

UNIVERSITY OF REGINA
FACULTY OF ENGINEERING



ENIN 340 HUMAN FACTORS ENGINEERING
FINAL EXAMINATION

Date: December 9, 1996

Time: 3 hours

Instructor: D.G. Vandenberghe

MARKS

- 1 A university wishes to develop a modern general purpose theater style classroom that could accommodate 150 students and a wide variety of lecturing styles, including those involving overhead and slide projectors, television, computer generated graphics or images from scanners, and multimedia computer presentations.
- (15) a) Complete a preliminary design of the classroom. Illustrate your design with a sketch that shows space, equipment and control layout arrangements. Discuss the features and attributes of your design.
- (10) b) Outline an experimental program to evaluate and improve your design. Discuss your proposed program in terms of
- setting
 - variables of concern
 - subject sample
 - data collection
 - data analysis
- (10) 2. A vehicle manufacturer has decided to incorporate a seat that can be adjusted to accommodate a wide range of operator preferences. It is envisaged that the seat will be adjusted by on-off drive motors that
- move the seat back and forth (horizontally)
 - move the seat up or down (vertically)
 - tilt the seat pan
 - tilt the back rest
- Assuming that the seat adjustment switch(es) are located on the side of the seat and not readily visible to the operator, design a switch interface that could be used for adjusting the seat. Illustrate your design with a sketch and a brief description of its ergonomic attributes.

MARKS

- (15) 3 a) Briefly discuss the basic requirements for starting and maintaining a successful health and safety program within an organization.
- (5) b) How do these requirements relate to the situation that existed on the Ocean Ranger prior to the disaster.
- (15) 4 Outline a general set of guidelines that you would use to assess the suitability of a machining workstation from a Cumulative Trauma Disorder (CTD) and a safety perspective. Assume the cycle for a human operator is as follows:
- reach, pick up a part and locate it on the machine for processing
 - after processing, remove the part from the machine and put it in the finished parts bin
 - continuously repeat this operating cycle
- (10) 5 Outline the criteria that you would use to select an air powered hand tool that is to be used to install vertically oriented screws and bolts on an assembly line. Discuss how you would ensure that your selection is acceptable to the workers.
- (10) 6 Define the key factors affecting visual discrimination. Discuss them in terms of lighting requirements for a series of workstations that make-up an assembly line for manufacturing printed circuit boards.
- (10) 7 Briefly outline the steps that you would follow to complete an indoor air quality investigation. Discuss the rationale that is guiding your investigative approach.