

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



Second-term 1424/1425
First Mid-term Exam

STAT 106
Time: 2 hours

Total 20 Marks

Student name: _____

Student number: _____

Class Serial number (_____)

Instructor: Dr. _____

Section Number: _____

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

21	22	23	24	25	26	27	28	29	30

Note: There are 30 multiple choice questions. Each question carries equal marks.

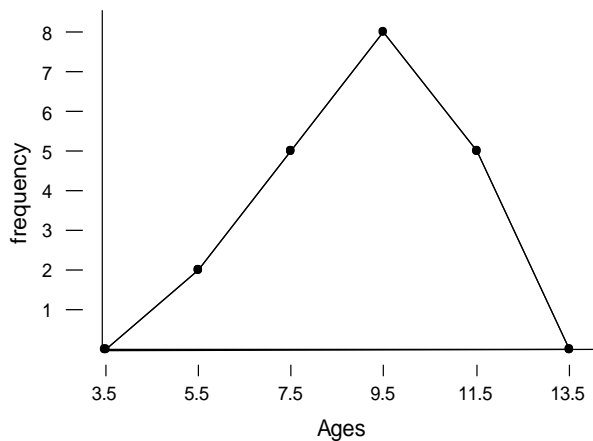
After you finish, put your answers very carefully on this cover page.

Do not remove the cover page. Your exam will be evaluated from answers given on the cover page only.

For each question, **choose the correct answer** among the given choices.

Some questions require calculations, some needs careful considerations of different available choices.

1) Consider the following frequency polygon of ages of students in a certain school.



The frequency distribution corresponding to above polygon is

(a)

Mid point	5.5	7.5	9.5	11.5
frequency	2	5	8	5

(b)

Age	4.5- 6.5	6.5-8.5	8.5- 10.5	10.5 -12.5	12.5- 14.5
frequency	2	5	8	4	1

(c)

Age	3.5- 5.5	5.5- 7.5	7.5-9.5	9.5- 11.5	11.5 -13.5
frequency	2	5	7	8	5

(d)

Mid point	3.5	5.5	7.5	9.5	11.5
frequency	2	5	8	5	0

(e) None is correct

The frequency distribution of Ages of 20 students in a certain school are given in the following table.

Age	5 – 6	7 - 8	9 - 10	11 - 12	13 - 14
frequency	2	5	8	4	1

Consider the graphs of data given below:

Figure 1

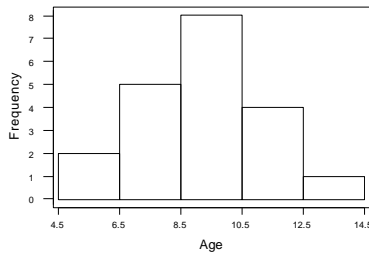


Figure 2

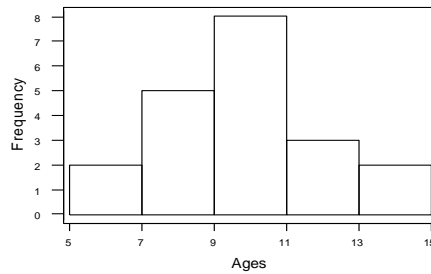


Figure 3

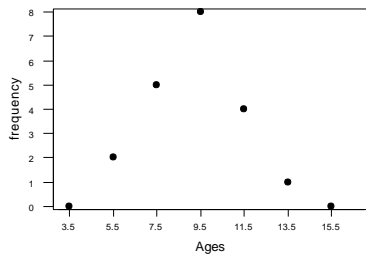
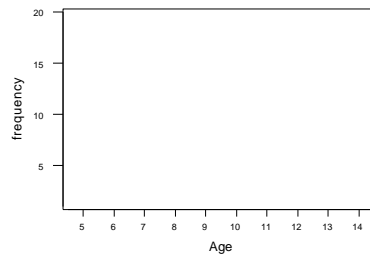


Figure 4



- 2) The frequency histogram for ages of students is represented by
 (a) Figure 1 (b) Figure 3 (c) Figure 2 (d) Figure 4 (e) None is correct
- 3) Frequency curve of ages of students is represented by
 (a) Figure 1 (b) Figure 3 (c) Figure 2 (d) Figure 4 (e) None is correct
- 4) Cumulative relative frequency for heights of students is
 (a) Figure 1 (b) Figure 4 (c) Figure 3 (d) Figure 2 (e) None is correct

Following table shows the weight loss (kg) of a sample of 40 healthy adults who fasted in Ramadan.

Class interval	Frequency	Cumulative Frequency
1.20 - 1.29	2	K
1.30 - 1.39	6	8
1.40 - 1.49	10	18
1.50 - 1.59	16	34
1.60 - 1.69	6	40

5) The value of the missing cumulative frequency K is
 (a) 0 (b) 6 (c) 2 (d) 1.20 (e) None is correct

6) The percentage of adults losing weight less than or equal to 1.59 kg is
 (a) 45% (b) 80% (c) 40% (d) 85% (e) None is correct

For a sample of 30 Saudi men aged 20-24, the hemoglobin levels are measured as “Below normal”, “Normal”, or “Above normal”.

