Hydraulics

Fundamental & Symbols

01.01 A push or pull applied against an object to move, it is called a…….:
(a) Force (b) Pressure (c) Torque (d) Displacement

01.02 A hydraulic fluid must have enough force to do work of the system & overcome……... in the system:
(a) Pressure (b) Resistance (c) Weight (d) None of these

01.03 The……..determines how much force is required to start, stop or cause a change in the movement of an object.
(a) Pressure (b) Weight (c) Inertia (d) Mass

01.04 The…… of a liquid is determined by comparing the weight of the fluid to the weight of an equal amount of water.
(a) Pressure (b) Force (c) Specific Gravity (d) None of these

01.05 ……is the amount of force exerted on an object divided by the area over which the force is exerted.
(a) Pressure (b) Hydraulic Force (c) Torque (d) None of these

01.06 …….takes place when a force is moved through a distance.
(a) Power (b) Work (c) Acceleration (d) None of these

01.07 Power is defined as an amount of ……..done in a given amount of time.
(a) Force (b) Displacement (c) Work (d) None of these

01.08 If a force of 1000kg is exerted against a piston having an area of $50cm^2$, the resulting pressure is……Kg/cm^2
(a) $10Kg/cm^2$ (b) $20Kg/cm^2$ (c) $50000Kg/cm^2$ (d) $200Kg/cm^2$

01.09 The ideal flow in a pipe is called-
(a) Laminar (b) Turbulence (c) Both ‘a’& ‘b’ (d) None of these

01.10 In accordance with Bernoulli’s Principle, when flow increases, pressure will……
(a) Increase (b) Decrease (c) No effect (d) Either a or b

01.11 The theory stating that pressure in a confined liquid is distributed equally throughout the fluid is……
(a) Bernoulli’s law (b) Boyle’s law (c) Pascal’s Law (d) Faraday’s law

01.12 In a hydraulic system, what must the force do?
(a) Perform work (b) Overcome system resistance (c) Both ‘a’& ‘b’ (d) None

01.13 If two different pistons have a force ratio of 4:1, the movement ratio is…….
(a) 4:1 (b) 1:4 (c) 1:6 (d) 16:1

01.14 Atmospheric pressure on the barometer scale is-
(a) 840mm (b) 760mm (c) 740mm (d) None of these

01.15 Liquid seeks a level depending on the-
(a) Force (b) Work (c) Pressure (d) Area

01.16 The relationship between Force, Pressure, Area-
(a) F = P x A (b) P = FxA (c) A = FxP (d) None

01.17 The basic symbol for a valve is a……
(a) Circle (b) Square (c) Triangle (d) None

01.18 ……is the basic symbol for rotating components such as pump & motor..
(a) Circle (b) Square (c) Triangle (d) Rectangle

01.19 Hydraulic returns lines are drawn as …..which carries out leakage oil back to the tank-
(a) Solid line (b) Long dashes (c) Short dashes (d) None

01.20 How many positions has the 4/3 way valve.
(a) 2 (b) 3 (c) 4 (iv) 5

01.21 How many envelops (squares) has the 4/2 way valve.
(a) 2 (b) 3 (c) 4 (iv) 5

01.22 …….line carries the main stream of flow in the system.
(a) Solid (b) Long dashes (c) Short dashes (d) Arrow

01.23 The arrow points out  showing the…….. as a source.
(a) Hydraulic Pump (b) Hydraulic Motor (c) 4/3 way valve (d) Relief valve

01.24 The arrow points in  showing the…….receive hydraulic energy.
(a) Hydraulic Pump (b) Hydraulic Motor (c) 4/3 way valve (d) Accumulator

01.25 The two arrows point in  showing the motor is ……
(a) Unidirectional (b) Bidirectional (c) Both ‘a’ & ‘b’ (d) None

01.26 The two arrow points out  showing that the pump can operate in ……..
(a) Forward (b) Reverse (c) Either ‘a’ or ‘b’ (d) None

01.27 ……Positioning valves such as relief valve, proportional valve has any number of positions between fully open and fully closed.
(a) Finite (b) Infinite (c) Both ‘a’ & ‘b’ (d) None

01.28 ……..Positioning valves such as directional control valve can be operated in certain no. of positions.
(a) Finite (b) Infinite (c) Both ‘a’ & ‘b’ (d) None

01.29 In symbol of relief valve, the…….. line indicates operation by pressure.
(a) main (b) pilot (c) return (d) None

01.30 In symbol of relief valve, …….. indicates adjustable the pressure.
(a) main line (b) pilot line (c) return line (d) arrow with spring

01.31 …… line i.e. pilot line carries the fluid that is used to control the operation of a valve or other component.
(a) solid (b) Long dashes with dot (c) Short dashes (d) Arrow

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
01.01	a	01.09	a	01.17	b	01.25	b
01.02	b	01.10	b	01.18	a	01.26	c
01.03	c	01.11	c	01.19	c	01.27	b
01.04	c	01.12	c	01.20	b	01.28	a
01.05	a	01.13	b	01.21	a	01.29	b
01.06	b	01.14	b	01.22	a	01.30	d
01.07	c	01.15	c	01.23	a	01.31	b
01.08	b	01.16	a	01.24	b		

Hydraulic Oil

02.01 ……is the measure of the fluid's resistance to flow or an inverse measure of fluidity.
(a) Viscosity (b) Force (c) Temperature (d) Pressure

02.02 The unit of kinematic viscosity of VG68 is-
(a) ^{0}C (b) Centistoke (c) Kelvin (d) Pascal

02.03 In ISO VG68 viscosity 68 lies at temp-
(a) 40^{0}C (b) 0^{0}C (c) 100^{0}C (d) 15^{0}C

02.04 …….in the lowest temperature at which a fluid will flow-
(a) Flash point (b) Fire point (c) Pour point (d) None

02.05 A hydraulic fluid must also act as a ……between the contacting surfaces of the components.-
(a) Lubricant (b) Sealing agent (c) Cooling agent (d) None

02.06 The viscosity of a fluid measures its……..friction-
(a) External (b) Internal (c) both (d) None of these

02.07 A hydraulic fluid that has a low viscosity will flow ……..than a high viscous fluid.-
(a) Faster (b) Slower (c) Cannot flow (d) None

02.08 The change in fluid viscosity caused by a change in temp. is referred to as the fluid's…….
(a) Viscosity (b) Viscosity Index (c) resistance (d) None

02.09 The property of a fluid to keep two surfaces separated under high pressure is referred to as its ……..
(a) Lubricity (b) Film strength (c) Viscosity (d) Viscosity Index

02.10 The chemical reaction between hydraulic fluid & air is called……
(a) Oxidation (b) Corrosion (c) No reaction (d) None

02.11 The term that describes the stability of fluid viscosity when it is heated is-
(a) Pour point (b) Vapour pressure (c) Viscosity index (d) Lubricity

02.12 Corrosion in a hydraulic system is generally caused by-
(a) Acids (b) Alkalis (c) Oxidation (d) All of the above

02.13 Air is usually introduced into a hydraulic system through leaks in the …….line.
(a) Outlet (b) Inlet (c) Pilot line (d) None

02.14 Any deterioration of a metallic surface can be said as……
(a) Oxidation (b) Rust (c) Corrosion (d) None

02.15 What are hydraulic fluids required to do?
(a) Lubricate (b) Remain Incompressible (c) Transmit Power (d) All of the above

02.16 Oil cleanliness level of hydraulic system is according to…….
(a) NAS 4-5 (b) NAS 15-16 (c) NAS 0-2 (d) NAS 8-9

02.17 The minimum & maximum viscosity of VG68 oil at 40^{0}C…….
(a) 61.2 & 74.8 (b) 68 (c) 15-100 (d) None

02.18 Flash point of petroleum base hydraulic oil (VG-68) is
(a) 40^0C (b) 90^0C (c) 150^0C (d) 210^0C

02.19 Pour point of VG-68 oil is-
(a) 0^0C (b) 10^0C (c) -21^0C (d) -4^0C

02.20 Water content in water glycol fluid used in RGM-
(a) 35-40% (b) 50% (c) 0% (d) 100%

02.21 The max. admissible concentration of water content in hydraulic oil is-
(a) 500ppm (b) 1000ppm (c) 1500ppm (d) 2000ppm

