Started on	Saturday, 20 January 2024, 4:12 PM
State	Finished
Completed on	Saturday, 20 January 2024, 5:12 PM
Time taken	1 hour
Marks	32.00/44.00
Grade	**7.27** out of 10.00 (**73**%)

Question **1**

Complete

Mark 1.00 out of 1.00

Suppose the probability that item produced by a certain machine will be defective is 0.2. Find the probability that 10 items will contain at most one defective item. Assume that the quality of successive items is independent.

- a. 0.27
- b. 0.38
- c. 0.73
- d. 0.63
- e. None of these

The correct answer is: 0.38

Question 2

Complete

Mark 0.00 out of 1.00

Suppose that the random variable X has a *geometric distribution* with parameter p = 0.4. Find

$P(X \leq 2)$

a. None of the others

b. 0.64

c. 0.24

d. 0.8

e. 0.16

The correct answer is: 0.64

Question 3

Complete

Mark 1.00 out of 1.00

Two events A and B are such that $P(A \cap B) = 0.25$,$P(A \cup B)=0.65$ and $P(A|B)=0.5$. Find $P(B|A)$.

- a. 0.35
- b. 0.5
- c. None of the other choices is correct
- d. 0
- e. 1.15
- f. 0.3

The correct answer is: None of the other choices is correct

Question 4

Complete

Mark 1.00 out of 1.00

Consider the time to recharge the flash in a camera. The probability that a camera passes the test is 0.9, and the cameras perform independently. What is the probability that the third failure is obtained in four or fewer tests?

- a. 0.0037
- b. 0.0027
- c. 0.0057
- d. 0.001
- e. None of the others

The correct answer is: 0.0037

Question 5

Complete

Mark 1.00 out of 1.00

The number of errors in a textbook follows a ***Poisson distribution*** with a mean of 0.01 error per page.

What is the probability that there are three or fewer errors in 100 pages ?

- a. 0.613
- b. 0.061
- c. 0.184
- d. None of the others
- e. 0.981

The correct answer is: 0.981

Question **6**

Complete

Mark 0.00 out of 1.00

A computer program consists of two blocks written independently by two different programmers. The first block and the second block have an error with probability 0.3 and 0.4, respectively. Suppose that the program returns an error. What is the probability that there is an error in the **first block** ? (round to 2 decimal places)

- a. 0.33
- b. 0.52
- c. 0.21
- d. 0.12
- e. 0.69

The correct answer is:
0.52

Question 7

Complete

Mark 0.00 out of 1.00

A sample preparation for a chemical measurement is completed correctly by 25% of the lab technicians, completed with a minor error by 72% and completed with a major error by 3%.

a) If a technician is selected randomly to complete the preparation, what is the probability it is completed without error ?

b) If a technician is selected randomly to complete the preparation, what is the probability that it is completed with either a minior or a major error ?

a. a/ 0.75 and b/ 0.75
b. a/ 0.25 and b/ 0.75
c. a/ 0.25 and b/ 0.25
d. None of the other choices is correct
e. a/ 0.75 and b/ 0.25

The correct answer is: a/ 0.25 and b/ 0.75

Question 8

Complete

Mark 0.00 out of 1.00

You flip an **unfair** coin until it shows a head. Given P(a head comes up) = 0.2.

What is the expected number of times of flipping?

- a. 5
- b. 4
- c. 2
- d. 6
- e. 10

The correct answer is:
5

Question 9

Complete

Mark 1.00 out of 1.00

The number of pages in a PDF document you create has a ***discrete uniform distribution*** from five to nine pages (including the end points). What are the mean and standard deviation of the number of pages in the document?

- a. 6.5, 2
- b. 7, 2
- c. None of the others
- d. 7, 4
- e. 6.5, 4

The correct answer is: 7, 2

Question 10

Complete

Mark 0.00 out of 1.00

A batch contains 52 bacteria cells. Assume that 13 of cells are not good. Five cells are selected at random, without replacement. What is the probability that all five cells of selected cells are not good ?

a. 0.495
b. $4.952x10^{-4}$
c. 0.221
d. 0,25
e. None of the other choices is correct

The correct answer is: $4.952x10^{-4}$

Question 11

Complete

Mark 1.00 out of 1.00

Suppose that X is a negative binomial random variable with p = 0.2. and r = 4. Determine E(X).

a. None of the others
b. 10
c. 5
d. 20
e. 8

The correct answer is: 20

Question 12

Complete

Mark 1.00 out of 1.00

Given $P(A) = 0.3$, $P(B \mid A) = 0.4$, and $P(C \mid A \cap B) = 0.5$, find $P(A \cap B \cap C)$.

