Practice Final Problems

The final exam will have 5 problems one of which will be true and false questions. The final is comprehensive and will cover the following chapters in Biggs "Discrete Mathematics":

Chapters 4.3, 4.6, 4.7, 6.4, 6.5, 15 (all), 16 (all except 16.9), 17 (all), 18.1, 18.3, 18.4, 19 (all).

Here are some practice problems for the second part of the class:

(1) Write down the codewords of the cyclic code corresponding to the ideal $\langle 1+x \rangle$ in $V^3[x]$ and find the parity-check matrix for this code.

(2) Let C_1 and C_2 be cyclic codes of the same length n. Show that

$$C_1 + C_2 = \{x \in V^n \mid x = c_1 + c_2 \text{ for } c_1 \in C_1,\, c_2 \in C_2\}$$

is a cyclic code. Prove that the generator of this code is the gcd of the generators of C_1 and C_2.

(3) Show that the generating function of partitions with distinct parts is

$$D(x) = \prod_{i=1}^{\infty} (1 + x^i).$$