02.22 The maximum decrease in original value of viscosity of hydraulic oil is-
(a) 0% (b) 5% (c) 10% (d) 20%

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
02.01	a	02.09	b	02.17	a
02.02	b	02.10	a	02.18	d
02.03	a	0211	c	02.19	c
02.04	c	02.12	d	02.20	a
02.05	a	02.13	b	02.21	b
02.06	b	02.14	c	02.22	c
02.07	a	02.15	d		
02.08	b	02.16	d		

Hydraulic Tank

03.01 The slower a hydraulic fluid moves in a reservoir, the better the contaminants------
(a) Separate or settle (b) Drain (c) Dissolve in oil (d) No effect

03.02 A baffle in a reservoirs keeps the oil in contact with the sides to…….the fluid-
(a) Heat (b) Pressurize (c) Settle (d) Cool

03.03 The bottom of a reservoir be designed-
(a) V-shaped (b) With a drain (c) Sloped (d) All of above

03.04 An……prevents pressure or suction buildups in a reservoir.
(a) Pump (b) Baffle plate (c) Filters (d) Air breather

03.05 Hydraulic tank in cleaned at-
(a) 200hrs (b) 500hrs (c) 1000hrs (d) IOH

03.06 Reservoir's capacity is kept minimum……..times the pump capacity-
(a) Same as pump's capacity (b) 2 to 3 times (c) 100 times (d) 20 times

03.07 Height of the baffle plate inside a reservoir is kept…….the ht. of the oil level.
(a) Same (b) 3/4 (c) 2/3 (d) None

03.08 The bottom portion of return lines terminate towards tank wall be at an angle of-.
(a) Same (b) 45^0 (c) 60^0 (d) None

03.09 The baffle plate separates the inlet line from the……..line.
(a) Pressure (b) Return (c) Drain (d) None

03.10 Inlet and return lines must be terminate …….the fluid level.
(a) High (b) Below (c) Same (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
03.01	a	03.04	d	03.07	c	03.10	b
03.02	c	03.05	c	03.08	b		
03.03	d	03.06	b	03.09	b		

Hydraulic Filter

04.01 Pressure line filters can trap much……particles than inlet line filters.
(a) Bigger (b) Smaller (c) Either (a) & (b) (d) None

04.02 Filter is……than strainer.
(a) Finer (b) Coarser (c) Either (a) & (b) (d) None

04.03……..filters are used for most minute filtration in hydraulic systems.
(a) Adsorbent (b) Absorbent (c) Mechanical (d) None

04.04 Inlet strainers should be mounted far enough below the fluid level of a reservoir to prevent a …….
(a) Whirlpool (b) Laminar (c) No effect (d) None

04.05 Filters (10-25µ) provided in return line generally have a ……..
(a) Check valve as a bypass (b) Throttle valve as a bypass valve
(c) Gate valve as a by pass valve (d) None of these.

04.06 Pressure line filter provided for proportional valve is of……..
(a) 3µ (b) 10µ (c) 25µ (d) 150µ

04.07 Suction filter provided for fixed displacement pump is of-
(a) 10µ (b) 25µ (c) 150µ (d) None

04.08 Pressure line & return line filters are replaced at every-
(a) 1000hrs (b) 100hrs (c) 200hrs (d) 500hrs

04.09 Suction filter is replaced at-
(a) 50hrs (b) 100hrs (c) 200hrs (d) 500hrs

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.
04.01	b	04.06	b
04.02	a	04.07	c
04.03	b	04.08	c
04.04	a	04.09	d
04.05	a		

Hydraulic Hoses

05.01 When selecting a pipe for hydraulic lines always make sure it will withstand the system……
(a) Flow (b) Pressure (c) Force (d) None

05.02 A bend in tubing should be smooth and have a ……..cross section.
(a) Sharp (b) twisted (c) round (d) None

05.03 If a hydraulic line has high fluid velocity, the flow will be……...
(a) Turbulent (b) Laminar (c) Both a & b (d) None

05.04 Bursting pressure of hose is kept ……times the working pressure.
(a) Same (b) 2 (c) 4 (d) 8

05.05 Flexible hose is used when the hydraulic lines are subjected to…….
(a) Movement (b) Fixed (c) Both (d) None

05.06 Higher pressure is permitted in……wire braided hose.
(a) single (b) double (c) Both a & b (d) None

05.07 SAE $100R_2$ standard is applicable for……..hose.
(a) Suction (b) Pressure (c) Return (d) Leakage line

05.08 DIN 20022 standard is used for…….hose.
(a) Suction (b) Pressure (c) Return (d) None

05.09 DIN 20023 standard represents for…….hose.
(a) 4 Spiral wire wrapped (b) Single wire braid (c) Textile braided (d) None

05.10 EN853 2SN standard represents for…….hose.
(a) Single wire braided (b) Double wire braided (c) 4 Spiral wire wrapped(d) None

05.11 Hydraulic hoses should have …….absorption coefficient.
(a) Low (b) Medium (c) High (d) None

05.12 The inner layer of hose should be …….. with the hydraulic oil being used.
(a) compatible (b) not compatible (c) both a & b (d) none

05.13 The hydraulic hose can with stand temperatures…….
(a) 0^0F to 50^0F (b) 10^0F to 200^0F (c) -40^0F to 200^0F (d) None

05.14 The recommended velocity range in pump inlet line……
(a) 1-2 ft/sec (b) 2-4 ft/sec (c) 7-20 ft/sec (d) None

05.15 The recommended velocity range in working line……
(a) 1-3 ft/sec (b) 3-6 ft/sec (c) 7-20 ft/sec (d) None

05.16 Doubling the inside diameter of a line, the velocity is……
(a) Quadruples (b) double (c) one half (d) one fourth

05.17 Halving the inside diameter of a line ……the oil velocity.
(a) Quadruples (b) double (c) one half (d) one fourth

05.18 The I.D. of a flexible hose in inch is generally given by-

(a) Pipe no./4 (b) Pipe no./8 (c) Pipe no./12 (d) Pipe no./16

05.19 Radius of bend is measured from…… of hose
(a) Either end (b) centre Line (c) both a or b (d) none

05.20 Hydraulic hose & fittings are either the crimp (permanent) or……..types.
(a) Reusable (b) welded (c) brazed (d) none

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
05.01	**b**	**05.06**	**b**	**05.11**	**a**	**05.16**	**d**
05.02	**c**	**05.07**	**b**	**05.12**	**a**	**05.17**	**a**
05.03	**a**	**05.08**	**b**	**05.13**	**c**	**05.18**	**d**
05.04	**c**	**05.09**	**a**	**05.14**	**b**	**05.19**	**b**
05.05	**a**	**05.10**	**b**	**04.15**	**c**	**05.20**	**a**

Hydraulic Seals

06.01 A positive seal…….. even a minute amount of fluid from getting past.
(a) prevents (b) permits (c) either (a) & (b) (d) None

06.02 A non positive seal…….. a small amount of internal leakage.
(a) Prevents (b) permits (c) both a&b (d) None

06.03 ……..seals are installed between parts which move relative to one another.
(a) Positive (b) Non positive (c) Dynamic (d) Static

06.04 'O' ring is a pressure actuated seal as well as …….. seal.
(a) Compression (b) Tension (c) Non positive (d) None

06.05 Lip seals are……seals & used principally to…….. rotating shafts.
(a) Positive, seal (b) Non positive, Cover (c) Static, seal (d) None

06.06 Cup seals are ……seals & used on cylinder piston.
(a) Positive (b) Non positive (c) Static (d) None

06.07 The seal used in D.C. Valve is……...
(a) Positive (b) Non positive (c) Dynamic (d) Static

06.08 Piston Rings are fabricated from……or steel
(a) Pig iron (b) Wrought iron (c) Cast Iron (d) None

06.09 Dia of seal on piston & rod in tamping unit UP/DN cylinder is…….
(a) 100/50 (b) 100/45 (c) 125/50 (d) 80/40

06.10 Track lifting cylinder seal dia on piston & rod…….
(a) 100/50 (b) 100/45 (c) 125/50 (d) 50/36

06.11 Dia of seal on piston & rod of lining cylinder is…….
(a) 100/45 (b) 100/50 (c) 80/30 (d) 125/50

06.12 The temperature limit for a seal…….
(a) -40^0F to 200^0F (b) 0^0 to 200^0F (c) 20^0F to 200^0F (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
06.01	a	06.04	a	06.07	b	06.10	c
06.0	b	06.05	a	06.08	c	06.11	a
06.03	c	06.06	a	06.09	d	06.12	a

