Most asked Mechanical Engineer Interview Questions & Answers (Freshers)

Q1. What is the second law of thermodynamics?

The second law of thermodynamics depicts that the total entropy of an isolated system can never be reduced over time.

Q2. What is ferrite?

Ferrite is a magnetic iron rock.

Q3. Which pipes are used for steam lines?

Steel pipes with welded fittings are used for steam lines.

Q4. Distinguish between the shear center and elastic center.

The shear center is a center where the force can act with no twist, whereas the elastic center is located at the center of gravity.

Q5. Name two vital conditions of a perfect gas.

Two vital conditions of perfect gas are:

- It should satisfy the state equation.
- Specific heat remains constant.

Q6. What is meant by a greenfield project?

These are the projects, which are built from scratch and does not create pollution.

Q7. What do you mean by cotter joint?

It is one of the types of joints that are used to connect two rods, which are under compressive or tensile stress. This joint is made of steel or iron.

Cotter joint is used for connecting a piston rod to the crosshead of the reciprocating steam engine.

Q8. Define pitting.

It is corrosion that turns to a small hole in the metal.

Q9. What is the alloy of tin and lead?

Solder is an alloy of tin and lead. It is primarily used to make electrical joints.

What is the importance of tolerance in engineering?

You cannot design any product without tolerance. It increases the chances of rejection rate and overall product cost. You utilize tolerance in part dimension to reduce cost and facilitate manufacturer.

Q10. What is caustic embrittlement?

Caustic embrittlement is a physical change in metal. In this phenomenon, the boiler becomes brittle because of accumulation of caustic soda.

Q11. Name the boiler that does not need a steam drum.

A supercritical pressure boiler does not need a steam drum.

Q12. Explain the Otto cycle in brief.

Otto cycle describes the functioning of a typical spark-ignition four-stroke engine. Otto cycle is a description of what happens to gas as it is subjected to changes in volume, temperature, addition, or removal of heat.

Q13. What do you mean by annealing?

Annealing is the process of heating any material above the recrystallization temperature and cooling after some time. This process increases the hardness and strength of metal material. The result you will get is a reduction of dislocations in the crystal structure of metal being annealed.

Q14. Explain enthalpy.

It is the heat content of a thermodynamic system.

Q15. Define a uniformly distributed load.

A uniformly distributed load is a load that is spread over a region of the beam. Here the magnitude of the load remains similar throughout the element.

Q16. Explain different types of fits.

Fits can be categorized into three groups: 1) clearance fit, 2) interference fit, and 3) transition fit.

Clearance fit: This fit is identified by the occurrence of clearance between the two similar parts.

Interference fit: In this fit, the size of the mating parts is predefined to occur interference between these parts. Here the hole tolerance zone is completely below shaft tolerance zone.

Transition fit: It is a comptonization between clearance and interface fit. In this case of fit, the tolerance zone of the shaft and hole overlaps.

Q17. Explain important rules that must be kept in mind while designing castings?

Following are the points that you should keep in mind:

1. Keep section thickness uniform as much as possible.
2. Sudden changes in the thickness should be averted at all costs.
3. Design casting by keeping simplicity.
4. Avoid large flat surfaces as true large spaces are difficult to create.
5. Use a curved shape to improve the stress handling of the cast."

What is universal coupling? B.Tech Mechanical Engineering

Universal coupling is used to connect two shafts whose axes are inclined to each other. It consists of a pair of hinges, connected by a cross shaft.

Why would you use pneumatics? B.Tech Mechanical Engineering

Pneumatic systems are significantly cheaper than other streams, i.e., hydraulic systems. It can move faster and does not leak oil if it develops a leak.

Q18. Explain mechanical refrigeration.

Mechanical refrigeration is a process by which heat is removed from a specific location using an artificial heat exchange system. The refrigeration system can be cyclic, non-cyclic, magnetic, or thermoelectric depending on the application for which refrigeration is needed.

Q19. What are various types of brakes?

Various types of brakes are 1) hydraulic breaks, 2) electric breaks, and 3) mechanical breaks.

Q20. How will you classify sliding contact?

Sliding contact can be classified based on the various thicknesses of film bearings

Q21. How will you create a piston head?

The piston head can be designed on the basis of the following points:
The crown must have enough strength to absorb the explosion pressure inside the cylinder.
You can consider Grashof's formula to calculate the thickness of the head.

Q22. Explain knurling.

It is a manufacturing process conducted on the lathe tool to create a pattern on a bar that can be used as a handle.

