

By OnlineInterviewQuestions.com

Cyient Design Engineer Interview Questions

Q1. Explain types of jet engines?

The types of jet engines are

- **Turbofan engine:** A turbofan engine has the largest fan at the front, which sucks in the air. Most of the airflows around the exterior of the engine. This makes it quieter and gives more thrust at low speeds.
- **Turboprop engine:** A turboprop engine is a jet engine connected to the propeller of the aircraft. The turbine present in the back is usually turned by hot gasses. This turns a beam that drives the propeller. Moreover, some of the small airliners and the transport aircraft are powered by turboprops.
- **Turbojet engine:** The turbojet engine is a rejoinder engine. In a reaction engine, escalating gasses push hard against the front of the engine. The turbojet sucks in air and condenses or compresses it.
- **Turboshaft engine:** The turboshaft engine is premeditated so that the swiftness of the helicopter rotor is free of the rotating speed of the gas producer. It is the form of a gas-turbine engine that functions much like a turboprop system. The engines thereby provide power for a helicopter rotor.

Q2. What are different types of Beams?

A beam is a structural element that resists load applied to the beam's axis. It is primarily made up of bending when the pressure is applied, it creates shear forces or bending moments. However, they are characterized based on their support, shape, length, profile, and material.

Types of beams are:

- Simply supported: they are supported at both ends allowing horizontal movement of the beam.
- Cantilever: A structured beam where one end is free and the other is fixed.
- Overhanging: It is the combination of a simply supported and cantilever beam. One or both of end overhang this beam.
- Continuous: Similar to simply supported but it is sustained on more than two supports.
- Fixed end: the beam is fixed at both the end. It doesn't allow vertical movement and rotation of the beam.

Q3. What is a boiler?

Boiler, also called **Steam Generator** is a setup designed to convert a liquid into vapor. In a steam power plant, a boiler consists of a heating system in which fuel is burned. It sends out heat from the ignition products to the water and a room where steam can structure and collect. Generally, a boiler has a furnace that burns fossil fuel in the same mechanism as burning waste fuels. A nuclear reactor can also work as a source of heat for generating steam. The steam boilers are usually classed into two category fire-tube and water-tube types. In the

fire-tube type, the water generally surrounds the steel tubes which the hot gases flow from the furnace. While in the water tube boiler, there is water inside tubes with the hot furnace gases circulating outside.

Q4. What is inverter cmos?

CMOS is known as **Complementary Metal Oxide Semiconductor**. CMOS technology is used in the computer chip design industry. It is broadly used to form incorporated circuits in numerous and varied applications. This technology makes use of both P channel and N channel semiconductor devices. The main advantage of CMOS over other NMOS (which is a p-type substrate with n-type source and drain diffused on it) and BIPOLAR technology is the smaller power debauchery. Unlike NMOS or BIPOLAR circuits, a MOS circuit has no stagnant power dissipation. The CMOS offers comparatively high speed, low power dissipation, high noise margins in both states. It operates over a wide range of sources and input voltages.

Q5. Explain signal variation for particular time in graph?

The TV and RW graph are created in 2 steps. First, the RW model is simulated to identify the time-varying coordinates over time. The model then simulates some sensors that are moving around a square space with random directions and speed. The time-varying data is obtained in correspondence to the position of every sensor at a particular given time. The number of sensors is $N=36$ and the speed of the motion is between 0.05 to 0.5 m/sec. In the second step, the nearest neighbour graph is constructed at a particular time from the data position.

Q6. What is mass flow rate equation?

The **mass flow rate** is the mass of a liquid substance passing per unit time. In other words, the mass flow rate is defined as the rate of movement of liquid mass through a unit area. Here the mass of a substance that passes per unit of time. The mass flow is directly dependent on the density, velocity of the liquid and area of cross-section. It is the movement of mass per unit time. The mass flow is denoted by m and the units in kg/s. The mass flow rate equation is calculated by $m=pVA$, where p stands for a density of a liquid, v for velocity and A for an area of cross-section.

The formula for mass flow rate is given: **Mass Flow Rate = (density)*(velocity)*(area of the cross section)**

Q7. What are different modes of thermal energy transfer?

