SHARE ONLINE REVISION

General Certificate of Education Advanced Level

STATISTICS 6046/2

PAPER 2

FINAL REVISION TEST 2022 SESSION 3 hours

Additional materials:
Answer paper
Graph paper
List of formulae MF7
Scientific calculator

Time 3 hours

INSTRUCTIONS TO CANDIDATES

Write your name in the spaces provided on the answer sheet/answer booklet.

Answer ***all*** questions in **Section A** and any **five** from **Section B.**

If a numerical answer cannot be given exactly, and the accuracy required is not specified in the question, then in the case of an angle it should be given correct to the nearest degree, and in other cases it should be given to 2 significant figures.

INFORMATION TO CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part of question.

The total number of marks for this paper is 120.

The use of a scientific calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

This question paper consists of 7 printed pages and 1 blank page.

Section A (40 marks)

Answer all question in this section.

1. A random sample of St Dominic`s mathematics students marks for end of term test are shown below.

   67 76 85 42 93 48 93 46 52 78 86

   72 77 74 52 82 78 47 66 50 67 87

   78 86 94 63 72 63 44 47 57 68 81

   a) Contract a stem a leaf diagram to represent these data. [2]

   b) Find the median and the quartiles for this distribution. [4]

   c) Draw a box plot to represent these data. [2]

   d) Give one advantage and one disadvantage of using

      i) a stem and leaf diagram

      ii) a box plot,

      to illustrate data such as that given above. [2]

2. Elven cards each bear a single letter, and they can be made to spell the word "**EXAMINATION**". Three cards are selected from the 11 cards, and the order of 11 cards is not relevant. Find how many possible selections can be made

   (a) if the three cards all bear different letter, [2]

   (b) if two of the cards bear the same letter. [2]

3. In a simple model of the weather in October, each day is classified as either fine or rainy. The probability that a fine day is followed by a fine day is 0.8. The probability that a rainy day is followed by a fine day is 0.4. The probability that that 1October is fine is 0.75.

   Find,

   (a) the probability that 2 October is fine and the probability that 3 October is fine.

   (b) the conditional probability that 3 October is rainy given that 1 October is fine.

(c) the conditional probability that 1 October is fine, given that 3 October is rainy. [5]

4. A random variable X has a Normal distribution with mean μ and variance σ^2. It is known that $P(X > 9) = 0.9192$ and $P(X < 11) = 0.7580$.

Calculate,

(a) the mean μ and variance σ^2. [5]

(b) Lower quartile Q_1, Median Q_2, Upper quartile Q_3. [7]

5. The continuous random variable X has probability density function given by

$$f(x) = \begin{cases} \beta e^{-\frac{x}{3}}, & x \geq 0 \\ 0 & otherwise \end{cases}$$

Find the

(a) value of β, [2]

(b) $P(X > 5)$, [2]

(c) value of the E(X) and Var(X), [5]

(d) cumulative function of X, F(x). [3]

Section B (80 marks)

Answer any **five** question from this section

Each question carries 16 marks

6. A continuous random variable has p.d.f ,

$$f(x) = \begin{cases} tx & 0 \le x \le 3 \\ 3t(4-x) & 3 \le x \le 4 \\ 0 & otherwise \end{cases}$$

where t is a constant.

(a) Find the value of t and sketch the graph of $f(x)$. [5]

(b) Find $P(X > 2)$. [1]

(c) Find E(X) and Var(X). [4]

(d) Find F(X), and calculate the value of Q_1, Q_2, Q_3. [6]

7. The following table shows two sets of data $\boldsymbol{e}$ and $\boldsymbol{a}$.

e	0	5	10	15	20	25	30	35
a	65	78	99	75	90	87	76	66

(a) (i) Draw a scatter diagram for the data.

(ii) Comment on the relationship between the two sets of data.

(b) (i) Calculate the product moment correlation coefficient.

(ii) Comment on the product moment correlation coefficient.

(c) (i) Find the equation of the regression line a on e.

(ii) Use the regression line to estimate the value of a when e is 1. 13

2. 54 [16]

8.

(a) For a certain strain of flower, the probability that, when sown, a seed produces a plant with a yellow flower is $\frac{1}{6}$. Find the minimum number of seeds that should be sown in order that the probability of obtaining at least one plant with yellow flowers is greater than 0.98. [4]

(b) Two people, Stanley and Kuzileza, play a game. An ordinary die is thrown and the first person to throw a 3 wins. Stanley and Kuzileza take it in turns to throw a die, starting with Stanley. Find the probability that Kuzileza wins. [5]

(c) The probability that a student is awarded a distinction in the statistics examination is 0.07. In a randomly selected group of 60 students, what is the most likely number of students awarded a distinction. [5]

If suppose that X~Geo(0.07). Find the mode. [2]

9. A company use to have a market proportion of 45% for their drink of type A. the company is no longer sure of their current market proportion for type A drink.
Out of a random sample of 50 retail outlets, 35 of them were selling type A drink.

(a) Calculate an approximate 99.9% confidence interval for the market proportion of type A drink. [3]
(b) Using a suitable approximation carry out a 5% level of significance test to investigate whether the market proportion of type A drink has increased. [9]
(c) What is the probability of making a type II error if in fact p = 0.55. [4]

10. The following data give the heights in centimeters of 100 male students.

Height (cm)	Frequency
155 – 160	5
161 – 166	17
167 – 172	38
173 – 178	25
179 – 184	9
185 – 190	6

Find the expected frequencies for a normal distribution having the same mean and standard deviation as the data given, and test the goodness of fit, using a 5% level of significance. [16]

11. In a seed viability test, 40 seeds were planted in rows of 4.The number of seeds that germinated in each row was counted and the results are shown in the table below.

Number of seeds germinating per row	0	1	2	3	4
Observed number of rows	14	14	9	2	1

(a) Calculate

(i) the mean of seeds germinating per row, [2]

(ii) the expected frequencies corresponding to these observed values for a binomial distribution with the same mean as that in (i) [5]

(b) Carry out the appropriate X^2 – test, at the 5% level of significance, to determine whether the observed values confirm that the number of seeds germinating follow a binomial distribution. [9]

12. A computer software co-records the following quarterly demand for a certain software from 2002 to 2004.

Year	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**
2002	37	24	62	80
2003	77	95	94	133
2004	148	155	128	161

(a) Plot the software demand for each quarter through the years 2002 to 2004, and comment on the trend. [4]

(b) By use of a 4 – point moving average, insert the trend. [6]

(c) Estimate demand for the software in 2005, Quarter 1. [6]

FEEL FREE TO CONTACT ME FOR ANY ADJUSTMENTS, CLARIFICATIONS AND ASSISTANCE!

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Sharewell B. C

"Concept before anything!", Author

Proverbs 11 vs. 2

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