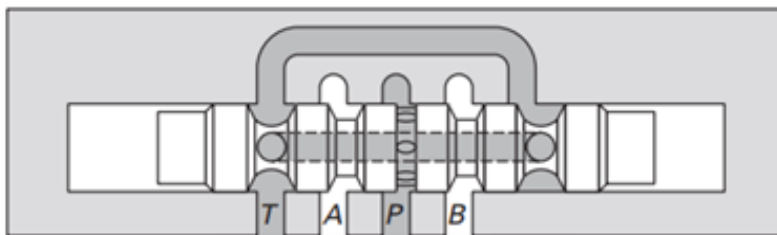




قائمة الاسئلة

اختبار النهائي للعام الجامعي 2025/2024-كلية الهندسة :: انظمة قدرة الموانع - كلية الهندسة - قسم الميكانيك- المستوى الرابع - 3 ساعات - درجات د.جمود النهاري

- 1) Which of the following is a common limitation of a rotary cylinder?
  - 1) - It can only operate in a single direction.
  - 2)  The angle of rotation is typically limited to a specific range, commonly 90° or 180°.
  - 3) - It can provide continuous rotary motion without limitations.
  - 4) - It can only be used for high-force, low-speed applications.
- 2) What is the primary disadvantage of gear hydraulic motors?
  - 1) - They have the highest pressure rating.
  - 2) - They are inefficient and less durable.
  - 3) - They are the most dirt tolerant.
  - 4)  They have the lowest pressure rating compared to other types.
- 3) Which of the following is NOT an advantage of hydrostatic transmissions?
  - 1) - Infinitely variable speed and torque
  - 2) - Extremely high power-to-weight ratio
  - 3)  Requires very high operating pressures
  - 4) - Ability to be stalled without damage
- 4) Which of the following is true about a fixed orifice flow control valve?
  - 1) - It provides variable flow control based on fluid viscosity.
  - 2)  It regulates flow but is unaffected by fluid viscosity.
  - 3) - It is used only in systems with high pressure.
  - 4) - It allows for pressure compensation.
- 5) Which of the following reasons make water unsuitable to use as a fluid in hydraulic systems? '1. poor lubrication '2. high viscosity '3. more leakage 4. quickly evaporates
  - 1) - 1 and 3
  - 2) - 2 and 4
  - 3)  1, 3 and 4
  - 4) - all the above
- 6) Which of the following statements are true?
  1. low viscosity fluids have higher leakage
  2. high viscosity fluids have high pressure drop
  3. low viscosity fluids consume more power
  4. low viscosity leads to wear of components
  - 1) - 1 and 2
  - 2) - 1, 2 and 3
  - 3)  1, 2 and 4
  - 4) - 2, 3 and 4
- 7) **What is the correct description for this position?**



- 1) - CLOSED CENTER-ALL PORTS CLOSED
- 2) - PRESSURE CLOSED; A & B OPEN TO TANK





- 3) - B CLOSED; PRESSURE OPEN TO TANK THROUGH A  
4)  TANDEM
- 8) What is the primary purpose of a flow control valve in a hydraulic system?  
1) - To increase the pressure in the system  
2)  To regulate the speed of cylinders  
3) - To change the direction of fluid flow  
4) - To limit the maximum pressure in the system
- 9) Where is an intercooler connected in a two-stage compressor?  
1) - intercooler is connected after the two-stage compressor  
2)  intercooler is connected between the two-stage of the compressor  
3) - intercooler is connected before the two-stage compressor  
4) - not one of the options
- 10) Which of the following types of air dryers is most effective at removing moisture from compressed air?  
1) - Chemical Air Dryer  
2)  Adsorption Air Dryer  
3) - Refrigeration Air Dryer  
4) - Aftercooler
- 11) When designing a pneumatic system, which of the following is most critical for determining the optimal operating pressure?  
1) - The system's weight density  
2) - The specific gravity of the fluid used  
3)  The possibility of tank rupture due to high pressure  
4) - The power consumption required to run the compressor
- 12) Volumetric efficiency of hydraulic motor is the ratio of  
1)  actual flow rate to theoretical flow rate  
2) - theoretical flow rate to actual flow rate  
3) - actual fluid power to pump input power  
4) - not one of the options
- 13) Which of the following is not a characteristic of hydrodynamic (non-positive displacement) pumps?  
1) - They have no positive seal between the inlet and outlet  
2) - They are generally used for low-pressure, high-volume flow applications  
3)  They are commonly used for fluid power systems  
4) - Flow is caused by kinetic energy and friction force
- 14) Which type of displacement is observed in gear pumps?  
1) - only variable displacement  
2) - both fixed and variable displacement  
3)  only fixed displacement  
4) - not one of the options
- 15) Which type of compressor is most commonly used for industrial pneumatic systems?  
1) - Vane Compressors  
2) - Screw Compressors  
3)  Piston Compressors  
4) - Rotary Compressors
- 16) Which of the following is not an advantage of positive displacement pumps over non-positive displacement pumps?  
1) - High pressure capability (up to 12,000 psi)  
2) - Small, compact size  
3) - High volumetric efficiency  
4)  They cannot operate over a wide range of pressure requirements





