Subject:

Industrial Hydraulics and Pneumatics

(22655)

SYLLABUS

Chapter No.	Name of chapter	Marks
1	Introduction to Hydraulic and Pneumatic System	6
2	Pumps And Actuators	12
3	Control Valves	16
4	Compressor, Pneumatic System and Acc. In Fluid System	12
5	Oil Hydraulic Circuits	12
6	Pneumatic Circuits	12
	Total Marks :-	**70**

BOARD THEORY PAPER PATTERN

Q.1		**Attempt any FIVE**	**5*2=10**
	a)	Introduction to Hydraulic and Pneumatic System	
	b)	Introduction to Hydraulic and Pneumatic System	
	c)	Control Valves	
	d)	Compressor, Pneumatic System and Acc. In Fluid System	
	e)	Oil Hydraulic Circuits	
	f)	Oil Hydraulic Circuits	
	g)	Pneumatic Circuits	
Q.2		**Attempt any THREE**	**3*4=12**
	a)	Pumps And Actuators	
	b)	Pumps And Actuators	
	c)	Compressor, Pneumatic System and Acc. In Fluid System	
	d)	Compressor, Pneumatic System and Acc. In Fluid System	
Q.3		**Attempt any THREE**	**3*4=12**
	a)	Introduction to Hydraulic and Pneumatic System	
	b)	Pumps And Actuators	
	c)	Compressor, Pneumatic System and Acc. In Fluid System	
	d)	Control Valves	
Q.4		**Attempt any THREE**	**3*4=12**
	a)	Control Valves	
	b)	Pumps And Actuators	
	c)	Compressor, Pneumatic System and Acc. In Fluid System	

	d)	Compressor, Pneumatic System and Acc. In Fluid System
Q.5		**Attempt any TWO** **2*6=12**
	a)	Pneumatic Circuits
	b)	Oil Hydraulic Circuits
	c)	Oil Hydraulic Circuits
Q.6		**Attempt any TWO** **2*6=12**
	a)	Oil Hydraulic Circuits
	b)	Oil Hydraulic Circuits
	c)	Pneumatic Circuits

CLASS TEST - I

PAPER PATTERN

COURSE: -Industrial Hydraulics and Pneumatics (22655)

PROGRAMME: -Mechanical engineering

Syllabus: -

Unit No.	Name of the Unit	Course Outcome (CO)
1	Introduction to Hydraulic and Pneumatic System	**CO-655.01**
2	Pumps And Actuators	**CO-655.02**
3	Control Valves	**CO-655.03**

Q.1	**Attempt any FOUR** **4*2=8Marks**	**Course Outcome (CO)**
a)	Introduction to Hydraulic and Pneumatic System	CO-655.01
b)	Pumps And Actuators	CO-655.02
c)	Control Valves	CO-562.02
d)	Introduction to Hydraulic and Pneumatic System	CO-655.01
e)	Introduction to Hydraulic and Pneumatic System	CO-655.01
f)	Pumps And Actuators	CO-655.02
Q.2	**Attempt any THREE** **3*4= 12Marks**	
a)	Introduction to Hydraulic and Pneumatic System	CO-655.01

b)	Pumps And Actuators	CO-655.02
c)	Control Valves	CO-562.03
d)	Pumps And Actuators	CO-655.02

CLASS TEST - II

PAPER PATTERN

COURSE: -Industrial Hydraulics and Pneumatics (22655)

PROGRAMME: -Mechanical engineering

Syllabus: -

Unit No.	Name of the Unit	Course Outcome (CO)
4	Compressor, Pneumatic System and Acc. In Fluid System	CO-655.04
5	Oil Hydraulic Circuits	CO-655.05
6	Pneumatic Circuits	CO-655.06

Q.1	**Attempt any FOUR** **4*2= 8Marks**	**Course Outcome (CO)**
a)	Compressor, Pneumatic System and Acc. In Fluid System	CO-655.04
b)	Compressor, Pneumatic System and Acc. In Fluid System	CO-655.04
c)	Compressor, Pneumatic System and Acc. In Fluid System	CO-655.04
d)	Pneumatic Circuits	CO-655.06
e)	Oil Hydraulic Circuits	CO-655.05
f)	Oil Hydraulic Circuits	CO-655.05
Q.2	**Attempt any THREE** **3*4= 12Marks**	
a)	Compressor, Pneumatic System and Acc. In Fluid System	CO-655.04

b)	Oil Hydraulic Circuits	CO-655.05
c)	Oil Hydraulic Circuits	CO-655.05
d)	Pneumatic Circuits	CO-655.06

COURSE OUTCOME

(CO)

COURSE: - Industrial Hydraulics and Pneumatics (22655)

PROGRAMME: -Mechanical Engineering

CO.NO.	Course Outcome
CO-655.01	Identify various component of hydraulic and Pneumatic System
CO-655.02	Select pump and Actuators for Given fluid operated system
CO-655.03	Select appropriate Control Valve for Given fluid operated system
CO-655.04	Select Compressor and Accessories for Given fluid operated system
CO-655.05	Develop Hydraulic Circuits for given simple application
CO-655.06	Develop Pneumatic Circuits for given simple application

1.Introduction to Hydraulic and Pneumatic System

Position in Question Paper **Total Marks-06**

Q.1. a) 2-Marks.
Q.1. b) 2-Marks.
Q.1. d) 2-Marks.

Descriptive Question

1. State the essential properties of hydraulic fluids
2. Draw general layout of hydraulic system and explain its working.
3. State at least four advantages and disadvantages of pneumatic systems.
4. What is function of (i) oil reservoir (ii) pressure relief valve, (iii) direction control valve, (iv) filters ?
5. Write the causes and remedies for the following : (i) Excess heat in oil (ii) Noisy pump (iii) Low pressure in system.
6. What are the advantages of pneumatic system over hydraulic systems
7. What are the effects of contaminants in the oil?
8. Draw a general layout of pneumatic system and state the function of components.
9. Draw symbols of: (i) Oil reservoir (ii) Oil filter (iii) Heat exchanger (iv) Unidirectional fixed displacement pump.
10. Draw symbol of: 1) 2 × 2 DC valve 2) Fixed type flow control valve 3) Pressured relief valve. 4) Muffler
11. In cold climate why oil tank is equipped with oil heaters? Explain.
12. Draw symbols of: 1) 4/3 direction control valve 2) Pilot operated pressure relief valve 3) Sequence valve

MCQ Question

(Total number of Question=Marks*3=06*3=18)

