Chemical Engineering Department

Minor 2; CHL 275; 21/3/2016

ime: 1 hour **M. Marks: 30**

1. A reactor experiences trouble once every 16 months. The protection device fails once every 25 years. Inspection takes place once every month. Calculate the unavailability, the frequency of dangerous coincidences and the MTBC. **(6)**
2. Determine the MTBF of the top event (explosion) of the system shown in Figure on the back of the page. Assume a one year period of operation. **(8)**
3. Discuss the 'guidewords' along with their meaning used in HAZOP. **(8)**
4. A starter is connected to a motor that is connected to a pump. The starter fails once in 50 years and requires two hours to repair. The motor fails once in 20 year and requires 36 hours to repair. The pump fails once per 10 year and requires 4 hours to repair. Determine the overall failure frequency, the probability that the system will fail in the coming 2 years and the reliability for this system. **(8)**