



بسم الله الرحمن الرحيم
Department of Statistics
& Operations Research
College of Science, King Saud University



STAT 145
First Midterm Exam
First Semester
1431– 1432 H

- Mobile Telephones are not allowed in the classrooms.
- Time allowed is 90 minutes
- Answer all questions.
- Choose the nearest number to your answer.
- WARNING: Do not copy answers from your neighbors. They have different questions forms.
- For each question, put the code of the correct answer in the following table beneath the question number:

1	2	3	4	5	6	7	8	9	10
B	D	B	C	A	D	B	A	B	C

11	12	13	14	15	16	17	18	19	20
C	B	C	B	D	C	D	A	A	D

21	22	23	24	25
B	D	A	C	D

➤ The following table shows the results of a screening test evaluation in which a random sample of 700 subjects with the disease and an independent random sample of 1300 subjects without the disease participated:

	Disease	Present	Absent
Test result			
Positive		500	100
Negative		200	1200

1) The sensitivity value of the test is:

(A) 0.2649	(B) 0.7143	(C) 0.7538	(D) 0.923
------------	------------	------------	-----------

2) The specificity value of the test is:

(A) 0.1	(B) 0.7143	(C) 0.9943	(D) 0.923
---------	------------	------------	-----------

3) If the rate of the disease in the general population is 0.002, then the predictive value positive of the test is:

(A) 0.9748	(B) 0.01827	(C) 0.002	(D) 0.0252
------------	-------------	-----------	------------

4) The probability of false positive of the test is:

(A) 0.0583	(B) 0.2462	(C) 0.0769	(D) 0.2649
------------	------------	------------	------------

➤ 339 patients are classified as given in the table below. A patient is to be selected at random:

	Smoking Habit	Daily	Occasionally	Not at all
Age				
20-29		31	9	7
30-39		110	30	49
40-49		29	21	29
50 +		6	0	18

If a patient is selected at random from this group, then

5) The probability that the patient is aged 40-49 is:

(A) 0.2330	(B) 0.7538	(C) 0.2212	(D) 0.8909
------------	------------	------------	------------

6) The probability that the patient smokes occasionally is:

(A) 0.5524	(B) 0.0619	(C) 0.3512	(D) 0.1770
------------	------------	------------	------------

7) The probability that the patient is aged 40-49 and smokes occasionally is:

(A) 0.220	(B) 0.0619	(C) 0.055	(D) 0.720
-----------	------------	-----------	-----------

- 8) The probability that the selected patient is aged 40-49 given that she/he smokes occasionally is:

(A) 0.35	(B) 0.55	(C) 0.11	(D) 0.25
----------	----------	----------	----------

- 9) The probability that the patient is aged 40-49 or smokes occasionally is:

(A) 0.8903	(B) 0.3481	(C) 0.5901	(D) 0.6652
------------	------------	------------	------------

➤ Some families were selected and the number of children in each family were considered as follows: 5, 8, 0, 8, 3, 7, 8, 9

Then,

- 10) The sample size is:

(A) 9	(B) 6	(C) 8	(D) 5
-------	-------	-------	-------

- 11) The sample mode is:

(A) 9	(B) 0	(C) 8	(D) No mode
-------	-------	-------	-------------

- 12) The sample mean is:

(A) 48	(B) 6	(C) 8	(D) 0
--------	-------	-------	-------

- 13) The sample variance is:

(A) 2.915	(B) 8.5	(C) 9.714	(D) 3.117
-----------	---------	-----------	-----------

- 14) The sample median is:

(A) 5.5	(B) 7.5	(C) 8	(D) 7
---------	---------	-------	-------

- 15) The range of data is:

(A) 8	(B) 0	(C) 3	(D) 9
-------	-------	-------	-------

- 16) The sample coefficient of variation is:

(A) 5.5	(B) 8	(C) 0.52	(D) 7
---------	-------	----------	-------

➤ If the probability to have cold in winter is 0.3, and if 5 random persons were tested and the variable Y = number of persons in the sample who had cold in winter, then:

17) The probability that exactly one person has cold is:

(A) 0.2592	(B) 1/5	(C) 0.4	(D) 0.3602
------------	---------	---------	------------

18) The probability $P(Y \leq 1)$ is:

(A) 0.5283	(B) 0.2592	(C) 0.33696	(D) 0.6
------------	------------	-------------	---------

19) The mean number of persons in the sample who had cold is:

(A) 1.5	(B) 3	(C) 0.75	(D) 5
---------	-------	----------	-------

20) The variance of the number of persons in the sample who had cold is:

(A) 5	(B) 0.21	(C) 1.5	(D) 1.05
-------	----------	---------	----------

➤ Suppose that the variable Y = Number of serious injuries in a given factory in a month. Suppose Y has Poisson distribution with rate 1.5 injuries in a month, then:

21) The probability that two serious injuries in next month will occur equal to:

(A) 0.1607	(B) 0.251	(C) 0.75	(D) 0.5
------------	-----------	----------	---------

22) The probability that 5 serious injuries in next two months will occur equal to

(A) 0.3214	(B) .567	(C) 0.01412	(D) 0.1008
------------	----------	-------------	------------

➤ Consider the probability distribution function of the random variable Y as follows:

Y	-1	1	2	3
$P(Y=y)$	2/12	6/12	C	1/12

Then,

23) The probability $P(Y < 1)$ equal to:

(A) 0.167	(B) 0.667	(C) 0.25	(D) 0
-----------	-----------	----------	-------

24) The value of the constant C is:

(A) 1	(B) 0.667	(C) 0.25	(D) 4
-------	-----------	----------	-------

25) The probability $P(Y > 2)$ is:

(A) 0.25	(B) 1	(C) 0.167	(D) 0.083
----------	-------	-----------	-----------

Good Luck