



SHREE DATTA POLYTECHNIC , DATTA NAGAR

Maharashtra State Board of Technical Education

CLASS TEST No:-1 Model Answer

12242



Course Name- **Mechanical Engg**
Semester-**SIXTH**

Course code-**ME6E**
Subject:-**IFP**

*** All Main Questions are compulsory**

Q1. ATTEMPT ANY THREE.

3x3=9Marks

A. How pump are classified?

→ 1) Classification based on principle of operation

----Hydrostatic type pump

-----Hydrodynamic type pump

2) Classification based on Displacement

---Constant displacement pump

---Variable displacement pump

3) Classification based on Construction

---gear type pump i) Internal ii) External

---Vane type pump i) const displacement ii) variable displacement

---piston type pump i) Radial ii) Axial piston pump

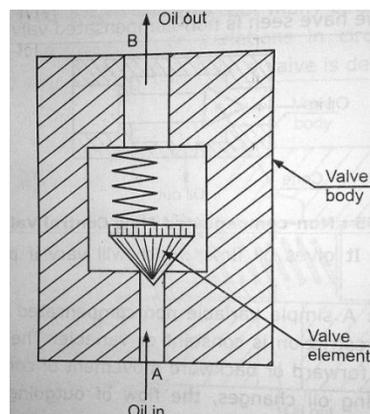
---Screw pump

---Ball piston type pump

B. Sketch and explain the working of Non return valve.

→

The purpose of NRV is to block the flow of fluid in given direction, but permit unrestricted flow in the opposite direction. fig shows the poppet type NRV.



When pressurized oil comes in port A it will lift up the cone by overcoming spring force and flow will start from port A to port B. When flow from A stops, spring will expand and cone will block the flow.

It is easily understood that no flow is possible from port B to A.

C. List the four field of application of fluid power.

- --Industrial Application
- Transportation application
- Construction Equipment application
- Agricultural Equipment application

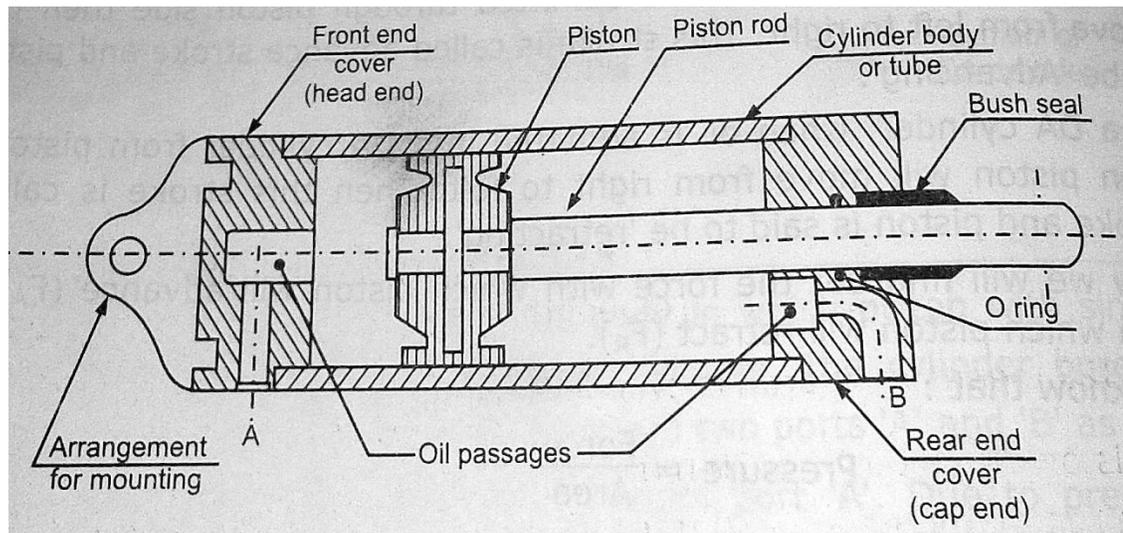
(Any suitable Example with description carries full mark)

D. State any four Reasons of failure of hydraulic seals.

- Following are the reasons of failure of seals
- Incompatibility of seal material with oil
- Low speed of actuator
- Seals are not correctly installed
- Unbalanced shaft, bend shaft, improper bearing
- Unavoidable vibrations
- High temp etc.

