

Total No. of Questions : 6]

SEAT No. :

P3679

[Total No. of Pages : 2

**Engg.-10**  
**T.E. (Mechanical) (Semester - I)**  
**HYDRAULICS AND PNEUMATICS (In Sem.)**  
**(2012 Pattern)**

*Time : 1 Hour]*

*[Maximum Marks : 30*

*Instructions to the candidates:*

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

- Q1)** a) What are the important properties of hydraulic fluids? Explain any four in detail. [5]  
b) State advantages of fluid power systems over mechanical & electrical system. [5]

OR

- Q2)** a) Draw a simple hydraulic system showing all its essential components and explain the functions of each. [5]  
b) List important applications of fluid power and explain any five in detail. [5]

- Q3)** a) Draw neat sketch of balance vane pump & write advantages of it. [5]  
b) A pump has a displacement volume of 98.4 cm<sup>3</sup>. It delivers 0.00152m<sup>3</sup>/s of oil at 1000 rpm and 70 bar pressure. If the prime mover input torque is 124.3 N-m, find the overall efficiency of the pump and theoretical torque required to operate the pump. [5]

OR

- Q4)** a) Explain the factors that justify a pump selection. [4]  
b) Explain the significance of  $\beta_{10}=50$ . [1]  
c) What size of accumulator is necessary to supply 500 cc of fluid in a hydraulic system within the pressure range of 100-200 bar gauge? Assuming nitrogen gas pre-charge of 66 bar gauge, find isothermal solution. [5]

**P.T.O.**

- Q5) a)** Name four important mountings in hydraulic cylinder with sketches. [4]
- b) A pump supplies oil at  $0.0015 \text{ m}^3/\text{s}$  to a 50 mm diameter double-acting hydraulic cylinder. If the load is 5000 N (extending and retracting) and the rod diameter is 25 mm, find the [6]
- Hydraulic pressure during the extending stroke.
  - Piston velocity during the extending stroke.
  - Cylinder kW power during the extending stroke.
  - Hydraulic pressure during the retracting stroke.
  - Piston velocity during the retracting stroke.
  - Cylinder kW power during the retracting stroke.

OR

- Q6) a)** What is the purpose of providing cushioning in cylinder? With the help of a neat sketch, explain how it is achieved. [5]
- b) A hydraulic motor has a displacement of  $150 \text{ cm}^3$  & operates with a pressure of 75 bars and a speed of 1800 rpm. If the actual flow rate consumed by the motor is  $0.005 \text{ m}^3/\text{sec}$  and the actual torque delivered by motor is 165 N.M. Find all three efficiencies and actual kW delivered by the motor. [5]