- a. 0.12
- b. 0.2
- c. 0.06
- d. None of these
- e. 0.15

The correct answer is:
0.06

Question 13

Complete

Mark 1.00 out of 1.00

Suppose that X has a hypergeometric distribution with N = 20, n = 4, and K = 6.
Determine P(X = 3).

- a. 0.0381
- b. 0.0132
- c. None of the others
- d. 0.0578
- e. 0.0030

The correct answer is: 0.0578

Question **14**

Complete

Mark 1.00 out of 1.00

Given $P(A) = 0.3$, $P(B) = 0.2$, and $P(A \cap B) = 0.1$.

Find $P(A \cup B)$ and $P(A \cap B')$.

a. 0.5, 0.2

b. None of these

c. 0.4, 0.2

d. 0.5, 0.9

e. 0.4, 0.9

The correct answer is:
0.4, 0.2

Question 15

Complete

Mark 0.00 out of 1.00

There is a 1% probability for a **hard drive** to **crash**. Therefore, it has one backup having a 2% probability to crash, and two components are **independent**. The stored information is lost when both two devices crash.

What is the probability that the information is saved ?

a. 0.98
b. 0.99
c. 0.97
d. 0.9998
e. None of these

The correct answer is:
0.9998

Question 16

Complete

Mark 0.00 out of 1.00

A lot of 20 semiconductor chips contains 4 that are defective.
Two are selected, at random, **without replacement**, from the lot. Determine th probability that **the second chip selected is defective**.

- a. 0.20
- b. None of these
- c. 0.21
- d. 0.16

The correct answer is:
0.20

Question 17

Complete

Mark 1.00 out of 1.00

In the 2012 presidential election, exit polls from the critical state of Ohio provided the following results:

Total	Obama	Romney
No college degree (60%)	52%	45%
College graduate (40%)	47%	51%

What is the probability a randomly selected respondent voted for Romney ?

a. 0.96
b. None of these
c. 0.48
d. 0.474
e. 0.5

The correct answer is:
0.474

Question 18

Complete

Mark 0.00 out of 1.00

Given $P(A) = 0.3$, $P(B) = 0.3$, $P(C) = 0.8$ and $P(A|C) = 0.3$,

and A and B are mutually exclusive.

State True or False

(i) A and B are independent

(ii) A and C are independent

- a. True, True
- b. False, True
- c. True, False
- d. False, False

The correct answer is:
False, True

Question 19

Complete

Mark 1.00 out of 1.00

The thickness of wood paneling (in inches) that a customer orders is a random variable X with the following cumulative distribution function

$$F(x)=\begin{cases}0 & x<1/8\\ 0.2 & 1/8\le x<1/4\\ 0.9 & 1/4\le x<3/8\\ 1 & 3/8\le x\end{cases}$$

Which the following statement is TRUE?

Find $P\left(\frac{1}{8}\le X\le\frac{1}{3}\right)$ and $P\left(\frac{1}{6}<X\le\frac{1}{2}\right)$.

a. 0.8, 0.5

b. 0.9, 0.8

c. 0.9, 0.5

d. None of the other choices is correct

e. 0.8, 0.7

The correct answer is: 0.9, 0.8

Question 20

Complete

Mark 1.00 out of 1.00

Suppose $P(A|B)=0.6, P(A|B')=0.3,$ and $P(A)=0.5.$

What is $P(B)$?

- a. 1/2
- b. 3/4
- c. 2/3
- d. 1/3
- e. None of these

The correct answer is: 2/3

Question 21

Not answered

Marked out of 1.00

A congested computer network has a 1% chance of losing a data packet, and packet losses are independent events.

An e-mail message requires 100 packets.

