This is a 15-question multiple-choice exam; there is no partial credit. Each problem is worth 7 points, for a total of 105 points. There will be a 20-point deduction if your phone rings or vibrates, or if you have your phone on your person during the exam. There will be a 5-point deduction if you have other transgressions. Other transgressions include not having the correct Scantron form 882E, not filling out your Scantron form correctly, having a folded or mutilated Scantron, not clearing your calculator before and after the exam, having any electronic device on you during the exam, not having your TAMU student ID, not following directions, not turning in your exam and Scantron on time (you must be finished filling in your Scantron and exam cover before time is called), not filling out this exam cover sheet correctly, or using an unapproved calculator. You must put your first name and last name, as officially known by TAMU, on this exam cover as well as on your Scantron; no nicknames or middle names, without your first and last name. The Scantron will not be returned so also mark all your answers on this exam paper. Your exam grade will be posted in WebAssign.

Note: It is a violation of the Aggie Honor Code to continue writing or taking the exam after time is called.

ALL CELL PHONES MUST BE TURNED OFF AND PLACED IN YOUR BACKPACK!

CALCULATORS MUST BE RESET BEFORE AND AFTER THE EXAM!

SCANTRON: Please double check to make sure you have completed your Scantron correctly, as shown below.

Name: print your legal name neatly (NO NICKNAMES)
Subject: Math 141
Date: April 2012

Test No.: TANGO
Period: your section number

Clear your calculator BEFORE and AFTER your exam. MEM (2nd +), Reset, ALL, Reset
To turn on the correlation coefficient: Catalog (2nd 0), DiagnosticOn, Enter, Enter
1. Using the Venn diagram which shows the number of elements in each region, what is \( P(B \mid A) \)?

\[
\begin{align*}
\text{a. } & \frac{b + e}{a + b + c + d + e + f + g + h} \\
\text{b. } & \frac{b + e}{b + c + e + f} \\
\text{c. None of these} \\
\text{d. } & \frac{b + e}{a + b + c + d + e + f} \\
\text{e. } & \frac{b + e}{a + b + d + e}
\end{align*}
\]

2. An urn contains 5 lilac balls, 4 peach balls, and 7 teal balls. If a sample of 6 balls is chosen at random, what is the probability of getting exactly 3 peach balls or exactly 3 teal balls?

\[
\begin{align*}
\text{a. } & \frac{905}{2002} \\
\text{b. None of these} \\
\text{c. } & \frac{3}{316} \\
\text{d. } & \frac{460}{1001} \\
\text{e. } & \frac{23}{1001}
\end{align*}
\]

3. Ryan owns a $45,600 robot. The probability that the robot will have to be replaced within the next year is 0.035. What is the minimum amount he can expect to pay for an annual premium if the insurance company expects a profit of $175?

\[
\begin{align*}
\text{a. None of these} \\
\text{b. } & \$1771 \\
\text{c. } & \$1596 \\
\text{d. } & \$1421 \\
\text{e. } & \$15,960
\end{align*}
\]
4. Let the random variable $X$ be the sum of the faces of two rolled fair 4-sided dice. Find the sum of the standard deviation, median and mode of the random variable to 4 decimal places.

   a. 12.5000
   b. 11.6330
   c. None of these
   d. 11.5811
   e. 12.0000

5. If two fair 6-sided dice are rolled, what is the probability that the sum is 8 or at least one of the dice shows a 3?

   a. $\frac{4}{9}$
   b. $\frac{17}{36}$
   c. $\frac{7}{18}$
   d. $\frac{2}{11}$
   e. $\frac{2}{5}$

6. An experiment has a sample space of $S = \{e_1, e_2, e_3, e_4, e_5\}$ with its probability distribution shown below.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>$e_1$</th>
<th>$e_2$</th>
<th>$e_3$</th>
<th>$e_4$</th>
<th>$e_5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>0.16</td>
<td>$p_2$</td>
<td>$p_3$</td>
<td>$p_4$</td>
<td>0.01</td>
</tr>
</tbody>
</table>

If $E = \{e_1, e_2, e_4\}$, $F = \{e_2, e_5\}$, $P(E) = 0.68$, and $P(E^c \cup F^c) = 0.53$, what is the value of $p_3$?

   a. 0.31
   b. 0.22
   c. 0.47
   d. 0.69
   e. Cannot be determined
7. If 47% of Math 141 students attended Week In Review, 36% attended Help Sessions, and 76% attended Week In Review or Help Session, what is the probability that a Math 141 student chosen at random only attended Week In Review?

   a. 0.40
   b. 0.07
   c. 0.29
   d. None of these
   e. 0.24

8. A factory knows that a ping pong ball has a \( \frac{1}{36} \) chance of being defective. If 60 ping pong balls are chosen at random from the factory, what is the probability, to 5 decimal places, that exactly 2 are defective?

   a. 0.73346
   b. 0.26654
   c. None of these
   d. 0.76726
   e. 0.23274

9. A fishing boat’s GPS has a 0.2% failure rate, its hull has a 0.1% failure rate, and its motor has a 3% failure rate. What is the probability that the GPS, hull, and motor will all fail on a fishing trip?

   a. 0.033
   b. 0.0000033
   c. 0.06
   d. 0.00006
   e. 0.00000006
10. If the random variable $X$ represents the number of cards drawn from a standard deck of 52 cards, without replacement, until the king of hearts is drawn, classify the random variable and describe all possible values of $X$.

a. Infinite discrete; 0, 1, 2, 3, 4, . . . .
b. Finite discrete; $1 \leq x \leq 52$
c. Finite discrete; 1, 2, 3, 4, . . . , 52
d. Finite discrete; 0, 1, 2, 3, 4, . . . , 52
e. Infinite discrete; 1, 2, 3, 4, . . . , 52

11. If there is a 34% chance of high winds tomorrow, what are the odds against high winds tomorrow?

a. 17:16
b. 33:17
c. 17:33
d. 17:50
e. 33:50

12. Given $P(B) = \frac{5}{12}$, $P(E \mid A) = \frac{2}{9}$, and $P(F \mid B) = \frac{1}{4}$, complete the probability tree before computing $P(B \mid E)$.

a. \( \frac{135}{191} \)
b. \( \frac{54}{7} \)
c. \( \frac{3}{4} \)
d. None of these
e. \( \frac{56}{191} \)
13. A medical test detects the presence of friggatriskaidekaphobia (fear of Friday the 13th). Among those who have this phobia, the probability that the phobia will be detected by the test is 0.97. However, the probability that the test will wrongly indicate the presence of this phobia in those who do not actually have it is 0.05. It is estimated that 6% of the population who take this test have friggatriskaidekaphobia. If the test administered to an individual is positive, what is the probability that the person actually has this phobia?

a. \( \frac{291}{5000} \)
b. None of these
c. \( \frac{235}{526} \)
d. \( \frac{291}{526} \)
e. \( \frac{291}{235} \)

14. In MaroonLand 78% of the people are fiscally conservative. If 200 people from MaroonLand are chosen at random, what is the probability, to 5 decimal places, that more than 170 will be fiscally conservative?

a. 0.00850
b. 0.00502
c. 0.00286
d. 0.00348
e. 0.00216

15. Which one of the following is a binomial experiment?

a. Roll a 6-sided die until a 4 appears uppermost
b. Roll a 6-sided die and observe the uppermost number
c. Roll a 6-sided die ten times and count the number of times a 4 appears
d. Roll a 6-sided die ten times and observe the uppermost number
e. Roll a 6-sided die twice and find the sum of the uppermost numbers