energy and thermal energy to the turbine blades.

A gas turbine engine's main lube oil system pump check valve serves to maintain system prime and perform what other function?
To prevent reverse flow of oil through a secured pump.

Lubricating oil contamination in a gas turbine bearing oil sump will most likely come from which of the following?
Failure of seal pressurization air.

Which of the following terms refers to thermal energy in transition?
Heat

The two basic types of compressors used in gas turbine engines are which of the following?
Centrifugal and axial.

An axial compressor stator vane that is mechanically adjusted to provide optimum compressor performance over a wide operating range is referred to as which of the following?
Variable Stator Vane (VSV)

Cadmium and zinc coatings provide which of the following type of protection for the base metal?
Sacrificial.

Which of the following is the most probable cause if, while underway, the main propulsion gas turbine air intake blow-in doors open?
Ice has formed on the air intakes.

Accelerating the compressor to the self sustaining speed of the engine is the function of which of the following components?
Starter

Which of the following components prevent(s) objects smaller than 1/4 inch from entering the GE LM2500 gas turbine engine?
FOD screens

The purpose of the main reduction gear in a marine gas turbine propulsion installation is which of the following?
Transfer high-speed gas turbine rotation to low-speed propeller rotation.

The gas generating sections of marine gas turbine engines are based on which of the following?
Aircraft jet engines.

In the operation of a marine propulsion gas turbine, kinetic and thermal energy required to drive the main propeller shaft are extracted by which of the following?
Power turbine.

To manually rotate the GE LM2500 gas turbine engine, you should use which of the following tools?
A socket wrench with an 18-inch long 3/4-inch drive extension.

What are the two principle functions of the turbine nozzle guide vanes?
Convert the heat energy of the hot gases into kinetic energy and direct the flow of gases to the turbine rotor blades.

When the main reduction gear lube oil system is secured, which of the following components maintains the air within the casing at less than 35 percent relative humidity?
Dehumidifier

The buildup of contamination in a gas turbine will cause all of the following conditions EXCEPT which of the following?
Reduced fuel consumption

What is the term given to a process that occurs without a loss or gain of heat?
Adiabatic

In comparing a centrifugal-type to an axial-type compressor, which of the following statements is true?
Centrifugal compressors have a higher compression ratio per stage than an axial flow compressor.

Variable stator vanes give an axial gas turbine compressor which of the following capabilities?
Efficiency at various speeds.

Which of the following conditions will NOT be the result of a build-up of deposits in a gas turbine compressor?
Reduced fuel consumption.

REF2124
The Brayton cycle is a thermodynamic cycle that describes the workings of a constant pressure heat engine. Gas turbine engines and air breathing jet engines use the Brayton cycle. Although the Brayton cycle is usually run as an open system (and indeed must be run as such if internal combustion is used), it is conventionally assumed for the purposes of thermodynamic analysis that the exhaust gases are reused in the intake, enabling analysis as a closed system. The engine cycle is named after George Brayton (1830–1892), the American engineer who developed it, although it was originally proposed and patented by Englishman John Barber in 1791. It is also sometimes known as the Joule cycle. The Ericsson cycle is similar to the Brayton cycle but uses external heat and incorporates the use of a regenerator. There are two types of Brayton cycles, open to the atmosphere and using internal combustion chamber or closed and using a heat exchanger.

REF2125
For a fixed amount of an ideal gas kept at a fixed temperature, pressure and volume are inversely proportional. Or Boyle's law is a gas law, stating that the pressure and volume of a gas have an inverse relationship, when temperature is held constant.

REF2126
A borescope (occasionally called a boroscope, though this spelling is nonstandard) is an optical instrument designed to assist visual inspection of narrow, difficult-to-reach cavities, consisting of a rigid or flexible tube with an eyepiece or display on one end, an objective lens or camera on the other, linked together by an optical or electrical system in between. The optical system in some instances is accompanied by (typically fiberoptic) illumination to enhance brightness and contrast. An internal image of the illuminated object is formed by the objective lens and magnified by the eyepiece which presents it to the viewer's eye.