Note: Correct answer is marked with **bold.**

1 It is the technology which deals with the transmission energy by means of enclosed pressurized fluids.
a) Electrical system
c) Fluid power system
b) Mechanical Sysyem
d) None of these

2 _____ works on the energy of pressured oil.
a) Pneumatic system
c) Hydro pneumatic system
b) Oil hydraulic system
d) None of these

3 Fluid power system deals with the transmission energy by means of _____
a) Oil
c) Gas
b) air
d) all of the above

4 When the branch of fluid power system which uses compressed air for energy transmission to do useful work it is known as
a) Oil hydarulic system
c) pneumatic system
b) Mechanical system
d) All of the above

5 Oil is _____ in nature
a) Compressible
c) Both a and b
b) Incomprssible
d) None of the above

6 _____ is used for increasing pressure of oil
a) Compressor
c) Filter
b) Pump
d) PRV

7 _____ needs return lines for recirculation of medium
a) Pneumatic system
c) Mechanical syytem
b) Oil hydraulic system
d) Electrical system

8 _____ medium is freely available from nature
a) oil
c) Both a and b
b) Air
d) None of these

9 Pneumatic system is preferred _____
a) Below 5 bar
c) Up to 10 bar
b) above 25 bar
d) All of these

10 The hydarulic sytem is suitable for
a) Heavy load
c) lifting of vehicle at service station
b) Large objects
d) all of the above

11 FRL unit is necessary for _____

a) Pneumatic system c) mechanical system

b) Hydraulic system d) all of these

identify the application of _____

12 _____ is used to make connections for oil circulation

a) Pump c) filter

b) Pipe fittings d) valves

13 _____ system is self lubricated and no need of addtional lubrication

a) Mechanical **c) oil hydarulic**

b) pneumatic d) Electrical

14 _____ has fast movement of actuator (high speed of response)

a) Pneumatic system **c) Oil hydraulic system**

b) Mechanical system d) None of them

15 _____ consists of pump,reservoir,Valves and filters,pipe pipe fittings,etc

a) Pneumatic system **c) Oil hydraulic system**

b) Mechanical system d) None of them

16 Which type of system uses ‘oil under pressure’ means for power transmission?

a) Fluid power system c) Pneumatic system

b) Hydraulic system d) Stepper motors

17 The force developed in hydraulic systems is high due to ____

a) high pressure c) less pressure

b) more oil d) less oil

18 Which component of a hydraulic system is used to store a sufficient amount of hydraulic oil?

a) Rotatory pumps c) Flow control valve

b) Oil reservoir d) Pressure gauge

2. Pumps And Actuators

Position in Question Paper **Total Marks-12**

Q.1. e) 2-Marks.
Q.2. a) 4-Marks.
Q.2. b) 4-Marks.
Q.3. b) 4-Marks.

Descriptive Question

1. Explain any two mounting methods of cylinder.
2. List various types of air motors. Explain vane type air motor with neat sketch.
3. Draw neat labelled sketch of (i) Internal gear pump (ii) Gerotor pump
4. List any four applications of pneumatic rotary actuator. Draw the symbol for variable speed bidirectional air motor.
5. Explain variable displacement axial piston pump with neat sketch.
6. Explain piston pump with neat sketch.
7. Explain gear pump with neat sketch.
8. Explain any four criteria for selection of hydraulic pump in hydraulic system.
9. What are actuators ? Draw a double acting cylinder.
10. Explain with neat sketch the working of variable displacement vane pump.
11. Compare positive displacement pump with Rotodynamic pump.
12. What is swash plate? What is its use? What will happen if we change the angle of swash plate? Explain with sketch.
13. What is the meaning of unidirectional air motor and bi directional air motor? Explain with sketch and draw symbol of both.
14. Compare linear actuators and rotary actuators.
15. Explain with neat sketch the construction of gerotor pump.

MCQ Question

(Total number of Question=Marks*3=12*3=36)

Note: Correct answer is marked with **bold.**

1 What pumps hydraulic oil to the hydraulic circuit?
a) Flow control valve
b) Oil reservoir
c) Rotatory pumps
d) Pressure gauge

2 In which type of system does power transmission takes place through compressed air?
a) Fluid power system
b) Hydraulic system
c) Pneumatic system
d) Stepper motors

3 The compressed air flows to the actuator through ____
a) pipes and valves
b) shafts
c) motors
d) flow control valve

4 What is the function of an air dryer?
a) Removes dirt
b) Removes moisture
c) Controls the rate of flow
d) Controls the pressure

5 Which part of the Pneumatic system stores the compressed air?
a) Air dryer
b) Air compressor
c) Air receiver tank
d) Air lubricator

6 . Which type of mechanical device is used to give energy to the liquid?
a) Fluid power system
b) Hydraulic system
c) Pneumatic system
d) Hydraulic Pumps

7 Which among the following pumps have a definite amount of discharge?
a) Positive displacement pumps
b) Non-positive displacement pumps
c) Self-priming pumps
d) Jet pumps

8 Which among the following is not the component of FRL unit?
a) Air filter
b) Air dryer
c) Air regulator
d) Air lubricator

9 What is the function of the flow control valve?
a) Controls the direction of flow of air
b) The moisture is separated and removed
c) It converts the mechanical energy to hydraulic energy
d) It controls the rate of flow of compressed air

10 The direction control valve controls ____
a) direction of flow
b) rate of flow
c) moisture
d) force and motion

11 Which among the following is an advantage of the Pneumatic system?

a) The requirement of a lubricator
b) Runs continuously
c) Use of silencers
d) Low viscosity

12 Which among the following is a disadvantage of Pneumatic system?
a) The requirement of a lubricator
b) Runs continuously
c) Used better in mines
d) Produces a dust-free surroundings

13 Which among the following are not the applications of Pneumatic system?
a) Aerospace
b) Packing systems
c) Mining
d) Agriculture equipment

14 What prevents the leakage of oil inside an unbalanced vane pump?
a) Vanes
b) Cylindrical rotor
c) Screw
d) Difference between the pressure of inlet and outlet

15 Which among the following are not the main selection criteria for selection of hydraulic pumps?
a) Discharge
b) Pressure
c) Speed
d) Weight

16 Which type of mechanical device is used to give energy to the liquid?
a) Fluid power system
b) Hydraulic system
c) Pneumatic system
d) Hydraulic Pumps

17 Which among the following pumps have a definite amount of discharge?
a) Positive displacement pumps
b) Non-positive displacement pumps
c) Self-priming pumps
d) Jet pumps

18 Which type of pumps can give discharge even at high pressure?
a) Multistage Pumps
b) Monoblock pumps
c) Rotary pumps
d) Single stage pumps