Hydraulic Pumps

07.01 A hydraulic pump converts……energy into…….energy.
(a) Mechanical, Hydraulic (b) Hydraulic, Mechanical
(c) Hydraulic, Electromechanical (d) None

07.02 A hydraulic pumps are either fixed displacement or…….displacement.
(a) Constant (b) Variable (c) Non positive (d) None

07.03 The vanes of a pump that are not spring loaded are held in contact with the cam ring by both the combination of…….force and……pressure.
(a) Centrifugal & Oil (b) Centripetal & oil (c) Reciprocating & Oil (d) None

07.04 In most of the hydraulic system……displacement pumps are used.
(a) Positive (b) Non positive (c) both a&b (d) none

07.05 The capacity of a pump can be specified by which of the following.
(a) Gallons per minutes (b) Cubic centimeter per revolution
(c) Litre per minute (d) All of the above.

07.06 The vane tips of a vane pump are usually constructed with a groove to permit…….
(a) Longer vane life (b) Better lubrication
(c) Free movement of vanes (d) All of the above.

07.07 The fluid flow in a fixed displacement vane pump is changed by changing the…….
(a) Shifting the cam ring (b) Off centre rotor (c) rpm of prime mover (d) None

07.08 The fluid flow in a variable displacement vane pump is changed by-…….
(a) Changing the discharge port (b) Shifting the cam ring
(c) Shifting the housing (d) Changing the inlet port

07.09 Internal gear pumps are used due to following characteristics.
(a) Low pressure (b) Slow speeds (c) Small capacities (d) All of the above.

07.10 The pumps in a hydraulic system, creates-.
(a) Fluid pressure (b) Fluid flow (c) Flow resistance (d) All of the above

07.11 A vane pump in which the rotor is placed off centre is said to be -.
(a) Unbalanced (b) Balanced (c) Fixed (d) None

07.12 The delivery or flow rating of a pump is referred to its -.
(a) Pressure (b) Efficiency (c) Capacity (d) None

07.13 The service life of a pump is specified in terms of operating-.
(a) Flow rate (b) Speed (c) Hours (d) Fluid pressure

07.14 In internal gear pump, both gears rotate in……..direction-.
(a) Same (b) Opposite (c) One Gear is stationary (d) None

07.15 In external gear pump, both gears rotate in……direction-.
(a) Same (b) Opposite (c) One Gear is stationary (d) None

07.16 Pressure is reduced at pump inlet due to-.
(a) Less oil in tank (b) Pump speed is less (c) Partial vacuum (d) None

07.17 Pump caters oil for Tamping Unit lifting-lowering in 09-CSM-.
(a) 90 LPM (b) 38 & 17 GPM (c) 25 & 25 GPM (d) 38 & 22 GPM

07.18 38 & 17 GPM pump is mounted on …….gear box in 09-CSM. -.
(a) Z.F. (b) Funk (c) Reduction (d) Distributor

07.19 …… caters flow for work drive motor in 09-CSM, 09-3X.-.
(a) Variable axial piston pump (b) Vane pump (c) Gear Pump (d) Radial piston pump

07.20 Swash plate in axial piston pump tilted by -.
(a) Manually Control (b) Pilot pressure control (c) Electronic control (d) All of the these

07.21 Charge pump pressure is set at-.
(a) 30 bar (b) 110 bar (c) 210 bar (d) 380 bar

07.22 Variable pump contains cross relief valves because it is ……pump-.
(a) LHS Pump (b) Reversible (c) RHS Pump (d) None

07.23 More the angle of tilting of swash plate ….flow we get-.
(a) Less (b) More
(c) Does not depend on angle of swash plate (d) none

07.24 Flushing valve is provided in work drive/travel drive closed loop circuit for …….of oil.
(a) Cooling (b) Heating (c) Does not effect (d) None

07.25 Pump does not give flow due to……...-.
(a) Direction of rotation is wrong (b) Pump shaft broken (c) Both a & b (d) None

07.26 Pump's bearing failure is caused due to-.
(a) Inadequate lubrication (b) Contaminants in pump (c) Both a & b (d) None

07.27 Pump making abnormal sound due to-.
(a) More viscous oil (b) Air entrapped (c) Filter clogged (d) All of the above

07.28 Excess foaming can be created due to -.
(a) Entrapping excess air (b) Pump's speed too less (c) Oil more viscous (d) None

07.29 ……is a sort of vacuum created in the hydraulic oil -.
(a) Aeration (b) Cavitation (c) Emulsification (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
07.01	a	07.07	c	07.13	c	07.19	a	07.25	c
07.02	b	07.08	b	07.14	a	07.20	d	07.26	c
07.03	a	07.09	d	07.15	b	07.21	a	07.27	d
07.04	a	07.10	b	07.16	d	07.22	b	07.28	a
07.05	d	07.11	a	07.17	d	07.23	b	07.29	b
07.06	d	07.12	c	07.18	b	07.24	a		

Pressure Control Valves

08.01 Pressure control valves are used to control fluid …….and……...
(a) Flow & pressure (b) Force & pressure (c) Speed & Pressure (d) None

08.02 Relief valves normally remain in…… position
(a) Opened (b) closed (c) either 'a' or 'b' (d) None

08.03 The relief valve opens at it's……pressure-
(a) Override (b) Cracking (c) Pilot Pressure (d) None

08.04 Functioning of a pressure control valve in a hydraulic system is to-
(a) Regulate flow rate (b) Regulate pressure (c) Limit pressure (d) All of these

08.05 Most unloading valves are ……..operated rather than pressure operated- .
(a) Pilot (b) Direct (c) Mechanical (d) None.

08.06 When a poppet relief valve is controlled from a remote point, the main valve is usually a ……..stage valve.
(a) One (b) Two (c) Three (d) None

08.07 The difference in area between the plunger & poppet seat is approximately…..in unloader valve.
(a) 15% (b) 40% (c) 70% (d) None

08.08 Reasons of no pressure in the system-
(a) Orifice in main spool choked up (b) Vent open to tank
(c) Safety valve at zero setting (d) All of the above.

08.09 Safety valve is set…….than the setting of unloading valve..
(a) Less (b) Equal (c) More (d) None.

08.10 …….is provided in accumulator charging circuit-.
(a) Relief valve (b) Unloader valve (c) Pressure reducing valve (d) Sequence valve

08.11 When pressure drops to about……% of the valve setting, the ball (poppet) & piston reseat and the cycle is repeated -.
(a) 15% (b) 50% (c) 85% (d) None

08.12 The …….has closed permitting the accumulator to maintain pressure in the system during unloading-.
(a) Check valve (b) Ball (c) Piston (d) None

08.13 Pressure reducing valves are used to reduce or limit the pressure in……circuit of the system.
(a) Primary (b) Secondary (c) Testing (d) None

08.14 Pressure reducing valves are provided for……
(a) Squeezing circuit (b) Booster circuit (c) Brake circuit (d) All of these

08.15 Pressure reducing valves are normally remains in …….position.-
(a) Opened (b) Closed (c) Both (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
08.01	a	08.05	a	08.09	c	08.12	a
08.02	b	08.06	b	08.10	b	08.13	b
08.03	b	08.07	a	08.11	c	08.14	d
08.04	d	08.08	d	08.12	a	08.15	a

Directional control valves

09.01 A …..can start, stop or change direction of fluid flow.
(a) Directional control valve (b) Pressure control valve
(c) Flow control valve (d) Pump

09.02 4/3 way valve have……..positions.
(a) 2 (b) 3 (c) 4 (d) 5

09.03 4/2 way valve have……..positions.
(a) 2 (b) 3 (c) 4 (d) 5

09.04 Spring centered valve have…… spring on each end.
(a) 1 (b) 2 (c) 3 (d) 4

09.05 Spring offset valve have…….spring on one end only- .
(a) 1 (b) 2 (c) 3 (d) 4

09.06 D.C. valves are operated by.
(a) Solenoid (b) Manually (c) Hydraulic power (d) All of the above

09.07 In lifting circuit of 09-CSM, the normal condition of 4/3 way valve is…….
(a) Floating condition (b) Closed position (c) Tandem Centre (d) None

09.08 D.C. valves have…….spool.
(a) Sliding (b) Rotary (c) Both a & b (d) None

09.09 In lining circuit on tamping machine… is used as bypass valve-
(a) Check valve (b) Spring off set valve (c) Spring centered valve (d) None.