Q23. What is the importance of a thermostat in the cooling system of an engine?

Thermostat makes sure to keep the engine cool at the optimum level. It prevents decreasing the overall efficiency of the engine.

Superheating is the process in which the fluid's temperature is increased along with the pressure.
Supercritical boilers do not have a heavy drum to separate steam from water and steam. They also require less steel metal.

Q24. What is the relation between the thickness of the thermal boundary layer and the depth of the hydrodynamic boundary layer?

The ratio of thickness = (Prandtl number)-1/3.

Q25. What do you understand by engineering drawing?
It is a technical document used to transfer technical details and define requirements.

Q26. Define the least count.
It is the smallest value that can be measured by measuring an instrument. Least count can be measured using the following formula:
Least Count Value of one scale division - Total number of a Vernier scale division.

Q27. What are the different types of screws?
Screws can be classified based on the following parameters:

Screw Head
Screw Thread Type
Screw Drive Type

Q28. What is a process flow diagram?
A process flow diagram is a sketch that describes major equipment, plant streams, and key central loops to show the relationship between system components. This diagram contains symbols to identify instruments and vessels it describes the primary flow course.

Q29. What is GD&T?
GD&T is a sort of abbreviation of Geometric Dimension & Tolerance. It is a system that defines engineering tolerances.

Q30. Explain bearing.

Bearing is a device that is placed between two components of engine for the smoother movement. It enhances the efficiency of any machine.

Q31. What is the difference between a pipe and a tube?

The significant difference between a pipe and a tube is that a pipe can be measured based on its inner diameter. On the other hand, a tube can be measured based on the outer diameter.

Q32. Explain the term torque

A force that causes rotation is called torque. It is a measure of how much force is required to rotate an object.

Q33. What do you mean by emissive power?

It is the amount of radiation emitted per unit.

Q34. Define coal.

Coal is a sedimentary rock that contains other elements like sulfur, oxygen, chiefly hydrogen, and nitrogen. It is the most important primary fossil fuel.

Q35. Differentiate between total moisture and inherent moisture of coal.

Total moisture in the coil is referred to as the moisture of the bulk as a sample while the air-dried sample is called inherent moisture.

Q36. What does AFBC stand for?

AFBC stands for Atmospheric Fluidized Bed Combustion.

Q37. What are the benefits of cycloidal gears?
The primary benefits of the cycloidal gears are:

It has a wider and high-power flank as compared to Involute gears.
The contact of Cycloidal gears is between the concave surface and the convex flank. This will reduce the wear and tear of the engine.
There are no chances of any interference in Cycloidal gears.

Q38. Briefly explain the term Gravity.
Specific Gravity is the proportion of the mass of a substance to the density of a reference substance.

Q39. Why is cast iron seasoning important before machining?
Cast iron seasoning is important for easy machining and saving the cutting edge of the tool.

Q40. What do you understand by heat treatment?
It is an operation that involves the heating and cooling process of metals to change their properties.

Q41. How can you identify mild steel, cast iron, and high-carbon steel?
You can identify these metals by a spark. Mild steel gives medium and dense sparks. Cast iron gives very thick and short flashes. High carbon steel gives long and thick sparks.

Q42. Define the term latent heat.

It is an amount of heat that changes the property of a material without increasing its temperature any further.

Q43. Why do you need a biological shield in nuclear plants?

The biological shield absorbs neutron, gamma, and beta radiation and protects living things.

Q45. How to report calorific values of fuel?

You can report them using the following methods:

1. On a received or wet basis.
2. Dry or moisture-free basis.
3. Combustible or ash basis.

Q46. Explain the nuclear reactor.

A nuclear reactor is a plant that initiates, controls, sustains, and maintains the nuclear fission chain reaction. It protects against radioactive radiation.

Q47. Why is heat treatment of steel metal crucial?

It is important to get the desired properties, change electrical and magnetic properties, and relieve the stress after hot or cold working.

Q48. What is called engineering drawing?

It is the technical document that is used to transfer technical details and requirements.

Q49. Can you give the definition of coal?
Coal is a sedimentary rock that contains elements like sulfur, oxygen, hydrogen and nitrogen.

Q50. What do you mean by latent heat?
It is the amount of heat that changes the property of a material without increasing its temperature.

Q51. Explain case hardening.
It is the method of using low-carbon steel to make the outer surfaces harder.

Q52. What is a periscope?
It is an optical instrument used for viewing objects above the level of sight. It is mostly used in submarines.