19 Which type of component in a hydraulic system supports less vibration and noise?
a) Flow control valve
b) Oil reservoir
c) Rotatory pumps
d) Pressure gauge

20 Which type of pump consists of two spur or helical gears?
a) External gear pumps
b) Internal gear pumps
c) Rotary pumps
d) Vane pumps

21 What is the property of a screw pump?
a) Discharge is continuous, smooth and non-pulsating
b) Very less vibration and noise
c) Has two or more rotating components

d) Consists of a left handed and a right handed screw

22 What prevents the leakage of oil inside an unbalanced vane pump?

a) Vanes

b) Cylindrical rotor

c) Screw

d) Difference between pressure of inlet and outlet

23 Which among the following are not the main selection criteria for selection of hydraulic pumps?

a) Discharge

c) Speed

b) Pressure

d) Weight

24 Hydraulic_____ is a mechanical device which converts mechanical energy into hydraulic energy.

a) Motor

c) actuator

b) pump

d) Valve

25 It is a mechanical device which delivers high pressure oil to the hydraulic system.

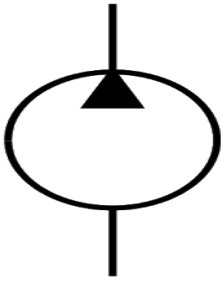
a) Motor

c) actuator

b) pump

d) Valve

26 _____ symbol of pump



a) Bi directional Fixed delivery

c) Bi dirctional variable delivery

b) Unidirectional variable delivery

d) Unidirectional fixed delivery

27 figure shows

a) Internal gear pump

c) Ge rotor pump

b) Vane pump

d) External gear pump

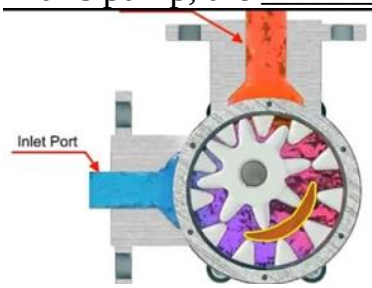
28 In this pump, the continuous flow is produced due to rotodynamic principle.

a) Positive displacement

c) Jet pump

b) Non positive dispalcement
d) None of the above

29 In this pump, the _____ stationary element .



a) External gear
c) Crescent sepeartor
b) Internal gear
d) None of the above

30 _____ type of pump consists of two spur or helical gears.

a) External gear
c) Ge rotor
b) Internal gear
d) None of the above

31 _____among the following are not the main selection criteria for selection of hydraulic pumps?

a) Oil pressure
c) Flowrate
b) weight of pump
d) Speed

32 The rotation of gears in internal gear pump takes place in _____ direction

a) opposite
c) can be both
b) same
d) none of the above

33 _____ force causes vanes to come out of the rotor slots in the vane pump

a) centripetal force
c) Friction force
b) centrifugal force
d) none of the above

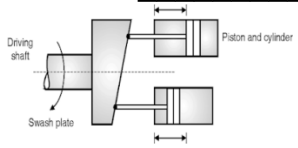
34 ___ works on the principle of reciprocation of piston parallel to the axis of driving shaft

a) Radial Piston pump
c) Axial piston pump
b) Vane pump
d) none of the above

35 It works on the principle of reciprocating motion of pistons with the help of swash plate or wobble plate

a) Radial Piston pump
c) Axial piston pump
b) Vane pump
d) none of the above

36 It shows _____ type of pump



a) Parallel axis Piston pump
c) swash plate Axial piston pump
b) Reciprocating pump
d) none of the above

3. Control Valves

Position in Question Paper **Total Marks-16**

Q.1. c) 2-Marks.
Q.3. d) 4-Marks.
Q.4. a) 4-Marks.
Q.5. a) 6-Marks.

Descriptive Question

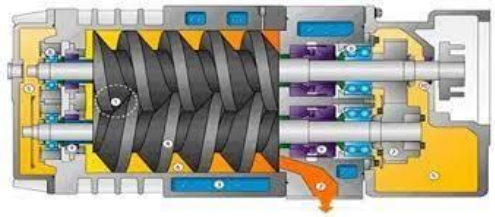
1. Explain the construction of 4/2 poppet valve with neat sketch & symbol.
2. With a neat sketch explain pressure compensated flow control valve. Draw symbol of it.
3. Explain the working of counter balance valve in hydraulic circuit.
4. Discuss pilot operated check valve with neat sketch.
5. Explain time delay valve with neat sketch.
6. List different types of pressure regulator valves ? Explain any one with neat sketch
7. Draw symbol of unloading valve and sequence valve.
8. Draw and explain working of pressure reducing valve.
9. Explain 4-way-3 position direction control valve used in hydraulic system.
10. Explain pressure relief valve in pneumatic system
11. State any two applications of 3 × 2 DC valve. Draw symbol for the same.
12. Compare pressure relief valve and pressure reducing valve.
13. Explain with neat sketch the working of rotary spool type DC valv
14. Classify flow control valves with their application
15. Draw the symbol: (i) unloading valve (ii) simple check valve

MCQ Question

(Total number of Question=Marks*3=16*3=48)

Note: Correct answer is marked with **bold.**

1 It shows _____ type of pump



a) Piston pump
c) Gear pump
b) Screw pump
d) none of the above

2 When the angle of swash plate becomes _____,no displacement of pistons takes place
a) zero
c) Maximum
b) minimum
d) none of the above

3 If the axis of the cylinder block is made _____ with the axis of the drive shaft to obtain reciprocating movement of pistons for pumping of oil. It is called as bent axis axial piston pump.
a) Parallel
c) at an angle
b) perpedicular
d) none of the above

4 _____can generate pressure in the range of 450 – 500 bar with high flow rate
a) Gear pump
c) Radial piston pump
b) Screw pump
d) Axial piston pump

5 _____ is the last element in which oil enters and leaves from it to drain to the reservoir for recirculation.
a) Control Valve
c) Actuator
b) Filter
d) Pump

6 identify the given symbol
a) Bi-directional Pump fixed delivery
c)Bi-directional motor fixed displacement
b)Bi-directional Pump variable delivery
d) Bidirectional motor Vari displace

7 Actuators are the devices which converts _____ into _____.
a) fluid power,mechanical power
c) Electrical power,mechanical power
b) mechanical power, Hydraulic power
d) Mechnaical power, Electrical power

8 In pneumatics, actuators are designed to handle and operate at pressure up to _____
a) 100 bar
c) 200 bar
b) 10 Bar
d) 500 bar