09.10 A 4-way valve has……..primary working ports.-.
(a) 1 (b) 2 (c) 3 (d) 4

09.11 A four way spool valve which does not shift linearly is a -.
(a) Rotary valve (b) Reciprocating valve (c) Both (d) None

09.12 The pressure at which check valve will start to open is called its-.
(a) Override pressure (b) Cracking pressure (c) Setting pressure (d) None

09.13 A three position, 4-way valve is also called as a-.
(a) 4/3 valve (b) Check valve (c) 3/2 way valve (d) 2/2 way valve

09.14 Double Decker solenoid operated D.C. valves are referred as -.
(a) Direct Operated valve (b) Pilot operated valve
(c) Manually Operated valve (d) None

09.15 ……..allow hydraulic fluid to flow in one direction -.
(a) Check valve (b) 4/2way valve (c) 4/3way valve (d) None

09.16 Ball or poppet are held against the check valve seat by a…….. -.
(a) Hydraulic force (b) Solenoid force (c) Spring (d) None

09.17 ……..is generally used as a bypass with filter -.
(a) Check valve (b) D.C. valve (c) Flow control valve (d) None

09.18 ……..is used as anti cavitation valve in vibration circuit of Tamping Unit. -.
(a) Relief valve (b) 3/2 valve (c) Check valve (d) None

09.19 …..…...is used to hold a load in mid position-
(a) Pilot operated check valve (b) Simple check valve
(c) Pressure control valve (d) Flow control valve

09.20 Reverse flow is possible through a check valve in…….
(a) Pilot operated check valve (POC) (b) Pilot operated DC valve
(c) Pressure control valve (d) None

09.21 The normal position of 4/3 way valve is generally….provided with pilot operated check valve.
(a) Neutral position (b) Tandem Centre (c) Opened condition (d) Floating condition

09.22 POC valves are used in……circuit-
(a) Tool tilting (b) Tamping unit lateral sliding
(c) Work drive of 08 DUO & UNO (d) Both a & b

09.23 ….valve is used in hook lifting-lowering circuit is Unimat- .
(a) Logic valve (b) POC valve (c) Pilot operated D.C. Valve (d) None

09.24 The normal position of 4/3 way valve used to control logic calve (Cartridge valve) is..
(a) P ⟶ A, B (b) P ⟶ T (c) A, B ⟶ T (d) Closed position

09.25 There are ……..poppet valves are provided in logic valve manifold.
(a) 1 (b) 2 (c) 3 (d) 4

09.26 Spool is stuck up in D.C. valve due to-
(a) Coil ineffective (b) Body parts defective (c) Spool stressed (d) All of these

09.27 Spool is not shifting due to-
(a) No electric supply (b) Coil burnt (c) Both ‘a’ & ‘b’ (d) None

09.28 Valve overheating takes place due to-
(a) System pressure too high (b) Wrong oil grade
(c) Faulty electric circuit (d) All of the above

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
09.01	a	09.08	c	09.15	a	09.22	d
09.02	b	09.09	b	09.16	c	09.23	a
09.03	a	09.10	d	09.17	a	09.24	a
09.04	a	09.11	a	09.18	c	09.25	d
09.05	a	09.12	b	09.19	a	09.26	d
09.06	d	09.13	a	09.20	a	09.27	c
09.07	c	09.14	b	09.21	d	09.28	d

Proportional Valve & Servo Valve

10.01 ……..control & vary pressure, flow direction, acceleration & deceleration-
(a) Proportional valve (b) Relief valve (c) D.C. Valve (d) Flow control valve

10.02 In proportional valve output flow is…….to input signal.
(a) Proportional (b) Inversely Proportional (c) Double (d) Quadruple

10.03 Current range for proportional valve is-
(a) 0-15mA (b) 250-750mA (c) 150-250mA (d) 750-1200mA

10.04 In 09-CSM, the current for tamping unit lowering & lifting respectively is-
(a) 0 & 250mA (b) 650mA & 600mA (c) 250mA & 750mA (d) None

10.05 To get a……..movement, ramp function is made which means gradually increasing or decreasing signal.
(a) Sudden & jerk (b) Smooth & shock free (c) Fast (d) Slow

10.06 ……..is used to operate tamping unit UP/DN cylinder and satellite drive motor-
(a) D. C. Valve (b) Servo Valve (c) Proportional Valve (d) Flow valve control

10.07 …….is used to pass neat & Clean oil to pilot stage of proportional valve-
(a) Suction filter (b) Return Filter (c) Servo filter (d) Proportional Filter

10.08 Proportional valve does not function due to……..
(a) Proportional solenoid defective (b) Electric circuit faulty
(c) Proportional filter clogged (d) All of the above.

10.09 In a……..small input signal causes a large output of hydraulic power.
(a) Servo valve (b) D.C. valve (c) Relief Valve (d) None

10.10 A low power control signal can produce output of several hundred horse power in a-
(a) Relief valve (b) D.C. Valve (c) Servo valve (d) Proportional valve

10.11 Maximum current is fed in servo valve-
(a) 15mA (b) 250mA (c) 650mA (d) 750mA

10.12 Servo valves are used for…….-
(a) Tamping unit lifting lowering (b) Track lifting-lining (c) Rail clamp (d) Work drive

10.13…….filters are used for all the three servo valves used in track lifting-lining in tamping machines-
(a) Servo (b) Proportional (c) Return line (d) Suction line

10.14 Button type filters are also provided to cater neat & clean oil…….the servo valve-
(a) Inside (b) Out side (c) No filter (d) None

10.15 Oil cleanliness class NAS……should be maintained for servo valve.
(a) 1 (b) 5 (c) 8 (d) None

10.16 Before the fitment of……. flushing must be done.
(a) Servo filter (b) Proportional filter (c) Return filter (d) None

10.17 Pressure difference is caused due to ……..in nozzle in servo valve-

(a) Area difference (b) Equal area (c) Current difference (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
10.01	a	10.07	d	10.13	a
10.02	a	10.08	d	10.14	a
10.03	b	10.09	a	10.15	b
10.04	c	10.10	c	10.16	a
10.05	b	10.11	a	1017	a
10.06	c	10.12	b		

Flow Control Valve

11.01 Flow control valves are used to control the…….. of actuator.
(a) Pressure (b) Direction (c) Speed (d) None

11.02 A flow control valve regulates fluid flow by -
(a) Meter-in (b) Meter-out (c) Bleed off (d) All of the above

11.03 Fluid flow is regulated on the outlet side of the actuator by…….-
(a) Meter in (b) Meter-out (c) Bleed off (d) None

11.04 Fluid flow is regulated on the inlet side of the actuator by…….-
(a) Meter in (b) Meter-out (c) Bleed off (d) None

11.05 ……..is used where only a portion of the main flow is required to control the actuator- .
(a) Meter in (b) Meter-out (c) Bleed off (d) None

11.06 Flow control valves controls the flow by…….-
(a) Fixed orifice (b) Variable orifice (c) Both ‘a’ & ‘b’ (d) None

11.07 As the area of an orifice increases, the pressure drop …….
(a) Increases (b) Decreases (c) No effect (d) None

11.08 Fluid velocity decreases when area of an orifice……..
(a) Increases (b) Decreases (c) No effect (d) None

11.09 One way flow control valve has a ……for return flow of an actuator-
(a) Check valve (b) Fixed orifice (c) Variable orifice (d) None