E. Sketch and label Actual construction of double acting cylinder.

→



Q2. ATTEMPT ANY TWO.**4x2=8Marks****A.** What are the features of the air? List any four.

→ Following are the features of the Air

- Freely & Easily available
- Fire proof (no chance of fire)
- Easy transportability, ie through pipes
- Easy storage
- Construction of Pneumatic system is comparatively simple
- Low maintenance cost
- Overall cost of Equipment and system is low
- Reliable for remote control

B. Compare hydraulic system and pneumatic system.

| Parameter | Hydraulic system | Pneumatic system |
|-----------------------|---|--|
| Energy carrier | Air (free Available) | Oil (with sp property) |
| Energy conversion Ele | Air Compressor | Hydraulic pump |
| Pressure | Limited up to 10bar | From 100-700 bar |
| Force application | Lower magnitude force demand | Higher magnitude force demand |
| Operation | Easy to operate with smaller value of control | Sys with high pressure is difficult to operate |
| Reservoir | Only one can serve the need | Every sys required its own |
| Maintenance | Easy and quicker, Sys is clean and neat | Complex & time consuming |
| Lubrication | Air lubrication needed | Self lubricated |
| Cost | Lower initial & operating cost | Higher |
| Overload protection | Pressure regulator | PRV |
| Application | Air cooling & conditioning | Hydraulic press |

C. List out any four sources of heat in any hydraulic system.

→ Following are the sources of heat in Hydraulic system

- Pump
- Friction
- Blockage in filter, valve and other element
- Oil viscosity
- Relief valve, flow control valve, DCV etc

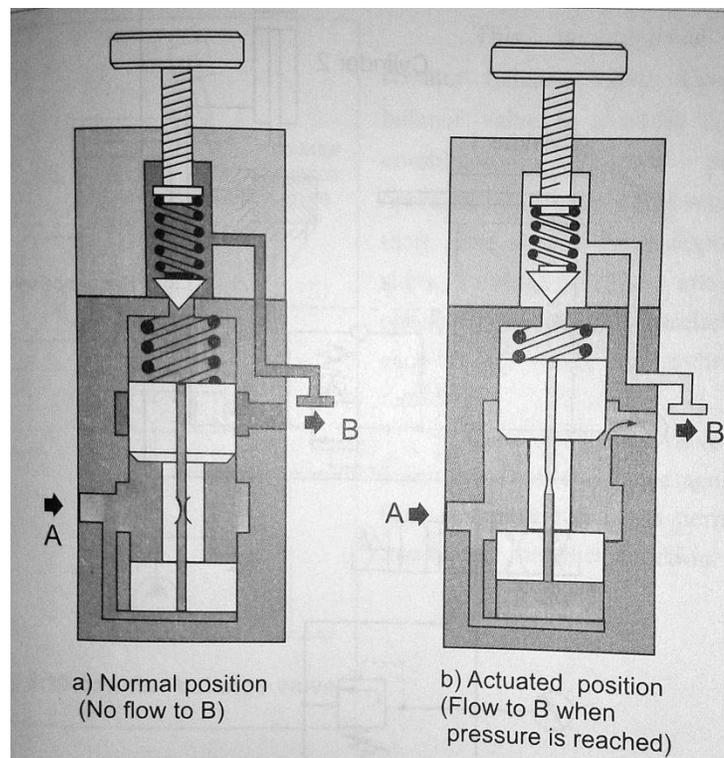
Q3. ATTEMPT ANY TWO.

4x2=8Marks

A. Draw and explain the working of pressure sequencing valve.

→ The function of sequence valve is to provide flow to a second consumer in the case when the pressure level at a particular consumer reached to threshold value. As name implies it is used for sequencing the operation one after another.

