

INSTITUTE AND FACULTY OF ACTUARIES

PRE-WORK MATERIAL

September 2021

Subject CS2 – Risk Modelling and Survival Analysis Core Principles

Paper B

INSTRUCTIONS TO THE CANDIDATES

You are provided with this advance information to enable you to read, understand and action in your own time, and not under examination conditions.

This instruction sheet provides you with two data files for you to use in the examination:

CS2B_Sept_21_Qu_1_Data.csv

CS2B_Sept_21_Qu_3_Data.csv

These data files need to be loaded into R by first saving them onto the computer you are going to be using in the examination. Once you have completed this then you need to load the data files into R ready for use during the examination.

Further guidance on how to do this can be found in “A Guide to CS1 and CS2 Examinations” on the [website](#).

The guide also provides details of the R packages that will be required for the 2021 CS2B examinations.

PLEASE NOTE that no prior knowledge of the `copula`, `rpart` and `rpart.plot` packages is required for the examination.

To test that you have successfully loaded the required R Packages run the following code in order within R:

```
#####  
#### (i) Open libraries #####  
#####  
  
library(copula)  
library(graphics)  
library(markovchain)  
library(rpart)  
library(rpart.plot)  
library(stats)  
library(survival)
```

```

library(utils)

#####
#### (ii) Check installs #####
#####

x = c(1:10)
y = matrix(data = c(1,0,0,0,1,0,0,0,1), nrow = 3 , byrow = TRUE)

# Check base package
mean(x)

# Check copula package
fk = frankCopula(5)
persp(fk, dCopula)

# Check graphics package
plot(x)

# Check markovchain package
mc = new("markovchain", transitionMatrix = y); mc

# Check rpart package
rectree <- rpart(Mileage ~ Weight, car.test.frame)
summary(rectree)

# Check rpart.plot package
rpart.plot(rectree, digits = 3, type = 4)

# Check stats package
ppois(5, 11.668332)

# Check survival package
cipoisson(5)

# Check utils package
combn(x,10)

```

If the code completes with no errors the nine packages are successfully installed.

If you encounter any issues, please contact the Examinations Team on +44 (0) 1865 268 873.

END OF PRE-WORK MATERIAL