11.10 In Duomatic……flow control valve is used in squeezing circuit-
(a) One way (b) two Way . (c) Fixed (d) None

11.11 …….flow control valve is provided in work drive circuit of 08-Duomatic & Unimat-3S-
(a) One way (b) two Way . (c) Fixed (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
11.01	c	11.05	c	11.09	a
11.02	d	11.06	c	11.10	a
11.03	a	11.07	b	11.11	a
11.04	b	11.08	a		

Accumulator

12.01 An ……..stores hydraulic fluid to maintain pressure in the circuit.
(a) Accumulator (b) Pump (c) Relief valve (d) None

12.02 When charging a bladder accumulator charge the ……side first.
(a) Oil (b) Gas (c) both a&b (d) None

12.03 The type of gas charged accumulator used in tamping machine-
(a) Bladder (b) Diaphragm (c) Both a&b (d) None

12.04 Function of an accumulator in a hydraulic circuit is-
(a) To compensate leakage loss (b) Absorb hydraulic shocks
(c) Supply fluid on demand (d) All of the above

12.05 Diaphragm accumulator is used in……
(a) Small squeezing circuit (b) Big squeezing circuit (c) Rail clamp circuit (d) None

12.06 Gas charged accumulators depend on the compression of a …. for their fluid capacity & pressure level.
(a) Oil (b) Gas (c) Both (d) None

12.07 An accumulator should be pre-charged while…….. of hydraulic oil
(a) Empty (b) Full (c) Both (d) Same as pressure

12.08 The gas pressure in accumulator is …….of maximum working pressure-
(a) 1/2 (b) 1/4 (c) 2/3 (d) Same as pressure

12.09 In 09-CSM, the N_2 Pressure & Oil capacity of accumulator provided for system circuit-
(a) 20bar, 1.6ltrs. (b) 100bar, 25ltrs. (c) 85bar, 32ltrs. (d) None

12.10 ……may be installed in a system to absorb shock or pressure surges due to the sudden stopping or reversing of oil flow-
(a) Accumulator (b) Relief valve (c) Pump . (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
12.01	a	12.05	a	12.09	c
12.02	b	12.06	b	12.10	a
12.03	c	12.07	a		
12.04	d	12.08	c		

Cylinder

13.01 The actuating device used to convert fluid pressure into straight line mechanical force is-
(a) Cylinder (b) Motor (c) Pump (d) None

13.02 A cylinder in which power strokes is in only one direction is -
(a) Single acting cylinder (b) Double acting cylinder
(c) Double rod cylinder (d) None

13.03 ……..is operated by hydraulic fluid in both directions.
(a) Single acting cylinder (b) Double acting cylinder
(c) both a& b (d) None

13.04 Double rod cylinder has…….piston &…….rods-
(a) 2, 3 (b) 1, 1 (c) 1, 2 (d) 2, 2

13.05 Double rod cylinder is also known as
(a) Differential (b) non-differential c) Both a &b (d) None

13.06 Cushioning is provided in cylinder to……it near the end of the stroke & prevent the piston from hammering.
(a) slow (b) fast (c) both a& b (d) none

13.07 ……is used for lifting of trolley table in motorized trolley of T-28.
(a) Double acting cylinder (b) Double rod cylinder
(c) Ram type cylinder (d) Telescopic cylinder

13.08 Ram type cylinder used in elevators, jacks & automobile hoists is a…….
(a) Single Acting cylinder (b) Double acting cylinder (c) Double rod cylinder (d) None

13.09 Ram type cylinder retracts by the force of …….on the load.
(a) Hydraulic (b) Gravity (c) Pneumatic (d) None

13.10 Track lifting cylinder in tamping machine is a-
(a) Single acting cylinder. (b) Double acting cylinder.
(c) Double rod cylinder. (d) None

13.11 ……is used in lining device in BCMs.-
(a) Single acting cylinder. (b) Double rod cylinder. (c) Ram type cylinder. (d) None

13.12 Cylinder mountings are-
(a) Trunnion mount (b) Clevis mount (c) Square flange mount. (d) all of the above

13.13 In Tamping Unit lifting lowering cylinder…….mounting is used.
(a) Trunnion. (b) Clevis (c) Square flange (d) None

13.14 In track lifting cylinder…….mounting is used-
(a) Trunnion. (b) Clevis. (c) Square flange. (d) None

13.15 The formula, $\frac{\text{GPM x 231}}{\text{Effective piston area in inch}^2}$ is applied to get cylinder's-
(a) Speed. (b) Flow (c) Both. (d) None

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Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
13.01	a	13.05	b	13.09	b	13.13	a
13.02	a	13.06	a	13.10	a	13.14	b
13.03	b	13.07	d	13.11	b	13.15	c
13.04	c	13.08	a	13.12	d		

Hydraulic Motor

14.01 The torque of a hydraulic motor is a result of the fluid-
(a) Pressure (b) Flow (c) Speed (d) None

14.02 Hydraulic motors convert the…….. energy into……energy.
(a) Mechanical, Hydraulic (b) Hydraulic, Mechanical
(c) Hydraulic, Pneumatic (d) None

14.03 The kinetic energy of the fluid is converted into the……..of a rotating shaft in a hydraulic motor.
(a) Potential energy (b) Kinetic energy (c) Torque output (d) None

14.04 The pressure of the fluid admitted to the motor determines it's…….
(a) Kinetic energy (b) Force or torque (c) Potential energy (d) None

14.05 The …..of a motor is the rotational force that it exerts on an object, causing the object to rotate.
(a) Speed (b) Flow (c) Torque (d) None

14.06 Fluid pressure acting on the gear teeth causes…….. in gear motor.
(a) linear movement (b) rotary movement (c) both a& b (d) None

14.07 A vane motor having two motor chambers is-
(a) Balanced (b) Unbalanced (c) Variable (d) None

14.08 Hydraulic motor need a starting torque……enough to start rotation while fully loaded-
(a) Small (b) Large (c) Equal (d) None

14.09 Fluid pressure acting on the exposed surfaces of rectangular vanes causes…… in vane motor.
(a) linear movement (b) rotary movement (c) both a& b (d) None

14.10 …….torque is the turning force, the motor exerts from a dead stop-
(a) Starting. (b) Running (c) Stalling. (d) None

14.11 ……torque is exerted when the motor is running & changes whenever there is a change in fluid pressure.
(a) Starting . (b) Running (c) Stalling (d) None

14.12 ……torque is the force necessary to stop the motor-
(a) Starting (b) Running (c) Stalling (d) None

14.13 Hydraulic motor is ……..actuator-
(a) Linear. (b) Rotary (c) Both (a) & (b). (d) None

14.14 Hydraulic motor are rated according to displacement (size), torque capacity and maximum ……..limitations-
(a) Flow (b) Pressure (c) Speed . (d) None

14.15 ……is the amount of fluid which the motor will accept in turning one revolution-
(a) Displacement (b) Pressure (c) Torque (d) None

14.16 Increase the pressure setting, the effect on torque available on motor shaft…….

(a) No effect (b) Decreases (c) Increases (d) None

14.17 Increase GPM, the effective torque available on motor shaft……..
(a) No effect (b) Increases (c) Decreases (d) None

14.18 High pressure at the inlet & low pressure at the outlet result in……..side loading on the shaft & gears in gear motor-
(a) High (b) Low (c) Equal (d) None

14.19 Hydraulic motor may be……-
(a) Unidirectional (b) Bidirectional (c) Variable (d) All of the above

14.20 ……motor is used for vibration in tamping unit-
(a) Unidirectional (b) Bidirectional (c) Variable (d) None

14.21 ……motor is used on work drive motor in 09-CSM & DUO…-
(a) Unidirectional (b) Bidirectional (c) Variable (d) None

14.22 The……..connects to two opposing pressure passages to balance side loads on the rotor in balanced vane motor.
(a) inlet (b) outlet (c) Both 'a' & 'b' (d) None

14.23 ……generate torque through pressure on the ends of reciprocating pistons operating in a cylinder block-
(a) Gear Motor (b) Vane Motor (c) Piston Motor (d) None

14.24 In axial piston motor the motor drive shaft and …….are centered on the same axis-
(a) Cylinder block (b) D.C. Valve (c) cross relief valve (d) None