- 17) In which of these pumps, swash plate is used to translate the motion of rotating shaft into reciprocating motion?
- 1) - radial piston pumps
  - 2)  axial piston pump
  - 3) - bent axis piston pump
  - 4) - all options
- 18) What is a key characteristic of rotary pneumatic actuators?
- 1) - They provide linear motion.
  - 2) - They convert rotary motion into linear motion.
  - 3)  They are commonly used for high torque applications.
  - 4) - They are not suitable for high-speed operations.
- 19) What is slippage in the context of hydraulic pumps?
- 1) - The failure of the pump to generate any flow
  - 2) - The leakage of fluid past the pump components due to poor seal design
  - 3)  The reverse flow of fluid back into the inlet when the pump stops or pressure increases suddenly
  - 4) - The inability of the pump to reach its rated pressure
- 20) In a telescopic cylinder, as the number of stages increase
- 1) - diameter of piston rod also increases
  - 2) - diameter of the piston rod remains the same
  - 3)  diameter of piston rod decreases
  - 4) - not one of the options
- 21) Which type of hydraulic cylinder has one piston connected to piston rod extended on both the sides of the cylinder?
- 1) - telescopic cylinder
  - 2) - telescopic cylinder&tandem cylinder
  - 3)  tandem cylinder
  - 4) - not one of the options
- 22) Which type of positive displacement pump is more efficient than a gear pump, but less efficient than a piston pump?
- 1)  Vane pump
  - 2) - Gear pump
  - 3) - Piston pump
  - 4) - Helical pump
- 23) Which of the following is true regarding a tandem cylinder?
- 1) - It is typically used in high-speed applications where rapid retraction is required.
  - 2)  It consists of two double-acting cylinders that are mechanically coupled.
  - 3) - It is designed for very long strokes and high forces.
  - 4) - It operates without lubrication and is ideal for small forces.
- 24) What distinguishes a multi-position cylinder from a regular hydraulic cylinder?
- 1) - It allows for movement in multiple directions at the same time.
  - 2)  It is used for sorting operations or movement of flaps by attaining stable positions.
  - 3) - It operates only in one direction with continuous force.
  - 4) - It can transform linear motion into rotary motion at multiple angles.
- 25) What is the function of sequence valve used in hydraulic circuits?
- 1)  to perform number of operations one after the other after the set pressure is reached
  - 2) - to perform number of operations continuously before the set pressure is reached
  - 3) - after reaching set pressure oil is flow to the tank
  - 4) - all options



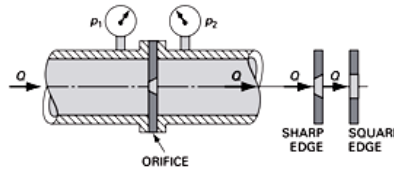


- 26) Which of the following statements are true for accumulator used in hydraulic systems?
- 1) accumulator stores fluid with pressure
  - 2) accumulator stores fluid without any pressure
  - 3) accumulator stores compressible liquid
  - 4) spring is used as an external source to keep the fluid under hydraulic pressure
- 1) - 1, 3 and 4  
2) - 2 and 3  
3)  1 and 4  
4) - 2, 3 and 4
- 27) The main purpose of a control valve positioner is to:
- 1) - Alter the fail-safe status of the valve
  - 2)  Improve the precision of the valve
  - 3) - Alter the characterization of the valve
  - 4) - Eliminate cavitation in the valve
- 28) The purpose of valve packing is to:
- 1) - Help reduce cavitation in the valve
  - 2) - Cushion the valve against harm during shipment
  - 3)  Seal process fluid from escaping past the stem
  - 4) - Lubricate the valve trim
- 29) Cavitation in a control valve is caused by:
- 1) - process noise
  - 2) - vibration in the piping
  - 3) - a laminar flow regime
  - 4)  pressure recovery
- 30) A pressure relief valve can be
- 1) - direct operated
  - 2) - pilot operated
  - 3) - solenoid operated
  - 4)  all options
- 31) A pressure relief valve contains a poppet with a 0.75 in<sup>2</sup> area on which system pressure acts. During assembly a spring with a spring constant of 2500 lb/in is installed to hold the poppet against its seat. The adjustment mechanism is then set so that the spring is initially compressed 0.20 in from its free-length condition. In order to pass full pump flow through the valve at the PRV pressure setting, the poppet must move 0.10 in from its fully closed position. The full pump flow pressure is:
- 1) - 900 psi
  - 2)  1000 psi
  - 3) - 1050 psi
  - 4) - 1100 psi
- 32) A hydraulic motor has a displacement of 164 cm<sup>3</sup> and operates with a pressure of 70 bars and a speed of 2000 rpm. If the actual flow rate consumed by the motor is 0.006 m<sup>3</sup>/s and the actual torque delivered by the motor is 170 N · m. The actual kW delivered by the motor is:
- 1) - 36.5 kW
  - 2) - 35.7 kW
  - 3) - 35.3 kW
  - 4)  35.6 kW
- 33) Air is used at a rate of 30 cfm from a receiver at 100°F and 150 psi. If the atmospheric pressure is 14.7 psia and the atmospheric temperature is 80°F, the cfm of free air must the compressor provide is:
- 1)  324 cfm
  - 2) - 325 cfm





