GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VIII (NEW) - EXAMINATION - SUMMER 2017 Subject Code: 2182115 Date: 06/05/2017 Subject Name: Alloy Design (Department Elective -III) Time: 10:30 AM to 01:00 PM **Total Marks: 70 Instructions:** 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 0.1 (a) Discuss the activities involved in alloy design 07 (b) Define Single Phase, Dual Phase and Multi-phase materials. Give example of 3+4each. Q.2 Define the terms: System, Phase, Components and degree of freedom 07 (a) relationship giving suitable examples. (b) What is Dual-phase Steel (DPS)? Discuss the various advantages offered by 3+4 DPS compared to Plain Carbon (PC) steel. List its applications. OR (b) Explain in brief with examples of each: Particle reinforced, Fiber reinforced 07 and Structural composites. Justify how composite materials are suitable for advanced applications? List 0.3 **(a)** 3+4 down the technological properties requirement for advanced applications. (b) Define the terms: Matrix, Dispersed phase, Particle, Fiber and List the effect 3+4of each of this in composite materials. OR 0.3 (a) Explain with the neat schematic variations in mechanical properties with 07 respect to recovery, recrystallization and grain growth. (b) What is Creep? With a neat diagram explain three stages of creep (Primary, 3+4steady-state and tertiary creep). What is Fatigue? Show S-N diagram for various alloys subjected to **O.4** 3+4(a) completely reversal loading at ambient temperature **(b)** State fundamental criteria for selection of materials for wear applications and 3+4 state four fundamental ways to reduce wear rates OR Write Composition, Characteristics and applications of HSLA 07 **Q.4 (a)** (b) How HSS are classified? What is the main advantage of group-M over group-2+5H?Q.5 (a) Write the role of various elements on Iron-base, Cobalt-base and Nickel-base 07 Super alloys. Write Properties and Applications of Maraging Steels. 07 **(b)** OR Write a short note on Hadfield Steel 07 Q.5 (a) (b) Define Lubricant. Discuss effects of lubrication on wear behavior. 03 +04