14.25 Pressure at the ends of the pistons in axial piston motor causes a reaction against a canted……..and drives the cylinder block & motor shaft-
(a) D.C. Valve (b) Swash plate (c) Cross relief valve (d) None

14.26 …… Oil pressure exerts force on pistons, forcing them out of the cylinder block-
(a) Inlet (b) Outlet (c) Both 'a' & 'b' (d) None

14.27……..the swash plate angle increases the torque capability but reduces the drive shaft speed.
(a) Increasing (b) Decreasing (c) No angle (d) None

14.28 Variable displacement axial piston motor is provided in driving circuit of-
(a) RM-80 (b) FRM-80 (c) Kershaw BRM (d) All of the above

14.29 In…… motor the cylinder block & drive shaft are not in true alignment to each other-
(a) Axial piston (b) Bent axis piston (c) Vane (d) None

14.30 Universal link maintains alignment so shaft and ……..always turn together in bent axis piston motor.-
(a) Pistons (b) Drive shaft flange (c) Cylinder block (d) None

14.31 ……. is used for vibration in screen in RM-80-
(a) Axial piston motor (b) Vane motor (c) Gear Motor (d) Bent axis motor

14.32 Less input pressure in motor results in……vibration pressure in Tamping Unit-
(a) Less . (b) High (c) Moderate (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
14.01	a	14.09	b	14.17	a	14.25	b
14.02	b	14.10	a	14.18	a	14.26	a
14.03	b	14.11	b	14.19	d	14.27	a
14.04	b	14.12	c	14.20	a	14.28	d
14.05	c	14.13	b	14.21	b	14.29	b
14.06	b	14.14	b	14.22	a	14.30	c
14.07	a	14.15	a	14.23	c	14.31	d
14.08	b	14.16	c	14.24	a	14.32	a

Heat exchanger

15.01 ……may either heat or cool the hydraulic, fluid-
(a) Cooler (b) Heater (c) Heat Exchanger (d) None

15.02 is called as……-
(a) Heater (b) Water cooler (c) Air cooler (d) All of above

15.03 In Track Machines……. is used to cool the hydraulic oil-
(a) Air cooler (b) Water cooler (c) Heater (d) None

15.04 The……is pumped through tubes that bounded to fins for cooling hydraulic oil
(a) Air (b) Fluid (c) Either 'a' or 'b' (d) None

1505 The……cooler has a blower to increase the heat transfer-
(a) Water (b) Air (c) Either 'a' or 'b' (d) None

15.06 Cooler is generally provided with ……..as a by pass valve-
(a) Relief valve (b) 4/2 way valve (c) Check valve (d) None

15.07 Cooler fins should be cleaned by-
(a)Compressed Air (b) Diesel oil (c) K. oil (d) None

15.08 These are…….. ..Hyd. oil coolers provided in 09-CSM, 08-275-3S, 08 DUO-
(a) 2 . (b) 3 (c) 4 (d) none

15.09 Friction causes energy losses when the hydraulic fluid flows through the lines & components. This causes the hydraulic fluid to…….. -
(a) Cool (b) Heat up (c) No effect (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
15.01	c	15.04	b	15.07	a
15.02	d	15.05	b	15.08	a
15.03	a	15.06	c	15.09	b

Hydraulic circuits

16.01 When hydraulic lines are tapped from main pressure line in parallel, they are called parallel circuit as well as …….. circuit
(a) Constant pressure (b) Series (c) Open loop (d) None

16.02 Pump's volume is distributed for Tamping Unit UP/DN, lifting-lining of track on 09-CSM & 09-3X. They are provided in circuit -
(a) Series (b) Parallel (c) Either 'a' & 'b' (d) None

16.03 Satellite lateral sliding, rail clamp, axle support/wheel support circuits in 09-CSM & 09-3X, is part of ……..circuit-
(a) Constant pressure (b) Closed loop (c) Series (d) None

16.04 On 08-DUO the circuits such as tamping unit UP/DN lifting lining, work drive, rail clamp, tamping unit lateral displacement, axle/wheel support are called……circuit.-
(a) Constant pressure (b) Parallel (c) Both 'a' & 'b' (d) series

16.05 On Unimat,…….circuit consisting of Tamping Unit UP/DN, lifting-lining, work drive, rail clamp, Tamping Unit lateral displacement, Hook lifting-lowering-
(a) Series (b) Parallel (c) Constant Pressure (d) Both b & c

16.06 The screen drive, chain guide UP/DN circuit is a part of……..circuit in BCM.-
(a) Closed loop (b) Constant Pressure (c) both 'a' & 'b' (d) None

16.07 In…….circuit, exhaust oil from the motor is returned directly to the pump inlet-
(a) Open loop (b) Closed loop (c) both 'a' & 'b' (d) None

16.08 In……..circuit, the pump's output is directed to an actuator & return oil from the actuator back into the tank-
(a) Open loop (b) Closed loop (c) Either 'a' & 'b' (d) None

16.09 On 09-CSM & 09-3X, the work drive circuit is an-example of…..circuit.-
(a) Open loop (b) Closed loop (c) both 'a' & 'b' (d) None

16.10 Variable displacement pump and…….displacement motor is used in work drive circuit of 09-CSM & 09-3X.-
(a) Variable (b) Fixed (c) both 'a' & 'b' (d) None

16.11 On 09-CSM & 09-3X the variable pump delivery is controlled…….in work drive circuit-
(a) Electronically (b) Manually (c) By pilot pressure (d) None

16.12 Cross relief valves are used in……circuit.-
(a) Squeezing (b) Work drive (c) Lining (d) None

16.13 The driving circuit in BCM, SBCM & BRM is …….circuit-
(a) Open loop (b) Closed loop (c) both 'a' & 'b' (d) None

16.14 On new BCM & SBCM, the variable pump'output (driving pump) is controlled by-
(a) lever (Manual power) (b) Pilot pressure (c) Electronic power (d) None

16.15 On Kershaw BRM, the variable pump'output (driving pump) is controlled by…….
(a) lever (Manual power) (b) Pilot pressure (c) Electronic power (d) None

16.16 Maximum torque valve is switched-on in Kershaw BRM in driving circuit to …..Torque during working drive.

(a) Increase (b) Decrease (c) both 'a' & 'b' (d) None

16.17 oil from the cylinder rod end is directed into the cap end to increase speed circuit called -.
(a) Open loop (b) Closed loop (c) Regenerative (d) None

16.18 Squeezing circuit in tamping machine is ……circuit-.
(a) Regenerating (b) Open loop (c) Closed loop (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
16.01	a	16.05	d	16.09	b	16.13	b	16.17	c
16.02	b	16.06	b	16.10	b	16.14	c	16.18	a
16.03	a	16.07	b	16.11	a	16.15	a		
16.04	c	16.08	a	16.12	b	16.16	a		

Pneumatics

symbols & Application of air

17.01 The fluid in a fluid power system can be ……..
(a) Gas & liquid (b) Liquid only (c) Gas only (d) None

17.02 A system that uses a gas/air for transmitting force is called a……system-
(a) Hydraulic (b) Pneumatic (c) None (d) Both 'a' & 'b'

17.03 Work is performed by……..under pressure in the pneumatic system-
(a) Hydraulic fluid (b) Compressed air (c) Mechanical Power (d) None

17.04 The word……is derived from the Greek word for unseen gas-
(a) Pneumatic (b) Hydraulic (c) both 'a' &'b' (d) None

17.05 The pneumatic energy is produced by the…….
(a) Hydraulic pump (b) Compressor (c) Both 'a' & 'b' (d) None

17.06 The property of a……that allows it to be stored in small spaces is its compressibility.-
(a) Gas (b) Oil (c) both 'a' or 'b' (d) None

17.07 The pressure of a confined gas acting on the container wall is ……..in all directions-
(a) Different (b) Equal (c) Both 'a' & 'b' (d) none

17.08 Air is readily…….& can be stored in large quantities in relatively small containers-
(a) Compressible. (b) Incompressible (c) both 'a' or 'b' (d) None