Q53. What are the different types of gate valves?
The different types of gate valves are

- Parallel disk gate
- Single disk gate
- Wedge Gate

Q54. How can we see the pipes behind the wall?
We can do so by using radio waves.

Q55. What is FOF in piping design?
FOF stands for Face of Flange.

Q56. What is extrusion?
Extrusion is the process by which a metal bar is elongated by pulling it through a mandrel.

Q57. What are the two types of cooling towers?
The two types of cooling towers are:
Natural draft and Mechanical or induced draft.

Q58. What does superheating mean?
Superheating is the process in which the fluid's temperature is increased along with the pressure.

Q59. Can you differentiate between thermodynamics and heat transfer?
Thermodynamics changes one equilibrium state to another. Heat transfer is a non-equilibrium process.

Q60. Why is Nitrogen used in welding?
Nitrogen is used in welding to stop oxygen and air from entering the fused metal while welding.

Q61. Which gases can be used in welding instead of nitrogen?
Nitrogen can be replaced with argon, helium, and carbon dioxide.

Q62. Why does white smoke come out in two-stroke locomotive engines?

White smoke comes out of two-stroke locomotive engines when the engine is running out of fuel.

Q63. What is a turboprop engine?

A turboprop engine is a gas turbine engine used to power propellers. It is an efficient engine for aircraft designs.

Q64. How do you differentiate between a rocket motion and a projectile motion?

A rocket motion uses a rocket that can accelerate the motion and resist forces like gravity. A projectile motion is a force given to a body during its launch.

Q65. What do you mean by orthographic drawing?

An orthographic drawing is a 3D representation of any object. The 3 Faces are: Plan view, Front view and Side view.

Q66. Can you provide us with some examples of mechanisms from our day-to-day life?

Some instances that show the use of mechanisms in our daily lives are switching a light on or winding up a clock

Q67. Can you tell the features used to identify mild steel, cast iron and high carbon steel?

While mild steel gives medium and dense sparks, cast iron gives out thick and short flashes. Meanwhile, high carbon steel gives long and thick sparks.

Q68. Do you know why a biological shield is used in nuclear plants?

The biological shield protects one from being exposed to neutron, gamma and beta radiation.

Q69. Can you explain what a nuclear reactor is?

A nuclear reactor is a plant that controls, sustains, and maintains the nuclear fission chain reaction, and thereby prevents exposure to radioactive radiation.

Q70. Why do you need to subject steel metal to heat treatment?

Heat treatment gives steel metal the desired properties.

Q71. Do you know why most gas containers are cylindrical?

Gas containers are built in a cylindrical shape to withstand high pressure. The sphere can withstand high internal gas pressure.

Q72. Is it possible to use motor oil in a hydraulic system?

You can use motor oil in a hydraulic system but it is best to avoid it. The reason is motor oil has elements that are harmful to seals and other parts of the hydraulic system.

Q73. Why do airplanes made out of thicker paper fly for a longer distance?

The reason is the thicker paper has a greater mass and potential energy. This changes into kinetic energy when it is in motion and gives the plane a larger lift.

Q74. What is the mechanical advantage of a double pulley?

A double pulley reduces the effort by half and moves the object by double the distance.

Q75. How are the pneumatic and hydraulic systems similar?

Both systems use pressure to act on a particular application. The difference is that the pneumatic system uses gases like air or nitrogen and the hydraulic system uses oil or water.

Q76. What are Newtonian fluids?

Newtonian fluids are those that have a linear stress-strain relationship curve. It also passes through the origin.

Q77. Why do we not use galvanized pipes for steam lines?

We do not use galvanized pipes for steam lines because the high pressure and temperature of the steam cause the zinc coating on the pipe to flake off.

Q78. What is the disadvantage of supercritical boilers?

Supercritical boilers do not have a heavy drum for separating steam from the mixture of water and steam.

Q79. What type of computer programs does a mechanical engineer use?

A mechanical engineer uses software like Mathcad, MATLAB, SolidWorks, and Autodesk Inventor.

Q80. Why are most of the gas containers cylindrical in shape?

Gas containers are made mostly cylindrical in shape to resist high pressure. The sphere ideally is the most efficient shape that resists high internal gas pressure but manufacturing that shape is quite expensive. Conversely, a cylinder with a domed top and bottom is cheaper and has sufficient potential to remain unaffected by the internal gas pressure.

Q81. Explain the role of Nitrogen in welding.

