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Hydraulic Mechanics Interview Questions

Q1. What is a hydraulic machine?

Hydraulic machines are the machine that is used to convert hydraulic energy into mechanical energy and vice versa. This type of machine utilizes hydraulic oil for actuation, power transmission, and working.

Below we have mentioned some important characteristics of Hydraulic machine

- These machines run at a pressure in 100s of a bar which is 100 times the atmospheric pressure.
- To withstand this high pressure, these machines utilize steel wires. The hoses and pipes used in this machine are extremely tough.
- As the machine is made of very hard material, the machine costs too high.
- Hydraulics machines are used in heavy machine industries, not in small applications.

Q2. List different types of hydraulic systems?

There are two types of hydraulic system

- Open-loop hydraulic system
- Closed-loop hydraulic system

Q3. What does P and T stand for in hydraulics?

P stands for **PUMP** and T stands for **Tank** in hydraulics.

Q4. Where are hydraulic systems used?

Mostly Hydraulics machines are used in large industries where machines required this for calibration, repair, and installation of rail.

Some daily-basis uses are:

- **Gasoline pumps:** They use the hydraulics system to pull the fuel from their reservoir tank to the vehicle.
- **Cars:** In cars, hydraulic systems are used for brakes. The circuit functions by operating the car's brakes on all four wheels.

- **Vehicle repair and maintenance:** In repair services, hydraulics systems are used for lifting heavy cars up and down for repair.
- **Construction machines:** It is only possible because of the hydraulics system that equipment such as cranes, forklifts, jacks, can lift and lower objects.
- **Airplanes:** Hydraulic systems are also used in aerospace for operating their control panels.
- **Amusement park rides:** Ferris Wheel make use of this system to provide and control motion for attractions
- **Theatrical presentations:** Hydraulic power makes it possible for stages to be raised higher and bring them back into place.
- **Elevators:** Elevators also take advantage of the hydraulic system to power the elevator's movement and make them stop when/where needed.
- **Snowplows:** Hydraulic mechanisms is also useful in the movement of the plow.
- **Bakeries:** Mass production of bread and pastries is possible because of a hydraulic system because it allows them to be lifted and moved along conveyor belts for packaging.
- **Barber chairs:** The barber also makes use of a hydraulic system to adjust the chair's height.
- **Office chairs:** Whenever you adjust the chairs corresponding levers, hydraulic systems come into use.

The list does not end here. There are many more examples of using the hydraulic system in daily life. It is used in machines ranging from car parts to doors, hoses, fences, etc.

Q5. What are the advantages of hydraulic system?

A **hydraulic system** is used extensively all around. The reason for its popularity because of its efficient conversion of energy to remote locations with less moving parts.

Here is the list of some important advantage of hydraulic system:

- Controlling the Hydraulic system is quite easy. It is easy to start, stop, accelerate, and slow down the system.
- Hydraulic systems are simpler and easier to maintain because these systems use fewer moving parts.
- This is the only system that can deliver constant torque or force irrespective of variation in speed.
- It is easy to find the leakage spot in this.
- The hydraulic system possesses the centralized lubrication systems that automatically lubricate the right points.
- The hydraulic system is also used to transmit a large amount of power using small flexible hoses and tubes.
- This system is worthy to use on chemical plant and mines as it does not cause any sparks
- Hydraulic systems can maintain its viscosity of airworthiness, its density, and the temperature of the fluid in a very hot environment.
- This system has a great ability to maintain its density, viscosity of airworthiness, and temperature of the fluid in a hot environment
- Components of the hydraulic system permit micrometric speed variations.
- It produces minimal noises.
- It is easy to repair the component of machines like direction control valves, Hydraulic Rams, motors, and gear pumps.

Q6. What are practical fluids?

Practical fluids are fluids that possess surface tension and are compressible and viscous in nature.

Practical fluids possess three properties

- They are viscous.
- They possess surface tension.
- Practical fluids are compressible.

Q7. What is a hydraulic bridge?

The **hydraulic bridge** also is known as "moving bridge" is a bridge that is used to allow seaside traffic through a body of water. In short, it can be moved to allow the passage for boats or ships.

Q8. What is a turbine?

A **turbine** is a machine that utilizes the fluid picked up by a rotor system to transform rotational energy into work or energy. Turbines use electromagnetic induction or mechanical gearing to produce electricity. There are many types of turbines e.g. **steam turbines, gas turbines, wind turbines, and water turbines**. Windmills and water wheels are also types of turbines that are used to grind grain.

Q9. What are different types of hydraulic devices?

There are several hydraulic devices which use the incompressible fluid to transfer the force and energy. These devices follow the principle of hydro-kinetics and hydro-static.

