

King Saud University  
College of Science  
Department of Statistics & Operations Research



STAT 145  
Mid-Term I Examination  
Second Semester  
1431/32

Student Name			
Student Number:		Section Number:	
Teacher Name:		Serial Number:	

- » Mobile Telephones are not allowed in the classrooms
- » Time allowed is 1 and 1/2 hour
- » Attempt all questions
- » Choose the nearest number to your answer
- » 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
C	A	D	A	C	A	B	D	C	B

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

21	22	23	24
C	B	B	C

Use the following table to answer questions (1 – 4)

A random sample of 1000 mothers from some health centre was investigated. The following table cross-tabulates the counts of mothers in the classifications of whether the baby was premature or not and whether the mother admitted to smoking during pregnancy (SMOKE) or not.

	Not- Premature	Premature	Total
Smoke	220	86	306
Not-Smoke	580	114	694
Total	800	200	1000

- 1) The probability that a mother selected at random in this sample admitted to smoking is  
 A) 0.220                      B) 0.86                      C) 0.306                      D) 0.275
- 2) The probability that a mother selected at random in this sample had a premature baby is  
 A) 0.2                      B) 0.86                      C) 0.43                      D) 0.281
- 3) The probability that a mother in this sample had a premature baby given that the mother admit to smoking is  
 A) 0.86                      B) 0.43                      C) 0.200                      D) 0.281
- 4) The probability that a mother selected at random in this sample had a premature baby or that the mother did not admit to smoking is  
 A) 0.780                      B) 0.200                      C) 0.694                      D) 0.894

Use the following data to answer questions (5 – 10)

The data below presents the heart rate of seven rat pups from the experiment involving the carotid artery.

500 570 560 570 450 560 570

- 5) The mean of this data is:  
 A) 560                      B) 500                      C) 540                      D) 570
- 6) The median in this data is:  
 A) 560                      B) 500                      C) 540                      D) 570
- 7) The mode of this data is:  
 A) 550                      B) 570                      C) 70                      D) 120
- 8) The range of this data is:  
 A) 550                      B) 570                      C) 70                      D) 120
- 9) The variance of this data is:  
 A) 1250                      B) 2500                      C) 2200                      D) 1890

10) The coefficient of variation of this data is:

- A) 11.51 %      B) 8.69 %      C) 4.07 %      D) 4.67 %

Use the following information to answer questions (11 – 14)

	Exhibit Symptom $D$	Does not Exhibit Symptom $\bar{D}$	Total
Positive $T$	495	12	507
Negative $\bar{T}$	25	868	893
Total	520	880	1400

11) The sensitivity of the symptom is

- A) 0.952      B) 0.495      C) 0.976      D) 0.356

12) The specificity of the symptom is

- A) 0.986      B) 0.148      C) 0.972      D) 0.625

13) Suppose it is known that the rate of the disease in the general population is 0.05. the predictive value positive of the symptom is

- A) 0.05      B) 0.491      C) 0.782  
D) 0.986

14) The predictive value negative of the symptom is

- A) 0.997      B) 0.954      C) 0.509      D) 0.052

15) A false positive indicates

- A) Given the subject has the disease, the test result is positive ( $T \mid D$ )  
B) Given the subject has the disease, the test result is negative ( $\bar{T} \mid D$ )  
C) Given the subject does not have the disease, the test result is positive ( $T \mid \bar{D}$ )  
D) Given the subject does not have the disease, the test result is negative ( $\bar{T} \mid \bar{D}$ )

16) If A and B are two mutually exclusive events(disjoint) then

- A)  $P(A \cap B) = P(A)P(B)$       B)  $P(A \mid B) = P(A)$   
C)  $P(A \cup B) = P(A) + P(B)$       D)  $P(A \cup B) = 1$

17) If  $P(A) = 0.2$ ,  $P(B) = 0.5$  and  $P(A \cap B) = 0.1$  then  $P(A \mid B) =$

- A) 0.5      B) 0.4      C) 0.2      D) 1.0

- 18) If the probability of left-handedness in a certain group is 0.07, the probability of right-handedness (assuming no ambidexterity) is

A) 0.07                      B) 0.93                      C) 0.00                      D) 1.00

- 19) The probability that a person selected from a population will have the classic symptom of a certain disease is 0.2, and the probability that a person selected at random has the disease is 0.23. The probability that a person has the symptom and also has the disease is 0.18. Given a person selected at random from this population does not have the symptom the probability that the person has the disease is

A) 0.0460                      B) 0.0360                      C) 0.0625                      D) 0.0420

- 20) Consider the following table for age and smoking habit of 200 teenagers.

Age group		A None Smoker	B Moderate Smoker	C Heavy Smoker
D	10-12	0	40	60
E	15-18	10	40	50

- From the above table, we can say that the event A and D are  
A) mutually exclusive(disjoint)    B)  $A^C = D$     C) independent    D)  $A = D^C$

Use the following table to answer questions (21 – 24)

No.	Classes	Frequency	Relative Frequency %
1	7.5 – 9.5	1	0.61
2	9.5 – 11.5	1	0.61
3	11.5 – 13.5	$x$	3.03
4	13.5 – 15.5	17	10.30
5	15.5 – 17.5	49	29.70
6	17.5 – 19.5	60	$y$
7	19.5 – 21.5	27	16.36
8	21.5 – 23.5	5	3.03
	Total	165	100.00

- 21) The value of  $x$  is:

A) 3                      B) 10                      C) 5                      D) 8

- 22) The value of  $y$  is:

A) 15.75                      B) 36.36                      C) 12.55                      D) 46.32

- 23) The mid-class(mid -point) of the second class is:

A) 9.5                      B) 10.5                      C) 9                      D) 8.5

- 24) The percentage of measurements that are less than 15.5 is:

A) 10.30 %                      B) 36.36 %                      C) 14.55 %                      D) 1.21 %