Questions 7 to 12 are based on material covered in *Chapter 4*.

7 If the random variable X has a binomial distribution $B(40, 0.03)$ and if Y has the corresponding approximating Poisson distribution, identify the two options corresponding to the two probabilities $P(X > 3)$, $P(Y > 3)$.

A 0.0247	B 0.8333	C 0.1205	D 0.0260
E 0.0314	F 0.1178	G 0.0338	H 0.1667

8 It is required to create a vector v in the SSC worksheet containing the means of 100 different random samples, each of size 8, taken from the Poisson distribution with mean 4. Select from the following options the one which creates v.

A `v= prand(100,4,8)`	B `v= mean(prand(1,4,8))`
C `v= mean(poisson(100,4,8))`	D `v= sum(poisson(100,4,8))/100`
E `v= mean(prand(100,4,8))`	F `v= mean(prand(100,8,4))`
G `v= mean(Prand(100,8,4))`	H `v= sum(prand(100,8,4))/100`

9 Long observation over many years suggests that a good model for the variation observed in ambient temperature at midnight in Manchester on the shortest day of the year is normal with mean 4 and standard deviation 3 (measured in degrees Centigrade). Express this in Fahrenheit.

$F = \frac{9}{5}C + 32$

A $N(39.2, 37.4^2)$	B $N(32, 5.4)$	C $N(35, 5.4)$	D $N(39.2, 29.16)$
E $N(34.2, 5.4^2)$	F $N(39.2, 37.4)$	G $N(39.2, 5.4)$	H $N(34.2, 29.16)$

10 If X is Poisson with mean 2.4 and Y is Poisson with mean 1.2, and if X and Y are independent, choose from the following options the probability $P(X + Y = 4)$.

$\mu = 1.2 + 2.4 = 3.6$

A 0.1912	B 0.1465	C 0.4335	D 0.9000
E 0.2198	F 0.1954	G 0.5413	H 0.4587

11 If the random variable T follows an exponential distribution with mean 437 days, choose from the following options the 10% and the 95% quantiles of T. (Choose two options.)

$1 - 1 - e^{-t/437}$ $e^{-t/437}$ t $-t/437$ $\ln(0.9)$

$e^{-t/437}$ 0.05

A 46.0 days	B 303 days	C 1006 days	D 48.6 days
E 22.4 days	F 486 days	G 1309 days	H 43.7 days

12 Suppose that events occur according to a Poisson process at a mean rate of twice a week. Select from the options listed the median time between consecutive events.

$0.5 = 1 - e^{-t/7}$ $e^{-2t/7} = 0.5$

$\ln(t/35) =$

A 7 days	B 2 days	C 2.4 days	D 14 days
E 3.5 days	F 3 days	G 4.9 days	H 1 day