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) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

(7) Use of Steam tables, logarithmic, Mollier’s chart is permitted.

Marks

1. a) Attempt any THREE of the following 12

(i) State the functions of:

1) Actuator
2) Filter

(ii) Draw neat sketch of 4/2 valve. Explain its working.

(iii) Enlist any four sources of heat generation in hydraulic system.

(iv) Why accumulators are used in hydraulic circuits? Explain any one of them with sketch.
b) Attempt any ONE of the following:  
(i) Explain with neat sketch the construction and working of gear pump.
(ii) Draw symbols of:
    1) 4/3 direction control valve
    2) Pilot operated pressure relief valve
    3) Sequence valve

2. Attempt any TWO of the following:  
   a) Explain with neat sketch the working of hydraulic circuit for shaping machine.
   b) State the functions of pressure relief valve for pneumatic system. Explain its working with neat sketch.

3. Attempt any FOUR of the following:  
   a) State advantages and disadvantages of poppet type directional control valve.
   b) What are the various materials used for pipes in hydraulic circuit?
   c) Explain with neat sketch the working and applications of meter-in hydraulic circuit.
   d) Enlist any four applications of oil hydraulic system.
   e) What is FRL? State its importance.

4. a) Attempt any THREE of the following:  
   (i) State any four advantages and disadvantages of pneumatic system.
   (ii) What are the features of air? List any four features.
   (iii) Sketch and explain speed control of bi-directional air motor in pneumatics.
   (iv) Explain time delay pneumatic circuit with neat sketch.
b) **Attempt any ONE of the following:**

(i) Explain with neat sketch the construction of gerotor pump.

(ii) Enlist the factors to be considered for selection of seal. What are the main causes of seal failure?

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

a) What are the different types of pressure regulator? Explain any one of them with neat sketch.

b) Explain with sketch the working of double acting cylinder.

c) What is meant by impulse circuit? Draw its circuit diagram.

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

a) Classify flow control valves with their application.

b) Draw general layout of pneumatic system.

c) Enlist the desirable properties of oil used in hydraulic system.

d) Draw the symbol:

   (i) unloading valve

   (ii) simple check valve

e) Explain actuated position of control of single acting cylinder with neat circuit.