

請依序作答：

- 有關核質互作型雄不稔性的遺傳，S 為雄不稔細胞質、N 為雄可稔細胞質、*Rf* 細胞核中的顯性的雄稔性恢復基因，請問：
  - S(RfRf), N(rf/rf), N(RfRf)* 的表現型？(3%)
  - 在辣椒 F1 生產所謂三系生產系統(A, B and C lines)，即是 CMS 的應用。A line 是不稔系，B line 是 A line 的維持系，C line 則是雄稔性恢復系。試問：
    - A、B、C lines 的稔性相關基因型？(3%)
    - F1 後代的遺傳組成與 A、B、C lines 的相關性？(5%)
    - A、B 與 C lines 是純系嗎？如何繁殖？(3%)
    - 三系生產系統的必要性為何？(4%)
- 某養雞場 walnut-comb 雞冠的雞交配後得到的後裔表現型及其分離比記載於附表請完成附表並分析該性狀之遺傳模式。(10%)

	Comb Type				Total
	Walnut	Rose	Pea	Single	
Observed Numbers(O)	87	31	30	12	160
Expected ratio					
Expected Numbers(E)					
O-E					
(O-E) <sup>2</sup>					
(O-E) <sup>2</sup> /E					
$\chi^2=?$					

- The amount of DNA per cell of a particular species is measured in cells found at various stages of meiosis, and the following amounts are obtained. Assign the amounts of DNA ( 3.7 pg, 7.3 pg, and 14.6 pg) to the corresponding stages of the cell cycle: (12%)
  - G1,
  - Following telophase II and cytokinesis,
  - Prophase I,
  - Anaphase I
  - G2,
  - Metaphase II
- In corn, the alleles *C* and *c* result in colored versus colorless seeds, *Wx* and *wx* in nonwaxy versus waxy endosperm, and *Sh* and *sh* in plump versus shrunken endosperm. When plants grown from seeds heterozygous for each of these pairs of alleles were testcrossed with plants from colorless, waxy, shrunken seeds, the progeny seeds as followed: (10%)

Colorless, nonwaxy, shrunken	84
Colorless, nonwaxy, plump	974
Colorless, waxy, shrunken	20
Colorless, waxy, plump	2349
Colored, waxy, shrunken	951
Colored, waxy, plump	99
Colored, nonwaxy, shrunken	2216
Colored, nonwaxy, plump	15
total	6708

- 請詳細說明 nuclear splicing 的機制。(10%)
- 請說明葉綠體基因組與原核生物基因組相同的特性。(10%)
- 請詳細說明 DNA packaging。(10%)
- Please explain the following terms: (20%)
 

(1) Ac/Ds	(4) Pribnow box	(7) siRNA	(10) Single-strand binding protein
(2) Crown gall disease	(5) Release factor	(8) YAC	
(3) Plaque	(6) Silent mutation	(9) Zinc finger	

試題隨卷繳回