

Fusion Reactor Engineering 1 (459.760)

Final Examination

June 17, 2021

- (1) (8 points) 핵융합로의 보수 방식 네 가지를 쓰시오.
- (2) (12 points) 각각의 장단점을 논하시오.
- (3) (10 points) 위를 바탕으로 자신만의 보수 방식을 제안하시오.
- (4) (20 points) A fusion power plant can be divided into four areas in terms of radiation shielding; inside vacuum vessel, vacuum vessel to cryostat (or bioshield), cryostat (or bioshield) to radiation controlled area, and hot laboratory (or hot cell). Draw your own fusion power plant by placing components in the four areas.

- (1) (10 points) What is the magnetohydrodynamics (MHD) pressure drop in a liquid breeding blanket?
- (2) (10 points) How to avoid the MHD pressure drop?

- (10 points) As fusion reactor structure materials, EUROFER and F82H have been developed with the mixture of elements as shown in the table. Discuss why.

	Eurofer (Europe)	F82H (Japan)
An element	Composition (wt%)	Composition (wt%)
Fe	89.04	89.924
C	0.11	0.09
Cr	9.0	7.7
W	1.1	1.94
Mn	0.40	0.16
V	0.20	0.16
Ta	0.12	0.02
N2	0.03	0.006
Total	100	100

- (20 points) Discuss the safety of a fusion reactor in terms of to the nuclear excursion and the decay heat density.

한 학기 동안 모두들 수고 많으셨습니다. 좋은 결과 얻으시길 바랍니다.

"So we fix our eyes not on what is seen, but on what is unseen. For what is seen is temporary, but what is unseen is eternal." (2 Corinthians 4:18)