What are the mean and standard deviation of the number of packets that must be re-sent?

a. 1, 0.5
b. None of the others
c. 2, 0.99
d. 1, 0.995
e. 1, 0.99

The correct answer is: 1, 0.995

Question 22

Complete

Mark 1.00 out of 1.00

Given the cumulative distribution function $F(x)=\begin{cases}0 & x<1\\ 0.5 & 1\le x<3\\ 1 & 3\le x\end{cases}$

Find $P(X\le 2)$ and $P(X>1)$.

a. 0.5, 0.75

b. None of the others

c. 0, 0.5

d. 0.5, 0.5

e. 0.5, 0

The correct answer is: 0.5, 0.5

Question 23

Complete

Mark 1.00 out of 1.00

A campus program evenly enrolls undergraduate and graduate students. If a random sample of 4 students is selected from the program to be interviewed about the introduction of a new fast food outlet on the ground floor of the campus building, what is the probability that all 4 students selected are undergraduate students ?

a. 1.00
b. 0.0256
c. 0.0625
d. 0.16

The correct answer is: 0.0625

Question **24**

Complete

Mark 1.00 out of 1.00

Printed circuit cards are placed in a functional test after being populated with semiconductor chips. A lot contains 140 cards, and 20 are selected without replacement for functional testing.

If there are 20 defective cards among 140 cards, what is the probability that at least 1 defective card is in the sample?

- a. 0.0356
- b. 0.0065
- c. None of the others
- d. 0.9935
- e. 0.964

The correct answer is: 0.964

Question 25

Complete

Mark 0.00 out of 1.00

Given two events A, B such that P(A | B) = 0.4, P(B) = 0.8 and P(A) = 0.5.

Which of the following statements is/are TRUE ?

(i) A and B **independent.**

(ii) A and B are **mutually exclusive.**

- a. Both
- b. Only (ii)
- c. Neither
- d. Only (i)

The correct answer is:
Neither

Question 26

Complete

Mark 1.00 out of 1.00

Consider a sequence of independent Bernoulli trials with p = 0.2. After the sixth success occurs, what is the expected number of trials to obtain the seventh success?

a. 35
b. None of the others
c. 5
d. 30
e. 10

The correct answer is: 5

Question 27

Complete

Mark 1.00 out of 1.00

A computer program is tested by 5 independent tests. When there is an error, each of these tests will discover it with probability 0.4.

Suppose that the program contains an error. What is the probability that it will be found by at least one test ?

- a. 0.9875
- b. 0.6
- c. 0.92224
- d. 0.9
- e. None of these

The correct answer is:
0.92224

Question 28

Complete

Mark 1.00 out of 1.00

In a test of a printed circuit board using a random test pattern, an array of 10 bits is equally likely to be 0 or 1. Assume the bits are independent.
What is the probability that exactly 5 bits are 1s and 5 bits are 0s ? Round to 3 decimal places.

- a. 4/7
- b. 0.250
- c. None of these
- d. 0.5
- e. 0.246

The correct answer is:
0.246

Question 29

Complete

Mark 1.00 out of 1.00

Given the probability distribution of a discrete random variable X. Compute $E(X^2)$ and $V(X)$.

X	1	2	3
P(X = x)	0.3	0.3	0.4

- a. 5.1, 0.69
- b. 5.1, 1.3
- c. None of these
- d. 4.1, 0.69
- e. 4.1, 1.3

The correct answer is:
5.1, 0.69

Question 30

Complete

Mark 1.00 out of 1.00

Given $P(A|B) = 0.4$, $P(B) = 0.5$, find $P(A \cap B)$.

- a. 0.6
- b. 0.2
- c. 0.1
- d. 0.8
- e. 0.3

The correct answer is:
0.2

Question 31

Complete

Mark 1.00 out of 1.00

In a NiCd battery, a fully charged cell is composed of nickelic hydroxide. Nickel is an element that has multiple oxidation states. Assume the following proportions of the state.

Nickel Charge	Proportions Found
0	0.17
+2	0.35
+3	0.33
+4	0.15

Determine the mean and variance of the nickel charge.

a. 2.53, 1.89
b. None of the others
c. 2.53, 1.75
d. 2.29, 1.53
e. 2.29, 1.33

The correct answer is: 2.29, 1.53

Question 32

Complete

Mark 1.00 out of 1.00

Among employees of a certain firm, 70% know Python, 60% know Java, and 50% know both languages. If someone knows Java, what is the probability tha he/she knows Python too ?

a. None of these
b. 5/13
c. 5/6
d. 5/7
e. 5/8

The correct answer is:
5/6

Question 33

Complete

Mark 1.00 out of 1.00

Which one is TRUE?

