Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech. Winter 2017 - 18 Examination

Semester: 1 **Date: 02/01/2018**
Subject Code: 03217104 **Time: 2.00 pm to 4.30 pm**
Subject Name: Advanced Machine Design-I **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Explain in brief Concurrent Engineering. **(05)**

B) Explain Adhesive and abrasive wear in details and enlist design precaution to avoid surface failure. **(05)**

C) Explain the Strain based approach to determine the fatigue life. **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

A) Define creep and discuss significance of creep curve in design.

B) Discuss the guideline of design for assembly.

C) Explain fracture and mode of fracture with neat sketch.

D) What is stress concentration? Explain methods for reducing stress concentration with suitable sketches.

Q.3 (A)A steel bar is subjected to two dimensional stresses; the tensile stress along the X-axis varies from 45 MPa to 100 MPa, whereas the tensile stress along the Y-axis varies from 5 MPa to 75 MPa. The corrected endurance strength of component is 260 MPa. The ultimate tensile strength is 650 MPa. Determine the factor of safety by maximum distortion energy theory. Use the Goodman's fatigue criterion for failure. **(07)**

B) Explain briefly the Hydrodynamic, hydrostatic and elsatohydro dynamics lubrication with neat sketch. **(08)**

OR

(B) The following data is given for a 360^0 hydrodynamic bearing:
Length to diameter ratio=1
Journal speed=1350 rpm
Journal diameter =100 mm
Diametral clearance = 100 μm **(08)**
External load = 9 kN
Somerfield number (S) = 0.0828
The value of minimum film thickness variable is 0.3. Find the viscosity of oil that need be used.

Q.4 A) Based on Griffith's analysis derive that stress required to advance a crack of length 2a for plane stress cases is;

$$\sigma_C \geq \left[\frac{2E\gamma}{\pi a}\right]^{1/2}$$ **(07)**

Where, γ is surface energy per unit area of one surface and E is Young's modulus.

OR

A) Discuss the contact stress in detail with suitable example. **(07)**

B) Explain the various factors for correcting endurance limit. **(08)**