

Question Paper 2009

Mechanical Engineering (Paper II)

1. (a) List out the merits and demerits of water tube boilers over fire tube boilers. (10)
(b) With the help of neat sketches explain the working of a four stroke diesel engine. (20)
2. (a) Explain different types of patterns used in foundry. (15)
(b) Explain any five different operations that can be carried out in lathe. (15)
3. (a) Give the classification of milling machines. Also explain up and down milling. (10)
(b) Explain with figure the quick return mechanism used in shapers. (10)
(c) Explain various parameters in selection of grinding wheel? (10)
4. (a) Derive Bernoulli's equation from Euler's equation. (15)
(b) Define the following (15)
Density, Newton's law of viscosity, Compressibility, Surface tension, and Pressure.
5. (a) Explain the salient features and behaviour of stress-strain curve for a tensile material with the figure. (10)
(b) A rectangular beam with depth 150 mm and width 100 mm is subjected to a maximum bending moment of 300 kNm. Determine: maximum stress in the beam, radius of curvature when the bending is maximum and bending stress at a distance of 40 mm from the top surface of the beam. E for beam is 200 GPa. (10)
(c) A solid circular shaft transmits 80 kW of power while turning 200 revolutions per minute. Work out suitable diameter of the shaft if the shear is limited to 60 MN/m^2 and the twist in the shaft is not to exceed 1 degree in 2 metres of length.
Assume uniform turning moment and take modulus of rigidity of the shaft material $C = 100 \text{ GN/m}^2$. (10)
6. (a) Write about Grubler's criteria for planar mechanism. (5)
(b) With neat sketch explain gear tooth nomenclature. (15)
(c) Explain: (10)
(i) Turning movement diagram
(ii) Flywheel of a punch press