Total number of printed pages–3

53 (FPT 504) MDPE

2021

MECHANICAL DESIGN OF PROCESS EQUIPMENT

Paper : FPT 504

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* What is Machine Design ? What are the basic procedures of Machine Design ? Explain. 2+8=10

   (b) What are the basic requirements of Machine elements ? Discuss. 10

2. *(a)* State Hook's law and find out the mathematical expression of Young's modulus. 2+8=10

Contd.

(b) A rod 160 *cm* long and a diameter 3 *cm* is subjected to an axial pull of 30 *kN*. If the modulus of elasticity of the material of the rod is 2×10^5 N/mm^2, determine —

(i) the stress

(ii) the strain

(iii) the elongation of the rod.

3+3+4=10

3. (a) What is stress-strain diagram ? Explain with diagram. What are the properties that can be obtained from the test ? Explain. 3+7=10

(b) What is BEP ? Explain with suitable diagram. What are the different types of costs involved in Machine design. 5+5=10

4. (a) What is shear stress and shear strain ? Discuss with diagram. 5+5=10

(b) Differentiate between : 5+5=10

(i) Ductility and Brittleness

(ii) Stress and Strain.

5. *(a)* What is Joint Efficiency Factor? Discuss different types of joints. 3+7=10

(b) Discuss the classification of pressure vessel. 10

6. Write short notes on : ***(any four)*** 5×4=20

(a) Plasticity

(b) Elastic limit

(c) Double pipe heat exchanger (DPHE)

(d) Manufacturability

(e) Rigidity.