Because the exam is open book, detailed solutions will not be provided. Some selected answers have been given below so that you may check your work.

Sample exam 1

1. (a) −
   (b) $P(B) = 0.65$, $P(B \mid A) = 0.98$, $P(B^c \mid A^c) = 0.98$.
   (c) $P(B) = 0.96 \cdot P(A) + 0.02$
   (d) −
   (e) $P(A^c \mid B) = 0.011$; $P(A^c \mid B^c) = 0.963$.
   (f) −

2. (a)   i. 0.050
        ii. 0.979
        iii. 0.051
        iv. 9.286
        v. 26.531
   (b) −

3. (a) −
   (b) It is not, but you must supply reasons.
   (c) $\frac{1}{3}$
   (d) $\frac{(x+2)^2}{12}$

4. (a) `mystery.2`
   (b) −

5. (a) $\mu = 24$ cars per hour, $\lambda = 19$ cars per hour, $\rho = 0.792$
   (b) 3.8
   (c) 9.5 minutes
   (d) 12 minutes
   (e)   i. 0.497
        ii. $\sqrt[3]{0.3}$

6. (a) Either -2.139 or $+2.139$ depending on chosen approach.
   (b) 0.121
   (c) Either $(-2.382, -1.896)$ or $(1.896, 2.382)$ depending on chosen approach.
   (d) −

7. (a) −
   (b) −
   (c) Estimate is 4.9864; you must provide interpretation.
   (d) Reject
   (e) $(4.474, 5.499)$
   (f) −

(g) –

8. (b) (c) and (e)

9. (e) and (f)

10. (c)

11. (d)

12. (f)

13. (a)

Sample exam 2

1. (a) $P(T \mid I) = 0.751$, $P(T \mid I^c) = 0.008$, $P(I) = 0.041$.
   (b) $P(T) = 0.038$
   (c) $P(I \mid T) = 0.810$; $P(I^c \mid T^c) = 0.989$.
   (d) FOR: 0.011; NPV: 0.989.
   (e) No.
   (f) –

2. (a)

y	1	2	6
$P(Y = y)$	0.13	0.45	0.42

   (b)   i. 0.01
       ii. 0.077
      iii. 0.04
      iv. 0.507

3. (a)   i. Let X be the number of faulty parts built before 50 working parts are built. Then $X \sim \text{NB}(50, 0.96)$.
       ii. 52.083
      iii. 0.610
   (b)   i. –
       ii. –

4. (a) –
   (b) –
   (c) $\frac{17}{32}$
   (d) $\frac{3}{8} - \frac{3(3-x)^2}{32}$. *Other correct but equivalent answers are possible.*

5. (a) $\mu = 20$ devices per (working) day, $\lambda = 15$ devices per day, $\rho = 0.75$
   (b) 3
   (c) 1.2 hours
   (d) 0.081
   (e) 75% of the time i.e. 6 hours per day.

6. (a) 2.138

(b) 10

(c) $(5.877, 15.403)$

(d) –

7. (a) –

(b) –

(c) Estimate is -107.804; you must provide interpretation.

(d) Do not reject.

(e) $(-233.091, 17.483)$

(f) –

(g) –

8. (a), (c), (f)

9. (c), (d), (f)

10. (a)

11. (b)

12. (b)

13. (e)