

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

Name of Student: \_\_\_\_\_ Student's Number: \_\_\_\_\_

Teacher's name: Dr. \_\_\_\_\_ Section number: \_\_\_\_\_

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|----------|----------|----------|----------|----------|----------|
| <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> |
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|----------|----------|----------|-----------|-----------|-----------|
| <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> |
|          |          |          |           |           |           |

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|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>13</b> | <b>14</b> | <b>15</b> | <b>16</b> | <b>17</b> | <b>18</b> |
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|           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>19</b> | <b>20</b> | <b>21</b> | <b>22</b> | <b>23</b> | <b>24</b> |
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|                    |  |
|--------------------|--|
| Marks for the term |  |
|--------------------|--|

- ▶▶ Mobile Telephones are not allowed in the classrooms
- ▶▶ Time allowed is 1 and 1/2 hours
- ▶▶ Attempt all questions
- ▶▶ Choose the nearest number to your answer
- ▶▶ For each question, put the code of the correct answer in the above table under the question number

**Q1-** The following information has been collected from 75 patients who visited the diabetic clinic in Riyadh:

| Age (years) | Frequency | Relative Frequency | Cumulative Frequency |
|-------------|-----------|--------------------|----------------------|
| 05 - 14     | 6         | 0.08               | 6                    |
| 15 - 24     | 9         | <b>X</b>           | 15                   |
| 25 - 34     | <b>Y</b>  | 0.24               | 33                   |
| 35 - 44     | 24        | 0.32               | 57                   |
| 45 - 54     | 15        | 0.20               | <b>Z</b>             |
| 55 - 64     | 3         | 0.04               | 75                   |

1- the value of **X** is :

- A) 0.12                      B) 0.20                      C) 9                      D) 12

2- the value of **Y** is :

- A) 0.18                      B) 0.20                      C) 18                      D) 12

3- the value of **Z** is :

- A) 80                      B) 0.20                      C) 0.72                      D) 72

4- If the ages have mean=35.1 and standard deviation = 12.76, then the coefficient of variation (*C.V* ) of the ages is :

- A) 0.765                      B) 36.35%                      C) 162.82                      D) 12.76

5- the unit of the *C.V* of age is :

- A) Year                      B) kg                      C) No unit                      D) None

6- If the *C.V* of the patient weight is 27.5%, then:

- A) Age has more variability                      B) Weight has more variability  
C) Both have the same variability                      D) None

**Q2-** If one person is selected randomly from a set of 75 persons which are classified according to three categories of ages and three categories of weights:

|                              | Slim ( <i>S</i> ) | Normal ( <i>N</i> ) | Fat ( <i>F</i> ) |           |
|------------------------------|-------------------|---------------------|------------------|-----------|
| (05 – 24) year ( <i>A1</i> ) | 15                | 10                  | 2                | <b>27</b> |
| (25 – 44) year ( <i>A2</i> ) | 10                | 12                  | 3                | <b>25</b> |
| (45 – 64) year ( <i>A3</i> ) | 7                 | 11                  | 5                | <b>23</b> |
|                              | <b>32</b>         | <b>33</b>           | <b>10</b>        | <b>75</b> |

7- The probability  $P( A1 \cup N )$  is:

- A) 4/5                      B) 2/3                      C) 2/15                      D) 72

8- The probability  $P( A1 | N )$  is:

- A) 10/27                      B) 10/75                      C) 10/33                      D) None

9- The probability  $P( \bar{N} )$  is

- A) 13/75                      B) 12/75                      C) 11/25                      D) 14/25

10- The events *A1* and *N* are:

- A) Independent                      B) Dependent                      C) Disjoint                      D) None

11- The events *S* and *F* are:

- A) Mutually exclusive (Disjoint)                      B) Not Disjoint  
 C) Independent    D) None

12- The probability  $P(S \cup F)$  is:

- A) 14/25                      B) 2/3                      C) 1/3                      D) 11/25

**Q3- the weights to nearest kg of 7 patients are: 16, 10, 9, 46, 15, 16, 10:**

13- the median of weight is:

- A) 10                      B) 15                      C) 19.1                      D) 46

14- the mean of weight is:

- A) 10                      B) 15                      C) 19.1                      D) 17.43

15- this data has:

- A) One mode                      B) Two modes                      C) Three modes                      D) No mode

16- for this data, the best of center measure is:

- A) The mode                      B) The median                      C) The mean                      D) None

17- The range of this data is:

- A) 7                      B) -6                      C) 6                      D) 37

18- The standard deviation of this data is:

- A) 167.95                      B) 12.96                      C) 17.43                      D) 12.0

**Q4- In order to check the reliability of a given Lab in Riyadh, suppose a sample with diabetic disease ( $D$ ) and another without disease ( $\bar{D}$ ) had the Lab tests and the results are as given below:**

|                        | Present ( $D$ ) | Absence ( $\bar{D}$ ) |
|------------------------|-----------------|-----------------------|
| Positive ( $T$ )       | 630             | 15                    |
| Negative ( $\bar{T}$ ) | 20              | 335                   |

**Use this data to answer the questions:**

19- The probability of false positive result is:

- A) 3/70                      B) 7/20                      C) 2/65                      D) 7/200

20- The probability of false negative result is:

- A) 3/70                      B) 7/20                      C) 2/65                      D) 7/200

21- The sensitivity of the test is:

- A) 67/70                      B) 3/70                      C) 2/65                      D) 63/65

22- The specificity of the test is:

- A) 67/70                      B) 3/70                      C) 2/65                      D) 63/65

**If the true Diabetic percentage in Riyadh is 20%, then:**

23- The predictive value positive of the test is:

- A) 0.977                      B) 0.85                      C) 0.944                      D) 0.992

24- The predictive value negative of the test is:

- A) 0.977                      B) 0.85                      C) 0.944                      D) 0.992