

SECTION-II (MECHANICAL)

8. (a) Distinguish between laminar & turbulent flows. (15)
- (b) Classify different kinds of hydraulic turbines. (15)
9. (a) Show that when a perfect gas changes from a state p_1, V_1, T_1 to another state p_2, V_2, T_2 the increase in entropy per unit mass is given by
- $$S_2 - S_1 = C_v \ln \frac{p_2}{p_1} + C_p \ln \frac{V_2}{V_1} \quad (15)$$
- (b) Explain the working of a two stroke SI Engine with suitable sketches. (15)
10. (a) Give definition, reasons and remedies of the following casting defects : (15)
- (i) Blow holes
 - (ii) Cold shuts
 - (iii) Hot tears
- (b) Draw a diagram showing the classification of welding processes. (15)
11. (a) Define a machine tool. What are the general requirements of a machine tool ? (10)
- (b) Explain the different parts and tool geometry of a twist drill with the help of neat sketches. (20)
12. (a) Distinguish between struts and columns. Derive an expression for Euler's critical load for long columns. Explain the term equivalent length. (15)
- (b) Explain briefly the terms ; shear stress, complementary shear, shear strain and Modulus of rigidity. (15)

13. What is a governor ? What is meant by sensitiveness, stability and hunting ? Describe the construction and working of Hartnell governor. (30)
14. (a) What are the uses of turning moment diagram ? Draw and discuss the turning moment diagram of a multi-cylinder engine. (15)
- (b) Derive relations between three elastic constants of a material. (15)