REF2127
Power, in science and engineering, time rate of doing work or delivering energy, expressible as the amount of work done W, or energy transferred, divided by the time interval t—or W/t.

REF2128
In physics, potential energy is the energy held by an object because of its position relative to other objects, stresses within itself, its electric charge, or other factors. Common types of potential energy include the gravitational potential energy of an object that depends on its mass and its distance from the center of mass of another object, the elastic potential energy of an extended spring, and the electric potential energy of an electric charge in an electric field. The unit for energy in the International System of Units (SI) is the joule, which has the symbol J.

REF2129
Absolute temperature is the temperature of an object on a scale where 0 is taken as absolute zero. Absolute temperature scales are Kelvin and Rankine. Absolute zero is the lowest temperature at which the system is in a state of lowest possible (minimum) energy. No electronic device can operate at this temperature. Common temperatures in the absolute scale are: 0°C (freezing point of water) = 273.15K 25°C (room temperature) = 298.15K 100°C (boiling point of water) = 373.15K 0K (absolute zero) = -273.15°C To convert from the Celsius scale into the absolute temperature, you add 273.15 and change °C to K. To get a temperature on the absolute scale to the Celsius scale, subtract 273.15 and change K to °C. This is normally used in the science world. Conversion Celsius to Kelvin: K=C+273 Kelvin to Celsius: C=K-273

REF2130
Thermal energy is energy possessed by an object or system due to the movement of particles within the object or the system. Thermal energy is one of various types of energy, where 'energy' can be defined as 'the ability to do work.' Work is the movement of an object due to an applied force. A system is simply a collection of objects within some boundary. Therefore, thermal energy can be described as the ability of something to do work due to the movement of its particles.

REF2131
Newton's Second Law of Motion: The relationship between an object's mass m, its acceleration a, and the applied force F is F = ma. Acceleration and force are vectors (as indicated by their symbols being displayed in slant bold font); in this law the direction of the force vector is the same as the direction of the acceleration vector.

REF2132
Newton's Third Law of Motion: For every action there is an equal and opposite reaction.

REF2133
Newton's First Law of Motion: Every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it.

REF2134
Axial flow compressors, as the name suggests, are a type of air compressors that move the air in a direction parallel with some axis. That axis is the axis of rotation of the driving shaft which moves the rotor blades around it. Between each two rows of rotor blades, which from now on will be referred to as rotors, there is a row of stator blades (to be called stators) attached to the casing of the compressor. These blades have in fact tiny airfoil cross sections just as we see on the wings of aircraft. The intake of the axial flow air compressors starts with a row of stationary vanes. This is to ensure a uniform entry of the air to the compressor. Rotors increase the speed of air flow in axial and circumferential directions. Now through the stators, the speed of air flow or its kinetic energy is converted to static pressure through a process called diffusion (some of the pressure rise also occurs in the rotors). Each stator row not only acts as a pressure raising agent, but also it redirects the flow direction so that it can properly enter the next row of rotor blades. The combination of a stators row followed by a rotors row is called a stage, and each stage of industrial axial flow compressors could raise the pressure by something between 5% and 25%. This means that in order to have high pressure ratios, you need multiple stages for your compressor. Industrial axial flow compressors are the ones you might purchase, but just to get an idea of what is out there, let us say that since these compressors are placed on the ground or ships, the flow speed is not that high; the flow is subsonic. However, aircrafts also make use of these compressors in their jet engines, and since they fly at much higher speed near the speed of sound where the flow becomes transonic, each stage of the compressor raises the pressure between 15% and 60%. There are also some laboratory designs that are still being studied that could handle supersonic air compression, pressure rise which is reported to be 80% to 120% per stage. As already mentioned, the air intake of axial air compressors starts with a row of stationary blades called the inlet guide vanes. They provide a proper air direction reaching at the first stage of the compressor. The compressor stages are placed successively until the final desired pressure is achieved after the last stage of the axial compressor. What matters here is that the space between each row of rotors and their followed row of stators in a stage should be as small as possible to ensure smoothness of air flow. Each stage is also placed as closely as possible to the next stage to provide a smooth air flow. There is also very little clearance between the stator tips and the shaft as well as between the rotor tips and casing.