

- (3) A bore of an alloy steel component prior to broaching is  $32.25^{+0.05}_{-0.0}$  mm. The bore is to be finished broached to  $32.75^{+0.01}_{-0.0}$  mm. If the length of bore is 35 mm and the cutting speed is 0.15 m/s, determine the broaching power and design the broach.
- (4) A hole of 50 mm diameter is to be punched in a steel plate of thickness 5.6 mm. The material is cold rolled 0.4% C steel with ultimate shear strength of 550 MPa. With normal clearance on the tool the cutting is completed at 40% penetration of the punch. Give the suitable diameter for the punch and die and suitable shear angle for the punch in order to reduce the punching force by 30 % then that without shear.
- (5) Define center of pressure and explain the method for calculation of center of pressure with suitable example.

**Q. 6 Attempt any two.**

**(12)**

- (1) Derive the equations of (i). root diameter of screw thread using wire method, (ii). best wire size.
- (2) Determine value of constant chord of spur gear tooth in terms of circular pitch and show that it exists at a vertical distance of  $H=P_c(0.125 \sin 2\phi)$  above the pitch line.
- (3) State whether the following statements are true or false;
- Surface with same  $R_a$  value may have different profiles.
  - If sampling length is not mentioned it is considered to be 0.8 mm.
  - Interference microscope requires recalibration.
  - $R_a$  values are expressed in microns.
  - Talysurf is the instrument for quick determination of surface roughness.
  - If  $N_{12}$  is 50  $\mu\text{m}$ , then value of  $N_{10}$  is 25  $\mu\text{m}$ .