(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 151852   Roll No.☐☐☐☐☐☐☐☐☐☐☐

B.TECH.

Theory Examination (Semester-VIII) 2015-16

DESIGN OF PIPING SYSTEMS

Time : 3 Hours   *Max. Marks : 100*

Section-A

1. **Attempt all parts of the following :**   **(2×10=20)**

   (a) Discuss the design code for process piping, crude oil pipelines and gas pipeline. write the features of piping codes.

   (b) Discuss the head loss in bend pipe.

   (c) Explain the API gravity.

   (d) What do you understand by approximate thickness of pipe?

   (e) Explain schedule Number.

   (f) Discuss the pipe attachment.

(g) Differentiate between Newtonian and non-Newtonian fluids.

(h) What is the design pressure for process piping? Explain the means of 5LX- 40 .

(i) Define the pipe Vibration.

(j) Explain Erosional velocity in pipe.

Section-B

2. **Attempt any five parts of the following.   (5×10=50)**

(a) What do you understand by Energy Loss in pipeline? Explain its Classification.

(b) What are the different types of flange joint. Explain them with suitable applications.

(c) What do you mean by seam welded and seamless pipe. Explain the various pipe manufacture processes.

(d) Explain the purging and venting . Write the important aspect of purging and venting in piping system.

(e) Calculate the allowable internal pressure at 72 % design factor for an 18 inch pipeline, wall thickness 0.375 inch and pipe material API 5LX-46. What is the hydrotest pressure range for this pipeline?

(2)

(f)   What are the different types of fitting use in process piping. Also write the applications.

(g)   Consider 40000 bbl/hr being transported through pipe-line with one pump station operating at 1000 psi discharge pressure. If the pump station suction pressure is 50 psi, the pump has to produce 950 psi differential pressure to pump 4000 bbl/hr of the liquid. If the liquid specific gravity is 0.85 at flowing temperature, calculate the power required to pump this liquid.

(h)   What do you understand by piping layout? Explain the steps of piping layout.

Section-C

Attempt any two parts of the following :   **(15×2=30)**

3.   Discuss the various types of valve used in piping system according to design code and standards. Describe the working and construction of flow control valves.

4.   Explain the syphon and also write the its application. A Syphon connects two reservoirs having a difference in elevation of 22m. The length of the syphon is 500 m and the summit is 3 m above the liquid level in the upper reservoir. The length of pipe from upper reservoir to the summit is 105 m. determine the discharge through the syphon and also pressure at the summit, if

(3)   P.T.O.

the diameter of syphon is 150 mm. Neglect minor losses. Given $f = 0.005$.

5. By using Hardy Cross methods, Calculate the discharge in each pipe. The network of pipe consists of 5 pipes, Given loss of head $h_f = rQ^2$