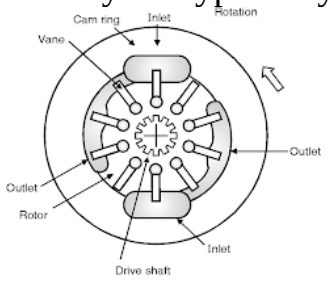
9 It is suitable for performing work such as pulling or pushing in machine tools, earth

moving equipments,etc

a) Rotary Actuator c) Linear Actuator

b) semi rotary Actuator d) All of the above

10 Identify the type of hydraulic motor



a) Radial piston **c) Balanced vane**

b) Vane type unbalanced d) Gear type

11 Identify the type of _____ cylinder

a) DA Cylinder **c) DA cylinder Gravity return**

b) SA cylinder Gravity return d) SA cylinder spring return

12 _____ cylinder has same velocity in both the strokes of piston

a) DA Cylinder single rod c) DA Tandem cylinder

b) Through rod DA Cylinder d) telescopic cylinder

13 _____ cylinder has larger stroke length in less space arrangment

a) DA Cylinder single rod c) DA Tandem cylinder

b) Through rod DA Cylinder **d) Telescopic cylider**

14 The force produced during retraction of piston is

a) F= P A **c) F= P (A-a)**

b) F= P a d) F= P A a

15 _____ consists of two double acting cylinders joined with the common partition

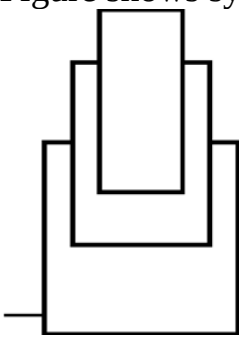
a) DA cylinder single rod c) Telescopic cylinder

b) Double rod DA Cylinder **d) Tandem cylinder**

16 Figure shows

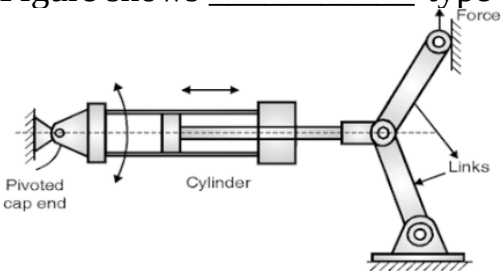
a) DA cylinder single rod
c) Telescopic cylinder
b) Double rod DA Cylinder
d) Tandem cylinder

17 Figure shows symbol of



a) DA cylinder single rod
c) Telescopic cylinder
b) Double rod DA Cylinder
d) Tandem cylinder

18 Figure shows _____-type of mounting

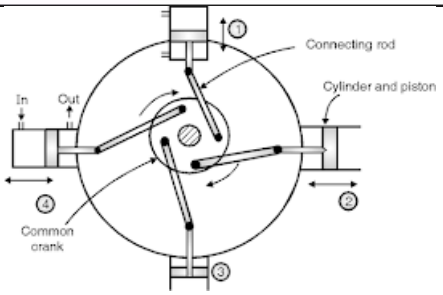


a) Foot
c) Clevis
b) Centre line
d) Trunnion

19 The _____is a fluid power device which converts fluid energy into mechanical energy in the form of rotary motion of the shaft.
a) hydraulic motor
c) hydraulic cylinder
b) hydraulic Pump
d) hydraulic wheel

20 This type of motor produces rotation of about 300 degree angle.
a) Gear
c) Semi rotary
b) Vane
d) Piston

21 Figure shows _____ type of motor



a) Gear
b) Vane
c) Semi rotary
d) Radial Piston

22 _____are used for pneumatic hand tools like grinders, drilling machines, mixers, etc.
a) Hydraulic motor
b) Electric motor
c) Air Motor
d) None of these

23 Figure shows the application of

a) Hydraulic motor
b) Electric motor
c) Pneumatic Motor
d) None of these

24 Figure shows the symbol of

a) Bi directional compressor variable speed
b) Bi directional Air motor fixed speed
c) Bi directional hydraulic motor fixed speed
d) Bi directional Air motor variable speed

25 ---------- motor can be used for removal of nuts at service station
a) Bi directional compressor variable speed
b) Uni directional Air motor fixed speed
c) Bi directional hydraulic motor fixed speed
d) Bi directional Air motor variable speed

26 ---------- is provided for lifting of Dumper trolley to more height
a) DA Cylinder
c) Telescopic cylider

b) tandem cylinder
d) Ram cylinder

27 _____ motor makes noise during its use
a) Air motor
Electric motor
b) Hydarulic motor
d) None of these

28 What is the function of the control valve?
a) To control different parameters of the fluid
b) To perform two operations in sequence
c) To control the direction of flow
d) To avoid development of excess of pressure

29 Which among the following fluid parameters are not controlled by the control valves?
a) Pressure
c) Speed
b) Rate of flow
d) Direction of flow

30 What is the function of the pressure control valve?
a) To control the force generated by actuators
b) To perform two operations in sequence
c) To control the direction of flow
d) To avoid development of excess of pressure

31 The valve packing of control valves is used ____
a) to prevent the fluid from escaping
b) to control the force generated by actuators
c) to control different parameters of the fluid
d) to control the direction of flow

32 What is the formula of speed control valve during extension of a flow control valve?
a) V=(Q/A)
c) V=A/Q
b) V=Q.A
d) V=Q(A-a)

33 What is the formula of speed control valve during retraction of a flow control valve?
a)V=(Q/A)
c) V=A/Q
b) V=Q.A
d) V=Q/(A-a)

34 Which among the following are not the ‘work parameters’ of the fluid?
a) Direction
c) Pressure
b) Speed
d) Temperature of flow

35 Which among the following are not the main selection criteria of the control valves?
a) Type of actuation
c) Space requirement
b) Environmental conditions
d) Software support

36 What is the function of a flow control valve?

a) **FCVchanges the direction of oil flow**
c) both a and b
b) FCV can adjust flow rate of hydraulic oil
d) none of the above

37 What does the numbers in 4/2 valve mean?
a) **4 positions and 2 ways**
c) 3 ways and 2 positions
b) 4 ways and 2 positions
d) none of the above

38 Which type of solenoid has more chances of coil failure?
a) **AC solenoid**
c) both AC and DC solenoids
b) DC solenoid
d) none of the above

39 Which stage in two stage direction control valve is solenoid operated?
a) **main stage direction control valve**
c) both stages
b) pilot stage direction control valve
d) none of the above

40 Check valve is a type of
a) pressure reducing valve
c) **directional control valve**
b) pressure relief valve
d) none of the above

