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.

1. a) Attempt any THREE of the following: 12
   (i) Write any four applications oil hydraulic systems.
   (ii) What are the effects of contaminants in the oil?
   (iii) Draw a general layout of pneumatic system and state the function of components.
   (iv) Draw the hydraulic circuit showing control of DA cylinder.
       Using $4 \times 2$ DC valve. Explain the working in brief.

   b) Attempt any ONE of the following: 6
   (i) Draw actual hydraulic system and explain its working.
   (ii) Explain with neat sketch the working of rotary spool type DC valve.
2. Attempt any TWO of the following: 16
   a) What is swash plate? What is its use? What will happen if we change the angle of swash plate? Explain with sketch.
   b) Why pressure relief valve is used in hydraulic circuit? Explain in details with neat sketches.
   c) Explain the construction and working of doubled acting reciprocating compressor with neat sketch.

3. Attempt any FOUR of the following: 16
   a) Write any four advantages of oil hydraulic system.
   b) Draw symbols of:
      (i) Oil reservoir
      (ii) Oil filter
      (iii) Heat exchanger
      (iv) Unidirectional fixed displacement pump.
   c) Explain the principle of regenerative circuit.
   d) What is FRL unit? Explain its function.
   e) Draw pilot operated DA cylinder circuit using 4 × 2 DC valve and 3 × 2 pilot valve.

4. a) Attempt any THREE of the following: 12
   (i) What is the use of direction control valve? Explain with sketch.
   (ii) Draw bleed off circuit and label it.
   (iii) What are the limitations of pneumatic system?
   (iv) Draw symbol of:
      1) 2 × 2 DC valve
      2) Fixed type flow control valve
      3) Pressured relief valve.
      4) Muffler
b) **Attempt any ONE of the following:**

(i) What is the meaning of unidirectional air motor and bi directional air motor? Explain with sketch and draw symbol of both.

(ii) Compare linear actuators and rotary actuators.

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

a) (i) Draw symbol of any three types of Hydraulic motors.

(ii) What is impulse circuit? Explain.

b) Explain construction and working of gear pump.

c) Explain working of directly operated (Poppet type) check valve with neat sketch.

6. **Attempt any FOUR of the following:**

a) In cold climate why oil tank is equipped with oil heaters? Explain.

b) Compare meter in circuit and meter out circuit.

c) Draw the hydraulic circuit for shaping machine. Explain its working.

d) Draw constructional details of pneumatic hose. Why hose is required in pneumatic circuits?

e) How can the speed control of any actuator be achieved? Explain the speed control circuit of bi directional air motor with sketch.