Nitrogen in welding is used to prevent porosity. It stops oxygen and air from entering the fused metal while welding.

Q82. What is the reason for white smoke in two-stroke locomotive engines?

When the engine is running out of fuel. This condition is harmful to the engine as it may result in overheating and eventually its failure.

Q83. Can motor oil be used in a hydraulic system?

Motor oil can be used in a hydraulic system, but we should avoid using it. This is mainly because motor oil has lower sulfur content, and contains tackifiers and other elements that are detrimental to seals and other hydraulic system components. Instead, we should use hydraulic fluids.

Q84. Why airplanes made up of thicker paper fly farther?
It happens because the thicker the paper, the greater its mass and potential energy. Potential energy converts into kinetic energy while moving and this large kinetic energy provides a larger lift to the airplane and larger lift results in a large flight distance.

Q85. Explain the difference between the turbine and the pump.
While the turbine conveys the flow energy of the fluid to mechanical energy, the pump deals with transferring mechanical energy to the fluid.

Q86. Is there any mechanical advantage of using a double pulley?
A double pulley cuts our efforts, taking half the effort and moving the object double the distance.

Q87. Are the pneumatic system and the hydraulic system similar? Explain, how.
Yes, both systems are similar in the mode of action. Both the pneumatic system and the hydraulic system use pressure to act on a particular application. As the pneumatic system makes use of gases like air or nitrogen, the hydraulic system uses oil or water.

Q88. Does stress produce strain or strain that produces stress?

A strain is the measurement of the displacement of an object caused due to applied force whereas stress is the force per unit area. Hence, both are produced by the applied force.

Q89. What is F.O.F. in piping design?

FOF stands for Face of Flange. It is used to determine the exact dimensions of the flange to avoid errors in measurement in the case of a vertical or horizontal pipeline.

Q90. Give some examples of mechanisms in daily life.

Some common examples of mechanisms like a light switch and the working of a clock.

Q91. Give one drawback of supercritical boilers?

Supercritical boilers lack a heavy drum for the separation of steam from the mixture of water and steam.

Q92. What are the major and minor head losses in a fluid flow system?

In the fluid flow system, the losses that occur in the pipes are termed major losses whereas head losses that occur due to bends and additional parts in the straight pipe system are termed minor losses.

Q92. Name the different types of compressors used in a gas turbine.

Three types of compressors are used in a gas turbine- Axial compressor, Centrifugal compressor, and Mixed Flow compressor.

Q93. What is the difference between total moisture and the inherent moisture of coal?

The total moisture of the coal means the total moisture of the sample while the air-dried sample is known as the inherent moisture of the coal.

Q94. Why is a thermostat used in the cooling system of engines?

A thermostat in the cooling system works to keep the engine cool at the optimum level. Doing so prevents a decrease in the efficiency of the system.

Q95. Which one has greater efficiency- A diesel engine or petrol engine with the same compression ratio?

If the compression ratio is the same then the petrol engine has greater efficiency than the former one. This is because the Otto cycle rejects lesser heat than the diesel engine cycle.

Q96. What was the first thing you ever designed?

I designed a toy car with a functional steering system when I was a kid. I spent weeks on it, figuring out how to create an axle and getting the thing to turn right. I used pieces from other toy cars and screws from around the house

Q97. What skills would you say are most important for an engineer?
The ability to be innovative is the most important quality for an engineer. We have to be able to look at things in a new way, even if it means realizing our past ideas are not as perfect as we thought they were. Our job is always trying to top our last design. Being a good communicator is also a good skill, because you have to be able to explain your idea to the rest of your team and get them to buy into it.

Q98. How would you explain a car's wheel and axle system to a layperson?
Axles serve two main purposes. They help bear some of the weight of the car, and they help the steering system turn your wheels. So, when you turn your steering wheel to the right, the axle helps turn the tires and absorbs any weight shift

Q99. Why do customers buy a product?
A customer buys a product because it makes their life better. Especially with technology, the product needs to make something easier for them if they're going to spend their money on it

Q100. What is a new engineering skill you've acquired in the last year?
I took a course on the design of solar water heating systems a few months ago. As the future of energy moves toward solar, I wanted to be familiar with the components and processes of using solar collector systems to generate energy. A lot of what I learned can be applied to other forms of solar absorption construction.

We all know that mechanical engineering is a thriving field. If you're aiming for a future in mechanical engineering, explore this comprehensive document on mechanical engineering interview questions.

Good luck!