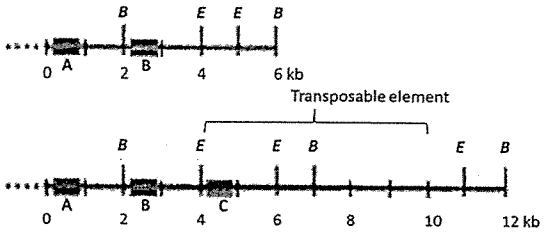
※ 注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

1. 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
   (a). S(*RfRf*), N(*rfrf*), N(*RfRf*) 的表現型? (3%)
   (b). 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:
   i. A、B、C lines 的稔性相關基因型？(3%)
   ii. F1後代的遺傳組成與A、B、C lines 的相關性? (5%)
   iii. A、B 與C lines 是純系嗎? 如何繁殖？(3%)
   iv. 三系生產系統的必要性為何？(4%)
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 (3.7pg, 7.3 pg, and 14.6 pg) to the corresponding stages of the cell cycle: amount of DNA. (12%)
   (a). G1,　　(b). Prophase I,
   (c). G2,　　(d).Following telophase II and cytokinesis,
   (e) Anaphase I　　(f) Metaphase II
3. 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				
	Walnut	Rose	Pea	Single	Total
Observed Numbers(O)	87	31	30	12	160
Expected ratio					
Expected Numbers(E)					
O-E					
$(O-E)^2$					
$(O-E)^2/E$					
χ^2=?					

4. Diagrammed here is DNA from a wildtype gene (top) and a mutant allele (bottom) that has an insertion of a transposable element that inactivates the genes. The symbols B and E represent the positions of restriction sites for BamHI and EcoRI, respectively, and the rectangles show sites of hybridization with each of three probes (A, B, and C) that are available. The dots at the left indicated that the nearest site of either BamHI or EcoRI cleavage is very far to the left of the region shown. Explain which probe and which single restriction enzyme you would use for RFLP analysis to identify both alleles. Also explain why any other choices would be unsuitable. (10%)



見背面

※ 注意：請於試卷內之「非選擇題作答區」作答，並應註明作答之題號。

一、 一塊正方形一公頃的土地，擬種行株距為 5 乘 5 米的檬果樹，請問要種幾株？每株樹在種植時，必須施 2 公斤磷酐(P_2O_5)為基肥，如果使用過磷酸鈣(0:18:0)，一公頃需使用多少過磷酸鈣？(10%)

二、 解釋與簡答下列名詞<u>於園藝生產上的之重要性</u> (70%，每則 5 分)

1. CEC
2. Dormancy
3. Soil reaction
4. Climacteric fruit
5. Essential nutrients
6. Plant growth regulators
7. Double fertilization
8. citrus nucellar seed
9. Xenia
10. Sterility
11. Phototropism
12. Paradormancy
13. Leaf area index
14. Blanching culture

三、 分別寫出韭黃、蒜黃、洋蔥、蘿蔔、胡蘿蔔、青花菜、花椰菜、筊白筍、馬鈴薯、抱子甘藍之食用部位的「器官或變態器官或組織的名稱」？(20%)

試題隨卷繳回