

BE/Insem./Oct.-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 whenever necessary.
- 3) Figure to the right indicate full marks.
- 4) Use of electronic pocket calculator is allowed.
- 5) Assume suitable data, if necessary.

- Q1)** a) A gear pump has an outside diameter of 80mm, inside diameter of 55mm and a width of 25mm. If the actual pump flow is 1600 rpm and the actual flow rate is 95 Lpm what is the volumetric displacement and theoretical discharge. **[6]**
- b) Draw the Following ISO Symbols **[4]**
- i) Counterbalance Valve
 - ii) Limited rotation motor
 - iii) Cylinder with fixed cushion on both side
 - iv) 4/3 float center solenoid operated DCV.

OR

- Q2)** a) A pump has displacement volume of 98.4cm³. It delivers of 0.0125m³/sec of oil at 1000 rpm and 70 bar. If the prime mover input torque is 124.3N-m. What is the overall efficiency of the pump and what is the theoretical torque required to operate the pump. **[6]**
- b) Draw the Following ISO Symbol **[4]**
- i) 4/3 pneumatically double pilot operated DCV
 - ii) Pressure compensated flow control valve
 - iii) Shuttle valve
 - iv) Pump unloading valve.

P.T.O.

- Q3)** a) A pump supplies oil at $0.006 \text{ m}^3/\text{sec}$ to a 40mm diameter double acting hydraulic cylinder if the load is 5000N (Extending and retracting) and the rod diameter is 20mm, 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) What are the different cylinder mountings used in hydraulic cylinders. [4]

OR

- Q4)** a) A hydraulic motor receives a flow rate of 72LPM at a pressure of 12000kPa. If the motor speed is 800RPM, determine the actual torque delivered by the motor assuming the efficiency 100%? [6]
- b) What do you understand from power units and state the types of accessories used in the fluid power system. [4]
- Q5)** a) Explain with neat sketch the working of a pressure compensated flow control valve. [4]
- b) Explain the importance of various center position of a direction control valve and enlist advantages and disadvantages of each center position. [6]

OR

- Q6)** a) Explain with neat sketch the working of pilot operated pressure reducing valve. [6]
- b) Explain in details the different methods to actuate direction control valves. [4]

