

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

Summer-term 1425/1426 Stat- 106 (Biostatistics)
Final Exam Time: 3 hours Total 50 Marks

Student name:

Student number:

1		10		19		28	
2		11		20		29	
3		12		21		30	
4		13		22		31	
5		14		23		32	
6		15		24		33	
7		16		25		34	
8		17		26			
9		18		27			

Choose one of the four answers for each of the 34 questions and put it next to the question number in the front page. All figures are **rounded to four** decimal places

QUESTION #1

Use the information in the following table to answer (1) - (5)

X	3	5	8	12
Frequency	20	50	10	20

(1) The sample mean of X is

- (A) 6.3 (B) 36 (C) 12.8571 (D) Non of these

(2) The sample range of X is

- (A) 9 (B) 40 (C) 180 (D) Non of these

(3) The sample mode of X is

- (A) 6.5 (B) 5 (C) 55 (D) Non of these

(4) The sample coefficient of variation of X is

- (A) 3.1479 (B) 5.1479 (C) 4.1479 (D) Non of these

(5) If X is multiplied by 2, then the mode will

- (A) Increase by 2 (B) Increase by 5 (C) Not change (D) Non of these

QUESTION #2

The following table gives the ages, in years, of a sample of 30 people.

Age(years)	Frequency
15 – 19	4
20 – 24	6
25 – 29	8
30 – 34	9
35 – 39	3
Total	30

Use the table to answer (6) - (8)

(6) The mean age is

- (A) 28.2870 (B) 24.395 (C) 27.1667 (D) Non of these

(7) The sample variance is

- (A) 37.0384 (B) 39.5 (C) 40.044 (D) Non of these

(8) The coefficient of variation

- (A) 5.4091 (B) 4.4639 (C) 6.1258 (D) Non of these

QUESTION #3

Let A and B be two events in a random experiment such that

$P(A \cap \bar{B}) = 0.4$, $P(B \cap \bar{A}) = 0.1$ and $P(\bar{A} \cap \bar{B}) = 0.6$. Use this information to answer (9)-(11)

(9) $P(\bar{A})$ is

- (A) 0.25 (B) 0.4 (C) 0.2 (D) Non of these

(10) $P(\bar{A} \cup B)$ is

- (A) 0.55 (B) 0.6 (C) 0.38 (D) Non of these

(11) $P(B | \bar{A})$ is

- (A) 0.212 (B) 0.5 (C) 0.24 (D) Non of these

QUESTION #4

A random variable takes the values 1, 2, 3, where $P(X = 1) = 0.5$ and $\mu = 1.7$, then

(12) $P(X = 3)$ is

- (A) 0.3 (B) 0.9 (C) 0.2 (D) Non of these

(13) Variance of X is

- (A) 0.521 (B) 0.1111 (C) 0.61 (D) Non of these

(14) $P(0 \leq X < 1)$ is

- (A) 0 (B) 0.5 (C) 0.1 (D) Non of these

QUESTION #5

A hospital employs 75% of males and 25% of females. The pediatric clinic in the hospital provides jobs for 12% of the males and 20% of the females.

(15) If an employee is chosen at random (using his/her ID #), then the probability that he is from the pediatric clinic is

- (A) 0.14 (B) 0.12 (C) 0.258 (D) Non of these

(16) If the chosen employee (using his/her ID #) , is from the pediatric clinic, then the probability that he is a male is

- (A) 0.3854 (B) 0.9111 (C) 0.375 (D) Non of these

(17) The probability that the chosen person is a female from other clinics is

- (A) 0.05 (B) 0.599 (C) 0.2774 (D) Non of these

QUESTION #6

The probability that a certain X-ray machine produces a defective X-ray is 0.20. Six X-rays are selected at random from a large number of X-rays produced by the X-ray machine. Let Y denote the number of defective X-rays from the sample. Use this information to answer (18) – (20).

(18) $P(Y \leq 2)$ is

- (A) 0.8011 (B) 0.9011 (C) 0.0887 (D) Non of these

(19) The expected number of the defective X-rays is

- (A) 1.2 (B) 1 (C) 2 (D) Non of these

(20) $P(\mu - \sigma \leq Y < \mu + \sigma)$

- (A) 0.6390 (B) 0.5287 (C) 0.2150 (D) Non of these

QUESTION #7

Suppose that the human breaths per minute X for adult are normally distributed with mean 16 and standard derivation 4. If an adult is chosen at random, the probability that X will be

(21) More than 20

- (A) 0.2547 (B) 0.1587 (C) 0.2488 (D) Non of these

(22) At most 18 is

- (A) 0.2547 (B) 0.987 (C) 0.6915 (D) Non of these

(23) Between 14 and 20 is

- (A) 0.2634 (B) 0.5328 (C) 0.2178 (D) Non of these

QUESTION #8

Suppose that the number X of cases visiting the emergency clinic (E-clinic) at KKUH is four cases per hour. By assuming Poisson ($\lambda = 4$) distribution, then

(24) $P(X > 3)$ is

- (A) 0.2149 (B) 0.7619 (C) 0.2158 (D) Non of these

(25) $P(1 \leq X < 3)$ is

- (A) 0.587 (B) 0.2789 (C) 0.2198 (D) Non of these

(26) The standard deviation of the number of cases visiting the E-clinic is

- (A) 1.521 (B) 2 (C) 3 (D) Non of these

(27) The expected number of cases visiting the E-clinic in 48 hours is

- (A) 192 (B) 24 (C) 51 (D) Non of these

QUESTION #9

In a study of the effects of a diuretic, 30 healthy adult males were given single doses of the drug and were closely monitored to determine their urinary output over the next 24 hours. The sample mean urinary output was 3300 milliliters and the sample standard deviation was 500 milliliters. The population mean of urinary output is μ . Use this information to answer (28) – (30).

- (28) The point estimate for μ is
- (A) 3300 (B) 3158 (C) 6.645 (D) Non of these
- (29) An upper limit of a 95% confidence interval for μ is:
- (A) 4.258 (B) 2487.254 (C) 3478.923 (D) Non of these
- (30) A lower limit of a 95% confidence interval for μ is:
- (A) -3121.0077 (B) 2131.0077 (C) 3121.077 (D) Non of these

QUESTION #10

In a study of the incidence of back pains for men aged 50 and over in a certain city, it was found that 20 out of 400 men selected, have back pains. The proportion of men aged 50 and over in the city with back pains is π . Use this information to answer (31) – (34).

- (31) The point estimate for π is
- (A) 0.08 (B) 0.05 (C) 0.8 (D) Non of these
- (32) An upper limit of a 90% confidence interval for π is:
- (A) 0.3547 (B) 0.0679 (C) 0.578 (D) Non of these
- (33) A lower limit of a 90% confidence interval for π is:
- (A) 0.0321 (B) 1.87 (C) -0.2544 (D) Non of these
- (34) When the confidence level increases, then the width of the confidence interval for π
- (A) increases (B) decreases (C) Does not change (D) Non of these