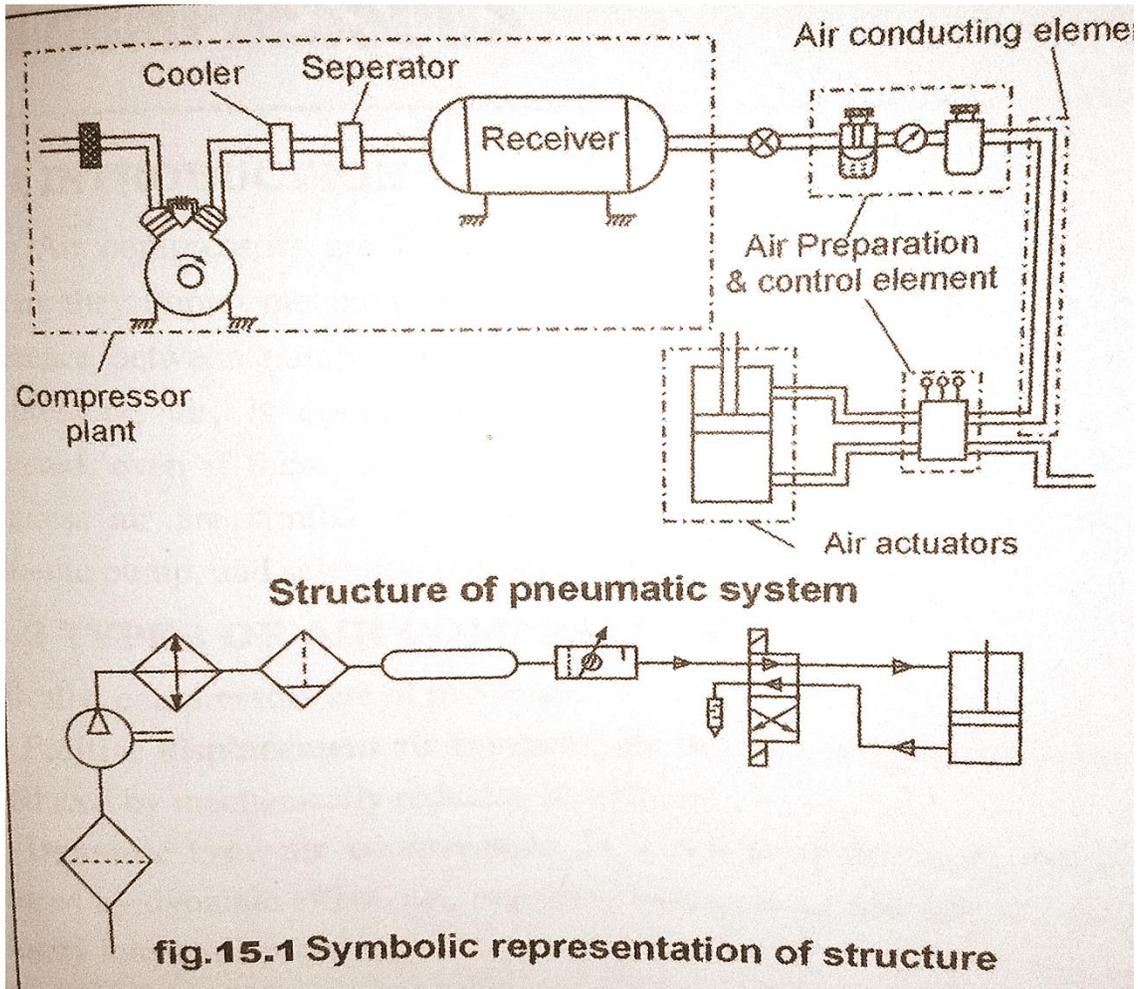
When cylinder 1 reaches its end, the pressure in the ckt start building, when the pressure reaches the value set by the spring force of the sequence valve, it causes the sequence valve to trigger, opening flow to the second cylinder.



In normal position the sequence valve is closed. When the operation of consumer 1 is completed, the pressure starts building. and when reaches to a set value fluid flows through spools to drain. As fluid flows through spool the orifice causes pressure differences between spring side and spool side. This pressure differences result in differential force which lifts the spool, causing it to uncover the port B. And thus supplying fluid to another consumer B. thus achieving the sequence operation.

B. Draw a general layout and symbolic representation of pneumatic system.

→



C. Draw the symbol for the following (Any four)

- i) Double acting double rod end hydraulic cylinder.
 - ii) Pressure relief valve
 - iii) Pressure reducing valve
 - iv) Sequence valve
 - v) Heat exchanger
 - vi) Tandem cylinder
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