**Question 1 part A**

1. P(AC) = 2/3
2. P(A and B) = 1/3 x 1/5 = 1/15
3. P(only one) = P(A and BC) + P(AC and B)
   * 1. = ( 1/3 x 4/5) + (2/3 x 1/5)
     2. = 6/15
4. P(neither) = P(AC and BC) = 2/3 x 4/5 = 8/15

Another way (use complement rule)

P(neither) = 1 - P(at least one) = 6/15 + 1/15

* + 1. = 1 - 7/15
    2. = 8/15

**Question 1 Part B**

|  |  |  |  |
| --- | --- | --- | --- |
| P(A) = 0.40 | P(Acc|A) = 0.75 | P(Acc and A) = P(Acc|A)P(A) = | 0.3 |
| P(B) = 0.35 | P(Acc|B) = 0.90 | P(Acc and B) = P(Acc|B)P(B) = | 0.3325 |
| P(C) = 0.25 | P(Acc|C) = 0.85 | P(Acc and C) = P(Acc|C)P(C) = | 0.2125 |
|  |  |  | 0.845 |

P(Acc) = P(Acc and A) + P(Acc and B) + P(Acc and C) + P(Acc and D)

***= 0.845***

P(A|Acc) = P(Acc|A)P(A) / P(Acc) = 0.30/0.845 = ***0.355***

**Question 1 Part C**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Good Components | Defective Components | Total |
| Plant A | 940 | 60 | 1000 |
| Plant B | 1930 | 70 | 2000 |
|  | 2870 | 130 | 3000 |

P(Defective) = 130/3000 = 0.0433

P(B|defective) = 70/130 = 0.53846

Question 2

(Formulae will not be given)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
| x | 0 | 1 | 2 | 4 | 8 | 10 |
| p(x) | 0.25 | 0.15 | 0.25 | 0.15 | 0.1 | 0.1 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| k = | 0.1 |  |  |  |  |  |
|  |  |  |  |  |  |  |
| x | 0 | 1 | 2 | 4 | 8 | 10 |
| p(x) | 0.25 | 0.15 | 0.25 | 0.15 | 0.1 | 0.1 |
| x.p(x) | 0 | 0.15 | 0.5 | 0.6 | 0.8 | 1 |
| x2.p(x) | 0 | 0.15 | 1 | 2.4 | 6.4 | 10 |
|  |  | ***E(X)*** | ***3.05*** |  |  |  |
|  |  | ***E(X2)*** | ***19.95*** |  |  |  |
|  |  |  |  |  |  |  |
|  |  | ***Var(X)*** | ***10.6475*** |  |  |  |

Question 2B sheet attached

|  |  |  |  |  |  |  |  |
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