- 3) - 326 cfm  
4) - 327 cfm  
34) The pressure drop across the sharp-edged orifice of the figure is 100 psi. The orifice has a 1-in diameter, and the fluid has a specific gravity of 0.9. The flow rate is:

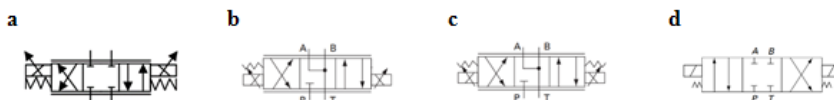


- 1) - 255 gpm  
2)  252 gpm  
3) - 250 gpm  
4) - 253 gpm  
35) Determine the actual power required to drive a compressor that delivers 100 scfm of air at 100 psig. The overall efficiency of the compressor is 75%.  
1)  24.0 hp  
2) - 24.3 hp  
3) - 24.5 hp  
4) - 24.7 hp  
36) The load on a 2-in.-diameter hydraulic cylinder increases from 10,000 lb to 15,000 lb. Due to the compressibility of the oil, the piston retracts 0.01 in. If the volume of oil under compression is 10 in<sup>3</sup>, what is the bulk modulus of the oil in units of psi?  
1) - 506999 psi  
2) - 507222 psi  
3) - 507111 psi  
4)  507000 psi  
37) A hydrostatic transmission operating at 105-bars pressure has the following characteristics:

Pump	Motor
$V_D = 100 \text{ in}^3$	$V_D = ?$
$\eta_v = 85\%$	$\eta_v = 94\%$
$\eta_m = 90\%$	$\eta_m = 92\%$
$N = 1000 \text{ rpm}$	$N = 600 \text{ rpm}$

Find the Displacement of the motor.

- a. 130 cm<sup>3</sup>  
b. 131 cm<sup>3</sup>  
c. 132 cm<sup>3</sup>  
d. 133 cm<sup>3</sup>  
1) - a  
2)  b  
3) - c  
4) - d  
38) The four-way proportional directional control valve symbol is:



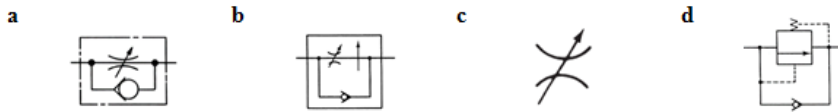
- 1) - a  
2) - b  
3)  c





4) - d

39) The pressure-compensated flow control valve symbol is:



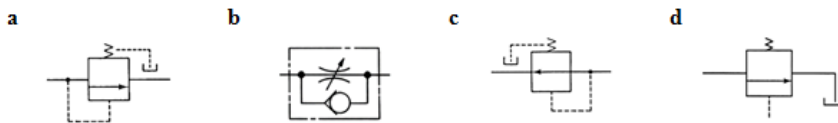
1) - a

2)  b

3) - c

4) - d

40) The unloading valve symbol is:



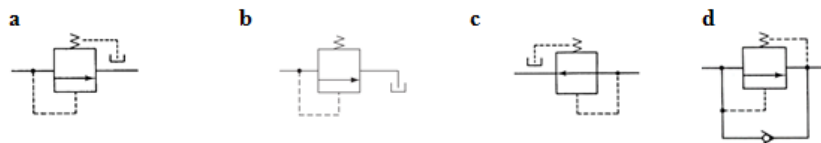
1) - a

2) - b

3) - c

4)  d

41) The sequence valve symbol is:



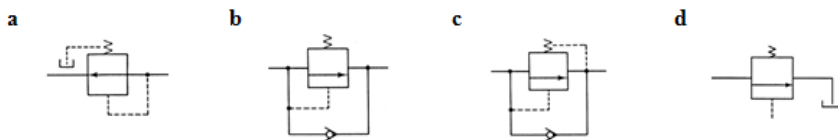
1)  a

2) - b

3) - c

4) - d

42) The counterbalance valve symbol is:



1) - a

2) - b

3)  c

4) - d

43) Hydraulic systems are slower in operation.

1)  true.

2) - false.

44) The non-positive displacement pumps do not have a constant discharge.

1)  true.

2) - false.





- 45) There is no difference between the control valve of the pneumatic and hydraulic system.
- 1) - true.
  - 2)  false.
- 46) Pressure reducing valve is used to maintain constant reduced pressure.
- 1)  true.
  - 2) - false.
- 47) Positive displacement pumps are divided into two types.
- 1)  true.
  - 2) - false.
- 48) In a double acting reciprocating pump, the piston carries suction and expulsion at the same time.
- 1)  true.
  - 2) - false.
- 49) Refrigeration type air dryers remove water from an airline by chemical absorbent action.
- 1) - true.
  - 2)  false.
- 50) Magnesium chloride removes water from an airline by chemical adsorbent action.
- 1) - true.
  - 2)  false.