41 A pressure relief valve can be
a) direct operated
c) solenoid operated
b) pilot operated
d)**. all the above**

42 How is reverse flow possible in pilot operated check valve?
a) spring force lifts the ball due to which reverse flow is possible
b) **fluid pressure lifts the ball due to which reverse flow is possible**
c) both a and b
d) none of the above

43 What is the difference between pressure relief valve and pressure reducing valve?
a) **pressure reducing valve is connected between pump and tank line while pressure relief valve is connected between DCV and branch circuit**
b) pressure relief valve is always normally opened
c) pressure reducing valve is connected between DCV and branch circuit while pressure relief valve is connected between pump and tank
d) none of the above

44 Why are bleed off circuits used?
a) **bleed off circuit is used to restrict the flow of fluid into the hydraulic cylinder**
b) bleed off circuit is used to restrict the flow of fluid out of the hydraulic cylinder
c) bleed off circuits are used to reduce the speed of actuator
d) all the above

45 Which of the following is applicable for bleed off circuits?

a) **bleed off develop heat in the system**
b) bleed off circuits are used for resistive loads
c) bleed off circuits are used for runaway loads
d) all the above

46 **What is the function of sequence valve used in hydraulic circuits?**
a) sequence valves are used to perform number of operations one after the other after the set pressure is reached
b) **sequence valves are used to perform number of operations continuously before the set pressure is reached**
c) sequence valves after reaching set pressure oil is flown to the tank
d) all the above

47 **When is a pressure reducing valve used?**
a) it is used when higher pressure than system pressure is required
b) it is used when lower pressure than system pressure is required
c) **when absolutely zero pressure is required**
d) all the above

48 Which type of system uses 'oil under pressure' means for power transmission?
a) Fluid power system c) Pneumatic system
b) Hydraulic system d) Stepper motors

49 The force developed in hydraulic systems is high due to ____
a) high pressure c) less pressure
b) more oil d) less oil

50 Which component of a hydraulic system is used to store the sufficient amount of hydraulic oil?
a) Rotatory pumps c) Flow control valve
b) Oil reservoir d) Pressure gauge

51 What pumps hydraulic oil to the hydraulic circuit?
a) Flow control valve **c) Rotatory pumps**
b) Oil reservoir d) Pressure gauge

52 What controls the direction of the flow of oil?
a) Pressure relief valve **c) Flow control valve**
b) Direction control valve d) Actuator

4. Compressor, Pneumatic System and Acc. In Fluid System

Position in Question Paper **Total Marks-12**

Q.1. d) 2-Marks.
Q.2. c) 4-Marks.
Q.3. c) 4-Marks.
Q.4. c) 4-Marks.

Descriptive Question

1. What is seal ? Classify seals according to shape. State the factors for seal selection.
2. What is FRL ? State the function of each component of FRL.
3. State the four merits and demerits of using a rubber hose in pneumatic circuit.
4. What is an accumulator ? Why accumulator is necessary for huge hydraulic pressers
5. Name any eight pipe or tube fitting with their application.
6. What is function of filters ? Classify the filters and draw any two types of filters
7. Name any four components of pneumatic system. What are the factors considered while selecting them ?
8. List the factors to be considered for selecting the pipe while designing the pneumatic system. Give specification of pipes for the pneumatic system.
9. What are the various types of Hoses used in pneumatic system ?
10. What are the various materials used for pipes in hydraulic circuit?
11. State the various lossess in pipes in pneumatic system.

MCQ Question

(Total number of Question=Marks*3=12*3=36)

Note: Correct answer is marked with **bold.**

1 What is the function of the air dryer?
a) Removes dirt
c) Controls the rate of flow
b) Removes moisture
d) Controls the pressure

2 Which part of the Pneumatic system stores the compressed air?
a) Air dryer
c) Air receiver tank
b) Air compressor
d) Air lubricator

3 Which among the following is not the component of FRL unit?
a) Air filter
c) Air regulator
b) Air dryer
d) Air lubricator

4 What is the function of the flow control valve?
a) Controls the direction of flow of air
b) The moisture is separated and removed
c) converts mechanical energy hydraulic energy
d) controls the rate of flow of compressed air

5 The direction control valve controls ____
a) direction of flow
c) moisture
b) rate of flow
d) force and motion

6 Which among the following is an advantage of the Pneumatic system?
a) The requirement of a lubricator
c) Use of silencers
b) Runs continuously
d) Low viscosity

7 Which among the following is a disadvantage of Pneumatic system?
a) The requirement of a lubricator
c) Used better in mines
b) Runs continuously
d) Produces a dust free surroundings

8 Which among the following are not the applications of Pneumatic system?
a) Aerospace
c) Mining
b) Packing systems
d) Agriculture types of equipment

9 What is the function of the air compressor?
a) Decreases the pressure of air
c) Removes dust particles
b) Increases the pressure of air
d) Adds lubricating oil

10 Which among the following are the applications of air compressors?
a) Supercharging of IC engines
c) Railways
b) Agriculture
d) Aerospace

11 Which among the following are not the accurate selection criteria for air

compressors?

a) Free air delivery
c) Power supply
b) Air receiver capacity
d) Speed

12 What is the normal pressure at which the compressed air is stored?

a) 30 bar
c) 10 bar
b) 40 bar
d) 100 bar

13 Which among the following leads to conserving of energy?

a) Conserving compressed air
b) Wasting the compressed air
c) Using compressed air Cleaning -Washing
d) Allowing leakages of compressed air

14 What is the use of Intake air filters?

a) To reduce the temperature of the air
c) To prevent dust from entering the compressor
b) Used as storage and smoothened
d) To remove the traces of moisture

15 What is the function of Interstage coolers?

a) To reduce the temperature of the air
b) Used as storage and smoothened
c) To prevent dust from entering the compressor
d) To remove the traces of moisture

16 The removal of moisture from the compressed air is done using ____

a) receivers
c) air dryers
b) moisture drain traps
d) interstage coolers

17 In which type of system does power transmission takes place through compressed air?

a) Fluid power system
c) Pneumatic system
b) Hydraulic system
d) Stepper motors

18 The compressed air flows to the actuator through ____

a) Pipes and valves
c) Motors
b) Shafts
d) Flow control valve

19 What is the function of the air dryer?

a) Removes dirt
c) Controls the rate of flow
b) Removes moisture
d) Controls the pressure

20 Which part of the Pneumatic system stores the compressed air?

a) Air dryer
c) Air receiver tank
b) Air compressor
d) Air lubricator

21 Which type of pumps can give discharge even at high pressure?

a) Multistage Pumps c) Rotary pumps
b) Monoblock pumps d) Single stage pumps

22 Which type of component in the hydraulic system supports less vibration and noise?
a) Flow control valve c) Rotatory pumps
b) Oil reservoir **d) Pressure gauge**

