Each candidate must be given:

(1) one copy of this question paper, 9870/44, 9871/44, 8771/44;
(2) one copy of the Mathematical Formulae;
(3) one 16-page Answer Book
(4) graph paper.

Items (2) and (3) are sent with the stationery parcel.

Graphics programmable calculators are expected to be available.

Instructions to candidates

Answer all the questions.

All necessary working must be shown and any numerical expression being evaluated by calculator must be clearly stated.

Information obtained from tables and used to justify answers must be clearly stated.

The final answer to questions requiring numerical values should normally be given to three significant figure unless otherwise stated.

This printed paper consists of 4 printed pages and no blank pages.

Marking Scheme for Paper 43

3.(a) Simple random sampling: randomly choose 50 from 700.   B1
Each student has an equal chance of being chosen.   B1
Need to interview each student.
Stratified random sampling: treat each list as a separate   B1   For any advantage or disadvantage

stratum and randomly choose $\frac{50}{700} \times 380 = 27$ from   B1
List I. Similarly 12 from List II and 11 from List III.   B1
Need to interview those chosen.   B1
More precise result.
Quota sampling: choose the first 27 from List I, the   B1   Or equivalent
first 12 from List II and the first 11 from List III.   B1
Quick to find respondents
Not random   B1   For any advantage or disadvantage
Cannot be modelled theoretically

(b) The stratified random sampling.   B1
This is the only way you can be sure to choose 11
students from List III; the simple random sample
could leave this group under represented.   E1
Quota sampling cannot be modelled theoretically or   E1
list may be in an order which affects results.

4.(a) H_0: Median males = median females.   B2
H_1: Median males < median females

(b) Mann-Whitney U Test   B1
The samples are independent   E1

(c)

Males	1					5	6		7			8	9		10
Females		2	3	3	4			7		7	7			9	

Males   1   5   6   7   8   9   10
Females   2   3   3   4   7   7   7   9

Male ranks   1, 4, 4, 4, 7, 7, 7, 9.5, 11.5, 14.5   M2.
Female ranks   2, 9.5, 11.5, 14.5, 14.5, 14.5, 17.5, 17.5, 19, 20   A1
Total male ranks   = 69.5
Total female ranks   = 140.5

$U_1 = 69.5 - \frac{1}{2} \times 10 \times 11 = 14.5$ ⎫
                                                      ⎬ $U = 14.5$
$U_2 = 140.5 - \frac{1}{2} \times 10 \times 11 = 85.5$ ⎭

Either Testing at 5% level, using a one-tailed test,
reject H_0 if $U < 28$.   B1
Or Testing at 2.5% level, using a one-tailed test,
reject H_0 if $U < 24$.
Conclude: There is significant evidence at 5% (and   B1
2½%) level that females judge more scenes
gratuitously violent than males.

52