17.09 The air is compressed, its…….increases
(a) Pressure (b) Temperature (c) Both 'a' & 'b' (d) None

17.10 …….. states that at constant temp. the absolute pressure of a confined quantity of gas varies inversely as its volume.
(a) Gas law (b) Charle's law (c) Boyle's law (d) None

17.11 $P_1V_1 = P_2V_2$ shows that even though the pressure and volume of a gas change, their total product is always…… -
(a) Equal or same (b) Different (c) Higher (d) None

17.12 ……law states that if the pressure of a confined quantity of gas remains the same, the change in volume of the gas varies with the change in temperature of the gas"

(a) Boyle's (b) Charles's (c) Gas (d) None

17.13 In a compressed air system, the total energy (Kinetic and potential) always remains -
(a) Different (b) Constant (c) both 'a' &'b' (d) None

17.14 The amount of work done by a cylinder having a $50cm^2$ piston area & a 30cm stroke when operated at pressure $4kg/cm^2$ equals…… -
(a) 6000Kg m (b) 6000kg cm (c) 1500 Kg cm (d) 120 Kg cm

17.15 The amount of force required to move an object is determined by the object's…… -
(a) Friction (b) Weight (c) Inertia (d) None

17.16 Which of the following factors determines the amount of work done by a pneumatic cylinder?
(a) Cylinder stroke (b) Air pressure (c) Cylinder bore (d) All of the above

17.17 What happens when heat is applied to gas contained in a cylinder?-
(a) Pressure increase (b) Volume increase (c) both 'a' &'b' (d) None

17.18 The ideal air flow in a pneumatic system is called-
(a) Laminar flow (b) Turbulent flow (c) both 'a' &'b' (d) None

17.19 …..Symbol shows the compressor-
(a) Circle (b) Square (c) both 'a' &'b' (d) None

17.20 Following component ……..consist a square symbol-
(a) Water separator (b) Air dryer (c) Air-oiler (d) All of the above

17.21 Pneumatic power is used in…….-
(a) Chord tension (b) Application of datum
(c) Application of brakes (d) All of the above

17.22 Satellite pinion is engaged with gear by……..power in 09-CSM & 09-3x-
(a) Hydraulic (b) Pneumatic (c) both 'a' &'b' (d) None

17.23 Engine rpm is raised by ……..power-
(a) Pneumatic (b) Hydraulic (c) both 'a' &'b' (d) None

17.24 Tamping unit & lifting unit is locked/unlocked by……..power-
(a) Hydraulic (b) Pneumatic (c) both 'a' or 'b' (d) Mechanical

17.25 Bogies (FB, LB, MB, RB) are locked/unlocked & lifted/lowered by…….-
(a) Pneumatic (b) Hydraulic (c) Mechanical (d) Electrical

17.26 Dog clutch is engaged by pneumatic power in 09-CSM, 09-3X, Unimat during…….-
(a) Travel drive (b) Work Drive (c) both 'a' & 'b'' (d) None

17.27 The greasing in corner rollers on BCM is done by……..operated pump
(a) Electrical (b) Hydraulic (c) Pneumatic (d) None

17.28 Pneumatic power is used for application of…….-
(a) Horn (b) Clapper cylinder (c) both 'a' & 'b' (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
17.01	a	17.11	a	17.21	d
17.02	b	17.12	b	17.22	b
17.03	b	17.13	b	17.23	a
17.04	a	17.14	b	17.24	b
17.05	b	17.15	c	17.25	a
17.06	a	17.16	d	17.26	b
17.07	b	17.17	a	17.27	c
17.08	a	17.18	a	17.28	c
17.09	c	17.19	a		
17.10	c	17.20	d		

Pneumatic components

18.01 When air is compressed in a compressor then ---- will be increased.
(a) pressure (b) Temperature (c) volume (d) Both 'a' or 'b'

18.02 The cooling of compressor is done by the use of …….-
(a) Air (b) Water (c) Both 'a' or 'b' (d) None

18.03 A compressor that draws in air at atmospheric pressure & compresses it to its final pressure in one stroke, is called a ……..compressor-
(a) Single stage (b) Multistage (c) Both 'a' or 'b' (d) None

18.04 …….compressors are more economical for pressure higher than 100psi.
(a) Single stage (b) Multi stage (c) both 'a' &'b' (d) None

18.05 The prime mover for the compressor is……in track machine-
(a) Hydraulic pump (b) Electrical motor (c) Engine (d) None

18.06……compressor are used for pneumatic power system in track machine.-
(a) Reciprocating (b) Rotary (c) Both 'a' & 'b' (d) None

18.07 Air cooled compressors are usually constructed with…….. for cooling
(a)water jacket (b) cooling fins (c) Both 'a' & 'b' (d) None

18.08 Lubrication of a compressor in track machines is done by -
(a) Splash lubrication (b) Pressurized lubrication(c) Both 'a' & 'b' (d) None

18.09 ……..is used to cool down the compressed air-
(a) Safety valve (b) Air dryer (c) Cooling coil (d) None

18.10 Cooling coil is a helical…….tube
(a) Copper (b) Aluminium (c) Brass (d) None

18.11 Excess air is released to atmosphere when air pressure is exceeded the setting value of -
(a) Pressure reducing valve (b) Safety valve (c) Brake valve (d) None

18.12 Air pressure is set ……bar at safety valve-
(a) 3.8 (b) 7-8 (c) 2.5 (d) 5.5

18.13 The accumulation of condensate (water) depends largely on the…….. -
(a) Absolute humidity (b) Relative air humidity (c) Both 'a' & 'b' (d) None

18.14 The …… is dependent on the air temperature and the weather condition-
(a) Absolute Humidity (b) Relative air humidity(c) Both 'a' & 'b' (d) None

18.15 The…… is the mass of water vapour, actually contained in $1m^3$ of air-
(a) Absolute humidity (b) Relative air humidity(c) Both 'a' & 'b' (d) None

18.16 The..…is the mass of water vapour, which $1m^3$ of air can absorb at the respective temperature-
(a) Relative humidity (b) Absolute humidity (c) Saturation quantity (d) None

18.17 The dew point temperature is the temperature at which relative humidity is-
(a) 0% (b) 50% (c) 100% (d) 200%

18.18 The service life of pneumatic system is considerably…….if excessive moisture is carried through the air system to the components-
(a) Increased (b) Reduced (c) No effect (d) None

18.19 ……dehumidifies the air by means of a granulate material (gel)
(a) water separator (b) air dryer (c) air oiler (d) None

18.20 The drying agent in air dryer is a granular material (gel) consisting almost entirely of-
(a) Silicon dioxide (b) Clay (c) Calcium oxide (d) None

18.21 Moisture and iron form rust because of a ……..reaction-
(a) Chemical (b) Physical (c) No reaction (d) None

18.22 The most common method used to remove……..from compressed air is by condensation-
(a) Contaminants (b) Water vapour (c) Solid substance (d) None

18.23 Condensed moisture is usually removed from the system by a…….-
(a) Air unloader (b) Water separator (c) Air oiler (d) None

18.24 As air pressure increases, the amount of moisture it can hold…….if temperature remains constant -
(a) Increases (b) Decreases (c) No effect (d) None

18.25 Most pneumatic components such as valves, cylinders require……air to reduce wear & corrosion-
(a) Dry (b) Lubricated (c) Both ‘a’ & ‘b (d) None

18.26 The dry air is lubricated through…….-
(a) Air oiler (b) Air dryer (c) Water separator (d) None

18.27 The…….. used to lubricate pneumatic equipments must be free of contaminants i.e. dirt & moisture.-
(a) Air (b) Oil (c) Both ‘a’ & ‘b (d) None

18.28 …….Valves in a pneumatic system direct the air flow to start, stop or reverse the direction of motion of pneumatic cylinders & other equipment -
(a) Direction control (b) Pressure control (c) Flow control (d) None

18.29 D. C. valves can be operated manually or automatically by-
(a) Mechanically (b) Electrical signals (c) Compressed air (d) All of the above

18.30 D.C. valves have…..connecting ports in pneumatic system-
(a) 2 Way (b) 3Way (c)4 Way (d)5 way (e) All of the above

18.31 D.C. valves have…..type of control element -
(a) Poppet (b) Spool (c) Rotary (d) all of the above

18.32 Ball or poppet in Check valves is used to ensure air flow in…….direction -
(a) One (b) Both (c) Both ‘a’ & ‘b’ (d) None