23 What prevents the leakage of oil inside an unbalanced vane pump?
a) Vanes c) Screw
b) Cylindrical rotor **d) Diff between pressure inlet and outlet**

24 Which among the following are not the main selection criteria for selection of hydraulic pumps?
a) Discharge c) Speed
b) Pressure d) Weight

25 Which type of cylinder has rod length less than the piston diameter?
a) Double acting cylinders **c) Short stroke cylinders**
b) Tie-Rod cylinders d) Telescopic cylinders

26 Which is not an example of linear actuator?
a) Screw jack **c) Rack and Pinion gear**
b) Electric fan d) Hydraulic cylinder

27 Which type of cylinders can extend piston from both sides?
a) Double acting cylinders c) Welded cylinders
b) Tie-Rod cylinders d) Telescopic cylinders

28 Which type of cylinder contains series of nested tubing?
a) Double acting cylinders c) Welded cylinders
b) Tie-Rod cylinders d) Telescopic cylinders

29 Which of the following logic valve is known as shuttle valve?
a) OR gate **c) NOR gate**
b) AND gate d) NAND

30 In pneumatic systems, AND gate is also known as
a) check valve **c) dual pressure valve**
b) shuttle valve d) none of the above

31 Which of the following is an element of time delay valve?
a) flow control valve **c) both a. and b.**
b) direction control valve d) none of the above

32 What is the function of the flow control valve?
a) Controls the direction of flow of oil c) mechanical energy to hydraulic energy
b) To pump hydraulic oil to the **d) It controls the rate of flow of oil**

hydraulic circuit.

33 How many types of actuators are present in hydraulic systems?

a) One
c) Three
b) Two
d) Four

34 What is the function of a pressure gauge?

a) It controls the rate of flow of oil
b) It shows the pressure reading
c) Controls the direction of flow of oil
d) It converts the mechanical energy to hydraulic energy

35 In which type of system does power transmission takes place through compressed air?

a) Fluid power system
c) Pneumatic system
b) Hydraulic system
d) Stepper motors

36 The compressed air flows to the actuator through ____

a) pipes and valves
c) motors
b) shafts
d) flow control valve

5. Oil Hydraulic Circuits

Position in Question Paper **Total Marks-12**

Q.1. f) 2-Marks.
Q.5. c) 6-Marks.
Q.6. a) 6-Marks.

Descriptive Question

1. Compare meter-in-circuit with meter-out-circuit, draw neat sketch of meter-in-circuit.
2. Draw bleed off circuit and label it.
3. Explain actuated position of control of single acting cylinder with neat circuit.
4. Using double acting cylinder, flow control valve with check valve, pressure relief valve, filter and DC valve, develop a circuit for speed control during a return stroke.
5. What is impulse pneumatic circuit? Explain
6. Draw the hydraulic circuit for shaping machine. Explain its working

MCQ Question

(Total number of Question=Marks*3=12*3=36)

Note: Correct answer is marked with **bold.**

1 Why are bleed off circuits used?
a) bleed off circuit is used to restrict the flow of fluid into the hydraulic cylinder
b) bleed off circuit is used to restrict the flow of fluid out of the hydraulic cylinder
c) bleed off circuits are used to reduce the speed of actuator
d) all the above

2 Which of the following is applicable for bleed off circuits?
a) bleed off circuits develop heat in the system
b) bleed off circuits are used for resistive loads
c) bleed off circuits are used for runaway loads
d) all the above

3 What is the function of sequence valve used in hydraulic circuits?
a) sequence valves are used to perform number of operations one after the other

after the set pressure is reached

b) sequence valves are used to perform number of operations continuously before the set pressure is reached

c) sequence valves after reaching set pressure oil is flown to the tank

d) all the above

4 Fluid power circuits use schematic drawings to:

a) simplify component function details.

b) make it so only trained persons can understand the functions.

c) make the drawing look impressive.

d) None of the above

5 A pneumatic symbol is:

a) different from a hydraulic symbol used for the same function.

b) the same as a hydraulic symbol used for the same function.

c) not to be compared to a hydraulic symbol used for the same function.

d) None of the above

6 Pneumatic systems usually do not exceed:

a) 1 hp. c) 2 to 3 hp.

b) 1 to 2 hp. d) None of the above

7 Most hydraulic circuits:

a) operate from a central hydraulic power unit.

b) use air-over-oil power units.

c) have a dedicated power unit.

d) None of the above

8 Hydraulic and pneumatic circuits:

a) perform the same way for all functions.

b) perform differently for all functions.

c) perform the same with some exceptions.

d) None of the above

9 The lubricator in a pneumatic circuit is the:

a) first element in line. c) last element in line.

b) second element in line. d) None of the above

10 When comparing first cost of hydraulic systems to pneumatic systems, generally they are:

a) more expensive to purchase. c) cost about the same.

b) less expensive to purchase. d) None of the above

11 When comparing operating cost of hydraulic systems to pneumatic systems, generally they are.

a) more expensive to operate. c) cost about the same to operate.
b) less expensive to operate. d) None of the above

12 The most common hydraulic fluid is:
a) mineral oil. c) water.
b) synthetic fluid. d) None of the above

13 Fluid power circuits use schematic drawings to:
a) Simplify component function details
b) Make it so only trained persons can understand the functions
c) Make the drawing look impressive
d) Make untrained person to understand

14 A pneumatic symbol is:
a) Different from a hydraulic symbol used for the same function
b) The same as a hydraulic symbol used for the same function
c) Not to be compared to a hydraulic symbol used for the same function
d) None of the mentioned

15 Pneumatic systems usually do not exceed:
a) 1 hp **c) 2 to 3 hp**
b) 1 to 2 hp d) 4 to 5 hp

16 Most hydraulic circuits:
a) Operate from a central hydraulic power unit
b) Use air-over-oil power units
c) Have a dedicated power unit
d) Does not have dedicated power unit

17 Hydraulic and pneumatic circuits:
a) Perform the same way for all functions
b) Perform differently for all functions
c) Perform the same with some exceptions
d) Does not perform all the functions

18 The lubricator in a pneumatic circuit is the:
a) First element in line c) Last element in line
b) Second element in line d) Third element in line

