Total No. of Questions : 10]

SEAT No. :

P3067

[Total No. of Pages : 3

[5354]-554

B.E. (Mechanical Sandwich)

INDUSTRIAL HYDRAULICS AND PNEUMATICS

(2012 Pattern) (End Semester) (Theory)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to candidates:

1) ***Slove Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat sketches wherever necessary.***
4) ***Use of electrionic pocket calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) Explain working of Vane type Pump with neat sketch. **[5]**

b) Compare Hydraulics and Pneumatics System. **[5]**

OR

Q2) a) State types of Accumulators and Explain Spring type accumulator. **[6]**

b) State the functions of hydraulic oil. **[4]**

Q3) a) Write a short note on different mountings for hydraulic actuators. **[4]**

b) A 10 cm diameter hydraulic cylinder has 5 cm rod diameter. If cylinder receives flow at 100 1pm and 15 MPa. Find speed and load carrying capacity of cylinder in both the strokes. **[6]**

OR

Q4) a) Draw the symbols for the following: **[4]**

i) Variable displacement air motor

ii) Pressure relief valve

iii) 3/2 roller type direction control valve

iv) 5/3 pneumatic direction control valve

b) Explain with symbols different centre positions of direction control valve. **[6]**

P.T.O.

Q5) a) Explain with neat sketch Regenerative circuit .State its Application. **[8]**

b) What is fail safe circuit? Explain with neat diagram. **[8]**

OR

Q6) a) Draw neat sketch and explain working of Automatic reciprocating pneumatic circuit.. **[8]**

b) Explain pneumatic Sequence Circuit. **[8]**

Q7) a) Explain working of Quick exhaust and shut off valve with help of circuit diagram. **[8]**

b) Write selection criteria and troubleshooting for compressors. **[8]**

OR

Q8) a) Explain different mountings of hydraulic actuator with neat diagram. **[8]**

b) Explain Actuator locking circuit. **[8]**

Q9) A machine slide is moved by means of hydraulic cylinder.

a) Initially moves through distance of 150 mm against a load of 15 KN in 4 seconds.

b) It is followed by working stroke of 150 mm against load of 25 KN with feed rate of 1m/min.

c) The return stroke is to be as fast as possible. A load during return stroke is 15 KN.

A Meter Out circuit is used. Draw the required circuit and select the required components for circuit from the given data as per the design calculations.**[18]**

OR

Q10)a) Explain different methods of vacuum measurement with neat diagram.**[9]**

b) Explain trouble shooting for pump, Control valves and FRL unit. **[9]**

DATA

1. SUCTION STRAINER:

Model	Flow capacity (lpm)
S1	38
S2	76
S3	152

2. PRESSURE GAUGE:

Model	Range (bar)
PG1	0-25
PG2	0-40
PG3	0-100
PG4	0-160

3. VANE PUMP:

Model	Delivery (lpm)		
	at 0 bar	at 35 bar	at 70 bar
P1	8.5	7.1	5.3
P2	12.9	11.4	9.5
P3	17.6	16.1	14.3
P4	25.1	23.8	22.4
P5	39	37.5	35.6

4. RELIEF VALVE:

Model	Flow range (lpm)	Max. working pressure (bar)
R1	11.4	70
R2	19	210
R3	30.4	70
R4	57	105

5. FLOW CONTROL VALVE:

Model	Max. working pressure (bar)	Flow range (lpm)
F1	70	0-4.1
F2	105	0-4.9
F3	105	0-16.3
F4	70	0-24.6

6. DIRECTION CONTROL VALVE:

Model	Max. working pressure (bar)	Flow capacity (lpm)
D1	350	19
D2	210	38
D3	210	76

7. CHECK VALVE

Model	Max. working pressure (bar)	Flow capacity (lpm)
C1	210	15.2
C2	210	30.4
C3	210	76

8. SEQUENCE VALVE

Model	Max. working pressure (bar)	Flow capacity (lpm)
PO1	210	19
PO2	210	38
PO3	210	76

9. CYLINDER (Max. working pressure -210)

Model	Bore Dia. (mm)		Rod Dia. (mm)
A1	25		12.5
A2	40		16
A3	50		35
A4	75		45
A5	100		50

10. OIL RESERVOIR:

Model	Capacity (lit)
T1	40
T2	100
T3	250
T4	400
T5	600