Total No. of Questions : 12]

SEAT No. :

P1694

[Total No. of Pages : 5

[4859]-34
B.E. (Mechanical)
INDUSTRIAL FLUID POWER
(2008 Course) (Semester - I) (402043)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer 3 questions from Section I and 3 questions from Section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Draw a simple hydraulic circuit, showing all its essential components. State the functions of each component. **[6]**

b) Classify the hydraulic fluids. What are the desirable properties of a hydraulic fluid? **[6]**

c) What is the difference between a static & dynamic seal? Name four type of materials used for seal. **[6]**

OR

Q2) a) Write short note on schedule number of standard pipe. **[4]**

b) Explain the purpose & construction of a good connecting fitting with neat sketch. **[6]**

c) State the type of sources of contaminants in a hydraulic system. What is a bypass filter? State its advantages & disadvantages. **[8]**

Q3) a) What are the different accessories used in hydraulic systems? What are their functions? **[6]**

b) Explain the applications of accumulator as: **[10]**

i) Power saving device

ii) Hydraulic shock absorber device

iii) A leakage compensator.

OR

P.T.O.

Q4) a) Explain with sketch the operation of a balanced vane pump, also write down the various efficiency expressions for the pump. **[8]**

b) Compare characteristics, advantages and applications of gear pumps, vane pumps, axial piston pumps and radial piston pumps. **[8]**

Q5) a) Classify direction control valves. **[4]**

b) Draw a neat sketch and explain the working of open centre direction control valve. **[6]**

c) Draw a neat sketch of a pressure compensated flow control valve and explain it's working. **[6]**

OR

Q6) a) What are the advantages of solenoid control methods over mechanical control in direction control valves. **[4]**

b) Explain the difference between direct and pilot operated pressure relief valve. **[4]**

c) Explain with a neat sketch working of counter balance valve and draw a typical sketch showing its application. **[8]**

SECTION - II

Q7) a) Classify different hydraulic actuators. **[6]**

b) Analyse the circuit shown in figure 1. **[10]**

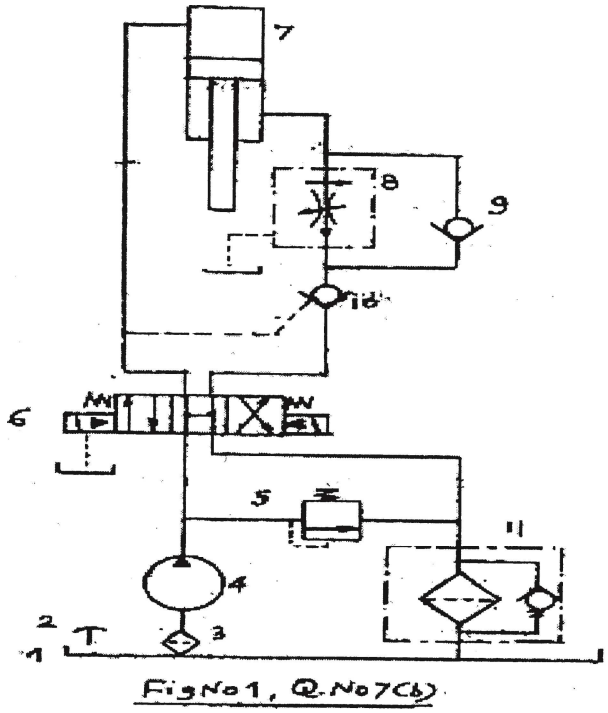

Fig No 1, Q. No 7(b)

OR

Q8) a) What is the purpose of providing cushioning in cylinders? With the help of a neat sketch, explain how it is achieved? **[8]**

b) Draw and explain a circuit for a riveting machine, whose speed has to be controlled. **[8]**

Q9) a) Compare characteristics of Hydraulic & Pneumatic systems. **[4]**

b) What is the purpose of quick exhaust valve in pneumatic circuits? **[4]**

c) Draw a typical circuit showing control of a double acting cylinder operated by a air pilot actuated direction control valve. The circuit uses another 3/2 direction control valve for ON-OFF operation. Explain working of the circuit. **[8]**

OR

Q10)a) What is the use of time delay valve in pneumatic systems? **[4]**

b) What is the purpose of providing Filter, Lubricator, mufflers and drier in pneumatic Systems? **[4]**

c) Explain 'AND' valve with a neat sketch. State its application with typical circuit. **[8]**

Q11)A hydraulic cylinder used to operate a machine has the following requirements. **[18]**

a) During the initial movement of 300 mm it has a load of 30 kN and it should complete this distance in about 6 seconds.

b) This is followed by a slow working stroke of 100 mm against a load of 50 kN which should be completed in 3 to 6 seconds. The time required is to be adjustable.

c) The return motion of 400 mm is against a load of 40 kN which should be completed in about 7 seconds time.

Facility is required to hold the cylinder anywhere in between the entire stroke.

Solenoid operated valves are used in the circuit. A meter out circuit is used. Draw a circuit which will fulfill these requirements. Select different components you have used in the circuit from the given data. Mention ratings of the components in case it is not available in the given data.

OR

Q12)a) Explain with a neat sketch the working of 4 way 2 position lever operated direction control valve. **[6]**

b) Draw a circuit for the following condition: The piston rod of a cylinder A is to advance only if a work piece is inserted in the work piece retainer, a guard has been lowered and operator presses the push button valve. Upon the release of the push button or if the guard is no longer in the lower position, the cylinder 'A' is to retract to the initial position. **[12]**

DATA

1. Suction Strainer :

Model	Flow Capacity (/pm)
S_1	38
S_2	76
S_3	152

2. Pressure Gauge :

Model	Range (bar)
PG_1	0 - 25
PG_2	0 - 40
PG_3	0 -100
PG_4	0 - 160

3. Vane Pump :

Model	Delivery in / pm		
	at 0 bar	at 35 bar	at 70 bar
P_1	8.5	7.1	5.3
P_2	12.9	11.4	9.5
P_3	17.6	16.1	14.3
P_4	25.1	23.8	22.4
P_5	39.0	37.5	35.6

4. Relief Valve :

Model	Flow capacity (/ pm)	Max Working Pressure & bar
R_1	11.4	70
R_2	19	210
R_3	30.4	70
R_4	57	105

5. Flow control Valve :

Model	Working Pressure (bar)	Flow Range (/pm)
F_1	70	0-4.1
F_2	105	0-4.9
F_3	105	0-16.3
F_4	70	0-24.6

6. Directional Control Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
D_1	350	19
D_2	210	38
D_3	210	76

7. Check Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
C_1	210	15.2
C_2	210	30.4
C_3	210	76

8. Pilot Operated Check Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
PO_1	210	19
PO_2	210	38
PO_3	210	76

9. Cylinder-(Max Working Pressure-210 bar)

Model	Bore dia. (mm.)	Rod dia (mm)
A_1	25	12.5
A_2	40	16
A_3	50	35
A_4	75	45
A_5	100	50

10. Oil Reservoirs :

Model	Capacity (litres)
T_1	40
T_2	100
T_3	250
T_4	400
T_5	600

Data sheet for Q 11