19 When comparing first cost of hydraulic systems to pneumatic systems, generally they are:
a) More expensive to purchase
b) Less expensive to purchase
c) Cost is same

d) Cost is not required

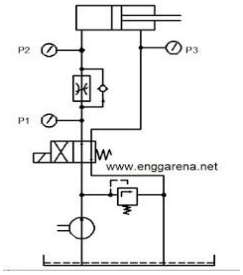
20 When comparing operating cost of hydraulic systems to pneumatic systems, generally they are.

a) More expensive to operate
c) Cost is same to operate
b) Less expensive to operate
d) Cost is not required

21 The most common hydraulic fluid is:

a) Mineral oil
c) Water
b) Synthetic fluid
d) Gel

22 Indentify given Circuit



a) Meter in
c) Bleed Off
b) Meter Out
d) Motoring

23 What is Advantages of Meter in Circuit?

a) The load is always under pressure from both sides, thus it is counterbalanced.
b) Even when the load changes the direction, no uncontrolled jerk motion occurs.
c) The main advantage of the meter-in circuit is that the cylinder undertakes one side pressure with a valve corresponding to the real load.
d) None of the above

24 What is Advantages of Meter in Circuit?

a) The load is always under pressure from both sides, thus it is counterbalanced.
b) Even when the load changes the direction, no uncontrolled jerk motion occurs.
c) The relatively small friction due to pressure on one side, decided by the load of the piston sealing ensures it's long life.
d) None of the above

25 What is Advantages of Meter in Circuit ?

a) The load is always under pressure from both sides, thus it is counterbalanced.
b) Even when the load changes the direction, no uncontrolled jerk motion occurs.
c) The uniform motion of the piston rod even at a very slow speed.
d) None of the above

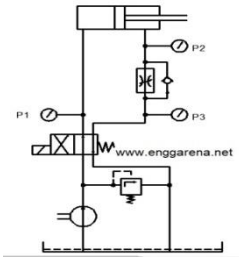
26 What is Advantages of Meter in Circuit?

a) The load is always under pressure from both sides, thus it is counterbalanced.
b) Even when the load changes the direction, no uncontrolled jerk motion occurs.
c) Flow rate estimation is made based on the large piston area, which is a

significant advantage when very small piston-rod speeds are to be achieved.

d) None of the above

27 Identify given Circuits



a) Meter in

c) Bleed Off

b) Meter Out

d) Motoring

28 What is Advantages of Meter out Circuit

a) The relatively small friction due to pressure on one side, decided by the load of the piston sealing ensures it's long life.

b) The uniform motion of the piston rod even at a very slow speed.

c) The load is always under pressure from both sides, thus it is counterbalanced.

d) None of the above

29 What is Disadvantages of Meter in Circuit

a) The relatively small friction due to pressure on one side, decided by the load of the piston sealing ensures it's long life.

b) The uniform motion of the piston rod even at a very slow speed.

c) Even when the load changes the direction, no uncontrolled jerk motion occurs.

d) None of the above

30 What is Disadvantages of Meter out Circuit

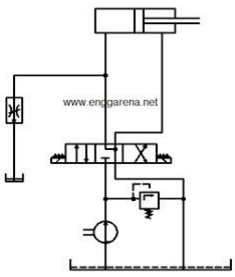
a) The relatively small friction due to pressure on one side, decided by the load of the piston sealing ensures it's long life.

b) The uniform motion of the piston rod even at a very slow speed.

c) The left side of the cylinder is always under maximum pressure even with a minimum load. Due to continuous pressure from both sides, there is more friction and less seal life.

d) None of the above

31 Indentify Given Circuit



a) Meter in

c) Bleed Off

b) Meter Out
d) Motoring

32 Identify Disadvantage of Bleed Off Circuits

a) The relatively small friction due to pressure on one side, decided by the load of the piston sealing ensures it's long life.
b) The uniform motion of the piston rod even at a very slow speed.
c) circuit is not sensitive enough to compensate for very small flow such as those encountered in precise boring operation.
d) None of the above

33 Identify Disadvantage of Bleed Off Circuits

a) The relatively small friction due to pressure on one side, decided by the load of the piston sealing ensures it's long life.
b) The uniform motion of the piston rod even at a very slow speed.
c) In such types of circuits, an individual pump should power each cylinder.
d) None of the above

34 Identify Disadvantages of Bleed Off Circuit

a) The relatively small friction due to pressure on one side, decided by the load of the piston sealing ensures it's long life.
b) The uniform motion of the piston rod even at a very slow speed.
c) circuit provides less accuracy in speed control because in these circuits metered flow goes to the tank rather than to the cylinder.
d) None of the above

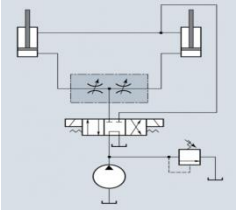
35 What is Application of Bleed Off Circuit?

a) broaching machines
c) boring
b) drilling
d) reaming

36 What is Application of Meter Out Circuit?

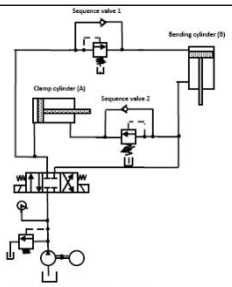
a) broaching machines
c) shapers
b) drilling
d) planers

37 Identify Given Hydraulic Circuit



a) Meter In Circuit
c) Motion Sychronizing Circuit
b) Meter out Circuit
d) Sequencing Circuits

38 Identify Given Hydraulic Circuit



a) Meter In Circuit
b) Meter out Circuit
c) Motion Sychronizing Circuit
d) Sequencing Circuits

6. Pneumatic Circuits

Position in Question Paper **Total Marks-12**

Q.1. g) 2-Marks.
Q.5. a) 6-Marks.
Q.6. c) 6-Marks.

Descriptive Question

1. Describe with a neat sketch, how speed of bidirectional air motor is controlled.
2. Develop a pneumatic circuit for operation of two DA cylinders such that one operates after other at a certain time interval using time delay valve.
3. Draw speed control of single acting cylinder pneumatic circuit using 3 × 2 DC valve.
4. Draw Time delay Circuit.
5. Explain Simple electro-Pneumatic circuit.
6. State the need of speed Control Circuit.

