Oct./BE/Insem. - 514
B. E. (Mechanical)
HYDRAULICS AND PNEUMATICS
(2015 Pattern) (Semester - I)

Time : 1 Hour]   *[Max. Marks : 30*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figure to the right side indicate full marks.*
4) *Use of electronic pocket calculator is allowed.*
5) *Assume suitable data if necessary.*

Q1) a) A pump has displaced volume of $100cm^3$. It delivers $0.0015m^3$/sec at 1000rpm and 70bars. If the prime mover input torque is 120Nm **[6]**

   i) What is the overall efficiency of the pump?

   ii) What is the theoretical torque required to operate the pump.

   b) Draw the Following ISO Symbols **[4]**

   i) F-R-L Unit detailed symbol

   ii) 5/2, solenoid operated, spring return DCV

   iii) Oscillating Hydraulic motor

   iv) Pump unloading Valve

<div align="center">OR</div>

Q2) a) A positive displacement pump has geometric displacement of $81.95cm^3$. It delivers 75.84 *lpm* of oil while operating at 1000 rpm at a pressure of 6.9 MPa. The input torque of the prime mover is 101.25 Nm. Determine: **[6]**

   i) Overall Efficiency of the pump

   ii) Theoretical torque required to operate the pump.

   b) Draw the following ISO Symbol **[4]**

   i) 4/3 push button operated DCV

   ii) Temperature compensated flow control valve

   iii) Pressure regulating valve

   iv) Sequence Valve

<div align="right">***P.T.O.***</div>

Q3) a) A hydraulic motor has an 82 cm^3 (0.082Lit) volumetric displacement. If it has a pressure rating of 70 bars and it receives oil from a 0.0006m^3/sec (0.60 *Lps* or 36.0 *Lpm*) theoretical flow rate of pump, Find i) Speed ii) Theoretical torque iii) Theoretical power. **[6]**

b) Name four different types of hydraulic cylinder mountings. **[4]**

OR

Q4) a) A pump supplies oil at 0.017 m^3/sec to a 50mm diameter double acting hydraulic cylinder if the load is 6000N (Extending and retracting) and the rod diameter is 30 mm, find the : **[6]**

   i)   Hydraulic pressure during extending stroke.

   ii) Piston velocity during extending stroke.

   iii) Cylinder kW power during extending stroke.

   iv) Hydraulic pressure during retracting stroke.

   v)   Piston velocity during the retracting stroke.

   vi) Cylinder kW power during retracting stroke.

b) Name the three major classifications of gas loaded accumulators. Give one advantage of each classification. **[4]**

Q5) a) Explain the operational features of the pressure compensated flow control valve with its construction. **[6]**

b) What is the difference between an open center and closed center type of DCV? **[4]**

OR

Q6) a) What is pressure relief valve? And why it is used in fluid power system.**[4]**

b) What is sequence valve? Explain its purpose in fluid power system with construction diagram. **[6]**

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