Thermal energy is defined as the total of all kinetic energies within a given system which causes the bonds within the solid to break apart. While thermal power generation is the process of obtaining thermal energy by burning fuels to convert electric energy by using power generating facilities. High thermal efficiency can be achieved by combining these two methods of power generation. By the gas turbine power generation by rotating the generator by using the expansion power of combustion. And from the gas generated by burning fuels inside

compressed air, and steam power generation by rotating the steam turbine.

The different modes of thermal energy transfer are **Conduction**, **Convection**, and **Radiation**.

Q8. What is CATIA V5?

CATIA V5 is a design leading software for product 3D CAD design used for parametric and non-parametric modeling. It is used to design, replicate, examine, and produce products for a variety of industries. This may include aerospace, automotive, consumer goods, and industrial machinery. CATIA V5 is primarily a CAD software capable of working alongside products with different brands. It is helpful as customers can buy as much purpose they require. It deals with all manufacturing from supply chains to small independent producers.

Q9. What is point of Contraflexure?

In a flexing beam, the point where there is a moment of zero bending, then it is known as the **point of contraflexure**. At the point of contraflexure, the bending direction changes its sign to negative from positive and vice versa. For this, it needs to pass through zero and that is the point of contraflexure.

In a moment of bending diagram, it is the position at which zero line gets intersect with the bending moment curve. In real-life situations, it is very difficult to identify the exact point of contraflexure.

Q10. Can we use gasoline is used in a Diesel engine?

No, If gasoline is inserted into the car or vehicle with a diesel engine, then it can cause a lot of problems to the engine. The diesel engine is not dependent on the spark plug unlike other engines, whereas the gasoline engine depends on the spark plug to set fire to the combustion chamber.

If gasoline enters the diesel engine there will be no ignition and lubrication. The fuel system will get damaged as it will affect the fuel pump, filter, and injectors. If there is an unnatural detonation, the shock waves could destroy various components of the engine like pistons, wrist pins, and rods. Ultimately it will result in the damage of the engine as well.

Q11. What is free body diagram?

Free Body Diagram is mostly present in engineering and physics. It represents a graphical illustration that visualizes the resulting reactions, applied forces, and moments of the body in the given conditions. They depict bodies that are connected with each other with all the reactions, applied forces and moments that act on the bodies.

A free body diagram is implemented to calculate the resulting reactions in any type of mechanical problem. It is also used to understand the loading of the individual structure of the components, calculation of the internal

forces in the structure, and application in the engineering disciplines like structural or biomechanics engineering.

Q12. Which is the best metal for gears?

The materials that are used for the manufacturing of the gears are based on the service conditions and strength. Cast iron is the most frequent material for gears due to its high wearing properties, ease in producing complicated shapes, and machinability. Phosphor bronze is used for worm gears due to the wear resistance ability of the material.

Alloy or carbon metals are used due to their high values of strength. Alloys like steels are heated to achieve an ideal combination of hardness and toughness. Hardness is one of the most important factors in the design of gear.

Q13. What is BMD and SFD?

Bending Moment Diagram (BMD) is a type of diagram that represents the bending moment variation along the member length. BMD assists to understand the bending moments of a structure. BMD is applied to identify the maximum number of bending behavior and locations. It also helps to improve the beam structure design through modification of the section modulus.

Shear Force Diagram (SFD) is a type of diagram that represents the variation of the shear force along the length of the structural member. It assists in a complete understanding of the shear forces. Through SFD shear stress can be identified at every beam instance. If SFD is compared with the shear strength of the material, it will tell if it can withstand the force or not.

Q14. What are Bevel Gears? List its types?

Bevel gears are a type of gears that have a cone-like appearance. Bevel gears are used to transmit the force in between two shafts that intersect at a point. The gear has a cone at the pitch surface and some teeth are cut in the cone. Different types of bevel gears are available in the market. They are Helical, Straight, Angular, Crown, Spiral, Miter, Zero, Hypoid.

Q15. How hydrostatic propulsion systems work?

A **hydrostatic propulsion** system is operated for the smooth drive of a vehicle. The propulsion system consists of a shift lever for moving a pump stroking valve into low forward, neutral, and reverses positions of speed to ready the system. After the lever is made into the reverse or forward position, a pedal for the accelerator must be pressed to fully or partially close to an inching valve for the throttle. This needs to be done before the swash plate of the pump moves from zero position of piston displacement and starts pumping the fluid into the hydraulic motors. The motor can be made to high-speed situations by activating the circuit by shifting hydraulic motor swash plates.

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