Minor-1(Sept-2022) Design of Machine Elements-I

1. Explain the different modes of failure of a cotter in a cotter joint. **(5)**

2. Endurance limit in true sense is not the property of the material. Justify. **(2)**

3. Explain the term efficiency of a riveted joint. Also discuss the different types of failure modes of a riveted joint **(5)**

4. Fig. 1. shows a cantilever beam made of 40C8 (Sut =620MPa, Syp =325 MPa). The material has the notch sensitivity of 0.9. The size factor may be taken as 0.83. The component is mirror polished, Determine the diameter 'd' of the shaft taking factor of safety as 2 and theoretical stress concentration factor=1.77 at the step. Use the Goodman criteria. **(8)**

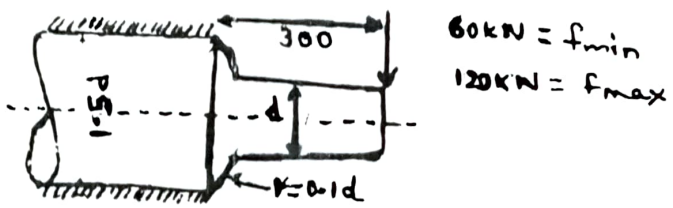

Fig. 1.

5. Determine the size of the rivets used for connecting the bracket to the vertical structure as shown in Fig. 2. Take allowable $\sigma_{crushing}$ = 100MPa and ζ_{shear} = 60MPa. The thickness of bracket is 20mm **(10)**