7) In this study, the variable is
 (a) the Saudi man aged 20-24 (b) measure of the hemoglobin level
 (c) the number of Saudi men (d) the age of a Saudi man (e) None is correct

8) The type of the variable is
 (a) Discrete (b) Quantitative (c) Continuous (d) Qualitative (e) None is correct

9) For the sample observations: 0.3, 0.7, 0.5, 1.1 and 0.4, the sample mean is:
 (a) 0.8 (b) 0.5 (c) 0.9 (d) 0.6 (e) None is correct

10) For the sample observations: 0.2, 3.0, 0.5, 2.0, 1.0 and 0.8, the sample median is:
 (a) 0.5 (b) 0.6 (c) 0.3 (d) 0.9 (e) None is correct

11) For the sample observations: 0.3 , 0.5 , 0.6 , 1.0 , 0.5 , 2.0 and 0.5, the sample mode is:
 (a) 0.6 (b) 0.5 (c) 2.0 (d) 0.9 (e) None is correct

12) If for a certain sample we have $\Sigma X^2 = 9.8$, $\Sigma X = 3$, $n = 5$
 then the sample variance is
 (a) 1.8 (b) 2.0 (c) 1.6 (d) 1.44 (e) None is correct

13) Consider the data given in the table below:

X	2	5
Frequency	8	4

The sample mean of X is

- (a) 3.5 (b) 18.0 (c) 3.0 (d) 6.0 (e) None is correct

14) Consider the data given in the table below:

X	0	1	2
Frequency	4	1	4

The sample variance of above data is

- (a) 8.5 (b) 1.0 (c) 0.889 (d) 0.667 (e) None is correct

15) Suppose for a data, we have the sample mean equal to 9.0 and the sample variance of 20.25 then the coefficient of variation of the data is

- (a) 200% (b) 225% (c) 50% (d) 44.444% (e) None is correct

16) The range of the data: 4, -10, 6, 10, 9 is

- (a) 20 (b) 0 (c) 6 (d) 5 (e) None is correct

17) Data set A has a coefficient variation of 50% while data set B has the coefficient of variation of 200% . Which of the following statement is true?

- (a) Both sets of data are equally variable.
(b) Data set A is more variable than the data set B.
(c) We cannot compare the variation of two data sets based on given information.
(d) Data set B is more variable than the data set A.
(e) None is correct

18) Let A and B be events defined on the same sample space such that

$$P(A \cap B^c) = 0.5, P(A \cap B) = 0.2 \text{ and } P(A^c \cap B^c) = 0.1.$$

Then $P(A) =$

- (a) 0.7 (b) 0.4 (c) 0.2 (d) 0.3 (e) None is correct

19) Let $P(A) = 0.4, P(B) = 0.7, P(A^c \cap B^c) = 0.1$, then

$$P(A \cup B) =$$

- (a) 0.9 (b) 0.6 (c) 0.8 (d) 0.5 (e) None is correct

20) Following table shows 80 patients classified by sex and blood group.

Sex	Blood Group		
	A	B	O
Male (M)	25	17	15
Female (F)	11	9	3

The probability that a patient selected randomly is a male and has blood group A is

- (a) $25/36$ (b) $25/57$ (c) $25/80$ (d) $52/80$ (e) None is correct

21) For the table given in Q.20, the probability that the patient is a female is

- (a) $6/80$ (b) $40/80$ (c) $23/80$ (d) $22/80$ (e) None is correct

22) In a certain population, 4% have cancer, 20% are smokers and 2% are both smokers and have cancer. If a person is chosen at random from the population, find the probability that the person chosen is a smoker and has cancer.

- (a) 0.02 (b) 0.24 (c) 0.2 (d) 0.22 (e) None is correct

23) Consider that three babies were born in a hospital. If we assume that a baby is equally likely to be a boy or a girl then find the probability that at least two babies were born.

- (a) $3/8$ (b) $4/8$ (c) $2/3$ (d) $1/8$ (e) None is correct

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

- (a) 0.5 (b) 5.0 (c) 0.2 (d) 1.0 (e) None is correct

25) If $P(A) = 0.2$, $P(B) = 0.5$ and that A and B are disjoint (mutually exclusive) then $P(A | B) =$

- (a) 0.2 (b) 0.0 (c) 0.4 (d) 0.5 (e) None is correct

- 26) If $P(A) = 0.2$ and $P(B | A) = 0.4$ then $P(A \cap B) =$
 (a) 0.2 (b) 0.08 (c) 0.5 (d) 4.0 (e) None is correct
- 27) Suppose that the probability a patient smokes is 0.20. If the probability that the patient smokes and has a lung cancer is 0.15, then the probability that the patient has a lung cancer given that the patient smokes is
 (a) 0.25 (b) 0.75 (c) 0.2 (d) 1.33 (e) None is correct
- 28) If events A and B are independent with $P(A) = 0.4$ and $P(B) = 0.5$, then $P(A \cap B) =$
 (a) 0.4 (b) 0.5 (c) 0.2 (d) 0.9 (e) None is correct
- 29) Consider the following table for age and smoking habit of 200 teenagers.

Age Group		A	B	C
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 (b) $A^c = D$ (c) independent (d) $A = D^c$ (e) None is correct
- 30) A set of all possible out comes of a random experiment is called a
 (a) population (b) sample (c) sample space (d) population space (e) None is correct