18.33 A……. is used where cylinder makes short, quick strokes & has to be returned quickly-
(a) Safety valve (b) Check valve (c) Quick release valve (d) None

18.34 Pneumatic……convert the pressure & movement of compressed air into straight line mech. Force & motion-
(a) Cylinders (b) Motors (c) D.C. Valve (d) None

18.35 The pneumatic cylinders used in track machines are mostly-
(a) Single acting (b) Double Acting (c) Both 'a' & 'b' (d) None

18.36 The …….cylinder has a power stroke in one direction only-
(a) Single acting (b) Double Acting (c) Double rod (d) None

18.37 Small air vent, provided in…….acting cylinder, prevent the piston seals & packings from drying out and also prevents an air lock from occurring-
(a) Single acting (b) Double Acting (c) Double rod (d) None

18.38 The brake cylinder in track machine is…….. cylinder with spring-
(a) Single acting (b) Double Acting (c) Double rod (d) None

18.39 The spring is only strong enough to overcome internal friction and exhaust the air from the……cylinder.-
(a) Single acting with spring (b) Double Acting (c) Double rod (d) None

18.40 The speed of the cylinder in determined by the……in pressure system-
(a) Air pressure (b) Air flow (c) Air temperature (d) None

18.41 Air should flow through a pipe in a ……..flow-
(a) Laminar (b) Turbulent (c) Both 'a' & 'b' (d) None

18.42 The size of an air pipe should be selected so only a small…….drop occurs-
(a) Pressure (b) Temperature (c) Velocity (d) None

18.43 ……affect the pressure drop-
(a) Volume of air (b) Air pressure (c) Length of pipe
(d) No. of bends (e) All of the above.

18.44 …….hoses are used in pneumatic system subjected to movement
(a) Flexible (b) Rigid (c) Both 'a' & 'b' (d) No. of fitting

18.45 The…….. used in pneumatic system are of 6.3 & 12.6 mm dia-
(a) Hoses (b) Steel pipe (c) Both 'a' & 'b' (d) None

18.46 The pneumatic hoses are reinforced with-
(a) Steel wire braids (b) Synthetic yarn (c) Spiral wire wrapped (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans
18.01	d	18.13	b	18.25	b	18.37	a
18.02	c	18.14	b	18.26	a	18.38	a
18.03	a	18.15	a	18.27	b	18.39	a
18.04	b	18.16	c	18.28	a	18.40	b
18.05	c	18.17	c	18.29	d	18.41	a
18.06	a	18.18	b	18.30	e	18.42	a
18.07	b	18.19	b	18.31	d	18.43	e
18.08	a	18.20	a	18.32	a	18.44	a
18.09	c	18.21	a	18.33	c	18.45	a
18.10	a	18.22	b	18.34	a	18.46	b
18.11	b	18.23	b	18.35	c		
18.12	b	18.24	b	18.36	a		

Pneumatic circuit

19.01 Compressed air is used in ……..system.
(a) hydraulic (b) pneumatic (c) both a&b (d) None

19.02 Brake pressure (approx 4 bar) is set at…….-
(a) Safety value (b) Pressure reducing value (c) Air compressor (d) None

19.03 Parking brake is applied by…….
(a) Pneumatic power (b) Manually (c) Hydraulic power (d) None

19.04 Brake cylinders are operated by……power in running mode in tamping machines -
(a) Pneumatic (b) Hand wheel (c) Hydraulic (d) None

19.05 ……...valve is provided for quick return of brake cylinder.
(a) Quick release (b) Safety valve (c) Pressure reducing valve (d) None

19.06 The pointer shows the brake pressure in dual pressure gauge-
(a) Red (b) White (c) none (d) Both 'a' & 'b'

19.07 Brakes can be applied by……-
(a) Pneumatic power (b) Manually (c) Hydraulic power (d) All of the above

19.08 The gap between brake shoe and wheel tread shall be maintained…….
(a) 10-12mm (b) 13mm (c) 3-5mm (d) None

19.09 Brake linings are permitted when their thickness of 35mm (new) has diminished to…..mm.
(a) 10mm (b) 5mm (c) 2mm (d) None

19.10 Change worn brake shoe at any points for minimum thickness of……
(a) 5mm (b) 10mm (c) 13mm (d) None

19.11 Brake valve should be checked regularly for -
(a) Leakages (b) Spring (c) Back pressure disc (d) All

19.12 The brake pressure is kept ….. &…..bar on satellite axle in 09-CSM
(a) 50, 80 (b) 2.5, 5.5 (c) 3.8, 7.0 (d) None

19.13 The circuits used in pneumatic working system are…….-
(a) Series Circuit (b) Parallel circuit (c) Both 'a' & 'b' (d) None

19.14 The normal condition of D.C. Valve used to blow horn is-
(a)opened (b) Closed (c) Both 'a' & 'b' (d) None

19.15 The valve is operated……to blow pneumatic horn-
(a) Manually (b) By solenoid (c) By hydraulic power (d) None

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q.No.	Ans.
19.01	b	19.05	a	19.09	b	19.13	b
19.02	b	19.06	a	19.10	c	19.14	b
19.03	b	19.07	d	19.11	d	19.15	a
19.04	a	19.08	c	19.12	b		

Pneumatic Troubleshooting

20.01 The causes of insufficient air volume are-
(a) System leakage excessive (b) Compressor too small
(c) Both 'a' & 'b' (d) none of the above

20.02 Low air pressure is caused due to-
(a) System leakage excessive (b) Compressor discharge pressure is low
(c) Both 'a' & 'b' (d) None

20.03 Early failure of pneumatic components is due to-
(a) Less air pressure (b) Lack of lubrication (c) Excessive moisture (d) Both b & c

20.04 Intake air filter should be checked for blockage at-
(a) Daily (b) 50hrs (c) 100hrs (d) 200hrs

20.05 Check the oil level in the compressor at-.
(a) Daily (b) 50hrs (c) 100hrs (d) 200hrs

20.06 Check lubricating oil level in the air oiler at-
(a) Daily (b) 50hrs (c) 100hrs (d) 200hrs

20.07 The causes of excess oil in the pneumatic system are-.
(a) Oil coming from air compressor (b) defective air lubricator
(c) Both 'a' & 'b' (d) None

20.08 Reasons of moistures in the pneumatic system are-
(a) Defective moisture separator (b) Defective drip cup
(c) Defective Air dryer (d) All of the above

20.09 The methods are used to cool a compressor……
(a) Lubrication (b) Conduction through cylinder walls & fins
(c) Both 'a' & 'b' (d) None

20.10 Burned……..in a reciprocating compressor is the result of heat and the accumulation of carbon deposits-
(a) Intake valve (b) Discharge valve (c) Piston (d) None of the above.

20.11 If a D.C.valve is not receiving air, the reasons are-
(a) Compressor not supplying air (b) Plugged ports (c) Leaked hose (d) All of the above

20.12 The reasons for sticky & inoperative control valves are-.
(a) Inoperative solenoid (b) Contaminants (c) Improper lubrication (d) All

20.13 The part which is replaced most frequently in a cylinder is-
(a) Seal (b) Gland bush (c) Piston ' (d) None

20.14 The purpose of plating the inside of cylinder tubes are-
(a) Improve the wear life (b) Reduce corrosion (c) Both 'a' & 'b' (d) None

20.15 When troubleshooting a cylinder for external misalignment, first disconnect the-
(a) Load (b) Piston rod (c) Air supply (d) None

20.16 Good cylinder performance depends on accurate mounting and……of the cylinder-
(a) Air pressure (b) Alignment (c) Lubrication (d) All

20.17 Pneumatic pipes get damaged easily due to-
(a) Excessive moisture (b) Twisting (c) Faulty connection (d) All

Answer Sheet

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
20.01	c	20.06	a	20.11	d	20.16	d
20.02	c	20.07	c	20.12	d	20.17	d
20.03	d	20.08	d	20.13	a		
20.04	a	20.09	c	20.14	c		
20.05	a	20.10	b	20.15	a		