MCQ Question

(Total number of Question=Marks*3=12*3=36)

Note: Correct answer is marked with **bold.**

1 Give significance of every digit used to denote a flow control valve 2.03

a) 3 denotes the forward movement
b) 3 denotes the backward movement
c) 2 denotes the cylinder number
d) 2 denotes the flow control valve number

a) B and C
b) A and C
c) A and D
d) B and D

2 Which of the following notations is used to represent a regulator unit?

a) 3.0
b) 0.3
c) 3
d) none of the above

3 Which of the following logic valve is known as shuttle valve?

a) OR gate
b) AND gate
c) NOR gate
d) NAND

4 In pneumatic systems, AND gate is also known as

a) check valve
c) dual pressure valve
b) shuttle valve
d) none of the above

5 What is a pressure sequence valve?

a) it is a combination of adjustable pressure relief valve and directional control valve
b) it is a combination of nonadjustable pressure relief valve and directional control valve
c) it is a combination of adjustable pressure reducing valve and check valve
d) it is a combination of adjustable pressure reducing valve and flow control valve

6 What is the difference between signal air and control air?

a) signal air actuates final control valve and control air flows to the cylinder through the final control valve for forward and backward movement of piston rod
b) control air actuates final control valve and signal air flows to the cylinder through the final control valve for forward and backward movement of piston rod
c) both a and b
d) none of the above

7 Which of the following is used to sense the initial and final positions of a piston rod?

a) lever operated direction control valve
b) limit switch
c) roller lever valve
d) all the above

8 Which valve gets activated only in one direction that is forward or backward movement of the piston rod?

a) roller lever valve
c) both a and b
b) idle roller lever valve
d) none of the above

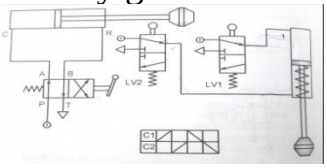
9 Which numbers are used to denote retraction of a piston rod?

a) even numbers
c) both even and odd numbers
b) odd numbers
d) none of the above

10 Which of the following is an element of time delay valve?

a) flow control valve
c) both a and b
b) direction control valve
d) none of the above

11 Identify given Circuits



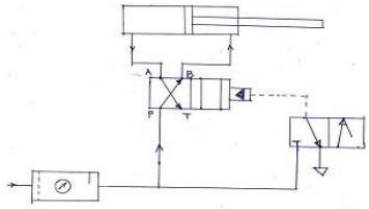
a) Meter In Circuit
c) Motion Sychronizing Circuit
b) Meter out Circuit
d) Sequencing Circuits

12 Which is not a components of Pneumatic Circuit

a) Pump c) Muffler

b) FRL Unit d) Moisture Separator

13 Identify given Circuits



a) Meter In Circuit c) Motion Sychronizing Circuit

b) Meter out Circuit **d) Impulse Pneumatic Circuits**

14 Which Type of Force is use in Impulse Circuit

a) Impulsive Force c) Tangential Force

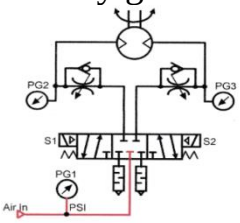
b) Centrifugal Force d) Centripital Force

15 Which is not Speed Control Pneumatic Circuit

a) Meter in c) Bleed Off

b) Meter Out **d) Motoring**

16 Identify given Circuits



a) Meter In Circuit c) Motion Sychronizing Circuit

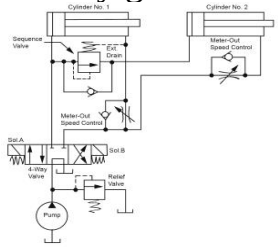
b) Meter out Circuit **d) speed control of bidirectional motor**

17 Identify Application of speed control of bidirectional motor

a) Hand Tool c) Broaching

b) Drilling d) Milling

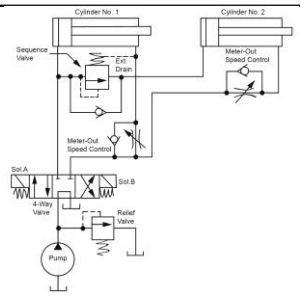
18 Identify given Circuits



a) Meter In Circuit **c) Motion Synchronizing Circuit**

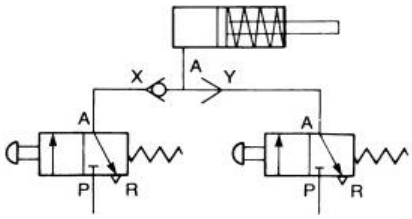
b) Meter out Circuit d) Sequencing circuits

19 Identify given Sequence Circuits



a) Sequence of DAC
c) Sequence of Spring Return SAC
b) Sequence of SAC
d) Sequence of Tandem Cylinder

20 Identify given Circuits



a) Meter In Circuit
c) Motion Sychronizing Circuit
b) Meter out Circuit
d) Shuttle Valve Circuit

21 Which among the following are not the applications of Pneumatic system?
a) Aerospace
c) Mining
b) Packing systems
d) Agriculture types of equipment

22 The compressed air, in pneumatic control systems, is not
a) Lubricated
c) Regulated
b) Filtered
d) All of the above

23 In pneumatic control systems the control panel used as final control element converts
a) Pressure signal to electric signal
b) Pressure signal to position change
c) Electric signals to be sure signal
d) Position change to pressure signal

24 A pneumatic amplifier
a) Amplifiers flow
b) Amplifiers differential pressure
c) Amplifiers change in air volume
d) Any of the above

25 Which material is used for pipes which conduct water and air?
a) Stainless steel
c) Ceramic
b) Copper
d) Plastic

26 For fail-safe action the control valve should, upon energy (air) failure:

a) Open
b) Close
c) Move in such direction as to make the process nonhazardous
d) Stay in its previous position

27 A process is to be controlled using an all pneumatic system. The maximum distance between loop components will be:

a) 1,000 feet
c) 200 feet
b) 500 feet
d. 20 feet

28 The integral dial in a pneumatic controller is calibrated in

a) Minutes or repeats
c) Gain
b) Integral units
d. Percentage

29 Which is an electro-pneumatic device?

a) Seven Segment display
c) Hydraulic cylinder
b) BO Motor
d) Lithium battery

30 Which actuator does not need any external power source?

a) 3 phase motor
c) Wax Motor
b) Solenoid valve
d) BO motor

31 How many directions are there, for a fluid to flow in check valves?

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

32 How many directions are there, for a fluid to flow in shuttle valves?

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

33 What is the full form DCV in terms of pneumatic control systems?

a) Delicate Control Valve
c) Directional Control Valve
b) Distance Control Value
d) Diameter Control Valve

34 Which valve should be used if there is a need of fluid to flow in 4 directions?

a) Spool valve
c) Check valve
b) Shuttle Valve
d) Rubber valve

35 What type of motion can be achieved using thermal actuator?

a) Rectilinear
c) Circular
b) Spiral
d) Parabolic

36 Who invented check valve?

a) Norbert wiener
c) Charles young
b) Robert Wiener
d) Frank P. Cotter