

Total No. of Questions : 12]

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P553

[4064] - 417

B.E. (Mechanical)

INDUSTRIAL FLUID POWER

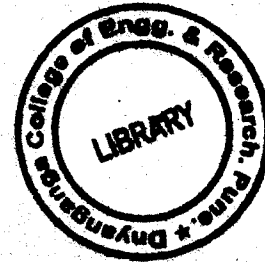
(2008 Course) (402043) (Sem. - I)

Time : 3 Hours]

[Max. Marks :100

Instructions to the candidates:

- 1) Attempt three questions from each section.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data.
- 4) Answer to the two sections should be written separately.



**SECTION - I**

- Q1)** a) Classify the types of hydraulic fluids. What are desirable properties of a hydraulic fluid? [6]  
 b) Discuss in brief the different materials used for seals used in hydraulic components. [6]  
 c) Explain the term 'rating of filters' and discuss in brief on 'pressure line filters'. [6]

OR

- Q2)** a) Compare characteristics of petroleum oil based and water based fluids used in hydraulic systems. [6]  
 b) Explain the difference between flared fitting and a compression fitting. [6]  
 c) Write in brief on 'contamination control'. [6]
- Q3)** a) Discuss with drawing the performance characteristics of a gear pump. [6]  
 b) What size of accumulator is necessary to supply 500 cc of a fluid in a hydraulic system of maximum operating pressure of 200 bar which drops to 100 bar minimum? Assume nitrogen gas pre-charge of 66 bar. Find adiabatic and isothermal solution. [6]  
 c) Discuss the factors influencing the selection of type of a pump for a particular application. [4]

OR

- Q4)** a) Enumerate the different types of accumulators and explain 'Gas charged accumulator'. [6]  
 b) Sketch and explain construction, working and performance of parallel piston pump. [6]  
 c) What are the functions of reservoirs? Draw a neat sketch of standard reservoir showing its Internal and external features. [4]

P.T.O

- Q5) a)** What is a function of a pressure relief valve? Draw simple sketch and symbol and explain its working. State its applications. [8]
- b)** Explain in detail with neat sketch how a pressure compensated flow control valve works. Name one application of this valve. [8]

OR

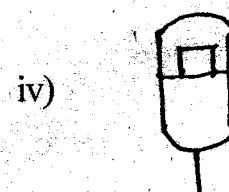
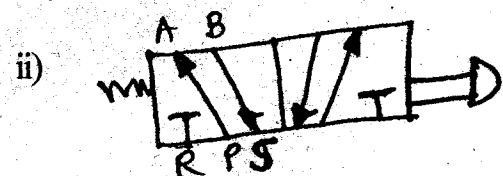
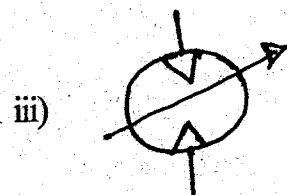
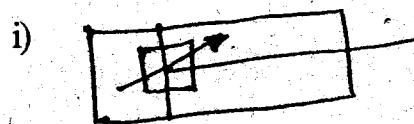
- Q6) a)** What is 'open centre' and 'closed centre' valve position of directional control valve (DCV). Explain with sketch the importance and applications of these center positions of DCV. [8]
- b)** Write short note on: Meter in and Meter out circuits. [8]

**SECTION - II**

- Q7) a)** Explain the need for speed control of Hydraulic motor. Explain in brief any two methods of it. [6]
- b)** Explain the applications of Tandem & Telescopic cylinders. [4]
- c)** Explain the various efficiencies related to Hydraulic motors. [6]

OR

- Q8) a)** A Hydraulic system consists of two cylinders. The cylinders required to be operated as per the following sequence:-  
 i) cylinder 'A' extends.  
 ii) cylinder 'B' extends.  
 iii) cylinder 'A' retracts.  
 iv) cylinder 'B' retracts.  
 Develop a hydraulic circuit for above requirements. [8]
- b)** What do you mean by cushioning of cylinders? How it is done? [4]
- c)** Identify the following components: [4]



- OR

- OR

- 3

## DATA

## 1. Suction Strainer :

Model	Flow Capacity (/pm)
S <sub>1</sub>	38
S <sub>2</sub>	76
S <sub>3</sub>	152

## 2. Pressure Gauge :

Model	Range (bar)
PG <sub>1</sub>	0 - 25
PG <sub>2</sub>	0 - 40
PG <sub>3</sub>	0 - 100
PG <sub>4</sub>	0 - 160

## 3. Vane Pump :

Model	Delivery in / pm		
	at 0 bar	at 35 bar	at 70 bar
P <sub>1</sub>	8.5	7.1	5.3
P <sub>2</sub>	12.9	11.4	9.5
P <sub>3</sub>	17.6	16.1	14.3
P <sub>4</sub>	25.1	23.8	22.4
P <sub>5</sub>	39.0	37.5	35.6

## 4. Relief Valve :

Model	Flow capacity (/pm)	Max Working Pressure & bar
R <sub>1</sub>	11.4	70
R <sub>2</sub>	19	210
R <sub>3</sub>	30.4	70
R <sub>4</sub>	57	105

## 5. Flow control Valve :

Model	Working Pressure (bar)	Flow Range (/pm)
F <sub>1</sub>	70	0-4.1
F <sub>2</sub>	105	0-4.9
F <sub>3</sub>	105	0-16.3
F <sub>4</sub>	70	0-24.6

## 6. Directional Control Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
D <sub>1</sub>	350	19
D <sub>2</sub>	210	38
D <sub>3</sub>	210	76

## 7. Check Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
C <sub>1</sub>	210	15.2
C <sub>2</sub>	210	30.4
C <sub>3</sub>	210	76

## 8. Pilot Operated Check Valve :

Model	Max working Pressure (bar)	Flow Capacity (/pm)
PO <sub>1</sub>	210	19
PO <sub>2</sub>	210	38
PO <sub>3</sub>	210	76

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

Model	Bore dia. (mm.)	Rod dia. (mm)
A <sub>1</sub>	25	12.5
A <sub>2</sub>	40	16
A <sub>3</sub>	50	35
A <sub>4</sub>	75	45
A <sub>5</sub>	100	50

## 10. Oil Reservoirs :

Model	Capacity (litres)
T <sub>1</sub>	40
T <sub>2</sub>	100
T <sub>3</sub>	250
T <sub>4</sub>	400
T <sub>5</sub>	600