



قائمة الاسئلة

اختبار النهائي للعام الجامعي 2025/2024-كلية الهندسة :: الانظمة الهيدروليكية والهوائية - كلية الهندسة - قسم الميكاترونكس- المستوى الثالث -  
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- 1) Check valve is a type of
  - 1) - pressure reducing valve
  - 2) - pressure relief valve
  - 3) + directional control valve
  - 4) - flow control valve
- 2) The hydraulic system is
  - 1) - less precise than pneumatic system
  - 2) + more precise than pneumatic system
  - 3) - both hydraulic and pneumatic systems are same on basis of precision
  - 4) - no one of the options
- 3) Which energy is used to transmit power in hydrostatic system?
  - 1) + pressure energy
  - 2) - kinetic energy
  - 3) - potential energy
  - 4) - all options
- 4) According to Pascal's Law, the pressure exerted on a confined fluid is:
  - 1) - Proportional to the density of the fluid
  - 2) + Transmitted undiminished in all directions throughout the fluid
  - 3) - Affected by the viscosity of the fluid
  - 4) - Independent of the fluid's volume and pressure
- 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) The bulk modulus is defined as the ratio of:
  - 1) - The change in fluid temperature to the change in pressure
  - 2) + The change in volume to the change in pressure
  - 3) - The density of the fluid to the change in volume
  - 4) - The viscosity of the fluid to its temperature
- 8) What is viscosity index?
  - 1) - effect of pressure on changes in viscosity
  - 2) + effect of temperature on changes in viscosity
  - 3) - effect of resistance between two surfaces
  - 4) - no one of the options
- 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)  no one of the options
- 10) Which of the following logic valve is known as shuttle valve?
- 1)  OR gate
- 2)  AND gate
- 3)  NOR gate
- 4)  NAND
- 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)  no 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)  no one of the options
- 15) Which force causes vanes to come out of the rotor slots?
- 1)  centripetal force
- 2)  centrifugal force
- 3)  friction force
- 4)  not one of the options
- 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) When the angle of swash plate decreases
- 1)  flow rate increases
- 2)  flow rate does not depend on swash plate angle





- 3)  flow rate decreases
- 4)  not one of the options
- 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 5-in<sup>3</sup> volumetric displacement. If it has a pressure rating of 1000 psi and it receives oil from a 10-gpm theoretical flow-rate pump. The motor theoretical horsepower is:
- 1) - 5.93 HP
  - 2) - 5.63 HP
  - 3) - 5.73 HP
  - 4)  5.83 HP
- 33) A compressor delivers 100 scfm of air at 100 psig. The overall efficiency of the compressor is 75%. The actual power required to drive the compressor is:
- 1)  24.0 hp
  - 2) - 23.0 hp
  - 3) - 30.0 hp
  - 4) - 35.0 hp
- 34) A gear pump has a 75-mm outside diameter, a 50-mm inside diameter, and a 25-mm width. If the volumetric efficiency is 90% at rated pressure and the pump speed is 1000 rpm, the corresponding actual flow rate is:
- 1) - 50.3 Lpm
  - 2) - 60.3 Lpm
  - 3)  55.3 Lpm
  - 4) - 45.5 Lpm
- 35) How much hydraulic power would a pump produce when-operating at 125 bar and delivering 1.25 Lps of





oil?

- 1)  15.625 kW
- 2)  15.725 kW
- 3)  15.525 kW
- 4)  15.825 kW

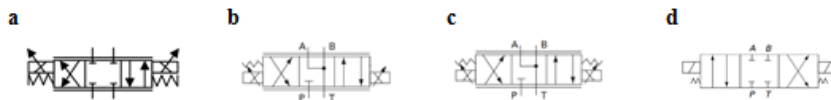
36) A pump has a displacement volume of 5 in<sup>3</sup>. It delivers 20 gpm at 1000 rpm and 1000 psi. If the prime mover input torque is 900 in · lb. The theoretical torque required to operate the pump is:

- 1)  973 in · lb
- 2)  937 in · lb
- 3)  739 in · lb
- 4)  793 in · lb

37) Air is used at a rate of 1.25 m<sup>3</sup>/min from a receiver at 45°C and 12 bar gauge. How many standard m<sup>3</sup>/min of free air must the compressor provide?

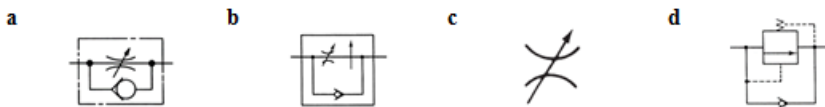
- 1)  12.82
- 2)  13.82
- 3)  13.92
- 4)  13.22

38) The four-way proportional directional control valve symbol is:



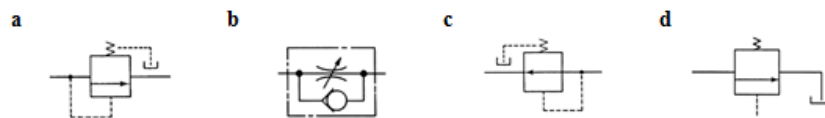
- 1)  a
- 2)  b
- 3)  c
- 4)  d

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



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

40) The unloading valve symbol is:



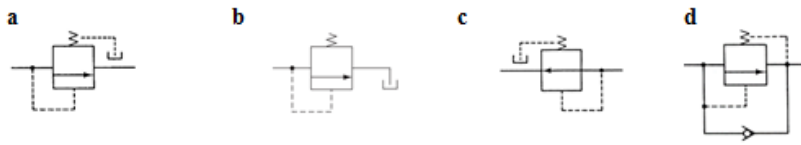
- 1)  a
- 2)  b
- 3)  c
- 4)  d

41)



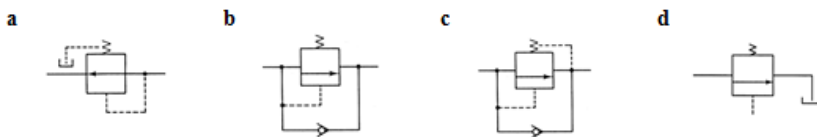


The sequence valve symbol is:



- 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