(i) $P(A \mid B) + P(A \mid B') = 1$
(ii) $P(A \mid B) + P(A' \mid B) = 1$

a. (i)
b. None of these
c. Both
d. (ii)
e. None

The correct answer is:
(ii)

Question **34**

Complete

Mark 1.00 out of 1.00

Let the random variable X have a discrete ***uniform distribution*** on the set of integers {5, 6, 7, ..., 20}.
Find the ***mean*** and ***variance*** of X.

- a. E(X) = 10, V(X) = 25
- b. E(X) = 15, V(X) = 25
- c. None of others
- d. E(X) = 12.5, V(X) = 20.5
- e. E(X) = 12.5, V(X) = 21.25

The correct answer is: E(X) = 12.5, V(X) = 21.25

Question 35

Complete

Mark 1.00 out of 1.00

Let the random variable X be a ***Poisson distribution*** with *mean* of 0.8.
Find the probability that X = 1.

- a. 0.412
- b. None of the other choices is correct
- c. 0.257
- d. 0.359
- e. 1.250

The correct answer is: 0.359

Question 36

Complete

Mark 1.00 out of 1.00

Given P(A | B) = 0.6, P(A) = 0.4, and P(B) = 0.2, find P(B | A)

a. None of these
b. 0.2
c. 0.3
d. 0.17
e. 0.1

The correct answer is:
0.3

Question 37

Complete

Mark 1.00 out of 1.00

An array of 30 LED bulbs is used in an automotive light. The probability that a bulb is defective is 0.001 and defective bulbs occur independently. Determine the probability that an automotive light has at least one defective bulb.

a. 0.014
b. None of the others
c. 0.03
d. 0.0296
e. 0.0435

The correct answer is: 0.0296

Question 38

Complete

Mark 1.00 out of 1.00

The number of 113-calls in Hanoi, has a Poisson distribution with a mean of 10 calls per day.
The probability of 5 calls in a day is ___

a. 0.0378

b. 0.0181
c. 0.5
d. None of the other choices is correct
e. 0.0113

The correct answer is: 0.0378

Question 39
Complete
Mark 1.00 out of 1.00

If you had no idea what the answer to this question was, and took a wild guess, what is the probability that you are correct?

a. 0.5
b. 0
c. 0.25
d. 0.75

The correct answer is: 0.25

Question 40

Not answered

Marked out of 1.00

Each multiple-choice question on an exam has four choices. Suppose that there are 50 questions and the choice is selected randomly and independently for each question. Let X denote the number of questions answered correctly.

Find E(X) and V(X).

a. 10, 8
b. 10, 6.5
c. None of the others
d. 12.5, 8.5
e. 12.5, 9.38

The correct answer is: 12.5, 9.38

Question 41

Complete

Mark 1.00 out of 1.00

The probability that an eagle kills a rabbit in a day of hunting is 10%. Assume that results are independent for each day. What is the probability that the first successful hunt occurs on day five ?

- a. 0.066
- b. 0.36
- c. 0.4
- d. 0.5
- e. None of the others

The correct answer is: 0.066

Question 42

Not answered

Marked out of 1.00

An automobile company has three different production sites. 4% of the cars from Site 1, 5% from Site 2, and 6% from Site 3 have been recalled due to a faulty brake system. Suppose that 50% of the cars are produced at Site 1, 30% at Site 2, and 20% at Site 3.

If a randomly selected car has been recalled, what is the probability that it came from Site 1? (Round to 3 decimal places.)

a. 0.255

b. None of these

c. 0.319

d. 0.426

The correct answer is:
0.426

Question 43

Complete

Mark 1.00 out of 1.00

Compute P(A | B) if P(A) = 1/3, P(B) = 1/2 and P(B | A) = 1/4.

a. 1/4
b. 1/6
c. 1/4
d. 1/3
e. None of these

The correct answer is:
1/6

Question **44**

Complete

Mark 1.00 out of 1.00

Assume that each of your calls to a popular radio station has a probability of 0.04 of connecting, that is, of not obtaining a busy signal. Assume that your calls are independent.

What is the probability that your first call that connects is your 12th call?

a. None of the others

b. 0.48

c. 0.0245

d. 0.0255

e. 0.0038

The correct answer is: 0.0255