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Instructions – (1) All Questions are *Compulsory*.

   (2) Illustrate your answers with neat sketches wherever necessary.

   (3) Figures to the right indicate full marks.

   (4) Assume suitable data, if necessary.

   (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

   (6) Preferably; write the answers in sequential order.

Marks

1. a) **Attempt any THREE of the following:**   **12**

   (i)   Define the following terms and state its S.I. unit:

   1)   Surface tension

   2)   Viscosity

   (ii) Quote classification of control valves.

   (iii) State difference between poppet and spool type valve.

   (iv) Describe the function of seals and gasket. State their applications in hydraulic and pneumatic circuit.

   b) **Attempt any ONE of the following:**   **6**

   (i)   Define C_c, C_v, C_d, C_r. State the relation between hydraulic coefficients.

   (ii) Describe with neat sketch construction and working of piston type air motor.

Marks

2. **Attempt any FOUR of the following:**   **16**

    a) Describe classification of fluids and write one example of each type.

    b) State any two faults of centrifugal pump and state two causes and two remedies of each of the faults.

    c) Explain cavitation in centrifugal pump suggest steps to prevent it.

    d) Draw a neat labelled sketch of any one positive displacement pump.

    e) Compare gear pump and vane pump on the basis of:

       (i) Construction

       (ii) Pressure

       (iii) Speed

       (iv) Application

3. **Attempt any FOUR of the following:**   **16**

    a) Explain construction and working of hydraulic lift with neat sketch.

    b) Draw a labelled sketch of sequence valve and describe its working.

    c) Explain construction and working of 412 DC valve, which is used in hydraulic system.

    d) Explain flexible hose. State its materials and applications.

    e) Classify filters and state their applications.

Marks

4. a) **Attempt any THREE of the following:** **12**

    (i) Draw the labelled sketch of swash plate type pump.

    (ii) Explain construction and working of safety valve with neat sketch.

    (iii) Why FRL unit is used in pneumatic system? State the function of each component of FRL unit.

    (iv) Draw a symbol for:

        1) Unidirectional air motor

        2) Muffler

        3) PRV

        4) Telescopic cylinder

  b) **Attempt any ONE of the following:** **6**

    (i) Compare between meter in and meter out circuit.

    (ii) Draw and explain pneumatic circuit to control the speed of bidirectional air motor.

5. **Attempt any TWO of the following:** **16**

  a) (i) State law of continuity and write its applications.

    (ii) State Bernoulli's theorem and write its application.

  b) Differentiate between centrifugal pump and reciprocating pump (any eight points).

  c) Give the application of hydraulics and pneumatics in automobiles. Explain any one of them with neat sketch.

Marks

6. **Attempt any <u>TWO</u> of the following:** **16**

a) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of water the pressure at inlet is 15 N/cm^2 and vacuum pressure at the throat is 40 cm of mercury, find the discharge of water through venturimeter. Take Cd = 0.98.

b) Explain negative slip in reciprocating pumps and justify use of air vessels in reciprocating pump.

c) Construct pneumatic circuit using sequence valve to control two applications performed in a proper sequence and describe its working.

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