Some examples of hydraulic devices include:

- Backhoes
- Bulldozers
- Excavators
- Jaws of life
- Metal shears
- Car crushers
- Automobile brakes
- Garbage compactors
- Log splitters
- Zero radius lawn tractors
- Bobcat tractors

Q10. Explain different types of Hydraulic circuits?

There are two types of hydraulic systems. These are mentioned below

- **Open-loop or open circuit:** When the operating mechanism is idle, there will be fluid flow but no pressure in the open-loop system. In this, the fluid passage from the actuator to the reservoir and then to the pump inlet. It uses a directional control valve. The advantage of using this hydraulic system is it generates less heat compared to a closed-loop hydraulic system.
- **Closed-loop or closed circuit:** In this system, when the pump operates there will be pressure for fluids. Unlike Open-loop, the fluid does not enter into the reservoir. The fluid flow only between the pump and the actuator. This system uses an additional pump called a feed pump or charge pump. The main advantage of using a closed-loop system is a precise response of actuation.

Q11. Enlist major components of Hydraulic machine?

Major components of Hydraulic machines are

- **Hydraulic Reservoir:** The fluid present in the hydraulic system is of utmost importance. The size of the reservoir containing the hydraulic system depends upon the system and the application used. Aeration can cause the problem so a reservoir is designed in a way that it can remove the trapped air efficiently. The reservoir cools down the pressurized hydraulic fluid.
- **Actuator:** The actuator takes the pressure energy and transforms it into mechanical force and motion.
- **Filters:** The major problem in a hydraulic system is contamination. There are various particles like rust, water, and other foreign particles that can contaminate and damage the hydraulic system. So, to remove the unnecessary contamination, filters are used. In this way, it is easy to purify the fluid effectively.
- **Hydraulic Pump:** As the pump transmits the mechanical energy of fluid into hydraulic energy it is also considered as the heart of the hydraulic system in hydraulic industries.
- **Flow control valve:** The fluid flow rate is responsible for the speed of the actuator (motion of the output) and is to be controlled in a hydraulic system. This operation can be performed by using a flow control valve.
- **Accumulator:** Accumulators work as an electrical storage battery in a hydraulic system. It stores hydraulic fluid under pressure to utilize it in the future.
- **Hydraulic Hoses:** Various components of Hydraulic hoses like pumps, motors, cylinders, etc. are connected with the help of hydraulic hoses and it allows the transfer of fluid between them.
- **Hydraulic Seals:** Hydraulic seals are mostly made up of non-metals like PTFE, rubber, and polyurethane (AU). It is used to prevent any leakage of fluid.

Q12. What is impulse turbine?

The **impulse turbine** converts the pressure through the fixed nozzles (can be one or more) to the kinetic energy in the form of a liquid jet(s). This liquid fluid flow when invades on the moving plates of the turbine, it spins the turbine, and absorbs all of the kinetic energy. These types of turbines are mostly used in high-head applications.

Q13. What are CENTRIFUGAL PUMPS?

The **centrifugal pumps** are widely used for the transfer of fluids with low viscosity like water or light oil. As the name suggests, it utilizes the centrifugal force to move water or any other fluid with the help of a rotating impeller. This pump is highly acceptable in industries like agriculture, municipal, power generation plants, petroleum, mining, pharmaceutical, and many more. This pump is used to transport the liquid from one place to another.

Q14. What is the use of hydraulic jack?

It is used for lifting the vehicle in some circumstances like tire replacement, moving the vehicle in muddy area etc.

Q15. What is Hydraulic intensifier?

It is used to enhance the intensity of the pressure of any fluid by using the hydraulic energy available from a large amount of water at low pressure. This device is very useful in those machines which require fluid at very high pressure and it is not possible to simply obtained from the main supply directly.

The hydraulic intensifier has three main components. They are mentioned below

- Fixed ram
- Hollow inverted sliding cylinder
- Fixed inverted cylinder.

Q16. What is specific speed for axial flow turbines?

The specific speed for axial flow turbines is 7000-20,000 (English unit)

Q17. What is Hydraulic gradient line?

The **hydraulic gradient line** is a line that gives the addition of datum head and pressure head of fluid flowing in a pipe in relation to some reference line. This line gives information about the pressure head of the flowing liquid. This line can be obtained by linking the top of all vertical ordinates.

Q18. What is Braking jet?

The **braking jet** is used to stop the runner present in the Pelton turbine when it is not working properly. This happens when the nozzle inlet is closed and the water jet is also stopped, but due to inertia runner doesn't stop running even after the proper closure of the inlet nozzle. So, a brake nozzle is provided in the turbine to divert the direction of the jet to the back of buckets. This direction provided by brake to the jet is known as the Braking jet.

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